

DRAFT

BASIN MANAGEMENT ACTION PLAN

**for the Implementation of Total Daily Maximum Loads for Fecal
Coliform Adopted by the Florida Department of Environmental
Protection**

in the

Lower St. Johns River Basin Tributaries

developed by the
Lower St. Johns River Tributaries Basin Working Group

in cooperation with the
Florida Department of Environmental Protection
Division of Environmental Assessment and Restoration
Bureau of Watershed Restoration
Tallahassee, Florida 32399

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LIST OF ACRONYMS

ARV	Air Release Valve
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BWG	Basin Working Group
CAFO	Concentrated Animal Feeding Operation
CARE	Citizen Action Response Effort
CIP	Capital Improvement Plan
CIPP	Cured In Place Pipe
CMOM	Capacity, Management, Operations, and Maintenance
COJ	City of Jacksonville
DCHD	Duval County Health Department
DCP	Drainage Connection Permit [Program]
EPA	U.S. Environmental Protection Agency
EPB	Environmental Protection Board
EQD	Environmental Quality Division
ETM	England-Thims and Miller
F.A.C.	Florida Administrative Code
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
FEHA	Florida Environmental Health Association
FOG	Fats, Oils, and Grease
FOWA	Florida Onsite Wastewater Association
F.S.	Florida Statutes
FWRA	Florida Watershed Restoration Act
FY	Fiscal Year
GIS	Geographic Information System
HDPE	High Density Polyethylene
IMZ	Industrial/Manufacturing Zone
IP	Industrial Pretreatment
IWR	Impaired Surface Waters Rule
LF	Linear Feet
LSJR	Lower St. Johns River
MF	Membrane Filter
MGD	Million Gallons Per Day
M/H	Manhole
mL	Milliliter
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
MSGP	Multi-Sector General Stormwater Permit
MST	Microbial Source Tracking
NHD	National Hydrography Dataset

LIST OF ACRONYMS

NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NS	Naval Station
OSTDS	Onsite Sewage Treatment and Disposal System
PBS&J	Post, Buckley, Schuh & Jernigan
PBTS	Performance-Based Treatment and Disposal System
PIC	Potential Illicit Connection
PSA	Public Service Announcement
PVC	Polyvinyl Chloride
PWD	Public Works Department
QA/QC	Quality Assurance/Quality Control
SCADA	Supervisory Control and Data Acquisition
SCS	U.S. Soil Conservation Service
SJRWMD	St. Johns River Water Management District
SOP	Standard Operating Procedure
SSO	Sanitary Sewer Overflow
SWIM	Surface Water Improvement and Management
SWMP	Stormwater Management Program
TAT	Tributary Assessment Team
TMDL	Total Maximum Daily Load
USF	University of South Florida
UV	Ultraviolet
WAV	Watershed Action Volunteer
WBID	Waterbody Identification
WSEA	Water and Sewer Expansion Authority
WWTF	Wastewater Treatment Facility

EXECUTIVE SUMMARY

TRIBUTARIES OF THE LOWER ST. JOHNS RIVER BASIN

The 15 tributaries discussed in this Basin Management Action Plan (BMAP) occupy approximately 3% or 78 square miles of the Lower St. Johns River (LSJR) Basin. The urban planning units are streams in the Duval County area, which include Trout River, Ortega River, North Mainstem, South Mainstem, Julington Creek, and Intracoastal Waterway. The water quality of these streams is affected by urbanization. At least part of the drainage from these tributaries flows through urban Jacksonville and many are tidally influenced for substantial distances.

TOTAL MAXIMUM DAILY LOADS

Total Maximum Daily Loads (TMDLs) are water quality targets for specific pollutants (such as fecal coliform) that are established for impaired waterbodies that do not meet their designated uses based on Florida water quality standards. The Florida Department of Environmental Protection (FDEP) has identified 75 tributaries in the LSJR Basin that have verified fecal coliform impairments.

In 2006, FDEP adopted TMDLs for the following waterbodies included in the BMAP:

- *Williamson Creek*
- *Wills Branch*
- *Moncrief Creek*

FDEP then adopted additional TMDLs for the BMAP in 2009 for the following waterbodies:

- *McCoy Creek*
- *Pottsburg Creek*
- *Deep Bottom Creek*
- *Trout River (WBID 2203)*
- *Blockhouse Creek*
- *Trout River (WBID 2203A)*
- *Sherman Creek*

The remaining TMDLs for the BMAP WBIDs were adopted in 2010:

- *Craig Creek*
- *Cormorant Branch*
- *Fishing Creek*
- *Greenfield Creek*
- *Hopkins Branch*

THE LOWER ST. JOHNS RIVER TRIBUTARIES BASIN MANAGEMENT ACTION PLAN

This BMAP is the second BMAP for the LSJR tributaries that are impaired for fecal coliform. The BMAP addresses 15 of the 75 tributaries that were identified as some of the worst-case waterbody identification (WBID) numbers, based on a ranking method establishing the severity of bacterial contamination. The projects and activities outlined in this BMAP are sufficient to address all of the identified sources and, with full implementation of this BMAP, the 15 WBIDs are expected to meet the TMDL requirements. Through ongoing studies, 5 year BMAP milestone evaluation, and annual reviews any additional sources can be identified and addressed.

BMAP BASIN WORKING GROUP MEMBERSHIP

FDEP worked with the Basin Working Group (BWG) to prepare this BMAP. The BWG members represent the following groups and organizations:

- *City of Atlantic Beach*
- *City of Jacksonville*
- *City of Jacksonville Beach (COJ)*
- *City of Neptune Beach*
- *Duval County Department of Health (DCHD)*
- *Florida Department of Transportation (FDOT)*
- *JEA*
- *Naval Station (NS) Mayport*
- *Environmental Interests*

BMAP APPROACH

This BMAP provides for phased implementation pursuant to Section 403.067(7)(a)1, Florida Statutes (F.S.). The adaptive management approach for TMDL implementation described in this BMAP will address fecal coliform bacteria reductions and the iterative evaluation process will continue until attainment of the TMDL. The phased BMAP approach allows for implementation of projects designed to achieve reductions while simultaneously implementing source assessment, monitoring, and conducting studies to better understand fecal coliform variability and water quality dynamics in each impaired waterbody.

A 5-year milestone in this BMAP will assess and verify that adequate progress is being made towards achieving the TMDLs. During the 5th year following the BMAP adoption (2015), the water quality data will be evaluated for in-stream reductions of fecal coliform levels within each WBID. By this year, the median value for the fecal coliform counts in the first 4 years of BMAP implementation should be 50% of the median expressed in the TMDL in each WBID. If this 50% reduction is not achieved by the time of this Year 5 analysis, additional efforts may be required. Achieving 50% of the required reductions will be an important milestone for this BMAP and will provide an opportunity to improve source assessment and management measures going forward.

SUFFICIENCY OF EFFORT EVALUATION

The tributary fecal coliform TMDLs are expressed as a percent reduction based on in-stream fecal coliform concentrations. This method of TMDL allocation prevents detailed allocations, as it is complicated to equitably allocate to stakeholders based on a percent reduction of in-stream concentration. Fecal coliform can be highly variable and easily transported, which makes it difficult, in many cases, to identify the source of the bacteria. Additionally, there are nearly no data that show the efficiency of stormwater BMPs and management actions in removing or reducing fecal coliforms.

FDEP evaluated fecal coliform reduction activities using a “sufficiency of effort” approach, which is a WBID-specific assessment of the identified potential sources and the specific activities that reduce or eliminate sources of fecal coliform loading. This sufficiency of effort evaluation is not an assessment of each entity’s individual activities; rather, the focus is whether the submitted activities corresponded to the potential sources identified in the WBID and whether the total efforts were adequate to eliminate the known sources, assess unknown sources, and prevent the development of new sources. If any of the likely sources were insufficiently addressed, FDEP identified the need for additional actions, which were added to the responsible entity’s project table for that WBID. The sum of the actions in this BMAP is sufficient to address the

potential sources, based upon the information available. Additional actions may be necessary in the next cycle if reductions do not occur as expected.

KEY ELEMENTS OF THE BMAP

This BMAP addresses the key elements required by the Florida Watershed Restoration Act (FWRA), Chapter 403.067, Florida Statutes (F.S.), including the following:

- *Document how the public and other stakeholders were encouraged to participate or participated in developing the BMAP (**Section 1.3.1 and Appendix C**);*
- *Equitably allocate pollutant reductions in the basin (**Section 1.3.4**);*
- *Identify the mechanisms by which potential future increases in pollutant loading will be addressed (**Section 1.5**);*
- *Document management actions/projects to achieve the TMDLs (**Chapter 6 through Chapter 20**);*
- *Document the implementation schedule, funding, responsibilities, and milestones (**Sections 6.3, 7.3, 8.3, 9.3, 10.3, 11.3, 12.3, 13.3, 14.3, 15.3, 16.3, 17.3, 18.3, 19.3, and 20.3**); and*
- *Identify monitoring, evaluation, and a reporting strategy to evaluate reasonable progress over time (**Section 4.2**).*

ANTICIPATED OUTCOMES OF BMAP IMPLEMENTATION

Through the implementation of projects, activities, and additional source assessment in this BMAP, stakeholders expect the following outcomes:

- *Improved water quality trends in the LSJR tributaries that will also help improve water quality in the main stem of the river;*
- *Decreased loading (levels) of the target pollutant (fecal coliform);*
- *Enhanced public awareness of fecal coliform sources and impacts on water quality;*
- *Enhanced effectiveness of corresponding corrective actions by stakeholders;*
- *Enhanced understanding of basin hydrology, water quality, and pollutant sources; and*
- *The ability to evaluate management actions, estimate their benefits and identify additional pollutant sources.*

BMAP COST

Costs were provided for 59% of the activities identified in the BMAP, with an estimated total cost of more than \$51 million for capital projects and approximately \$93 million for ongoing programs and activities. In addition, some of the activities identified in the BMAP only had countywide costs available, for a total of more than \$25 million. The funding sources range from local contributions to legislative appropriations. Technical stakeholders and BWG members will continue to explore new opportunities for funding assistance to ensure that the activities listed in this BMAP can be maintained at the necessary level of effort.

BMAP FOLLOW-UP

As a part of BMAP follow-up, FDEP and stakeholders will track implementation efforts and monitor water quality to determine additional sources and water quality trends. The sampling locations in the monitoring plan were selected to identify other potential sources of contamination through source assessment monitoring in key locations throughout the watersheds and to track trends in fecal coliform in the WBIDs by using existing stations with extensive historical data. The source assessment monitoring will follow the established Tributaries Assessment Team (TAT) protocol in which any observed fecal coliform colony counts over 5,000 will be followed-up with bracketed sampling in an effort to determine the source of the high fecal coliform count. COJ, FDEP, JEA, City of Atlantic Beach, City of Jacksonville Beach, City of Neptune Beach, and NS Mayport are responsible for the trend and source assessment sampling in the monitoring plan.

The results of these efforts will be used to evaluate the effectiveness of the BMAP activities in reducing fecal coliform loading in the tributaries. The BWG will meet at least every 12 months to discuss implementation issues, consider new information, and determine what other management strategies are needed if monitoring indicates that additional measures are necessary to reduce fecal coliform.

BENEFITS OF THE BMAP PROCESS

With the implementation of activities outlined in this BMAP, in addition to the anticipated outcomes noted above, the following benefits are expected:

- *Increased coordination between state and local governments and within divisions of local governments in problem solving for surface water quality restoration;*
- *Securing additional state and local funding for water quality restoration;*
- *Improved communication and cooperation among state and local agencies responding to restoration needs; and*
- *Determination of effective projects through the stakeholder decision-making and priority-setting processes.*

COMMITMENT TO BMAP IMPLEMENTATION

BWG members will provide endorsement of the BMAP on behalf of the entities they represent and are committed to ensuring the plan is implemented to achieve reductions of fecal coliforms in the tributaries. In addition to this endorsement, the entities will also provide FDEP with letters of commitment or resolutions of support to ensure that as staff and board members change over time, the entity has a way to ensure support for the BMAP and the efforts included.

CHAPTER 1: CONTEXT, PURPOSE, AND SCOPE OF THE PLAN

1.1 WATER QUALITY STANDARDS AND TOTAL MAXIMUM DAILY LOADS

Florida's water quality standards are designed to ensure that surface waters can be used for their designated purposes, such as drinking water, recreation, and agriculture. Currently, most surface waters in Florida, including those in the Lower St. Johns River (LSJR) Basin, are categorized as Class III waters, which mean they must be suitable for recreation and must support the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. **Table 1** shows all designated use categories.

TABLE 1: DESIGNATED USE ATTAINMENT CATEGORIES FOR FLORIDA SURFACE WATERS

CATEGORY	DESCRIPTION
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 (<i>no current Class V designations</i>)

* Class I and II waters include the uses of the classifications listed below them.

Under Section 303(d) of the federal Clean Water Act, every 2 years each state must identify its “impaired” waters, including estuaries, lakes, rivers, and streams, that do not meet their designated uses and are not expected to improve within the subsequent 2 years. The Florida Department of Environmental Protection (FDEP) is responsible for developing this “303(d) list” of impaired waters.

Florida's 303(d) list identifies hundreds of waterbody segments that fall short of water quality standards. The 3 most common water quality concerns are coliform, nutrients, and oxygen-demanding substances. The listed waterbody segments are candidates for more detailed assessments of water quality to determine whether they are impaired according to state statutory and rule criteria. FDEP develops and adopts Total Maximum Daily Loads (TMDLs) for the waterbody segments it identifies as impaired. A TMDL is the maximum amount of a specific pollutant that a waterbody can assimilate while maintaining its designated uses.

The water quality evaluation and decision-making processes for listing impaired waters and establishing TMDLs are authorized by Section 403.067, Florida Statutes (F.S.), known as the Florida Watershed Restoration Act (FWRA), and contained in Florida's Identification of Impaired Surface Waters Rule (IWR), Rule 62-303, Florida Administrative Code (F.A.C.). The impaired waters in the tributaries of the LSJR Basin addressed in this plan are all Class III waters. TMDLs have been established for these waters, identifying the amount of fecal coliform and other pollutants they can receive and still maintain Class III designated uses.

TMDLs are developed and implemented as part of a watershed management cycle that rotates through the state's 52 river basins every 5 years (see **Appendix A**) to evaluate waters, determine impairments, and develop and implement management strategies to restore impaired waters to their designated uses. **Table 2** summarizes the 5 phases of the watershed management cycle.

TABLE 2: PHASES OF THE WATERSHED MANAGEMENT CYCLE

Phase 1	Preliminary evaluation of water quality
Phase 2	Strategic monitoring and assessment to verify water quality impairments
Phase 3	Development and adoption of TMDLs for waters verified as impaired
Phase 4	Development of management strategies to achieve the TMDL(s)
Phase 5	Implementation of TMDL(s), including monitoring and assessment

1.2 TMDL IMPLEMENTATION

Rule-adopted TMDLs may be implemented through Basin Management Action Plans (BMAPs), which contain strategies to reduce and prevent pollutant discharges through various cost-effective means. During Phase 4 of the TMDL process, FDEP and the affected stakeholders in the various basins jointly develop BMAPs or other implementation approaches. A basin may have more than 1 BMAP, based on practical considerations. The FWRA contains provisions that guide the development of BMAPs and other TMDL implementation approaches. **Appendix B** summarizes the statutory provisions related to BMAP development.

Stakeholder involvement is critical to the success of the TMDL Program, and varies with each phase of implementation to achieve different purposes. The BMAP development process is structured to achieve cooperation and consensus among a broad range of interested parties. Under statute, FDEP invites stakeholders to participate in the BMAP development process and encourages public participation to the greatest practicable extent. FDEP must hold at least 1 noticed public meeting in the basin to discuss and receive comments during the planning process. Stakeholder involvement is essential to develop, gain support for, and secure commitments to implement the BMAP.

1.3 THE LOWER ST. JOHNS RIVER TRIBUTARIES BASIN MANAGEMENT ACTION PLAN

1.3.1 *STAKEHOLDER INVOLVEMENT*

In 2005, the Tributaries Assessment Team (TAT) was formed to investigate potential sources of fecal coliform in the LSJR tributaries. The TAT membership comprises several agencies and organizations, including FDEP, City of Jacksonville (COJ) Environmental Quality Division (EQD), COJ Public Works Department (PWD), Duval County Health Department (DCHD), and JEA (the regional utility provider). The TAT has collected much of the water quality data that provide the basis for the analyses presented in this BMAP.

As part of its efforts, the TAT samples a number of tributaries (10 WBIDs are included in the current sampling plan). When a sample is above a fecal coliform colony count of 5,000, the TAT collects additional samples upstream and downstream of the high count in an effort to bracket the location of the source. In addition to intensive water quality sampling, the TAT analyzes the water quality data in conjunction with Geographic Information System (GIS) information to identify opportunities for eliminating sources and carrying out additional focused sampling. This effort requires interagency coordination and communication to effectively address a source, because the TAT member who identifies the source may not be associated with the appropriate entity to implement the corrective action. The TAT's interagency, coordinated effort has identified and eliminated fecal coliform sources in the tributaries, which has helped to improve water quality in the tributaries.

In July 2006, FDEP initiated BMAP technical meetings involving key stakeholders to prepare information for the first tributaries fecal coliform BMAP (adopted December 2009). The technical meetings for this second tributaries fecal coliform BMAP began in September 2009. The purpose of the technical meetings is for stakeholders to gather information on the impaired tributaries to aid in the development of the BMAP and to identify management actions to improve water quality.

In addition to stakeholder input on the technical issues of BMAP development, FDEP solicited further input from key stakeholder groups at the management level by creating the Basin Working Group (BWG) in October 2007. The BWG membership was expanded to include additional entities that have responsibilities as part of this BMAP and their meetings on this second tributaries fecal coliform BMAP began in December 2009. The BWG provides recommendations to FDEP on issues related to BMAP development. The BWG developed the following mission statement:

The mission of the Lower St. Johns River Tributaries Basin Working Group is to encourage participation of all stakeholders in working to restore impaired waterbodies through recommendations for an equitable and cost-effective Basin Management Action Plan to achieve Total Maximum Daily Load reduction goals in the tributaries of the Lower St. Johns River.

This BMAP document reflects the input of the technical stakeholders and the BWG, along with public input from workshops and meetings held to discuss key aspects of the TMDL and BMAP development. **Appendix C** provides further details.

1.3.2 *PLAN PURPOSE AND APPROACH*

As reflected in the BWG's mission statement, the purpose of this BMAP is to implement load reductions to achieve the fecal coliform TMDLs for the LSJR tributaries. The plan also outlines specific actions that will achieve load reductions and a schedule for implementation. In addition, it details a monitoring approach to identify additional sources of fecal coliform and to track trends in water quality. The BWG will meet at least annually to review progress made towards achieving the TMDLs.

This BMAP addresses 15 of the 75 tributaries impaired for fecal coliform in the LSJR Basin. Specifically, it focuses on actions that reduce fecal coliform levels, with a goal of meeting the associated TMDLs. Other water quality concerns will benefit from these BMAP actions, such as issues with nutrients and low dissolved oxygen. However, it must be emphasized that this BMAP does not address all of the water quality issues in the basin.

For assessment purposes, FDEP has divided the LSJR Basin into water assessment polygons with a unique waterbody identification (WBID) number for each watershed or stream reach. **Figure 1** shows the 15 WBIDs discussed in this BMAP.

Though considerable effort was taken to understand the dynamics of the TMDL waterbodies, the relationship of fecal coliform water quality exceedances to pollutant sources is not well understood. Where specific fecal coliform sources were identified, the BWG and stakeholders have proposed projects and activities to eliminate those sources. In areas where specific sources were not definitively identified, programs to prevent further fecal coliform loading, including assessments and sampling to identify and eliminate sources, are listed.

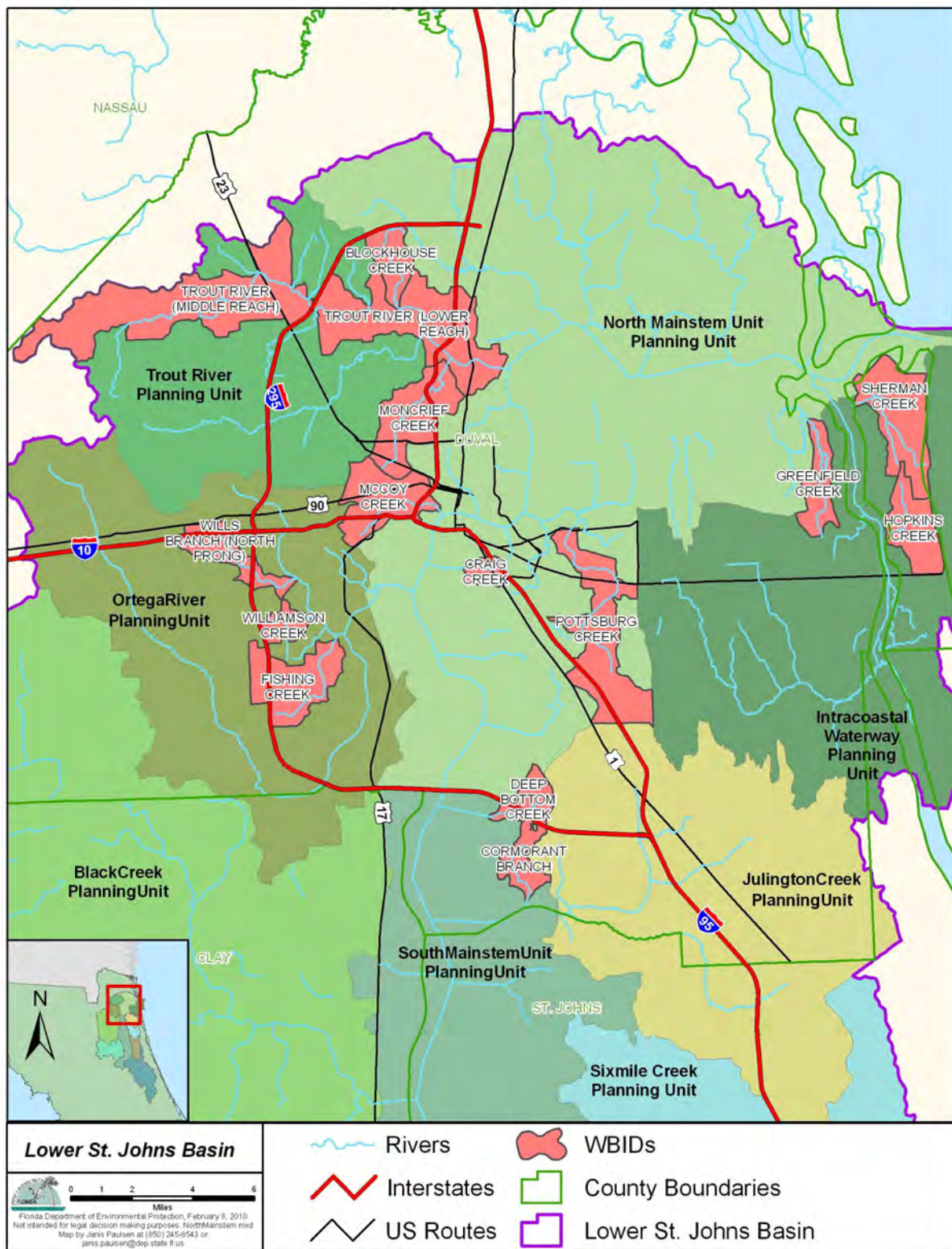


FIGURE 1: LSJR BASIN TRIBUTARIES INCLUDED IN THE BMAP

For the projects and programs in this BMAP, quantitative values for pollutant load reduction activities cannot be calculated due to a lack of scientific information on the bacteria removal rates for best management practices (BMPs) and activities that reduce fecal coliform levels. While it is known that certain BMPs prevent or remove fecal coliform sources, it is not known exactly how much of a reduction will occur in the tributaries. As a result, the expected dates on which the TMDLs will be achieved are not provided; however, there is a milestone to evaluate progress in Year 5 of the BMAP (**Section 4.5**). Despite the uncertainties, stakeholders do expect to achieve water quality improvements by the end of the first 5-year BMAP cycle through past and future activities, projects, and programs to eliminate sources outlined in this BMAP.

1.3.3 PLAN SCOPE

The 15 tributaries included in this BMAP were identified as the next priority worst-case WBIDs, after the 10 WBIDs included in the first tributaries fecal coliform BMAP. This determination uses a ranking method that establishes the severity of water quality impairment based on the number of exceedances of fecal coliform colony counts. The water quality ranking method uses the total number of fecal coliform samples in the waterbody during the period of record to categorize how many samples were over 800, 5,000, and 10,000 colony counts. A combined rank is then created based on the number of exceedances in each category. The WBIDs are sorted from worst to best to provide a guideline for assessment priorities, with the worst-case waterbody ranked as number 1.

In an effort to address the known impairments in these tributaries, FDEP contracted with Post, Buckley, Schuh & Jernigan (PBS&J) to develop technical reports that describe and interpret the water quality, spatial, and geographic data from FDEP, DCHD, COJ, JEA, City of Atlantic Beach, City of Jacksonville Beach, City of Neptune Beach, and Naval Station (NS) Mayport. The available data are analyzed in the reports to identify the most probable sources of fecal coliform, which fall into 5 main categories (not in order of magnitude), as follows: (1) stormwater; (2) onsite sewage treatment and disposal systems (OSTDS); (3) sewer infrastructure; (4) nonpoint sources such as pet waste; and (5) natural background such as wildlife.

These reports were peer reviewed by the technical stakeholders in the basin, who also provided additional input based on their knowledge of the tributaries. Each of the technical reports provides individual waterbody-specific information in a stand-alone document. The technical stakeholders used the reports to establish a baseline and to assist in identifying projects and additional monitoring needs, which are included in this BMAP. **Chapter 6** through **Chapter 20** summarize key findings from the technical reports. Additional detailed information for each WBID is located in the full versions of the technical reports, which are available from FDEP.

The technical reports use a “weight-of-evidence” approach to help identify likely sources of fecal coliform and guide follow-up reconnaissance and investigation toward corrective actions. This approach utilizes statistical and GIS data analyses to focus watershed management efforts, classify priorities, and support decisions related to fecal coliform reduction efforts. These analyses are a product of the best information available at the time to summarize impairments and identify potential sources. The limitations of the available datasets were identified in the technical reports to provide context for data interpretation. The weight-of-evidence method, in conjunction with the best professional judgment of the stakeholders who have local knowledge of these WBIDs, was used to aid in source identification to the maximum extent possible.

At this time, water quality modeling has not been used to assess the temporal relationship between the source of fecal coliform and the associated impact on the waterbody. Due to the inherent variability of fecal coliform and the diffuse nature of nonpoint sources, modeling was not considered viable, and the weight-of-evidence approach was utilized to provide information

on the most likely sources. Modeling may be considered in the future to help refine the understanding of sources and impacts in the tributaries.

1.3.4 SUFFICIENCY OF EFFORT APPROACH AND DETERMINATION OF SUFFICIENCY

Fecal coliform can be highly variable and easily transported, making it difficult, in many cases, to identify the source of the bacteria. Based on the potential sources in each WBID, the stakeholders were asked to identify their activities to reduce or remove bacteria sources that have been implemented since 1996 (the start of the TMDL verified period) and additional efforts that are currently under way or planned in the next 5 years. City of Atlantic Beach, COJ, City of Jacksonville Beach, City of Neptune Beach, DCHD, Florida Department of Transportation (FDOT) District 2, JEA, and NS Mayport submitted project sheets and program descriptions for the prevention, reduction, and source removal activities they conduct in the 15 WBIDs or on a countywide basis. FDEP then used a “sufficiency of effort” approach to conduct a WBID-specific assessment of the potential sources, and cumulative projects and activities that address or eliminate fecal coliform loading. This sufficiency of effort evaluation was not an assessment of each agency’s individual activities; rather, it focused on whether the activities submitted by all the entities corresponded to the potential sources identified and whether the total efforts were adequate to eliminate the known sources, assess unknown sources, and prevent the development of new sources.

During the sufficiency of effort evaluation, FDEP reviewed the following information about each WBID:

- *Documentation of the most likely sources;*
- *A GIS database to determine the spatial and temporal distribution of the sources;*
- *Permit and water quality information;*
- *Relevant field information; and*
- *The completed corrective actions.*

As the evaluation was conducted, the agencies’ programs and activities for each type of source were recorded in a table summarizing restoration activities (see the sections on *Summary of Restoration Activities* in **Chapter 6** through **Chapter 20**). Because the controllable sources (sewer infrastructure, septic tanks, and stormwater conveyances) vary considerably among the WBIDs, the actions and responsibilities of the stakeholders also vary considerably from WBID to WBID. To describe each WBID accurately and assess the efforts appropriately, each WBID is described in its own chapter and evaluated separately.

The criterion for sufficiency for OSTDS-related efforts included the following: designation as a septic tank (OSTDS) failure or nuisance area in accordance with COJ Ordinance Code (further described in **Appendix E**), which prioritizes these areas for transition to sewer service; status of OSTDS phase-out to sewer; number of complaint investigations and any resulting enforcement actions; and number of septic tank repair permits and proximity of the repair sites to surface waters or stormwater inlets. In addition, program implementation was evaluated for efforts such as inspections, training programs, plan reviews and site visits, and the regulation of annual operating permits. Local ordinances were also evaluated for their ability to proactively address potential OSTDS failures.

The evaluation of efforts for sewer infrastructure included a determination of the percentage of infrastructure within the watershed with recent sewer line upgrades (cured in place pipe, pipe bursting, and open cut and removal). In addition, the number of rebuilt pump stations in each WBID was compared with the sanitary sewer overflow (SSO) history to determine if a previous problem was addressed through repairs and upgrades. Rehabilitated manholes can also prevent overflows from occurring at the manhole and potentially into surface waters or the stormwater system; therefore, manhole rehabilitation and monitoring efforts were quantified. Additional sanitary sewer programs that occur on a systemwide or countywide basis, including air release valve (ARV) inspection and rehabilitation, SSO investigations, and sewer line inspection and cleaning, were also evaluated as measures to prevent and control sewer infrastructure as a potential fecal coliform source.

The stormwater sufficiency evaluations included a review of flood control projects (which reduce fecal coliform loading by preventing water from inundating septic systems) and stormwater BMPs, such as wet/dry retention (which reduce sediment buildup that can provide a breeding ground for fecal coliform). Consideration was also given to the maintenance of stormwater ditches, ponds, and closed conveyances to prevent debris, vegetation, dense tree canopy, and sediment from potentially providing conditions that would allow new sources of fecal coliform bacteria.

Another important activity that was evaluated was the detection and removal of illicit connections to stormwater conveyances to eliminate illegal discharges that can contribute fecal coliform and other pollutants into surface waters. Stormwater-related program implementation also includes public education campaigns, the Adopt-A-Highway Program, street sweeping, and the Drainage Connection Program, all of which reduce contaminants entering the stormwater system. Additionally, COJ has a pet waste public education campaign using televised public service announcements, website content, billboards, and printed handouts to raise awareness and promote compliance with the Pet Waste Ordinance.

In addition to efforts specific to each source, the entities also participate in special source assessment activities. The activities include TAT sampling of several WBIDs and follow-up sampling at locations where high counts occur, in an effort to identify potential sources. Additional assessments including a “Walk the WBID” exercise, microbial source tracking (MST) sampling, and thermal imaging were completed from September 2008 through July 2009 to gain a better understanding of the WBIDs and potential sources. These assessments were implemented in 3 waterbodies in this BMAP and are further described in **Section 4.3**.

For each waterbody evaluation, FDEP used the technical report source summary and compared it with the summary of restoration activities table to ensure that appropriate programs and activities were being implemented for the most likely sources to either decrease or eliminate the known sources, or further assess fecal coliform loadings. If any of the likely sources was not sufficiently addressed, FDEP identified the need for additional actions. The full implementation of the management actions/projects identified in this BMAP is deemed sufficient to address the fecal coliform bacteria reductions needed to meet the TMDLs.

1.3.5 POLLUTANT REDUCTION AND DISCHARGE ALLOCATIONS

1.3.5.1 Categories for Rule Allocations

The rules adopting TMDLs must establish reasonable and equitable allocations that will alone, or in conjunction with other management and restoration activities, attain the TMDL. Allocations may be to individual sources, source categories, or basins that discharge to the impaired waterbody. The allocations identify either how much pollutant discharge in colonies per day

each source designation may continue to contribute (discharge allocation), or the colonies per day or the percent of its loading the source designation must reduce (reduction allocation). Currently, the TMDL allocation categories are as follows:

- **Wasteload Allocation** – *The allocation to point sources permitted under the National Pollutant Discharge Elimination System (NPDES) Program includes the following:*
 - o **Wastewater Allocation** is the allocation to industrial and domestic wastewater facilities.
 - **NPDES Stormwater Allocation** is the allocation to NPDES stormwater permittees that operate municipal separate storm sewer systems (MS4s). These permittees are treated as point sources under the TMDL Program.
 - o **Load Allocation** is the allocation to nonpoint sources, including agricultural runoff and stormwater from areas that are not covered by an MS4.

1.3.5.2 Initial and Detailed Allocations

Under the FWRA, the TMDL allocation in rule may be an “initial” allocation among point and nonpoint sources. In such cases, the “detailed” allocation to specific point sources and specific categories of nonpoint sources must be established in the BMAP. The FWRA further states that the BMAP may make detailed allocations to individual “basins” (i.e., sub-basins) or to all basins as a whole, as appropriate. Both initial and detailed allocations must be determined based on a number of factors listed in the FWRA, including cost-benefit, technical and environmental feasibility, implementation time frames, and others (see **Appendix B**).

Due to the nature of the fecal coliform impairment, this BMAP does not specify detailed allocations. It is difficult to attribute the fecal coliform loads to specific sources because bacteria are highly variable and can be easily transported. In addition, research is not available that quantifies the expected fecal coliform reduction from project implementation. Instead of assigning detailed allocations, a sufficiency of effort evaluation (as described in **Section 1.3.4**) was conducted to assess whether the management actions provided by the entities in the basin were sufficient to address the potential sources of fecal coliform identified in each WBID.

1.3.6 TMDLS IN THE LSJR TRIBUTARIES

The water quality criterion for fecal coliform bacteria is detailed in Rule 62-302, F.A.C. The requirements for exceeding maximum fecal coliform concentrations in a Class III waterbody are stated as follows:

The most probable number (MPN) or membrane filter (MF) counts per 100 milliliters (mL) of fecal coliform bacteria shall not exceed a monthly average of 200, nor exceed 400 in 10% of samples, nor exceed 800 on any one day.

FDEP has verified the 15 LSJR tributaries included in this BMAP as impaired for fecal coliform bacteria. The TMDLs for Williamson Creek, Moncrief Creek, and Wills Branch were adopted by FDEP in 2006. The TMDLs for McCoy Creek, Deep Bottom Creek, Blockhouse Creek, Sherman Creek, Trout River (WBID 2203), and Trout River (WBID 2203A) were adopted in June 2009. The TMDL for Pottsburg Creek was adopted September 2009. The TMDLs for Craig Creek, Fishing Creek, Hopkins Creek, Cormorant Branch, and Greenfield Creek **are currently in draft and are being finalized through the FDEP rule-making process**. **Table 3** lists the TMDLs and pollutant load allocations adopted by rule for the 15 tributaries that are the focus of this BMAP.

TABLE 3: TMDLS FOR THE LSJR TRIBUTARIES

WBID NUMBER	WBID NAME	WATERBODY TYPE	WASTELOAD ALLOCATION		LOAD ALLOCATION (%)
			WASTEWATER	NPDES STORMWATER (%)	
2297	Craig Creek	Stream			
2257	McCoy Creek	Stream	N/A	84	84
2316	Williamson Creek	Stream	N/A	83	83
2324	Fishing Creek	Stream			
2361	Deep Bottom Creek	Stream	N/A	82	82
2228	Moncrief Creek	Stream	83%	83	83
2207	Blockhouse Creek	Stream	N/A	82	82
2266	Hopkins Creek	Stream			
2381	Cormorant Branch	Stream			
2282	Wills Branch	Stream	N/A	80	80
2227	Sherman Creek	Stream	N/A	71	71
2240	Greenfield Creek	Stream			
2265B	Pottsburg Creek	Stream	N/A	50	50
2203	Trout River	Stream	N/A	66	66
2203A	Trout River	Stream	N/A	60	60

N/A – Not applicable

1.4 ASSUMPTIONS AND CONSIDERATIONS REGARDING TMDL IMPLEMENTATION

The water quality impacts of BMAP implementation are based on several fundamental assumptions about the pollutants targeted by the TMDLs, modeling approaches, waterbody response, and natural processes. In addition, there are important considerations to keep in mind about the nature of the BMAP and its long-term implementation.

1.4.1 ASSUMPTIONS

The following assumptions were used during the BMAP process:

- *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 loads from MS4s from other nonpoint sources (given the nature of stormwater transport).*
- *Quantified bacteria loads from specific sources are generally not known because they are highly variable. As the bacteria loads from individual sources are not well understood, it is not possible to calculate a specific 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 evaluated the known sources of bacteria contributing to the impairment in each waterbody and where there was strong evidence of responsibility. The stakeholders and BWG then determined projects to address these problems and included these projects in the BMAP.*
- *In cases where the sources were unknown, the stakeholders and BWG determined appropriate assessment programs to investigate the sources of bacteria loadings.*

- *It is difficult to determine the quantitative load reductions expected from management actions to decrease fecal coliform due to a lack of literature values and high variability; therefore, the benefits of these management actions were evaluated on a qualitative basis by matching elimination, reduction, and prevention activities to known or potential sources.*
- *Flood control projects are included as BMAP activities because these projects help to reduce flooding after a storm event, which reduces the amount of fecal coliform loading to the nearby waterbody through stormwater runoff. Programs such as Adopt-A-Highway and street sweeping are also included because they remove trash, sediment, debris, and pollutants from roadways 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 were given credit in this BMAP as actions to reduce fecal coliform.*
- *The penetration of ultraviolet (UV) light into waters and sediments may assist in aiding fecal coliform die-off and preventing bacteria regrowth.*

1.4.2 CONSIDERATIONS

This BMAP requires all stakeholders to implement their projects and programs to achieve reductions as soon as practicable. However, the full implementation of this BMAP will be a long-term process. While some of the projects and activities contained in the BMAP were recently completed or are currently ongoing, several projects require more time to design, secure funding, and construct. While funding the projects could be an issue, funding limitations do not affect the requirement that every entity must implement the activities listed in the BMAP.

Since BMAP implementation is a long-term process, the TMDL targets established for the LSJR Basin may not be achieved in the next 5 years. It may take even longer for the tributaries to respond to reduced loadings and fully meet applicable water quality standards. Regular follow-up and continued coordination and communication by the BWG and stakeholders will be essential to ensure the implementation of management strategies and assessment of their incremental effects. Any additional management actions required to achieve TMDLs, if necessary, will be developed as part of BMAP follow-up.

During the BMAP process, several items were identified that should be addressed in future watershed management cycles to ensure that future BMAPs use the most accurate information:

1. **Source Identification** – *Sources of fecal coliform impairment are particularly difficult to trace. For this reason, source identification studies are included as management actions. The TAT is monitoring 10 WBIDs as part of its current sampling plan. In addition, FDEP contracted with PBS&J to conduct detailed assessments of 11 WBIDs (3 of which are included in this BMAP) through a combination of field reconnaissance, MST sampling, and thermal imaging. These studies provided additional information and techniques that aid in identifying potential sources in the impaired tributaries.*
2. **Septic Tanks** – *FDEP is implementing a study, Evaluation of Septic Tank Influences on Nutrient Loading to the Lower St. Johns River Basin and Its Tributaries, to provide a better understanding of the nutrient and bacteria loading from septic tanks via ground water by monitoring conditions at representative sites. The study seeks to answer questions related to potential OSTDS impacts*

and the attenuation of nitrogen, phosphorus, and bacteria (fecal coliform) by soil type, under the range of conditions that represent typical OSTDS sites near impaired surface waters. This study will also document the nutrients and bacteria in the receiving LSJR tributaries at each site. The results will provide information about the relative contribution of fecal coliform from septic tanks located near the impaired tributaries.

3. **GIS information** – During the BMAP process, the available GIS data, which provided a basis for some of the source analyses, have improved. As more information becomes available, the updated GIS database for the tributaries will be utilized to aid in source identification. This information will include determining the locations for private wastewater systems and infrastructure, collecting jurisdictional or systemwide programs and activities on a WBID scale for future reporting and assessment, and systematically updating all GIS information databases used to compile the BMAP. The updated databases should be submitted by the entities during the annual BMAP progress report process.
4. **BMP evaluations** – During the 5-year BMAP implementation cycle, studies to evaluate the effectiveness of BMPs to remove fecal coliform may present new science for consideration in the BMAP process. As more information becomes available, the new science will be incorporated into the annual review process.

1.5 FUTURE GROWTH IN THE TRIBUTARIES

The FWRA (Paragraph 403.067[7][a][2], F.S.) requires that BMAPs “identify the mechanisms by which potential future increases in pollutant loading will be addressed.” To meet this requirement, fecal coliform loadings associated with future growth in the 15 tributaries were analyzed. Currently, human land uses predominate in the vast majority of these WBIDs (**Table 4**). These uses include residential (high, medium, and low density), commercial/utility/institutional, transportation, recreational, industrial, communication, and extractive. Since these watersheds are mostly developed, any future growth in these areas is not expected to substantially increase fecal coliform loadings to the creeks.

TABLE 4: PERCENT HUMAN LAND USES BY WBID

WBID	% IN HUMAN USES
Craig Creek	94.9
McCoy Creek	90.5
Williamson Creek	86.0
Fishing Creek	70.9
Deep Bottom Creek	88.4
Moncrief Creek	88.1
Blockhouse Creek	49.2
Hopkins Creek	91.2
Cormorant Branch	80.2
Wills Branch	70.4
Sherman Creek	61.7
Greenfield Creek	66.9
Pottsburg Creek	67.5
Trout River (WBID 2203)	16.9*
Trout River (WBID 2203A)	56.7

*Note: The majority of the basin (66.3%) is upland forest and wetlands.

New development in these tributaries would most likely be connected to existing or future sanitary sewer system infrastructure, as opposed to septic tanks, where the wastewater will be treated to high levels. Several WBIDs include failure areas and, as funding is available, sewer

lines will be installed in these areas to remove failing septic tanks, which will reduce fecal coliform loading from current development. Where sewer service is not available, DCHD reviews septic tank plans and evaluates sites before issuing new permits, so that the new systems are correctly designed, placed, and operated to prevent further fecal coliform loading.

In addition, ordinances, regulations, and guidelines address fecal coliform loading from new development and redevelopment. COJ, City of Jacksonville Beach, City of Neptune Beach, and Naval Station Mayport have ordinances for pet waste management that address sources of fecal coliform. In addition, COJ has an ordinance for septic tank phase-out. COJ also participates in the Florida Yards and Neighborhoods Program and has ordinances for landscape, irrigation, and fertilization that reduce sediment loads to waterbodies. Sediment loading may increase survival rates and may support the regrowth of fecal coliform bacteria. DCHD also has ordinances for repairing faulty septic tanks and phasing out systems in septic tank nuisance areas.

These programs and regulations, in conjunction with the COJ, FDOT, Atlantic Beach, and Jacksonville Beach stormwater and flood control projects described later in this BMAP, will effectively address potential fecal coliform loadings from any future growth in these tributaries.

CHAPTER 2: WATER QUALITY TRENDS IN THE TRIBUTARIES

2.1 WATER QUALITY TRENDS

2.1.1 CRAIG CREEK

FDEP verified Craig Creek as impaired for fecal coliform using the IWR database. **Table 5** summarizes the results, by year, for the verified period.

TABLE 5: SUMMARY OF CRAIG CREEK FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR	N ¹	MINIMUM	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

2.1.2 MCCOY CREEK

Table 6 summarizes the fecal coliform data results in McCoy Creek, by year, for the verified period. Exceedances occur in all months in which samples have been collected with exceedance rates greater than or equal to 50% except December (33.3%) and April (40%). When aggregating data by season, the summer season demonstrates the highest percentage of exceedances (93%). The yearly data show that exceedance rates appear to be decreasing over time, with 100% exceedances in 1996 and 1998 and only 40% by 2003 (FDEP, June 2009a).

TABLE 6: SUMMARY OF MCCOY CREEK FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	1	500	500	500	500	1	100.0
1997	-	-	-	-	-	-	-
1998	6	1,700	24,000	5,000	10,350	6	100.0
1999	8	140	50,000	7,000	12,680	7	87.5
2000	10	80	9,500	650	1,975	6	60.0
2001	8	310	200,000	5,350	53,064	7	87.5
2002	16	78	53,800	576	4,797	8	50.0
2003	5	340	2,400	340	1,024	2	40.0

*Table represents years for which data exist. “-” means no data are available.

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

2.1.3 WILLIAMSON CREEK

Table 7 summarizes the fecal coliform data results for Williamson Creek, by year, for the verified period. There is a 75.56% overall exceedance rate for fecal coliform. Exceedances occur in all seasons, however, a greater number occur in the fall (October - December), and the least amount occur in the spring (April - June). The greatest percent of exceedances occurred during the months of February, July, October, November, and December (all 100% exceedance) (FDEP, July 2005a). When looking at the data by year, there does appear to be a decrease in fecal coliform concentrations over time.

TABLE 7: SUMMARY OF WILLIAMSON CREEK FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	1	160,000	160,000	160,000	160,000	1	100.00%
1997	-	-	-	-	-	-	-
1998	3	300	90,000	22,000	37,433	2	66.67%
1999	5	140	13,000	1,100	3,268	4	80.00%
2000	4	220	21,000	400	5,505	2	50.00%
2001	4	38	3,000	835	1,177	2	50.00%
2002	5	120	3,233	530	1,159	3	60.00%
2003	-	-	-	-	-	-	-

* Table represents years for which data exist.

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

2.1.4 FISHING CREEK

Table 8 summarizes the fecal coliform data results for Fishing Creek, by year, for the verified period.

TABLE 8: SUMMARY OF FISHING CREEK FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003							

*Table represents years for which data exist. “–” means no data are available.

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

2.1.5 DEEP BOTTOM CREEK

Table 9 summarizes the fecal coliform results for Deep Bottom Creek, by year, during the verified period. There is a 92.31% overall exceedance rate for fecal coliforms in Deep Bottom

Creek during the verified period. Exceedances occurred in all months in which samples were collected, with exceedance rates greater than or equal to 66.67% except February, June, and December (all had no samples). The winter and fall seasons demonstrate the highest percentages of exceedances (both 100%). The yearly data show that exceedances appear to be decreasing with 100% exceedances from 1996 through 2001 and 50% exceedance in 2003 (FDEP, June 2009b).

TABLE 9: SUMMARY OF DEEP BOTTOM CREEK FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	1	8,000	8,000	8,000	8,000	1	100
1997	0	-	-	-	-	-	-
1998	3	1,700	5,000	3,000	3,233	3	100
1999	7	870	11,000	1,800	3,996	7	100
2000	4	2,200	7,000	2,600	3,600	4	100
2001	4	1000	4,000	2,050	2,275	4	100
2002	5	204	2,100	801	909	4	80
2003	2	340	610	475	475	1	50

*Table represents years for which data exist. “-” means no data are available.

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

2.1.6 MONCRIEF CREEK

Table 10 summarizes the results in Moncrief Creek, by year, for the verified period. There is a 74.1% overall exceedance rate for fecal coliforms. Exceedances occur in all seasons, however, a greater number occur in the summer months (July – September), and the least amount occur in the winter (January - March). Additionally, the greatest percent of exceedances occurred during the month of August; the least in February (FDEP, July 2005b).

TABLE 10: SUMMARY OF MONCRIEF CREEK FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	6	40	2,400	400	778	3	50.00%
1997	5	70	2,100	210	548	1	20.00%
1998	12	36	24,000	500	3,543	7	58.33%
1999	8	170	50,000	1,050	8,696	7	87.50%
2000	10	40	32,000	2,350	7,314	9	90.00%
2001	9	180	5,000	700	1,381	7	77.78%
2002	13	90	89,600	398	9,029	6	46.15%
2003	-	-	-	-	-	-	-

*Table represents years for which data exist. “-” means no data are available.

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

2.1.7 BLOCKHOUSE CREEK

Table 11 summarizes the fecal coliform results for Blockhouse Creek, by year, during the verified period. There is a 76.19% overall exceedance rate for fecal coliform in Blockhouse Creek during the verified period. Exceedances occur in all months in which samples have been collected with exceedance rates greater than or equal to 50% except February (no samples), November (no samples), and December (0% exceedance rate). When aggregating data by season the winter and spring seasons demonstrate the highest percentages of exceedances (100.00% and 83.33%, respectively) (FDEP, June 2009c).

TABLE 11: SUMMARY OF BLOCKHOUSE CREEK FECAL COLIFORM DATA BY YEAR FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	0	-	-	-	-	-	-
1997	0	-	-	-	-	-	-
1998	3	1,400	17,000	2,400	6,933	3	100
1999	4	2,200	9,000	3,700	4,650	4	100
2000	4	170	17,000	2,850	5,718	3	75
2001	4	184	11,000	1,915	3,754	2	50
2002	4	28	520	369	322	2	50
2003	2	430	580	505	505	2	100

*Table represents years for which data exist. “-” means no data are available.

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

2.1.8 HOPKINS CREEK

Table 12 summarizes the fecal coliform results for Hopkins Creek, by year, during the verified period.

TABLE 12: SUMMARY OF HOPKINS CREEK FECAL COLIFORM DATA BY YEAR FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003							

*Table represents years for which data exist. “-” means no data are available.

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

2.1.9 CORMORANT BRANCH

Table 13 summarizes the fecal coliform results for Cormorant Branch, by year, during the verified period.

TABLE 13: SUMMARY OF CORMORANT BRANCH FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003							

¹Number of samples.²Coliform counts are #/100mL.³Exceedances represent values above 400 counts/100mL.

2.1.10 WILLS BRANCH

Table 14 summarizes the fecal coliform results for Wills Branch, by year, during the verified period. Fecal coliform exceedances occur in all seasons, however, a greater number occur in the summer months (July – September), and the least amount occur in the spring (April – June). Additionally, most of the exceedances occurred during the months of February and November; the least in March. It appears that the number of exceedances by year is decreasing, with 100% in 1996 and only 7% in 2002 (FDEP, July 2005c).

TABLE 14: SUMMARY OF WILLS BRANCH FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	1	8,000	8,000	8,000	8,000	1	100
1997	2	300	2,400	1,350	1,350	0	0
1998	7	110	160,000	1,300	25,937	2	29
1999	8	130	5,000	950	1,450	1	13
2000	8	110	7,000	800	1,760	2	25
2001	8	25	50,000	1,303	8,858	3	38
2002	14	90	2,600	425	645	1	7
2003	-	-	-	-	-	-	-

*Table represents years for which data exist.

¹Number of samples.²Coliform counts are #/100mL.³Exceedances represent values above 400 counts/100mL.

2.1.11 SHERMAN CREEK

Table 15 summarizes the fecal coliform results for Sherman Creek by year, during the verified period. There is a 41.6% overall exceedance rate for fecal coliforms in Sherman Creek. Exceedances occur in all months, except March and July, with 100% exceedance in August. When aggregating data by season, the lowest percentage of exceedances occurred in the winter and fall and the greatest occurred in summer. There is at least a 33.33% exceedance rate across each season. By year, there appears to be a general downward trend in exceedances from 1996 – 2002, with exception of 2000. However, there is only 1 sample from 1996; all other years have at least nine samples (FDEP, July 2009).

TABLE 15: SUMMARY OF SHERMAN CREEK FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	1	1,300	1,300	1,300	1,300	1	100.00
1997	-	-	-	-	-	-	-
1998	9	20	5,000	700	1,069	5	55.56
1999	12	20	1,700	225	390	5	41.67
2000	12	20	42,000	2,600	7,754	8	66.67
2001	12	20	5,000	285	793	5	41.67
2002	14	4	5,800	97	506	1	7.14
2003	-	-	-	-	-	-	-

*Table represents years for which data exist.

¹Number of samples.²Coliform counts are #/100mL.³Exceedances represent values above 400 counts/100mL.**2.1.12 GREENFIELD CREEK**

Table 16 summarizes the fecal coliform results for Greenfield Creek by year, during the verified period.

TABLE 16: SUMMARY OF GREENFIELD CREEK FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003							

*Table represents years for which data exist.

¹Number of samples.²Coliform counts are #/100mL.³Exceedances represent values above 400 counts/100mL.**2.1.13 POTTSBURG CREEK**

FDEP used the IWR to assess water quality impairments in the Pottsburg Creek watershed and has verified that this WBID is impaired for fecal coliform bacteria. The verification of impairment was based on the observation that 27 out of 98 fecal coliform samples for Pottsburg Creek collected during the verified period (January 1, 2001, through June 30, 2008) exceeded the fecal water quality criterion. **Table 17** summarizes the fecal coliform results by year from January 1, 1996 through June 30, 2008 (FDEP, September 2009). Overall, there is a decrease in the number exceedances, by year, with 100% in 1996 and only 18% in 2007.

TABLE 17: SUMMARY OF POTTSBURG CREEK FECAL COLIFORM DATA BY YEAR (JANUARY 1, 1996–JUNE 30, 2008)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	MEAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	1	800	800	800	800	1	100
1997	-	-	-	-	-	-	-
1998	6	110	16,000	1,200	3,973	4	67
1999	14	70	1,700	315	576	6	43
2000	8	120	10,000	950	2,478	7	88
2001	6	80	1,000	230	348	1	17
2002	20	75	850	265	291	4	20
2003	12	90	2,100	465	540	7	58
2004	11	20	40,000	300	5,314	4	36
2005	13	20	14,000	260	1,370	4	31
2006	8	20	3,000	230	616	2	25
2007	28	18	5,400	218	484	5	18
2008	-	-	-	-	-	-	-

*Table represents years for which data exist.

¹Number of samples.²Coliform counts are #/100mL.³Exceedances represent values above 400 counts/100mL.

2.1.14 TROUT RIVER (WBID 2203)

Table 18 summarizes the fecal coliform results for Trout River (WBID 2203) by year, during the verified period. There is a 55.8% overall exceedance rate and a 52.9% exceedance rate for the verified period. There are data from all months except for February. There are several months (July, November, and December) which have a 100% exceedance rate, but July and November only have 1 observation; March, April, and May had the lowest exceedance rate – all have 33.3%. Fall had the highest exceedance rate among seasons (85.7%); spring has the lowest (37.5%). When considering the data by year, there was 100% exceedances in 1996 and 1998, with the fewest occurring in 2003 (33.33%) (FDEP, June 2009d).

TABLE 18: SUMMARY OF TROUT RIVER (WBID 2203) FECAL COLIFORM DATA BY YEAR FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	1	5,000	5,000	5,000	1	100.00%
1997	-	-	-	-	-	-
1998	3	1,700	160,000	2,400	3	100.00%
1999	4	230	3,000	800	3	75.00%
2000	6	30	1,700	525	4	66.67%
2001	5	60	2,200	800	4	80.00%
2002	5	40	1,267	256	2	40.00%
2003	3	110	700	380	1	33.33%

*Table represents years for which data exist.

¹Number of samples.²Coliform counts are #/100mL.³Exceedances represent values above 400 counts/100mL.

2.1.15 *TROUT RIVER (WBID 2203A)*

Table 19 summarizes the fecal coliform results for Trout River (WBID 2203A) by year, during the verified period. There is a 32.07% overall exceedance rate for fecal coliform and a 25.6% exceedance rate for the verified period. Data exist for all months except February and November. The highest exceedance rate occurred in January (75.0%), followed by December (40.0%) and July (33.33%). March, May, and September had no exceedances. Seasonally, exceedance rates are highest in the winter and fall (33.33% each), followed by summer (22.22%). When considering the data by year there were no exceedances in 2002 and 2003 (through June 30) and a 42.9% exceedance rate in 2000 (FDEP, June 2009d).

TABLE 19: SUMMARY OF TROUT RIVER (WBID 2203A) FECAL COLIFORM DATA BY YEAR
FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

YEAR*	N ¹	MINIMUM ²	MAXIMUM ²	MEDIAN ²	NUMBER OF EXCEEDANCES ³	% EXCEEDANCES
1996	-	-	-	-	-	-
1997	-	-	-	-	-	-
1998	6	40	9,000	260	2	33.33
1999	8	20	2,400	265	3	37.50
2000	7	40	3,000	170	3	42.86
2001	8	20	800	155	2	25.00
2002	5	56	177	156	0	0.00
2003	4	70	200	185	0	0.00

*Table represents years for which data exist.

¹Number of samples.

²Coliform counts are #/100mL.

³Exceedances represent values above 400 counts/100mL.

CHAPTER 3: POLLUTANT SOURCES AND ANTICIPATED OUTCOMES

3.1 POLLUTANT SOURCES COMMON TO THE TRIBUTARIES

The following sections summarize the general types of sources associated with the fecal coliform impairments in the tributaries. Additional details on these sources, specific for each tributary, can be found in **Chapter 6** through **Chapter 20** and the supporting documents available from FDEP.

3.1.1 SANITARY SEWER SYSTEMS

A centralized 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 wastewater treatment plants, and 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 do not readily transport to nearby surface waters, there are no local data for bacterial transport in the soil types and ground water conditions of the LSJR Basin.

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, wastewater in the sanitary sewer pipes can exfiltrate out through the leaks in the pipes 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 in the sanitary sewer pipes.

A study in California (Brown and Caldwell, 2005) confirmed that high water tables do not usually result in the exfiltration of sewage from pipes or couplings into ground water. Rather, as indicated above, ground water is more likely to infiltrate into the collection system. Some studies suggest that the transport of sewage and fecal coliform bacteria into ground water depends on many factors, with one of the largest being the difference in hydraulic head between the sewage and the ground water table. According to a recent U.S. Environmental Protection Agency (EPA) study, "The occurrence of exfiltration is limited to those areas where sewer elevations lie above the ground water table. Since ground water elevations near surface water bodies are typically near the ground surface, sewers near surface water bodies generally are below the ground water table, and infiltration (rather than exfiltration) will dominate the mode of sewer leakage in these areas (Amick and Burgess, 2003)." It is important to note that the majority of the Jacksonville area has a relatively high ground water table, and therefore infiltration may be the primary form of sewer leakage in many areas.

The sewer system serves the majority of the watershed (more than 50%) in all of the WBIDs except Pottsburg Creek. Therefore, it is possible that the sewer system and the associated infrastructure contribute to the impairments in these areas, especially where this infrastructure crosses or is located near the creeks. A number of these tributaries have had SSOs with the potential to impact surface waters. They include Craig Creek, McCoy Creek, Williamson Creek, Fishing Creek, Deep Bottom Creek, Moncrief Creek, Cormorant Branch, Wills Branch, Sherman Creek, Greenfield Creek, Pottsburg Creek, and Trout River (WBID 2203A).

3.1.2 ONSITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS

OSTDS consist of a septic tank and a subsurface wastewater infiltration system, or drainfield, where most of the treatment occurs in the soil above the water table. The drainfield and underlying soils are the most critical components of septic systems for the treatment of wastewater. Under Subsection 64E-6.002(23), F.A.C., a failing septic system is one that is not functioning in a sanitary manner and that may result in the transport of untreated or partially treated wastewater to surface waters.

OSTDS failure can be due to a number of causes, including unsuitable soil conditions, flooding, improper design and installation, or inadequate maintenance practices. Improperly functioning septic systems are recognized as a significant contributor of pollutants, including microbiological pathogens (Nicosia et al., 2001; McDowell et al., 2005). These failing systems may result in obvious sanitary hazards, such as ponding on the ground and runoff into surface waters or stormwater collection systems, and less conspicuous nuisances, including the leaching of untreated wastewater into ground water. As noted above, the Jacksonville area has a relatively high ground water table, which could potentially transport fecal coliform from septic tanks through shallow ground water into the creeks.

The majority of households in Pottsburg Creek are on septic tanks. OSTDS in areas near the creeks are likely contributing to the fecal coliform concentrations and the impairment in these waterbodies. Septic tank failure areas, as determined by DCHD, are located in Craig Creek, McCoy Creek, Williamson Creek, Fishing Creek, Deep Bottom Creek, Moncrief Creek, Cormorant Branch, Pottsburg Creek, and Trout River (2203A). DCHD has issued repair permits for septic tanks in all of the 15 WBIDs. The locations of the repair permits closely correspond with the failure areas in Craig Creek, Deep Bottom Creek, Cormorant Branch, Pottsburg Creek, Trout River (WBID 2203A).

3.1.3 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; discharges from failing septic systems; and atmospheric deposition. Additional nonpoint sources may include areas with concentrated wildlife (e.g., bird rookeries) or domestic animals (e.g., dog parks). Certain land uses are likely to contribute fecal coliform loading to surface waters, including agricultural activities and marinas. 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. Marinas that provide onsite waste disposal areas (flush-out pumps) can leak or overflow and can dump raw sewage directly into a waterbody. Marinas that do not provide onsite waste disposal areas can be much larger sources of contamination if boaters discharge their waste directly into waterbodies.

Sediments in streambeds can allow stormwater conveyance systems, especially those underground, to act as reservoirs for contamination as bacteria persist and possibly regrow in

sediment environments. These sediment bacteria sources can periodically result in the influx of high levels of bacteria to receiving waters (Anderson et al., 2005; Brownell et al., 2007). Bacteria from sediments could be an issue in areas where the majority of the watershed (more than 50%) is served by stormwater treatment areas, such as Greenfield Creek, Pottsburg Creek, and Craig Creek.

Illicit connections to a stormwater system can also contribute to fecal coliform loading. COJ and FDOT have a program to identify potential illicit connections (PICs) to MS4 conveyances and tributaries. As part of this program, they have verified and removed illicit connections in Craig Creek, Williamson Creek, Fishing Creek, Deep Bottom Creek, Moncrief Creek, Blockhouse Creek, Cormorant Branch, Wills Branch, Sherman Creek, Pottsburg Creek, Trout River (WBID 2203), and Trout River (WBID 2203A). Open PIC cases for COJ and FDOT are pending in several WBIDs and the results of these investigations will be reported in the first annual BMAP progress report.

3.2 ANTICIPATED OUTCOMES

Although the relationship between fecal coliform loading and sources is not fully understood for these WBIDs, the implementation of the projects, programs, and additional source assessments in this BMAP should improve water quality in the impaired tributaries. The following outcomes are expected from BMAP implementation:

- *Improved water quality trends in the LSJR tributaries that will also help improve water quality in the main stem of the river;*
- *Achievement of TMDLs;*
- *Decreased loading of the target pollutant (fecal coliform bacteria);*
- *Increased coordination between state and local governments and within divisions of local governments in problem solving for surface water quality restoration;*
- *Securing additional state and local funding for water quality restoration;*
- *Improved communication and cooperation among local agencies allowing a more effective response to restoration needs;*
- *Determination of effective projects through the stakeholder decision-making and priority-setting processes;*
- *Enhanced public awareness of pollutant sources, pollutant impacts on water quality, and corresponding corrective actions; and*
- *Enhanced understanding of basin hydrology, water quality, and pollutant sources.*

CHAPTER 4: ASSESSING PROGRESS AND MAKING CHANGES

Successful BMAP implementation requires commitment and follow-up. In the Commitment to Plan Implementation (see **Chapter 5**), BWG members have expressed their intention to carry out the plan, monitor its effect, and continue to coordinate within and across jurisdictions to achieve water quality targets. The FWRA requires that an assessment be conducted every 5 years to determine whether there is reasonable progress in implementing the BMAP and achieving pollutant load reductions. This chapter contains the water quality monitoring component sufficient to make this evaluation.

4.1 TRACKING IMPLEMENTATION

FDEP will work with the stakeholders to organize the monitoring data and track project implementation. This information will be presented to the BWG in an annual report. The BWG has agreed to meet at least every 12 months after the adoption of the BMAP to follow up on plan implementation, share new information, and continue to coordinate on TMDL-related issues. The following types of activities may occur at annual meetings:

- ***Implementation Data and Reporting***
 - o Collect project implementation information from the stakeholders and MS4 permit reporting and compare with the BMAP schedule. **Table 20** provides a sample annual reporting form on BMAP project implementation (to be completed by the entities).
 - o Discuss the data collection process, including any concerns and possible improvements to the process.
 - o Review the monitoring plan implementation, as detailed in **Section 4.2**.
- ***Sharing New Information***
 - o Report on results from water quality monitoring and trend information.
 - o Provide updates on new projects and programs in the basin that will help reduce fecal coliform loading.
 - o Identify and review new scientific developments on addressing fecal coliform contamination and incorporate any new information into annual progress reports.
 - o Discuss new sampling technologies that will improve source identification.
- ***Coordinating TMDL-Related Issues***
 - o Provide updates from FDEP on the basin cycle and activities related to any impairments, TMDLs, and BMAP.
 - o Obtain reports from other basins where tools or other information may be applicable to the LSJR tributaries' TMDLs.

Covering all of these topics is not required for the annual meetings of the BWG, but they provide examples of the types of information that should be considered for the agenda to assist with BMAP implementation and improve coordination among the agencies and stakeholders.

TABLE 20: PROPOSED BMAP ANNUAL REPORTING FORM

2010 LSJR Tributaries BMAP

___ YEAR ___ ANNUAL IMPLEMENTATION REPORT

REPORTING ENTITY: _____ DATE: _____

Note: Relevant MS4 activities, whether contained in the BMAP or not, may be included in this report.

IMPLEMENTATION STATUS – BMAP MANAGEMENT STRATEGIES

¹ BMAP PROJECT #	AFFECTED AREA (WBID)	² BRIEF DESCRIPTION	³ PROJECTED START/ END	⁴ PROJECT/ ACTIVITY STATUS	⁵ PROJECT MONITORING RESULTS	⁶ COMMENTS
Shade if also an MS4 activity						

NEW MANAGEMENT STRATEGIES

¹ BMAP PROJECT #	AFFECTED AREA (WBID)	² BRIEF DESCRIPTION	³ PROJECTED START/ END	⁴ PROJECT/ ACTIVITY STATUS	⁵ PROJECT MONITORING RESULTS	⁶ COMMENTS
Shade if also an MS4 activity						

Directions for BMAP Annual Reporting Format:

¹ **BMAP Projects:** This includes projects and other management strategies. Use the project number assigned in the BMAP Activities Tables (e.g., COJ-1). Please include all management strategies for which you have lead responsibility in the BMAP, regardless of their status. **New Management Strategies:** Include new projects/activities that are not included in the BMAP in the New Management Strategies table. Create a project number for new management strategies by using the prefix, then -N# (e.g., COJ-N1). If a management action listed in either table is part of your MS4, please shade the project number box in grey.

² Include a brief description of the management action being reported (e.g., street sweeping removing gross debris on all streets with "L curbs" – 5 miles performed each month).

³ If applicable, include the start and end dates for the management action. If not applicable, put "N/A" or, if it is a continuous activity, put "Continuous" and indicate how often the activity takes place (e.g., for street sweeping).

⁴ Clearly summarize the status of the management action, in a way that makes sense for the item listed. For instance, for educational activities, list pertinent publications, events, etc., including name and/or topic for each. Include specific or general time frames (e.g., 2 public workshops on pet waste disposal in March 2009). Also, describe any significant changes to the management action that have taken place.

⁵ As applicable: If monitoring is required as part of a management action (e.g., in a cost-share situation), or is conducted voluntarily (e.g., as part of an effort to collect information on BMAP effectiveness), include the monitoring results to date, as practicable.

⁶ Include comments on any implementation obstacles, including weather, funding, technical difficulties, etc. Identify needs for assistance from the BWG as a whole, or from individual entities represented on the BWG. Include any other comments you consider important.

4.2 WATER QUALITY MONITORING

4.2.1 WATER QUALITY MONITORING OBJECTIVES

Focused objectives are critical for a monitoring strategy to provide the information needed to evaluate implementation success. The primary and secondary objectives of the monitoring strategy for the tributaries are described below. These objectives will be used to evaluate the success of the BMAP, help interpret the data collected, and provide information for potential future refinements of the BMAP.

Primary Objective

- *Identify additional sources in the 15 tributaries to guide the implementation of future actions to reduce fecal coliform.*

Secondary Objective

- *Track trends in fecal coliform colony counts in the tributaries through ambient monitoring to determine if reductions are occurring with the implementation of BMAP actions.*

4.2.2 WATER QUALITY INDICATORS

The water quality indicators listed in **Table 21** will be sampled to achieve the monitoring plan objectives. These parameters will be analyzed to determine if there is a correlation with the observed fecal coliform concentrations. In addition, descriptions of the field conditions are important because factors outside of water quality could affect the observed bacterial colony counts.

TABLE 21: WATER QUALITY INDICATORS AND FIELD PARAMETERS

WATER QUALITY INDICATORS
Fecal coliform (colony-forming units per 100 milliliters [cfu/100mL])
Conductivity (micromhos per centimeter [umho/cm])
Dissolved Oxygen (milligrams per liter [mg/L])
Dissolved Oxygen Saturation (%)
pH
Salinity (parts per thousand [ppt])
Temperature (°C)
Turbidity (Nephelometric Turbidity Units [NTU])
FIELD CONDITIONS
Air Temperature (°C)
Cloud Cover
Rainfall
Tide Stage
Canopy Cover
Water Flow Condition
Wind

4.2.3 MONITORING NETWORK

The monitoring network for this plan builds on existing COJ and FDEP sampling programs and stations in the basin. The entities responsible for monitoring are:

- COJ
- FDEP
- JEA
- City of Atlantic Beach
- City of Jacksonville Beach
- City of Neptune Beach
- NS Mayport

Sampling stations, parameters, frequency, and other elements of this monitoring plan may be modified as appropriate based on data obtained from the monitoring. However, any modifications made will not affect the ability of the monitoring network to fulfill the objectives described above. This monitoring plan only includes 8 of the 15 WBIDs in this BMAP. These are the worst-case WBIDs and initial monitoring efforts will focus on source assessment and fecal coliform trends in these WBIDs. The water quality for the remaining 7 WBIDs will be assessed through the routine sampling efforts by COJ and FDEP. The monitoring data for all WBIDs in the BMAP will be evaluated in Year 2 of BMAP implementation to determine if efforts should be shifted to focus on some of the WBIDs not included in this monitoring plan.

The specific stations in the monitoring network and responsibilities for sampling are described below for each WBID. Stations listed as trend will be sampled quarterly, and monitoring efforts will continue at existing locations. Stations shown as source assessment will be sampled monthly, with additional sampling occurring as needed to follow up on high fecal coliform counts. This additional sampling will follow the process outlined in the TAT Manual (PBS&J, 2006). While some of the source assessment stations are existing sampling locations, stations were added to meet the objectives of the monitoring plan and to better identify potential sources in each WBID. The monitoring plan will be initiated once the BMAP is adopted.

In addition to this monitoring plan, several of the entities conduct other monitoring in the basin that will provide additional information about water quality in the tributaries. FDEP conducts an intensive sampling event every 5 years as part of the TMDL process. This event generally involves collecting at least 20 samples over 4 seasons. To include the data in the IWR run to assess impaired waters, the samples must be collected with at least a 200-meter separation between stations, with 4 days between samples collected in the same location. COJ also collects quarterly samples in most of the tributaries as part of its routine monitoring program. COJ uses this program to meet its NPDES permit requirements.

4.2.3.1 Craig Creek Monitoring Network

X will be responsible for monitoring in Craig Creek. Table 22 lists the stations that will be sampled.

TABLE 22: MONITORING STATIONS IN CRAIG CREEK

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
21FLJXWQSS63	Trend	Quarterly	Craig Creek in Park at Hendricks Avenue	
New station	Source assessment	Monthly	Outfall to creek at Fieldston Lane	
New station	Source assessment	Monthly	Outfall to creek at Thornwood	

4.2.3.2 McCoy Creek Monitoring Network

X will be responsible for monitoring in McCoy Creek. **Table 23** lists the stations that will be sampled.

TABLE 23: MONITORING STATIONS IN MCCOY CREEK

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
21FLJXWQMC1	Trend	Quarterly	Myrtle Avenue	
21FLJXWQMC3	Trend	Quarterly	Leland Street	
TAT Station MC3	Source assessment	Monthly	South of Broadway Avenue	
New station	Source assessment	Monthly	Shearer Street between Dellwood Avenue and Myra Street	

4.2.3.3 Williamson Creek Monitoring Network

X will be responsible for monitoring in Williamson Creek. **Table 24** lists the stations that will be sampled.

TABLE 24: MONITORING STATIONS IN WILLIAMSON CREEK

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
21FLA 20030618	Trend	Quarterly	Jammes Road at Williamson Creek	
21FLJXWQCR84	Trend	Quarterly	Hyde Park Road	
21FLA 20030884	Source assessment	Monthly	Williamson Creek at Wilson Boulevard	
TAT Station WC3	Source assessment	Monthly	South of Wilson Boulevard and East of Lane Avenue	

4.2.3.4 Fishing Creek Monitoring Network

X will be responsible for monitoring in Fishing Creek. **Table 25** lists the stations that will be sampled.

TABLE 25: MONITORING STATIONS IN FISHING CREEK

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
21FLJXWQOR4	Trend	Quarterly	Timuquana Road and Fishing Creek	
21FLA 20030617	Trend	Quarterly	Fishing Creek at Ortega River Confluence	
New station	Source assessment	Monthly	Fishing Creek and West 118 th Street, east of Jammes Road and west of Blanding	
21FLA 20030604	Source assessment	Monthly	Fishing Creek at Jammes Road	

4.2.3.5 Deep Bottom Creek Monitoring Network

X will be responsible for monitoring in Deep Bottom Creek. **Table 26** lists the stations that will be sampled.

TABLE 26: MONITORING STATIONS IN DEEP BOTTOM CREEK

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
21FLJXWQSS18	Trend	Quarterly	Scott Mill Road	
New station	Source assessment	Monthly	At ditch downstream of Crown Point Road and Old St. Augustine Road	

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
New station	Source assessment	Monthly	Northern branch at Hartley Road, west of Cypresswood Drive	

4.2.3.6 Moncrief Creek Monitoring Network

☒ will be responsible for monitoring in Moncrief Creek. **Table 27** lists the stations that will be sampled.

TABLE 27: MONITORING STATIONS IN MONCRIEF CREEK

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
21FLJXWQTR316	Trend	Quarterly	33 rd Street	
21FLA 20030726	Trend	Quarterly	Moncrief Creek at Moncrief Road	
New station	Source assessment	Monthly	Southwestern branch at West 18 th Street	
New station	Source assessment	Monthly	Northeastern branch at West 63 rd Street	

4.2.3.7 Hopkins Creek Monitoring Network

☒ will be responsible for monitoring in Hopkins Creek. **Table 28** lists the stations that will be sampled.

TABLE 28: MONITORING STATIONS IN HOPKINS CREEK

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
21FLJXWQIWWH	Trend	Quarterly	Kings Road	COJ
21FLA 20030697	Source assessment	Monthly	Hopkins Creek at Atlantic Boulevard	Atlantic Beach
New station	Source assessment	Monthly	Main channel at Penman Road	Neptune Beach
New station	Source assessment	Monthly	Seagate and 5 th Street	Jacksonville Beach
New station	Source assessment	Monthly	Tallwood Road and creek	Jacksonville Beach

4.2.3.8 Sherman Creek Monitoring Network

☒ will be responsible for monitoring in Sherman Creek. **Table 29** lists the stations that will be sampled.

TABLE 29: MONITORING STATIONS IN SHERMAN CREEK

MONITORING STATION	STATION TYPE	FREQUENCY	LOCATION	RESPONSIBLE ENTITY
21FLJXWQSC1	Trend	Quarterly	Puckett Creek at Wonderwood Drive	COJ
21FLJXWQIWW2	Trend	Quarterly	Sherman Creek at A1A Bridge	COJ
New station	Source assessment	Monthly	Southeastern Branch at Sherry Drive	NS Mayport
New station	Source assessment	Monthly	Ditch at southeastern branch on 20 th Street west of Selva Marina Drive	Atlantic Beach
New station	Source assessment	Monthly	Assisi Lane and Puckett Creek intersection	Atlantic Beach
New station	Source assessment	Monthly	Sherman Creek and Selva Marine Drive north of Country Club Lane	Atlantic Beach

4.2.4 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 BMAP progress but also for future TMDL evaluations and other purposes. The collection of water quality data will be conducted 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 www.dep.state.fl.us/labs/qa/sops.htm. All stakeholders contributing data in support of the BMAP agree to follow these SOPs.

4.2.5 DATA MANAGEMENT AND ASSESSMENT

Data collected as part of this monitoring plan will need to be tracked, compiled, and analyzed for it to be useful in support of the BMAP. 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 have agreed 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. The sampling entities will be responsible for submitting this type of data to FDEP in the TAT spreadsheet each month.

Only data that are uploaded to STORET or submitted to FDEP as follow-up data will be utilized in the WBID ranking process and water quality analyses. It is important that each sampling entity follow these procedures to ensure that the most current data are available for future analyses of the impairments and water quality trends in the tributaries.

4.3 ADDITIONAL ASSESSMENTS IN THE TRIBUTARIES

This BMAP provides for phased implementation under Paragraph 403.067(7)(a)1, F.S. The management actions and adaptive management approach described in the BMAP will address fecal coliform bacteria reductions, and the process will continue until the TMDLs are attained. The phased BMAP approach allows for the implementation of projects designed to achieve incremental reductions, while simultaneously implementing source assessment, monitoring, and conducting studies to understand better water quality dynamics (sources and response variables) in each impaired waterbody. During subsequent 5-year management cycles, stakeholders will evaluate progress and make adjustments, as needed, to meet the TMDLs.

Additional assessments of the tributaries are currently ongoing. FDEP has initiated a study on septic tanks in the Jacksonville area in an effort to assess fecal coliform and nutrient loadings and associated surface and ground water quality impacts from septic tanks. This study will be completed in 2010 and the results will be used to refine BMAP efforts that target OSTDS sources. FDEP also contracted with PBS&J to conduct detailed assessments of 11 impaired tributaries in 2008-2009, known as the LSJR Tributary Assessment Project. The project included a Walk the WBIDs effort to conduct a field assessment of the tributaries, MST sampling of 10 tributaries, and thermal imaging for 4 WBIDs. As part of this detailed assessment, the University of South Florida (USF) collected and analyzed sediment samples to determine the fecal coliform concentrations in the sediments. This will help improve the understanding of

bacterial regrowth in sediments and how this loading may contribute to the waterbody impairment. Of the WBIDs that received these additional assessments, this BMAP discusses Craig Creek, McCoy Creek, and Williamson Creek.

MST sampling began as a part of Walk the WBIDs in September 2008 and ended in July 2009. This sampling program utilized fecal coliform samples and MST testing, including a quantitative human assay as well as animal assays, to assist in determining if the bacteria sources are human or animal, helping to guide corrective actions. The program was designed to have fixed and flexible sampling stations, with the flexible stations moved to assist in identifying sources associated with high in-stream concentrations. As part of this effort, the TAT coordinated on implementing appropriate measures when sources were discovered.

Thermal imaging is a tool for identifying PICs in waterbodies. Often, unpermitted or unauthorized discharges come from pipes located underground and underwater, making them nearly impossible to locate through field identifications and intensive sampling alone. Thermal imagery uses the thermal portion of the light spectrum to identify inputs that are warmer than the surrounding water. This may indicate ground water, a stormwater outlet, a failing septic tank, or illicit connections as potential sources. The flyover for the thermal imaging occurred the night of February 6, 2009, with a presampling event earlier that day and a postsampling event the following morning. Of the WBIDs discussed in this BMAP, thermal imagery was completed for Craig Creek and McCoy Creek. PBS&J conducted a field assessment to follow up on the thermal anomalies identified in Craig Creek; none of the anomalies were found to be fecal coliform sources. COJ was responsible for the anomalies follow up in McCoy Creek and none of the thermal anomalies were determined to be sources of fecal coliform.

In addition to the field studies discussed above, COJ is considering a review of its septic tank ordinance (Chapter 751: Septic Tank Superfund) for potential modifications that could increase considerations for water quality impairments and cost-effective sewer expansion, in addition to addressing public health concerns. This review could include re-evaluating the criteria used to rank the septic tank failure areas to incorporate a greater focus on water quality data and potentially increase the sewerage requirements in severely impaired watersheds. The modification of the ordinance would enable COJ to more accurately identify surface waters that are most impacted by failing septic tanks, and to focus its septic tank phase-out efforts to reduce fecal coliform and nutrients entering the COJ tributaries.

4.4 DATA TRACKING AND REPORTING SYSTEMS MODIFICATIONS

The BMAP process created opportunities for local entities to invest in internal organizational changes that are not otherwise characterized in this BMAP. Through the process of understanding the basin's characteristics and each organization's respective purposes, the way in which each entity organized and reported their information under their mission statements was not well suited to the restoration process at the waterbody scale. These discussions led to the stakeholders' voluntary modification of their internal databases and/or business processes, which facilitates a restoration perspective, enabling more effective planning and management actions. Most importantly these modifications also increase the ease and effectiveness of interagency coordination and response, which is a critical element in restoration.

Currently, JEA processes provide multiple data systems for reporting quantitative performance measures specific to the organization. Through the BMAP process, JEA is making efforts to report this quantitative information spatially. This implementation effort will benefit the tributaries by allowing JEA to analyze its system data on a waterbody scale, rather than exclusively by the current systemwide analysis. JEA is working towards a GIS-compatible

electronic reporting system for construction and maintenance activities that will make the information more readily available than it currently is through the non-spatial reporting process. In addition, JEA is streamlining its database, which will include spatial information on programs and activities. As part of the expanded GIS data, first responders will have a more robust dataset to help them implement corrective actions. These improvements will aid JEA in identifying and correcting sewer infrastructure problems before they result in overflows, reducing fecal coliform loading in the tributaries.

COJ EQD and PWD each have sections that are responsible for a variety of activities. COJ is also changing its data systems to improve the processes associated with these activities. COJ is working to consolidate multiple database formats and update the online countywide GIS database to include the WBID and other key datasets; this consolidation will provide valuable information from the multiple divisions in one location.

COJ is also modifying the information included in the Citizen Action Response Effort (CARE) database, which will aid in reporting activities on a WBID basis. These modifications will improve COJ's ability to identify the problems and activities at the waterbody scale and allow it to better recognize patterns and respond to issues. The enhancements to the data systems will assist in reducing fecal coliform loading from stormwater, private wastewater infrastructure, illicit connections, and failing septic tanks.

4.5 IMPLEMENTATION MILESTONES

The full implementation of the management actions/projects identified in this BMAP is sufficient to address the fecal coliform bacteria reductions needed to meet the TMDLs. However, to verify that adequate progress is being made, a 5-year milestone will be assessed. During the 5th year following the BMAP adoption (2015), the water quality data collected as part of the monitoring plan (see **Section 4.2**) and the TAT sampling plan will be evaluated for reductions in fecal coliform levels in each WBID, and progress towards the TMDL will be documented. By this year, the median value for the fecal coliform counts in the first 4 years of BMAP implementation should be 50% of the median in the TMDL in each WBID. The median in the TMDLs was calculated to determine the in-stream percent reduction required from current conditions to achieve the fecal coliform standard of 400 counts.

If this 50% reduction is not achieved by the time of the Year 5 analysis, additional efforts may be required. These efforts may include Walk the WBIDs—type assessment actions to identify and remove sources and/or additional projects and programs to reduce and prevent sources from reaching surface waters. Achieving 50% of the required reductions will be an important milestone for this BMAP and will provide an opportunity to improve source assessment and management measures going forward. As noted in **Table 30** and Error! Reference source not found., efforts implemented since the TMDL verified period have led to improved water quality in most of the WBIDs.

TABLE 30: PERCENT FECAL COLIFORM REDUCTION SINCE THE TMDL VERIFIED PERIOD

WBID NUMBER	WBID NAME	TMDL MEDIAN*	MEDIAN (2004–2008) ¹	% REDUCTION
2297	Craig Creek		2,034	
2257	McCoy Creek	2,510	935	63
2316	Williamson Creek	2,400	780	68
2324	Fishing Creek		800	
2361	Deep Bottom Creek	2,200	1,768	20

WBID NUMBER	WBID NAME	TMDL MEDIAN*	MEDIAN (2004–2008) ¹	% REDUCTION
2228	Moncrief Creek	2,600	620	76
2207	Blockhouse Creek	2,200	980	62
2266	Hopkins Creek		847	
2381	Cormorant Branch		800	
2282	Wills Branch	4,000	570	86
2227	Sherman Creek	1,400	267	81
2240	Greenfield Creek		400	
2265B	Pottsburg Creek	800	240	70
2203	Trout River	1,184	364	69
2203A	Trout River	1,000	110	89

Note: The geometric mean was not used because there is not a minimum of 10 samples within a 30-day period, which is required under the Florida Administrative Code to calculate a geometric mean.

* The data periods for the TMDLs range between 1991 and 2008. Each TMDL uses a different time period and, in some cases, there is an overlap between the TMDL data range and the 2004 through 2008 data used as a comparison.

¹Coliform counts are #/100mL.

Major components of this BMAP to achieve the milestones are the maintenance, inspection, enforcement, and public outreach programs conducted by City of Atlantic Beach, COJ, City of Jacksonville Beach, City of Neptune Beach, DCHD, FDOT, JEA, and NS Mayport. Many of these existing programs began during the Cycle 1 verified period (1996-2003) and are ongoing programs. However, many of these programs have been enhanced since their initiation or targeted toward specific problems recently identified; therefore, these programs are expected to increase their effectiveness. Information gathered through the tributaries assessment activities, Walk the WBIDs exercise, source assessment sampling, intensive monitoring, MST, and thermal imaging have required the entities to adjust their programs to respond more efficiently to potential fecal coliform sources. These programs will continue over the next 5 years as part of BMAP implementation and continue to be refined based on new data and more experience with removing fecal coliform sources.

In addition to these programs, COJ has several capital improvement projects planned in the next 5 years including 13 projects under construction and 9 in the design phase. These 22 projects will be completed by 2013. FDOT has 1 project under construction that will be completed in 2011. Jacksonville Beach has 2 projects under construction that will be completed in 2010. Neptune Beach has 3 capital projects planned for completion in 2010. Additionally, Atlantic Beach has 3 projects in construction with scheduled completion of all by 2014.

COJ has also committed to removing septic tanks in failure areas that are within 300 meters of surface water, as part of their responsibilities in the 2008 LSJR Main Stem BMAP. As a more specific commitment for reducing coliform sources to the 15 tributaries in this BMAP, there are 2,338 septic tanks in failure areas in these WBIDs (all may not be within 300 meters of surface waters) that will be prioritized by COJ for removal. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study (see **Section 4.3**), or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023.

The capital projects discussed in this section will alleviate flooding, improve drainage systems, and remove failing septic tanks, which will reduce the amount of fecal coliform entering the tributaries.

4.6 ADAPTIVE MANAGEMENT MEASURES

Adaptive management involves setting up a mechanism for making adjustments in the BMAP when circumstances change or feedback indicates the need for a more effective strategy. Adaptive management measures include the following:

- *Procedures to determine whether additional cooperative strategies are needed;*
- *Criteria/processes for determining whether and when plan components need revision due to changes in costs, environmental impacts, social effects, watershed conditions, or other factors; and*
- *Descriptions of the BWG's role after BMAP completion.*

Key components of adaptive management to share information and expertise are tracking plan implementation, monitoring water quality and pollutant loads, and holding periodic meetings.

BMAP execution will be a long-term process. Some key projects with significant source reductions will extend beyond the first 5 years of BMAP cycle. The BWG will track implementation efforts and monitor water quality to measure effectiveness and ensure BMAP compliance. The BWG will meet at least every 12 months to discuss implementation issues, consider new information, and, if the tributaries are not projected to meet the TMDLs, determine additional corrective actions. Project implementation as well as program and activity status will be collected annually from the participating entities. The BWG will review these reports to assess progress towards meeting the BMAP's goals.

CHAPTER 5: COMMITMENT TO PLAN IMPLEMENTATION

Section 403.067(7), F.S., lays out the mechanisms for BMAP implementation (see **Appendix B**). While the BMAP is linked by statute to permitting and other enforcement processes that target individual entities, successful implementation mandates that local stakeholders willingly and consistently work together to attain adopted TMDLs. This collaboration fosters the sharing of ideas, information, and resources. The members of the BWG have demonstrated their willingness to confer with and support each other in their efforts.

The BWG members endorsed the BMAP at their [date] meeting on behalf of the entities they represent, as these members been actively involved in the BMAP process. In addition to this endorsement, FDEP will ask for letters of commitment or resolutions of support for the BMAP from the entities to ensure that as staff and board members change over time, the entity has a way to show support for the BMAP and the efforts included. This process will occur concurrently with BMAP adoption, and the written statements of commitment will be added to this chapter of the BMAP as they are received.

CHAPTER 6: CRAIG CREEK (WBID 2297)

6.1 WBID DESCRIPTION

Craig Creek, WBID 2297, is located in Duval County, east of the Lower St. Johns River within the North Mainstem Planning Unit, as designated by the St. Johns River Water Management District (SJRWMD) (**Figure 2**). The “headwaters” of Craig Creek are presumably comprised of stormwater runoff that appears to originate from its associated forks and branches at Interstate 95, just north of Inwood Circle East, and slightly east of the San Jose Boulevard and Saratoga Drive intersection (**Figure 3**). The creek generally flows west in a single channel with the exception of contributing branches and forks that join Craig Creek from the south (“south fork” and “southern branch”) and north (“north fork”). The headwaters of the north fork appear to be a wetland area just east of Interstate 95 between Westmont Street and Woodmont Avenue. It is currently unknown as to whether the open and closed conveyance systems paralleling either side of Interstate 95 eventually drain into this wetland system. The waters of the north fork flow southwest and join a closed conveyance system that originates near Belair Court, northwest of the Rockmont Street and Dellmont Avenue intersection. The north fork continues southwest and empties into the main channel at a box culvert located southeast of the St. Augustine Road and St. Augustine Road East intersection. The south fork is comprised entirely of an underground conveyance system that originates just north of Inwood Circle East. The south fork flows northwest and also joins the main channel at the box culvert south of the St. Augustine Road and St. Augustine Road East intersection. The southern branch originates slightly east of the San Jose Boulevard and Saratoga Drive intersection and stretches north before merging with the main channel north of Brookwood Road. It is also important to mention that numerous ditches, ponds, and closed conveyance systems flow into segments of Craig Creek, especially between St. Augustine Road and Hendricks Avenue. Most notably, a small tributary flows south from a wetland area, located south of Thornwood Lane, into the main channel. The waters of Craig Creek continue west from the confluence of the southern branch and flow into the St. Johns River north of River Point Road (PBS&J, December 2009).

The spatial distribution and acreage of different land use categories in the Craig Creek watershed were identified using 2004 land use coverage data from SJRWMD (**Table 31**). The dominant land use (238.6 acres; 37.3% of total coverage) in the Craig Creek watershed is classified as high-density residential, and is primarily located: (1) in the center of the watershed between Hendricks Avenue and the railroad tracks; (2) in two locations in the northeastern corner of the WBID along Interstate 95; (3) in an area along Stonemont Street; and (4) in close proximity to the downstream segment of the main channel between Green Bay Lane and West Cove Lane. The next two most abundant land cover categories are: (1) commercial/utility and institutional areas (165.4 acres; 25.8% of total coverage), located primarily along Phillips Highway; and (2) medium-density residential (105.1 acres; 16.4% of total coverage) predominantly located: (i) near the headwaters of the northern fork at Interstate 95; and (ii) at the southern branch and downstream segments of the main channel between the western WBID boundary and Hendricks Avenue (PBS&J, December 2009).

Although wetlands accounted for only 1.1% of the total land coverage of the Craig Creek watershed, there is one area (approximately 7 acres) that forms a boundary along the main channel north of Lorimier Road, just east of Hendricks Avenue and west of Fieldston Lane. It should be noted that over the duration of the LSJR Tributary Assessment Project sampling period (December 2008-July 2009), sites in this area demonstrated consistently high levels of indicator organisms in the surface waters (typically between about 1,000 and 50,000 CFU/100mL) as well as the sediments (>158,000 CFU/100mL). Although multiple human-

specific markers were also detected in these water samples, as wetlands serve as habitat for various species of wildlife, and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution observed in this area. It is also worth noting that River Oaks Park borders the downstream segment of Craig Creek west of Hendricks Avenue. Wildlife may inhabit areas of the park as indicated by two herons observed at this location during the March 2009 LSJR Tributary Assessment Project sampling event (PBS&J, December 2009).

According to the 2000 Census, there are 1,536 households in the watershed, averaging 2.06 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 614 dogs in the watershed.

TABLE 31: LAND USES IN THE CRAIG CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
High Density Residential	238.6	37.3
Commercial/ Utility/ Institutional	165.4	25.8
Medium Density Residential	105.1	16.4
Recreational	44.7	7.0
Transportation	41.5	6.5
Open Land	17.5	2.7
Low Density Residential	12.2	1.9
Water	8.1	1.3
Wetlands	7.2	1.1
TOTAL:	640.3	100.0

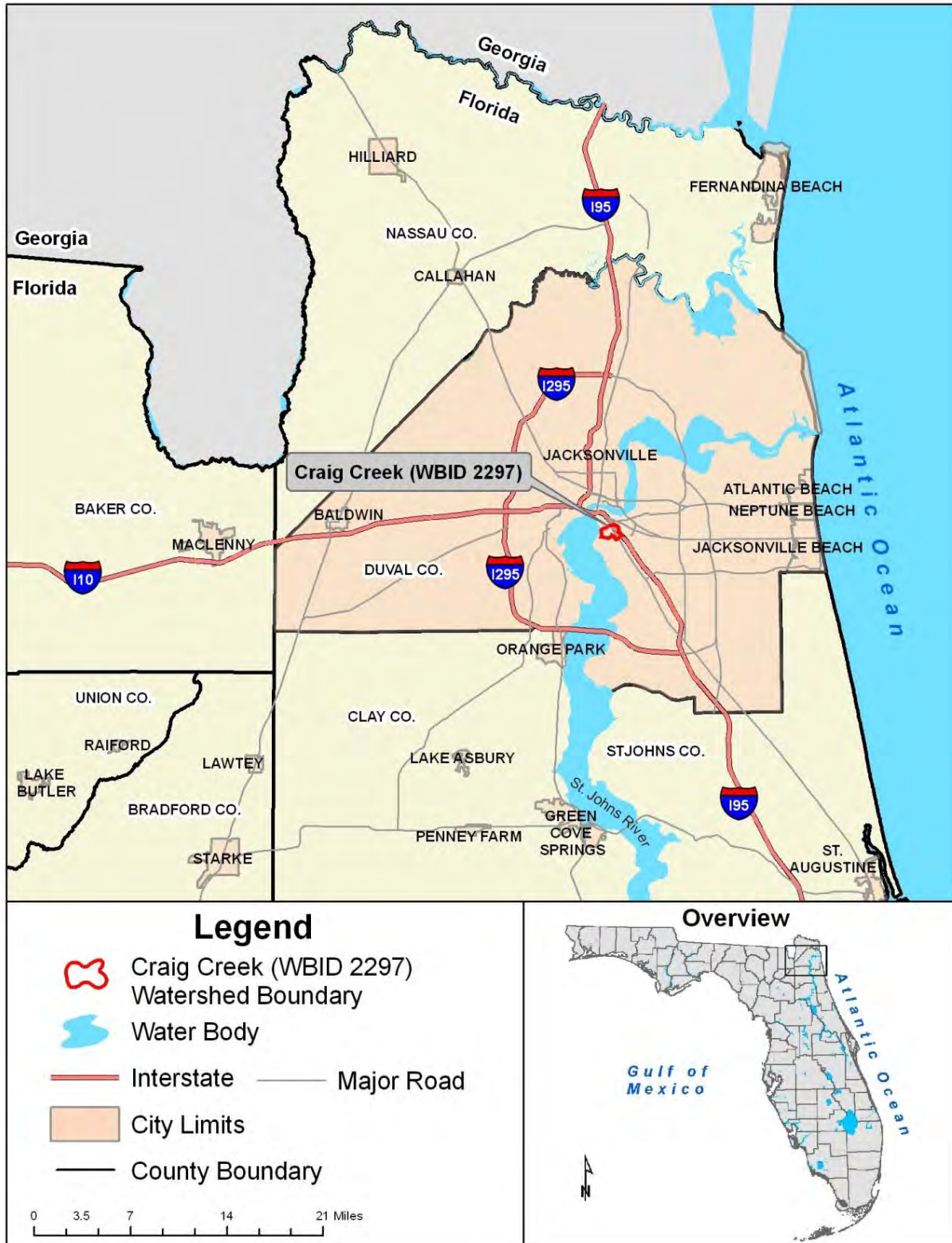


FIGURE 2: LOCATION OF THE CRAIG CREEK WATERSHED

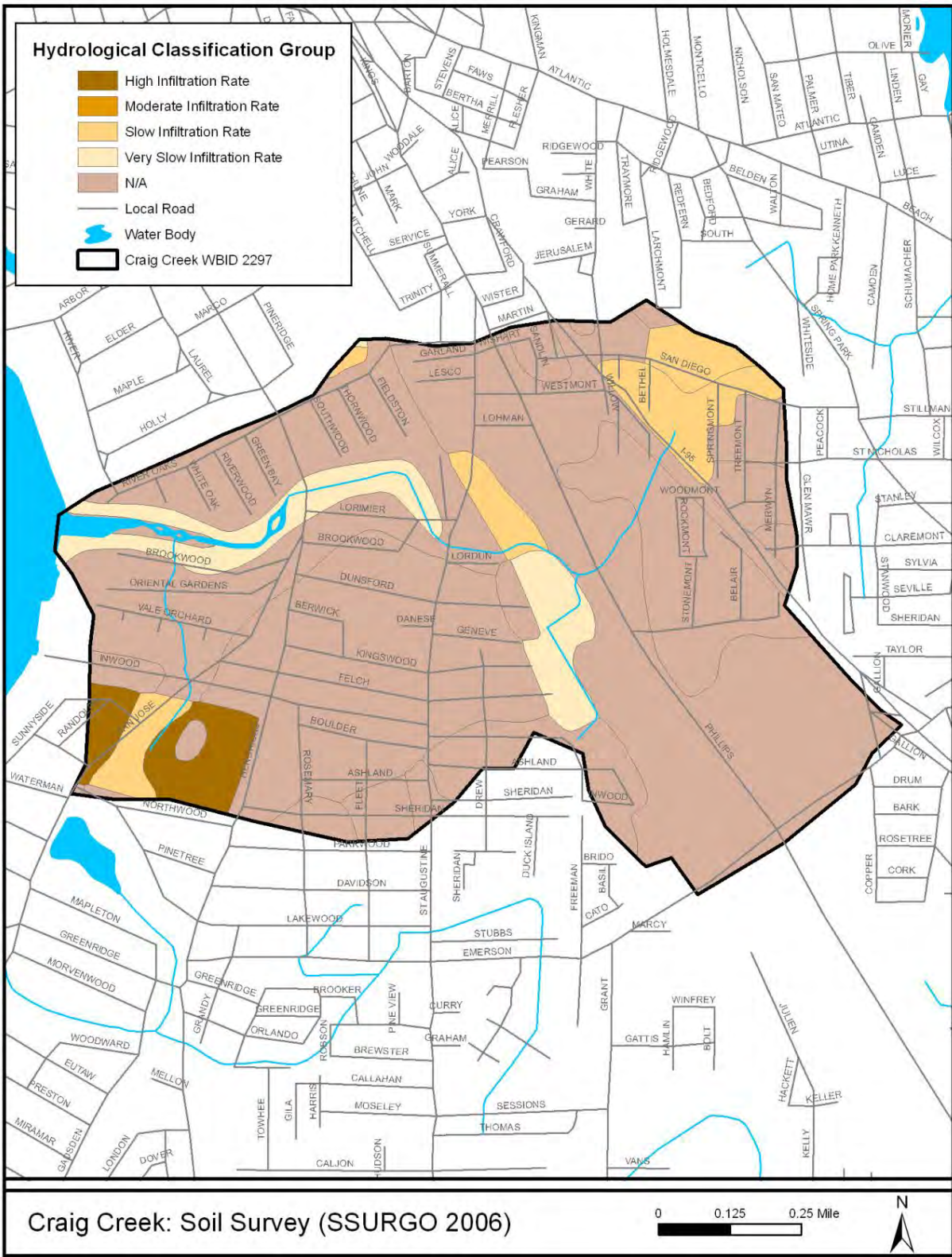


FIGURE 3: CRAIG CREEK WBID LOCATOR MAP

6.2 POTENTIAL SOURCES

6.2.1 *POINT SOURCES*

There are no industrial or domestic wastewater treatment facilities (WWTFs), CAFOs, application sites for septic residuals, or landfills permitted to discharge to Craig Creek. COJ and FDOT have an MS4 permit that includes the Craig Creek watershed (PBS&J, December 2009).

6.2.2 *ILLICIT DISCHARGES*

Contamination of the stormwater drainage system and receiving waters by illegal and/or improper discharges occurs in a variety of ways. Such discharges may include, but are not limited to, sanitary sewer flow, industrial process water, chlorinated pool water, and laundry releases. Sanitary sewer flow may result from improper connections to sanitary sewage pipes, leaking and broken sewage pipes, backups and overflows of sewage conveyance systems during localized flooding, and the direct connection of septic systems to stormwater conveyance systems that short-circuits treatment provided by the drainfield (PBS&J, December 2009).

COJ EQD and FDOT are continuing a program to identify, confirm, and respond to illicit connection issues in Jacksonville (see **Appendix E**). As part of this effort, COJ has confirmed approximately 1,100 PICs to the MS4 (as of September 2006); most were related to swimming pools and washing machines and have been resolved (PBS&J, December 2009). COJ responded to and investigated 38 PICs in the Craig Creek watershed between 1998 and 2009. Of these, 2 were verified as illicit connections and were removed and 34 PICs were confirmed as not illicit. There are currently 2 PICs that are pending investigation.

6.2.3 *CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS*

The Craig Creek watershed is located within the Buckman JEA WWTF service area. There are an estimated 1,075 households (approximately 70% of households) connected to the sanitary sewer system within the Craig Creek watershed. This watershed supports over 99 kilometers (62 miles) of sewer lines and two sanitary sewer lift stations (including one private), as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters (PBS&J, December 2009).

Available GIS data indicate that sewer infrastructure is generally located in close proximity to surface waters throughout the watershed with the exception of portions of the south fork. Collection lines and associated manholes parallel and cross the north fork from Woodmont Avenue south to the confluence with the south fork and main channel. This pattern extends along Craig Creek to Lorimier Road where the sewer infrastructure becomes slightly offset from the main channel, though remains in close proximity to contributing ditches in the area, especially north of the main channel. Sewer infrastructure becomes more closely associated with the main channel west of Hendricks Avenue where a trunk line crosses over the surface waters in River Oaks Park. Sewer collection lines, as well as a trunk line, also cross the southern branch in several locations south of Brookwood Road. In contrast, the two sanitary sewer lift stations within the Craig Creek watershed are both located along the southern WBID boundary and are relatively distant from any contributing surface waters. The overall close proximity of sanitary sewer infrastructure to Craig Creek increases the possibility of potential spills and/or unidentified sewer infrastructure leaks to impact surface waters (PBS&J, December 2009).

There have been a total of 6 SSOs reported by JEA within the Craig Creek WBID boundaries between March 2001 and July 2008 (**Table 32**); the SSO events are mainly located in the

midstream and upstream portions of the watershed. The estimated volume of spills associated with these overflows ranged from 50 to 3,500 gallons and averaged approximately 717 gallons; 2 SSOs were reported to have potentially impacted surface waters (PBS&J, December 2009). The inoculation of sediments following an SSO event or unknown infrastructure leak may lead to the persistence and likely regrowth of indicator bacteria in sediments, thus possibly allowing an influx of high levels of bacteria to receiving waters for an unspecified period (Davies et al., 1995; Anderson et al., 2005).

TABLE 32: SSOs REPORTED IN THE CRAIG CREEK WATERSHED, MARCH 2001 – JULY 2008

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Craig Creek (2297)	1-Jul-02*	200	Yes
Craig Creek (2297)	24-Feb-03	200	No
Craig Creek (2297)	20-Oct-03*	3,500	Yes
Craig Creek (2297)	29-Jun-05	50	No
Craig Creek (2297)	21-Feb-06	50	No
Craig Creek (2297)	2-Mar-06	300	No

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

6.2.4 OSTDS

The Water and Sewer Expansion Authority (WSEA) estimates that there are approximately 133 OSTDS in the Craig Creek watershed. Households that utilize septic systems are located near Craig Creek surface waters: (1) just west of the north fork along Redmond Avenue; (2) near the headwaters of the south fork just north of Inwood Circle North, within the Inwood Terrace failure area; (3) at two locations north of the main channel between Southwood Lane and Fieldston Lane; and (4) at one site near the downstream segment of the main channel, just southeast of River Road. In addition, according to DCHD, 14 septic system repair permits were issued within this watershed. The permits and presumably failed septic systems are located primarily near the southern WBID boundary. Two failure areas, Inwood Terrace and Freeman, are located in the southern portion of the WBID near the headwaters of the south fork. According to WSEA, there is no planned activity for the transition from OSTDS to centralized sewer in these failure areas (PBS&J, December 2009).

6.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the Craig Creek WBID contains predominantly 10% to 25% impervious surface. Areas with less than 10% impervious surface primarily correspond to wetland land use classifications. Areas with 10% to 25% impervious surface occur throughout the WBID. Areas of the WBID with greater than 25% impervious surface are typically consistent with commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) at the north fork between Phillips Highway and Interstate 95; (2) at the south fork between the railroad tracks and Phillips Highway; and (3) along the upstream segment of the main channel west of Phillips Highway (PBS&J, December 2009).

The potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients within the WBID range from low-to-high depending on the area of the watershed. Lower runoff coefficients were calculated primarily in areas classified as wetlands, open land, and low-density residential. The highest runoff coefficients correlated with high-density residential, transportation, and commercial/utility and institutional land use classifications and are located in

close proximity to surface waters: (1) at the north fork between Phillips Highway and Interstate 95; (2) at the south fork between the railroad tracks and Phillips Highway; and (3) along the main channel between Hendricks Avenue and Phillips Highway. High stormwater coefficients indicate that there is a potential for stormwater to impact surface waters in these areas (PBS&J, December 2009).

The storm sewer network in the Craig Creek watershed includes 14 permitted stormwater treatment areas, encompassing approximately 12.54% to 67.31% of the WBID area. Stormwater infrastructure within the WBID includes 24 outfalls by receiving water (one is classified by FDEP as a “major outfall”) and 307 inlets. Although closed conveyances are common throughout the WBID, there are fewer open ditch systems present in the watershed. Ditches form segments of the: (1) main channel from Hendricks Avenue east to the railroad tracks; (2) southern branch from the confluence with Craig Creek south to Vale Orchard Lane; and (3) south fork from Geneve Street south to Inwood Terrace. Ditches are also located: (1) extending from San Diego Road to just outside the northeast corner of the WBID; (2) parallel to the east side of Interstate 95 from outside the eastern WBID boundary at Taylor Street northwest to Westmont Street; (3) parallel to the west side of Interstate 95 along the western WBID boundary near Taylor Street northwest to just north of Woodmont Avenue; (4) parallel to Phillips Highway near the southern WBID boundary; (5) parallel to the railroad tracks from the southern WBID boundary northwest to near Fetch Avenue; (6) parallel to the railroad tracks adjacent to the stormwater pond at St. Augustine Road; (7) extending from the railroad tracks in the northern portion of the WBID southwest to the main channel southwest of Fieldston Lane; and (8) on the east side of the railroad tracks north of the St. Augustine Road and St. Augustine Road East intersection. The ditch systems located along the east side of Interstate 95, parallel to the railroad tracks in the southern portion of the WBID, parallel to the railroad tracks at the stormwater pond near St. Augustine Road, and extending from the railroad tracks southwest past Fieldston Lane, all appear to merge directly with the main channel or with its associated forks (PBS&J, December 2009).

There are also several ponds located in close proximity to Craig Creek surface waters: (1) in close proximity to the south fork just east of Felch Avenue; (2) in close proximity to the main channel slightly south of the St. Augustine Road and St. Augustine Road East intersection; and (3) at the upstream segment of the southern branch just southeast of the Inwood Terrace and San Jose Boulevard intersection. As these ponds are in close proximity to Craig Creek, there is a potential for their waters to merge with Craig Creek surface waters (PBS&J, December 2009).

6.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

6.3.1 JEA ACTIVITIES IN THE CRAIG CREEK WATERSHED

6.3.1.1 Completed JEA Projects

The Elder Lane Part 1 project included the replacement of old water, sanitary sewer, and storm sewer lines with new ones. Areas along Hendricks Avenue between River Oaks Road and Dunsford Road were included in this project; the estimated start and completion dates of this project are unknown. The St. Augustine Road project (September 5, 2000-January 2001) used the cured in place pipe (CIPP) method to rehabilitate sewer lines in areas of the Craig Creek watershed at St. Augustine Road from Ashland Street to Lorimier Road and at Dunsford Road from St. Augustine Road to Craig Creek. The San Jose-Granda to Brookwood CIPP project (October 3, 2000-January 2001) included CIPP rehabilitation of a 30-inch sewer line along San Jose Boulevard from Granada Boulevard north to Brookwood Road. The South Shores CIPP project (March 12, 2001-August 13, 2001) included a small area of the downstream segment of

Craig Creek along River Road from the northern WBID boundary south to River Oaks Park. The West Englewood Project used pipe bursting to rehabilitate sewer infrastructure within and near many areas of the Craig Creek watershed. The River Oaks CIPP project (September 24, 2001-March 1, 2002) involved the rehabilitation of approximately 4,670 linear feet of sewer pipe using the CIPP method. In addition to the new sewer lines, this project included the replacement of individual service connections that run from the main sewer line in the street to the City's right-of-way. The Jacksonville East CIPP project (October 20, 2003-April 20, 2004) objective was the rehabilitation of deteriorated 8- to 24-inch gravity sewer lines using the CIPP method in areas south of the main channel. The Phillips Belair Infrastructure project (January 5, 2004-June 15, 2006) included the replacement of existing water mains and sewer lines in upstream areas of the watershed at Phillips Highway, Woodmont Avenue, Rockmont Street, Stonemont Street, Dellmont Avenue, and Belairs Road South (PBS&J, December 2009).

As part of the LSJR Tributary Assessment Project, JEA was specifically requested to perform field investigations at 1821 Kingswood Road in response to high fecal coliform levels (>200,000 CFU/100mL) from a water sample collected at the curb on September 9, 2008. Also, after COJ EQD reported a cave-in near a manhole on Kingswood Road on October 1, 2008, JEA investigated the area and discovered a void in the manhole. Repairs for the manhole were estimated to be completed by JEA the following week. In response to extreme bacteria levels and the presence of multiple human-specific markers during the course of the LSJR Tributary Assessment Project at sampling locations just southwest of Thornwood Lane, JEA also performed investigations of the nearby sewer collection system. The gravity lines between Hendricks Avenue and Fieldston Lane were dye tested by JEA on April 21, 2009, at which time no leaks were detected. Additional inspections performed by JEA on July 7, 2009 indicated that all collection lines were comprised of high density polyethylene (HDPE) pipe (as of 2003) except along Thornwood Lane, where portions of pipe remained vitrified clay and cast iron. CIPP was completed on these lines, as well as the associated lateral lines to the right-of-way, on August 20, 2009. Laterals associated with HDPE lines were reported by JEA as being HDPE to the right-of-way. Lateral lines on the private side of the right-of-way remain vitrified clay unless previously replaced by the owners. Of these vitrified clay laterals, 7 are owned by JEA. JEA was also requested to perform investigations at a manhole just south of 2750 Hendricks Avenue in River Oaks Park that showed signs of an unreported SSO during PBS&J field investigations (July 15, 2009). On July 17, 2009, JEA reported the manhole to be operating properly upon inspection but that the location of the manhole makes further inspection by closed-circuit television difficult (PBS&J, December 2009).

6.3.1.2 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) Fats, Oils, and Grease (FOG) Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) Capacity, Management, Operations, and Maintenance (CMOM) Program. **Appendix E** describes each of these programs.

JEA conducts several types of activities to replace or rehabilitate failing or leaking infrastructure, including pipe bursting to increase carrying capacity and CIPP to install a new inner lining in the pipe. A total of 24.88% of the sewer lines in the watershed have been pipe burst and 1.43% had CIPP. JEA has also replaced or repaired components on 1 of the 2 (50%) lift stations in the WBID. In the watershed during fiscal year (FY) 2009, using a closed circuit television system, JEA inspected 3,147 linear feet (LF) of pipe. It also pipe cleaned 5,114 LF of pipe to avoid

blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 33** provides additional information on JEA's activities in the Craig Creek watershed.

TABLE 33: JEA ACTIVITIES IN THE CRAIG CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-1	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 81,434	\$4,172,556	JEA	Ongoing
JEA-2	CIPP - Install New Inner Lining	Rehabilitation of failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 4,690	\$626,970	JEA	Ongoing
JEA-3	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-4	Pump Station SCADA Upgrades	Retrofit completed in 2004; all stations constructed since have SCADA installed ; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-5	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Complete
JEA-6	Pump Station Class I/II Rebuilding	Repair or replace components of existing pump stations	1 project in watershed in FY09	\$22,125	JEA	Ongoing
JEA-7	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (S5 Gen on Basil Road)	Unknown	JEA	Planned
JEA-8	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	3,147 feet of pipe inspected in FY09	Unknown	JEA	Ongoing
JEA-9	Pipe Cleaning - JEA	Clean existing pipes to avoid blockages	5,114 feet of pipe cleaned in FY09	Unknown	JEA	Ongoing
JEA-10	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-11	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-12	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-13	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-14	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-15	Walk the WBID – Chronic Exceedances and Human Markers near CC2, TCC2, and TCC2A	Dye testing found no leaks and additional inspections found no sewer problems	Not applicable	Unknown	JEA	Complete
JEA-16	Walk the WBID – Elevated Levels at TCC1	Investigated and found no sanitary sewer in area	Not applicable	Unknown	JEA	Complete
JEA-17	Walk the WBID – SSO at 2750 Hendricks Avenue Manhole	No problems during inspection but will regularly check manhole to determine cause of SSOs	Not applicable	Unknown	JEA	Planned

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

6.3.2 DCHD ACTIVITIES IN THE CRAIG CREEK WATERSHED

6.3.2.1 Completed DCHD Projects

As part of the LSJR Tributaries Assessment Project, DCHD was requested on to investigate the outlet hose that was observed to be disconnected from the recreational vehicle at 3018 St. Augustine Road on September 9, 2008. DCHD reported that if the hose is kept connected, the owner will remain in compliance; a permit is not necessary for a temporary holding tank under 300 gallons (PBS&J, December 2009).

6.3.2.2 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** includes a description of each of these programs.

Failure and nuisance areas were first identified in 1999–2000. As of July 28, 2008, DCHD updated the listing of failure and nuisance areas and corrected the accuracy of the defined geographic areas through the re-evaluation process. The Emerson and Freeman/Inwood failure areas are located in the watershed. The ranking of these areas is determined using an 8-point criteria system. One of these criteria, sanitary conditions, is based on fecal coliform concentrations and is analyzed using the TAT ranking process described in **Section 1.3.3**. Those areas scoring above a total of 56 points across all 8 criteria (a maximum of 80 possible points) have been identified as “nuisance areas” (PBS&J, December 2009).

DCHD has implemented the OSTDS Program to address septic tanks as a potential source in the watershed. As part of this effort, it has issued 14 new construction permits, 14 repair permits, and 5 abandonment permits in the WBID. In addition, 3 annual operating permits have been issued for performance-based treatment and disposal systems (PBTS) in the watershed. DCHD also performs a plan review and site evaluation for each application received for an OSTDS, whether it is new construction or repair or modification to an existing system. In the watershed, DCHD has conducted 28 plan reviews and site evaluations. In addition, it has performed 22 investigations in response to complaints received. DCHD will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 34** lists DCHD's projects in the Craig Creek watershed.

TABLE 34: DCHD ACTIVITIES IN THE CRAIG CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-1	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 14 new construction permits, 14 repair permits, and 5 abandonment permits issued	\$14,425	FDOH/LSJR SWIM Grant	Ongoing
DCHD-2	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within industrial/manufacturing zones (IMZ), and commercial systems	3 annual operating permits issued for commercial properties	\$7,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-3	Surface Water Improvement and Management (SWIM) Project	Implementation of broad-ranging septic tank ordinance	Approximately 9.4% of Emerson Septic Tank Failure Area and 19.6% of Freeman/Inwood Septic Tank Failure Area exist within this WBID	\$83,600	FDOH/LSJR SWIM Grant	Ongoing
DCHD-4	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-5	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 28 plan reviews and site evaluations have been performed within based upon permitting history	\$7,000	FDOH/LSJR SWIM Grant	Ongoing
DCHD-6	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-7	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	22 complaint investigations have been performed	\$7,350	FDOH/LSJR SWIM Grant	Ongoing

6.3.3 COJ ACTIVITIES IN THE CRAIG CREEK WATERSHED

6.3.3.1 Completed COJ Projects

COJ has completed a regional pond project on St. Augustine Road from Emerson to US 1 that treats stormwater from an area of 167 acres. This project provides stormwater treatment, which helps to reduce fecal coliform loading to Craig Creek from stormwater runoff in this area.

6.3.3.2 COJ Projects under Construction

COJ also has a drainage system rehabilitation project under construction. This project will improve the curbing along Vale Orchard Lane where the previous street repairs have settled

and damage the curbing. These improvements will help make the stormwater system in this area more effective.

6.3.3.3 Ongoing COJ Programs and Projects

COJ has also established a monitoring plan to evaluate the effectiveness of the Stormwater Management Program (SWMP) and the associated pollutant reduction from MS4 systems to waters of the state to the Maximum Extent Practicable. The monitoring plan is a requirement of Part V.B. of the COJ/FDOT NPDES MS4 permit and supported by Title 40 of the Code of Federal Regulations, Part 122.26(d)(2)(iii). It is the responsibility of the MS4 co-permittees (COJ, FDOT, City of Atlantic Beach, and City of Neptune Beach). In this watershed, 1 routine monitoring station is sampled quarterly, with 55 samples taken between 1995 and 2009. The *Annual Report Form for Individual NPDES Permits for Municipal Separate Storm Sewer Systems (Subsection 62-624.600[2], F.A.C)* provides additional information on the SWMP.

In addition to the routine monitoring, COJ EQD is part of the TAT and conducts sampling to help identify potential sources of fecal coliform contamination. In 2008 and 2009, EQD collected a total of 19 samples as part of the TAT.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. From 2005 through 2009, this included 75 work orders for ditch and creek regrading, erosion control, and cleaning; 5 work orders for lake and pond maintenance; and 138 work orders for the repair/clearing of blocked structures and measures to prevent flooding. PWD will maintain a future level of effort for the maintenance activities based on information in the CARE database.

In addition, COJ EQD is working with England-Thims and Miller (ETM) to implement the PIC Program. ETM is currently developing an inventory and mapping MS4s in Duval County. COJ EQD keeps a record of reported PICs in a database, and that information is transferred into GIS. This system is checked to determine where site visits are necessary. COJ inspectors conduct the site visits and talk to both the people who live on the site, as well as their neighbors, to verify the nature of the issue. If there is a known discharge, the inspector investigates in order to direct the resolution of the discharge to the appropriate entity (COJ, DCHD, or FDEP). If necessary, a sample is collected to determine the nature of the discharge. COJ may assist the individual in remedying the situation and return to ensure that the connection has been removed (PBS&J, December 2009). Between 1995 and 2009, 38 PICs were identified in the Craig Creek watershed, of which 2 were confirmed as illicit and removed.

Educational outreach is a vital part of the PIC Program. COJ EQD, and formerly COJ PWD, primarily provides this outreach by distributing materials to the public such as educational pamphlets and informational door hangers, and through a storm drain–stenciling program. COJ also collaborates with SJRWMD's Watershed Action Volunteer (WAV) Program, which equips volunteers through training and education to perform a variety of tasks to improve the environmental quality of their local watersheds (PBS&J, December 2009).

In the Craig Creek watershed, inspections between 1995 and 2009 included 1 investigation into an illicit water discharge, 8 illegal discharges, 2 sewer lines that drained into a yard or ditch, 8 SSOs, and 1 private lift station. These inspections are initiated through information from the CARE database, and PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 35 provides additional details on COJ's activities in the watershed.

TABLE 35: COJ ACTIVITIES IN THE CRAIG CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Capital Improvement Projects						
COJ-1	St Augustine Rd (Emerson to US 1) (Main Stem COJ-7)	Regional Pond	167 acres	Unknown	COJ	Complete
Drainage System Rehab Projects						
COJ-2	Vale Orchard Lane Street Improvements	Previous street repair has settled and damaged side curbing	Unknown	Unknown	COJ	Construction
MS4 Maintenance Activities						
COJ-3	Ditch/Creek Regrade/Erosion/Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	75 (for 2005-09)	\$15,111	COJ	Ongoing
COJ-4	Lake or Pond Problem		5 (for 2005-09)	Unknown	COJ	Ongoing
COJ-5	Structure Blocked/Repair/General Flooding		138 (for 2005-09)	\$7,429	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-6	Illicit Water Discharge	CARE initiated	1 (for 2006)	\$379	COJ	Ongoing
COJ-7	Pollution - Water - Illegal Discharge	CARE initiated	8 (for 1999-2008)	\$3,032	COJ	Ongoing
COJ-8	Sewer drains into yard/ditch	CARE initiated	2 (for 2008)	\$758	COJ	Ongoing
COJ-9	Sewer Overflow	CARE initiated	8 (for 2000-09)	\$3,032	COJ	Ongoing
COJ-10	Private Lift Station Inspection	1 private lift station in the WBID	1 (for 2009)	\$379	COJ	Ongoing
COJ-11	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-12	Illicit Discharge Detection and Elimination	2 open, 2 illicit	38 (for 1998-2009)	\$4,402	COJ	Ongoing
COJ-13	Follow Up on Outstanding PICs	Follow up on the 2 open PICs in the watershed	2 (for 2010-2011)	Unknown	COJ	Planned
COJ-14	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	55 (for 1995-2009)	Unknown	COJ	Ongoing
COJ-15	TAT Sampling	Conducted by EQD to assess bacteria levels in the creek and help identify potential fecal bacteria sources	19 (for 2008-09)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-16	Freeman Road/Inwood Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	28 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-17	Emerson Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	87 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-18	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	18 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-19	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-20	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

¹ COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study, or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023. For the 15 tributaries addressed in this BMAP, the failing tanks within 300 meters of surface waters will be included in the COJ plan and schedule to phase out tanks and will be identified as Tributaries BMAP-related tanks.

6.3.4 FDOT ACTIVITIES IN THE CRAIG CREEK WATERSHED

6.3.4.1 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a Drainage Connection Permit (DCP) Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT Drainage Connection permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. Street sweeping occurs monthly on 16 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 8 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. A total of 26 PICs have been identified in FDOT conveyances with 5 that were true illicit connections and removed. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund a monitoring station in the Craig Creek watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 36** lists FDOT's activities in the watershed.

TABLE 36: FDOT ACTIVITIES IN THE CRAIG CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-1	PIC Program	Search for illicit connections	Effort is continuous in this WBID	See Note 1	FDOT/COJ	Ongoing
FDOT-2	PIC Program	Illicit connections identified and removed if found to be true illicit	26 identified and investigated, 5 found to be true illicit and removed	See Note 1	FDOT/COJ	Ongoing
FDOT-3	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	55 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-4	TAT Sampling	Conducted by COJ EQD to further assess bacteria levels in the stream and to help identify potential fecal bacteria sources	19 (for 2008-09)	See Note 2	FDOT/COJ	Ongoing
FDOT-5	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-6	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 8 miles of roadway and associated stormwater conveyance systems currently maintained in this WBID; approximately 16 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

6.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 33 through **Table 36** list the projects and programs to reduce fecal coliform loading in the Craig Creek watershed. Several key efforts completed in this WBID are summarized, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Craig Creek based on the best information available about fecal coliform sources. As water quality improves as a result of these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Craig Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

6.4.1 OSTDS

Failure Area – Based on the GIS current database, there are approximately 133 septic tanks in the WBID. Of these, 115 OSTDS are eligible for sewer connection due to their inclusion in the Freeman Road/Inwood and Emerson failure areas. COJ committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. The failing tanks in the Freeman Road/Inwood and Emerson failure areas in the Craig Creek watershed that are within 300 meters of a surface water will be included in the COJ phase-out plan and schedule, as described in the Main Stem BMAP, and will be identified in the plan as Tributaries BMAP-related efforts.

Repair Permits – Outside the failure areas, there are no indications that additional failure areas are developing. The majority of the 14 repair permits filed in the WBID closely correspond to the failure areas. Therefore, the 18 OSTDS outside of the failure area are not an immediate threat to surface water contamination.

Program Implementation – City ordinances, inspections, and program implementation, combined with DCHD permit review processes and inspections, proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure areas and to prevent the creation of new OSTDS sources.

6.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there is 1 private lift station in the watershed that was inspected by EQD in 2009. COJ will continue to inspect the private lift

station annually to ensure it is operating properly and should take enforcement action when necessary.

Project Implementation – JEA has pipe burst 24.9% and CIPP 1.43% of the sewer lines in the WBID and upgraded 50% of the lift stations. These sewer infrastructure repairs constitute a large percentage of the sewer infrastructure in the WBID, indicating that the previous system was due for substantial maintenance and that these repairs and upgrades have likely addressed some leakage and potential SSO problems. There is 1 lift station, S5 Gen on Basil Road, on the WBID boundary that JEA should confirm if the station is located in the watershed. The results of this investigation will be included in the first annual BMAP report. In addition, during the LSJR Tributary Assessment Project, problems were observed at the manhole at 2750 Hendricks Avenue. JEA will regularly inspect this manhole to prevent further problems and report the status in the first annual BMAP report. Continued inspection, repair, and maintenance activities in conjunction with the systemwide programs and Walk the WBID follow up are sufficient to address potential sewer sources in the WBID at this time.

Program Implementation – The Root Cause Program and other SSO prevention efforts, such as FOG and CMOM, should be continued so that any additional infrastructure problems that develop will be identified and repaired. JEA will report its inspection, SSO root cause prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to demonstrate that the system is monitored and maintained.

6.4.3 STORMWATER

Illicit Connection Removal – Two illicit connections have been removed by COJ and 5 have been removed by FDOT through the PIC Program. This effort has removed illicit connections from the stormwater conveyance system that could be potential sources of bacteria. COJ and FDOT have committed to continue the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner. COJ has 2 open PIC cases and it will investigate these PICs and take any necessary enforcement during the first year of BMAP implementation. The status of these PICs will be discussed in the annual BMAP report.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. The permit program will continue, and FDOT will periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. In addition, FDOT maintains 8 miles of roadway and associated stormwater conveyances and sweeps 16 miles of roadway monthly. FDOT will continue stormwater infrastructure maintenance to help prevent potential bacteria regrowth in the MS4 conveyances.

COJ Program Implementation – COJ has completed 5 work orders to repair stormwater pond problems, 75 for ditch or creek maintenance, and 138 for structures maintenance. COJ has also completed a drainage system rehabilitation project, Vale Orchard Lane improvements, which is located downstream from a stormwater pond that overflows to the creek. This project helps to reduce stormwater runoff to the pond and ultimately to Craig Creek. The continuation of maintenance activities is sufficient to address stormwater in the watershed at this time.

LSJR Tributary Assessment Project – During the LSJR Tributary Assessment Project, high fecal coliform counts and human MST markers were found in the north fork of the watershed along the I-95 corridor and in the downstream segments near the confluence with the main channel. There are additional efforts to identify and address any fecal coliform sources in the area being considered by FDEP that still require discussion with stakeholders before sufficiency can be determined in Craig Creek.

6.4.4 OTHER ANTHROPOGENIC SOURCES

During Walk the WBID efforts, human feces were observed at a cemetery located at the Lorimier Road and St. Augustine Road intersection. Homeless were also observed sleeping in the stormwater culverts just downstream at Lorimier Road as well as upstream of the cemetery at the confluence of the north and south forks. Homeless populations in these areas may potentially contribute to the contamination of the upstream segments of Craig Creek's main channel. COJ should be aware of this potentially significant human source and prepare recommendations on how to address the situation in the annual reports until it is resolved.

TABLE 37: SUMMARY OF RESTORATION ACTIVITIES FOR THE CRAIG CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehab	X	X	X	-
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	-
Stormwater				
Flood Control Capital Projects	√	X	-	X
Capital Projects/Stormwater Water Quality BMPs	√	X	-	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	-	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	+	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	√	X	√	X
Tributary Assessment Team (TAT)	√	X	√	X
Microbial Source Tracking (MST)	^	X	^	X
Thermal Imagery To Identify PICs	^	X	^	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.
+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.
^ These source assessment efforts were completed by FDEP Northeast District Office for this WBID.

CHAPTER 7: MCCOY CREEK (WBID 2257)

7.1 WBID DESCRIPTION

McCoy Creek, WBID 2257, is located in Duval County, west of the Lower St. Johns River within the North Mainstem Planning Unit, as designated by SJRWMD (**Figure 4**). The “headwaters” of McCoy Creek are presumably comprised of stormwater runoff that appears to originate from its associated forks and branches just east of the terminus of McDuff Avenue North, southeast of the 6th Street and Division Street intersection, at Detroit Street, at College Road just west of Shearer Avenue, at West 1st Street, and northeast of Strickland Street (**Figure 5**). The creek generally flows east in a single channel with the exception of contributing branches and forks that join McCoy Creek from the south (“south fork”) and north (“north fork” and “Strickland branch”). The creek divides at Leland Street to form the north fork and the south fork. The north fork continues northwest from Leland Street until it branches west (“north fork’s southern branch”) and north (“north fork’s northern branch”) just west of the Benbow Street and Bradford Road intersection. The north fork’s northern branch continues north where it divides north to just east of the terminus of McDuff Avenue North and east to slightly east of the 6th Street and Division Street intersection. The north fork’s southern branch extends southeast to Detroit Street. A smaller branch (“Lowell branch”) extends from the north fork’s south branch just south of Lowell Avenue north to a stormwater pond at the property of A-P-A World Transport Corporation. An unnamed branch merges with north fork’s south branch just northeast of the Beaver Brooke Place and McDuff Avenue intersection; the location of the headwaters for this branch is currently unknown. The headwaters of McCoy Creek’s south fork are located at College Road just west of Shearer Avenue and extend northeast to the main channel at Leland Street. A closed conveyance system forms the Gilmore branch, which extends southeast from the south fork near the Gilmore Street and Willow Branch Avenue intersection. The Strickland branch extends north from the main channel, below the confluence of the north and south forks, just east of Smith Street near the property of the WZAZ radio station (appeared to be abandoned during the “Walk the WBIDs” effort) to just south of Strickland Street. The waters of McCoy Creek continue east to Riverside Avenue where it flows underground and empties into the St. Johns River, just west of the Acosta Bridge (PBS&J, January 2010a).

The spatial distribution and acreage of different land use categories in the McCoy Creek watershed were identified using 2004 land use coverage data from the SJRWMD (**Table 38**). The dominant land use (906.2 acres; 26.5% of total coverage) in the McCoy Creek watershed is classified as high-density residential, and is primarily located: (1) south of Interstate 10 in the southwestern corner of the WBID adjacent to the south fork; (2) east of McDuff Avenue between Burke Street and Lennox Avenue along the downstream and upstream segments of the north fork and south fork, respectively; (3) between the south fork and Woodlawn Avenue from the main channel south to Edison Street; (4) between the north fork’s northern branch and Line Street, from 2nd Street south to Orchard Street; (5) east of the north fork’s northern branch between Canal Street and Robinson Avenue from Beaver Street north to Kingston Street; (6) in the northeastern corner of the WBID; and (7) in several smaller areas along the downstream segments of the main channel. The next two most abundant land cover categories are: (1) commercial/utility and institutional areas (693.6 acres; 20.3% of total coverage), located primarily along Beaver Street, Edgewood Avenue, Interstate 10, McDuff Avenue, and Interstate 95; and (2) medium-density residential (478.2 acres; 14.0% of total coverage) predominantly located: (i) north of Beaver Street between the western WBID boundary and Superior Street in close proximity to the north fork’s southern branch; (ii) in areas northwest of the McDuff Avenue

and Interstate 10 intersection; and (iii) in smaller pockets throughout the watershed (PBS&J, January 2010a).

Although wetlands and upland forest account for only approximately 4% of the total land coverage of the McCoy Creek watershed, these areas are located in close proximity to surface waters and form a boundary along segments of main channel, north fork, and north fork's northern branch. As wetlands serve as habitat for various species of wildlife, and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution in these areas. Segments of the north fork, between Broadway Avenue and Orchard Street, and the downstream segment of the south fork, between McCoy Creek Boulevard and Edison Avenue, course through the Hollybrook Park and Westbrook Park, respectively. Although it is possible that wildlife inhabiting these parks contribute to the fecal contamination of McCoy Creek, no signs of wildlife were observed over the duration of the LSJR Tributary Assessment Project (2008-2009). During the Walk the WBIDs effort (September 30, 2008), 8 chickens were observed in a homeowners backyard, approximately 30 meters (100 feet) upstream of Commonwealth Avenue. A small chicken pen was also observed against a fence adjacent to the creek (PBS&J, January 2010a).

According to the 2000 Census, there are 7,300 households within the watershed, averaging 1.85 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 2,920 dogs in the watershed. No dogs or signs of dogs (e.g., dog feces) were observed during the course of the LSJR Tributary Assessment Project (PBS&J, January 2010a).

TABLE 38: LAND USES IN THE MCCOY CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
High Density Residential	906.2	26.5
Commercial/ Utility/ Institutional	693.6	20.3
Medium Density Residential	478.2	14.0
Industrial	429.7	12.6
Transportation	340.7	10.0
Recreational	227.4	6.7
Non-Forested Upland	112.6	3.3
Wetlands	102.1	3.0
Disturbed Land	39.6	1.2
Upland Forest	32.9	1.0
Open Land	23.1	0.7
Water	17.3	0.5
Low Density Residential	9.1	0.3
Extractive	4.9	0.1
TOTAL:	3,417.5	100

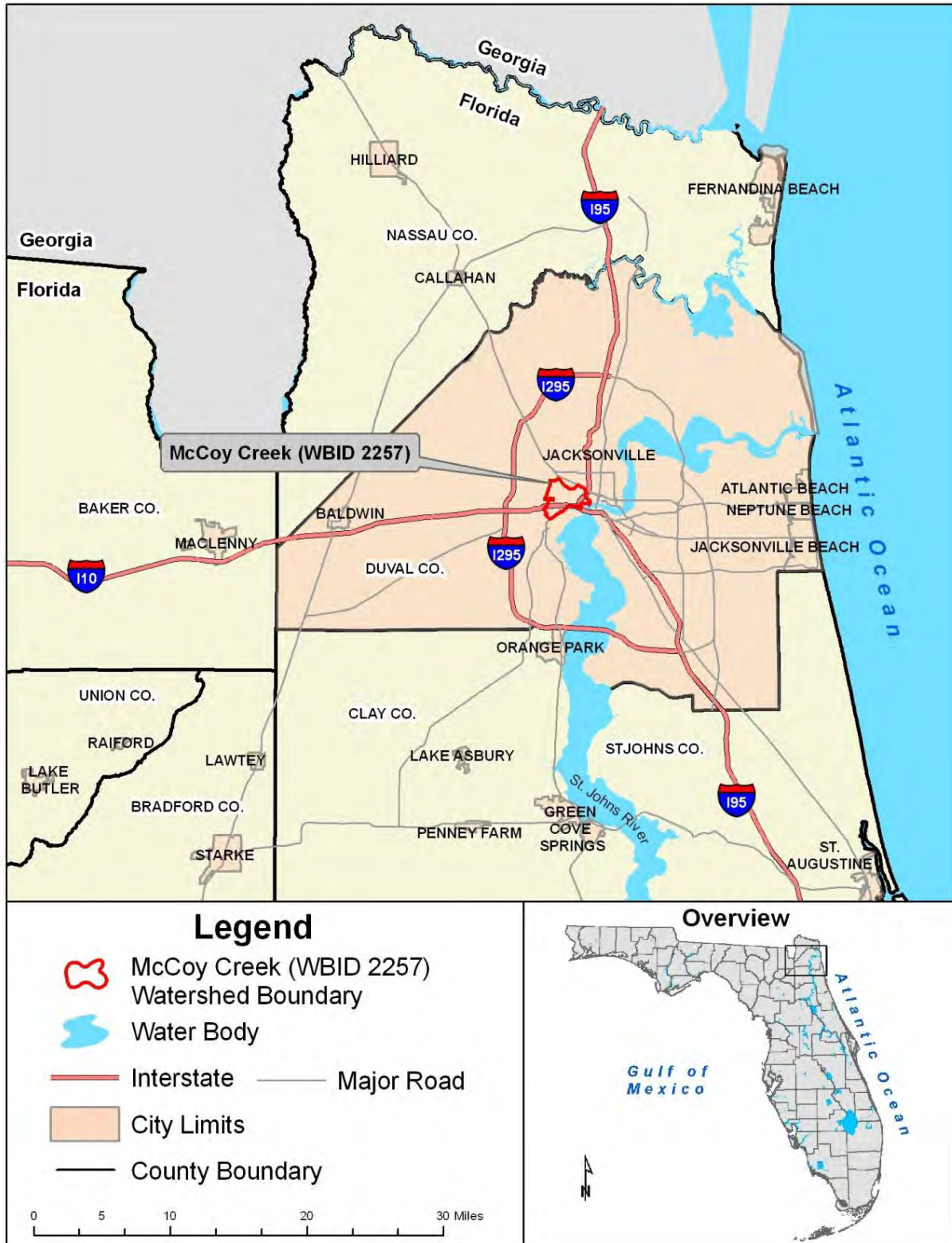


FIGURE 4: LOCATION OF THE MCCOY CREEK WATERSHED

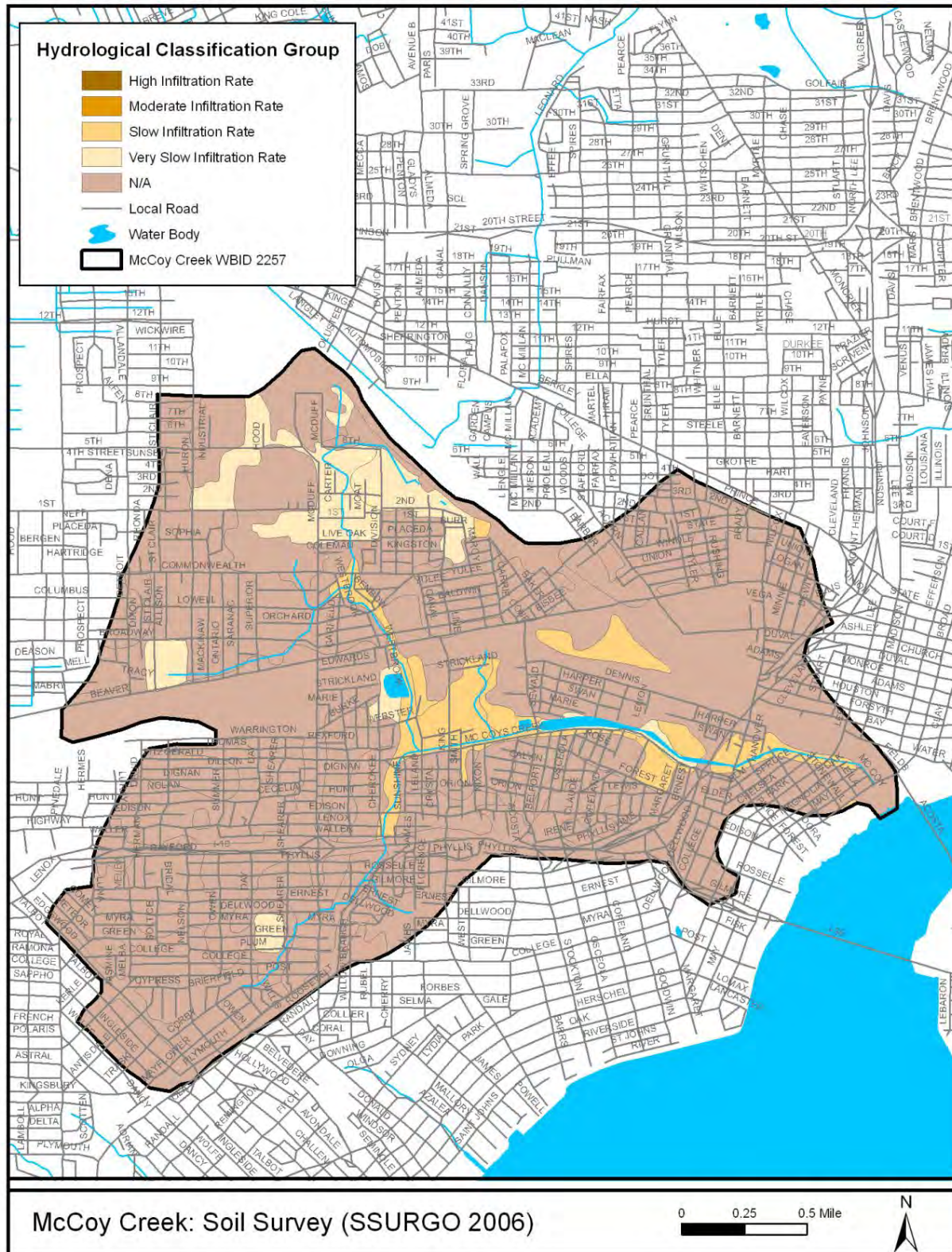


FIGURE 5: MCCOY CREEK WBID LOCATOR MAP

7.2 POTENTIAL SOURCES

7.2.1 *POINT SOURCES*

The City of Jacksonville Fleet Maintenance and CSX Transportation Inc. Moncrief Rail Yard have industrial wastewater permits west of McCoy Creek's north fork's northern branch at Industrial Boulevard and at McDuff Avenue North, respectively. In addition, the Conrad Yelvington Distributors Inc. and Load King Manufacturing have industrial multi-sector general stormwater permits (MSGPs) located just west of the north fork's northern branch at the West 1st Street and McDuff Avenue North intersection and in the northeast corner of the WBID, respectively. Lastly, Tarmac America LLC - Yelvington Ready Mix Plant has a concrete batch plant general permit north of the main channel, just north of Dennis Road. The COJ/FDOT MS4 permit includes the McCoy Creek watershed (PBS&J, January 2010a).

7.2.2 *ILLICIT DISCHARGES*

COJ EQD identified 115 PICs within the McCoy Creek watershed between 2001 and 2007. None of these were determined to be illicit; however, there are 14 PICs pending investigation in the watershed.

7.2.3 *CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS*

The McCoy Creek watershed is located within the JEA Buckman WWTF service area. There are an estimated 7,300 households (approximately 100% of households) connected to the sanitary sewer system within the McCoy Creek watershed. This watershed supports over 558 kilometers (347 miles) of sewer lines and 10 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is generally located in close proximity to surface waters throughout the watershed. Collection lines and associated manholes parallel and/or cross McCoy Creek surface waters along nearly all segments of the creek. Trunk lines parallel the main channel from Stockton Street west to Leland Street. Trunk lines also parallel surface waters at: (1) the north fork's northern branch along 6th Street; (2) the north fork from Westbrook Road south to the main channel; and (3) the south fork from the main channel south to Waller Street. Forcemains are located along the main channel from Claude Street west to Stockton Street and along the north fork from Orchard Street south to Webster Street (PBS&J, January 2010a).

Four JEA lift stations are in close proximity to surface waters: (1) near the Claude Street and McCoy Creek Boulevard intersection; (2) along the north fork at Webster Street; (3) on the south fork at Phyllis Street; and (4) on the south fork just northwest of the Shearer Avenue and Plum Street intersection (this is a new lift station that will be added to JEA's GIS infrastructure database). Two private lift stations are located at the upstream segment of the north fork's northern branch at Canal Street and at the upstream segment of the south fork at Plum Street. The remaining 5 JEA lift stations within the McCoy Creek watershed are relatively distant from any contributing surface waters. The overall close proximity of sanitary sewer infrastructure to McCoy Creek increases the possibility that potential spills and/or unidentified sewer infrastructure leaks could impact surface waters (PBS&J, January 2010a).

There have been a total of 27 SSOs reported by JEA within the McCoy Creek WBID boundaries between March 2001 and July 2008 (**Table 39**). The estimated volume of spills associated with these overflows ranged from <1 to 80,000 gallons and averaged approximately 4,098 gallons; 11 SSOs were reported to have potentially impacted surface waters. In addition to the reported SSO events, during the Walk the WBIDs effort on September 30, 2008 and again on July 17,

2009, an unsealed manhole with signs of a recent sewer overflow (i.e., debris was trapped under the manhole lid which was not on straight) was observed on the south fork near the Edison Avenue and Cherokee Street intersection. These events were likely related to recent precipitation. It is also worth noting that during preliminary field investigation (July 2, 2008) an open manhole was observed along the upstream segment of the north fork's northern branch just north of the railroad tracks at Division Street. JEA was immediately contacted to replace the manhole cover and notified that illegal dumping may have occurred (PBS&J, January 2010a).

TABLE 39: SSOs REPORTED IN THE MCCOY CREEK WATERSHED, MARCH 2001–JULY 2008

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
McCoy Creek (2257)	14-Sep-01	150	Not in Database
McCoy Creek (2257)	27-Sep-01	300	Not in Database
McCoy Creek (2257)	14-Oct-01*	20	Yes
McCoy Creek (2257)	18-Mar-02*	80,000	Yes
McCoy Creek (2257)	6-Jan-03	40	No
McCoy Creek (2257)	5-Mar-03*	15,000	Yes
McCoy Creek (2257)	11-Mar-03	10	No
McCoy Creek (2257)	10-Jun-03	200	No
McCoy Creek (2257)	3-Oct-03	120	No
McCoy Creek (2257)	20-Nov-03*	5,000	No
McCoy Creek (2257)	14-Mar-04	0	No
McCoy Creek (2257)	12-Jul-04*	2,500	Yes
McCoy Creek (2257)	16-Aug-04	250	No
McCoy Creek (2257)	16-Sep-04	900	No
McCoy Creek (2257)	20-Nov-04	25	No
McCoy Creek (2257)	31-Mar-05*	3,000	Yes
McCoy Creek (2257)	30-Dec-05	10	No
McCoy Creek (2257)	23-Jan-06	50	No
McCoy Creek (2257)	23-Jan-06*	3,000	Yes
McCoy Creek (2257)	24-Feb-06	20	No
McCoy Creek (2257)	13-Mar-06	50	No
McCoy Creek (2257)	28-Mar-06	20	No
McCoy Creek (2257)	15-May-06*	56,700	Yes
McCoy Creek (2257)	20-Jun-06*	20	Yes
McCoy Creek (2257)	6-Dec-06*	552	Yes
McCoy Creek (2257)	25-Apr-07*	300	Yes
McCoy Creek (2257)	29-May-08*	300	Yes

* Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

7.2.4 OSTDS

WSEA estimates that there are approximately 316 OSTDS in the McCoy Creek watershed. Households that potentially utilize septic systems are located near McCoy Creek surface waters: (1) near the upstream segment of the north fork's northern branch, north of 6th Street; (2) at the north fork's northern branch near 3rd Street; (3) at the north fork's northern branch at Westbrook Circle; (4) at the north fork's southern branch, north of Broadway Avenue; (5) at the north fork's southern branch at Westbrook Road; (6) along the south fork from the headwaters near Post Street downstream to Ernest Street; (7) at the downstream segment of the south fork at Edison Avenue; (8) at the downstream segment of the south fork along Sunnyside Street; (9) along the main channel at Corbett Street; and (10) in areas of the downstream segment of the

main channel next to Dora Street. In addition, according to DCHD, 11 septic system repair permits were issued within this area. The permits and presumably failed septic systems are located primarily near the southwestern portion of the WBID (PBS&J, January 2010a).

A past failure area, Murray Hill A, was located in the southwest portion of the WBID; this area intersects segments of the south fork. According to WSEA, Murray Hill A was removed from the list of septic system failure areas in 2008 due to centralized sewer in over 90% of the failure area. Four of the OSTDS repair permits within the McCoy Creek watershed are located in the former Murray Hill A failure area (PBS&J, January 2010a).

7.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the McCoy Creek WBID contains predominantly 10% to 25% and greater than 25% impervious surface. Areas with less than 10% impervious surface primarily correspond to wetland, upland forest, and non-forested upland land use classifications. Areas with 10% to 25% impervious surface occur throughout the watershed. Areas of the WBID with greater than 25% impervious surface are typically consistent with commercial/utility and institutional, industrial, and transportation land use classifications and are located in close proximity to surface waters: (1) at the upstream segment of the north fork's northern branch north of 6th Street; (2) just north of 3rd Street along the upstream segment of the north fork's northern branch; (3) adjacent to the north fork's southern branch from Huron Street downstream to Orchard Street; (4) at the Lowell branch; (5) at the north fork between the railroad tracks and Broadway Street; (6) at the south fork between Interstate 10 and Edison Avenue; (7) at the headwaters of the Gilmore branch; (8) at the head waters of the Strickland branch; (9) along the main channel from Smith Street downstream to Interstate 95; and (10) at the downstream portion of the main channel from Stonewall Street downstream to the confluence with the St. Johns River (PBS&J, January 2010a).

Furthermore, the potential for stormwater runoff was predicted through the calculation of runoff coefficients using the U.S. Soil Conservation Service (SCS) Curve Number approach (SCS, 1986). This analysis demonstrates that stormwater runoff coefficients within the WBID range from low-to-high depending on the area of the watershed. Lower runoff coefficients were calculated primarily in areas classified as wetlands, upland forest, and recreational. The highest runoff coefficients correlated with high-density residential, transportation, and commercial/utility and institutional land use classifications and are located in close proximity to surface waters in the same locations as the greater than 25% impervious surface areas. The exception to this is the high stormwater runoff potential near the headwaters of the south fork from Green Street downstream to Myra Street. High stormwater coefficients indicate that there is a potential for stormwater to impact surface waters in these areas (PBS&J, January 2010a).

The storm sewer network in the McCoy Creek watershed includes 51 permitted stormwater treatment areas, encompassing approximately 8.58% to 29.74% of the WBID area. Stormwater infrastructure within the WBID includes 86 outfalls by receiving water (five are classified by FDEP as "major outfalls") and 1,717 inlets. Although closed conveyances are common throughout the WBID, there are fewer open ditch systems present in the watershed. Ditches are located: (1) between Thompson Street and Summer Street in the southwestern portion of the WBID; (2) parallel to Interstate 10 between Nelson Street and Day Avenue; (3) at the south fork at Shearer Street; (4) at the headwaters of the Gilmore Branch at James Street; and (5) in several smaller areas in the western portion of the WBID. The ditch systems at Shearer Street and James Street appear to merge directly with the south fork and closed conveyance system outfall that forms the Gilmore branch, respectively (PBS&J, January 2010a).

There are also several ponds located in close proximity to McCoy Creek surface waters: (1) at the south fork near the eastern end of Phyllis Street; (2) parallel to the south fork just south of Fitzgerald Street; (3) just west of the south fork within Hollybrook Park; (4) on either side of the north fork's northern branch at Live Oak Avenue; (5) adjacent to the north fork's northern branch immediately south of Broadway Avenue; (6) at the north fork just east of Strickland Street; and (7) parallel to the main channel slightly east of Leland Street. As these ponds are in close proximity to McCoy Creek, there is a potential for their waters to merge with McCoy Creek surface waters. Field investigations during the "Walk the WBIDs" effort on September 30, 2008 verified that the stormwater ponds located at Live Oak Avenue near the north fork's northern branch and slightly east of Leland Street at the main channel each outfall to McCoy Creek's surface waters (PBS&J, January 2010a).

7.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

7.3.1 *JEA ACTIVITIES IN THE MCCOY CREEK WATERSHED*

7.3.1.1 **Completed JEA Projects**

JEA completed several projects between April 2001 and March 2004. The Corbett Street and Patterson pipe bursting project included the rehabilitation of approximately 3,186 linear feet of sanitary sewer pipe. The James-Nelson pipe bursting improvement project rehabilitated approximately 44,094 linear feet of existing sewer lines in the area via the pipe bursting method. The Margaret-Osceola project included the rehabilitation of nearly 5,145 linear feet of sanitary sewer lines using the pipe bursting method. Pipe bursting improvement projects occurred in McDuff and Riverside 5B. The Robinson pipe bursting project rehabilitated 30,000 linear feet of existing sewer lines in the Robinson area. The Cherokee Street CIPP project included the rehabilitation of approximately 1,068 linear feet of 36-inch sewer pipe and approximately 315 linear feet of 8-inch sewer lines. The Southwest Jacksonville CIPP project rehabilitated approximately 28,600 linear feet of deteriorated 8-inch to 18-inch gravity sewer lines. In addition, JEA is providing \$2.3 million additional funding for the addition of water and sewer lines for the Better Jacksonville Plan project McDuff and 5th Street – I-10 to Edgewood. This project includes the reconstruction of a three-lane section with bike lanes, sidewalks, and curb and gutter on both sides (PBS&J, January 2010a).

As part of the LSJR Tributary Assessment project, JEA performed field investigations at a drop inlet located at Nelson Street and Plum Avenue in response to sewage odors and elevated levels of fecal coliform results (5,600 CFU/100mL) observed during the Walk the WBIDs effort (September 30, 2008). JEA also provided a lid for an uncovered manhole identified just south of the railroad tracks at Division Street. JEA performed investigations at a manhole at the intersection of Cherokee Street and Edison Avenue that showed signs of an unreported SSO. On October 5, 2009, JEA reported that they had cleaned debris (bricks and solids) out of the manhole and reset and sealed the manhole frame with cement (PBS&J, January 2010a).

7.3.1.2 **Ongoing JEA Programs and Activities**

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA conducts several types of activities to replace or rehabilitate failing or leaking infrastructure, including: (1) pipe bursting to increase carrying capacity; (2) CIPP to install a new inner lining in the pipe; and (3) open cut to remove and replace pipe. A total of 12.10% of the sewer lines in the watershed have been pipe burst, 12.44% have CIPP, and 0.10% have been repaired through open cut. JEA has also replaced or repaired components on 1 of the 10 (10%) lift stations in the WBID. In addition, it conducts activities to help prevent future infrastructure problems. During FY09, JEA inspected 10,986 LF of using a closed circuit television system pipe, pipe cleaned 23,452 LF of pipe, and cleaned 36,394 LF of HDPE pipe to avoid blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 40** provides additional information on JEA's activities in the McCoy Creek watershed.

TABLE 40: JEA ACTIVITIES IN THE MCCOY CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-18	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 221,709	\$19,632,784	JEA	Ongoing
JEA-19	CIPP - Install New Inner Lining	Rehabilitation of failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 227,973	\$19,472,268	JEA	Ongoing
JEA-20	Open Cut - Removal and Replacement	Replacement of failing/leaking infrastructure	Total footage of open cut replacement in watershed since 2001: 1,872	\$421,936	JEA	Ongoing
JEA-21	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-22	ARV Inspection and Rehab	See Appendix E	3 of 5 ARVs replaced	\$100,000*	JEA	Ongoing
JEA-23	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-24	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-25	Pump Station Class I/II Rebuilding	Repair or replace components of existing pump stations	1 project in watershed in FY09	\$71,522.00	JEA	Ongoing
JEA-26	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	3 stations (Westbrook, McCoys, 3113 Plum Street)	Unknown	JEA	Planned
JEA-27	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-28	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	10,986 feet of pipe inspected in FY09	Unknown	JEA	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-29	HDPE Pipe Cleaning - Contractor	Clean existing HDPE pipes to avoid blockages	36,394 ft of HDPE pipe cleaned in watershed	\$45,493	JEA	Ongoing
JEA-30	Pipe Cleaning	Clean existing pipes to avoid blockages	23,452 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-31	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-32	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-33	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-34	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing
JEA-35	Walk the WBID – Inspect drop inlet at Nelson and Plum	Inspections showed no problems with manholes	Implement quarterly sampling to determine source	Unknown	JEA	Planned
JEA-36	Walk the WBID – SSO at Manhole at Cherokee Street and Edison Avenue	Manhole was repaired	Look at SCADA and pump times of stations upstream of manhole to determine what causing overflows	Unknown	JEA	Planned

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

7.3.2 DCHD ACTIVITIES IN THE MCCOY CREEK WATERSHED

7.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As part of the OSTDS Program, DCHD has issued 17 new construction permits, 11 repair permits, and 56 abandonment permits in the WBID. In addition, 15 annual operating permits have been issued for PBTS in the watershed. DCHD has also performed 28 plan reviews and site evaluations and 165 investigations in response to complaints received. DCHD will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 41** lists DCHD's projects in the McCoy Creek watershed.

TABLE 41: DCHD ACTIVITIES IN THE MCCOY CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-8	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 17 new construction permits, 11 repair permits, and 56 abandonment permits issued	\$22,400	FDOH/LSJR SWIM Grant	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-9	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ and commercial systems	Approximately 15 annual operating permits issued for commercial properties	\$37,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-10	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-11	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 28 plan reviews and site evaluations have been performed based upon permitting history	\$7,000	FDOH/LSJR SWIM Grant	Ongoing
DCHD-12	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-13	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	165 complaint investigations have been performed	\$54,950	FDOH/LSJR SWIM Grant	Ongoing

7.3.3 COJ ACTIVITIES IN THE MCCOY CREEK WATERSHED

7.3.3.1 Completed COJ Projects

COJ has completed 4 capital improvement projects in the watershed: (1) Lenox Avenue Wet Detention, which treats 108 acres; (2) McCoy Creek Ponds A and B that treat 680 acres; (3) McCoy Creek Pond F, which treats 11 acres; and (4) McCoy Creek Pond D that treats 27 acres. In addition, 4 drainage system rehabilitation projects were completed in the WBID on Winter Street, Barber Street and Broadway Street, Dignan/Day, and Acorn Street. These projects capture and treat stormwater runoff, helping to reduce stormwater-associated bacterial loadings to McCoy Creek.

In addition, as part of the LSJR Tributary Assessment Project, COJ committed to following up on the thermal anomalies identified through the thermal imagery. COJ investigated these anomalies and determined that none were sources of fecal coliform.

7.3.3.2 COJ Projects in Design or Construction

COJ currently has 1 flood improvement project, McCoy Creek – Air Liquid Site, in design and 3 projects, McCoy Creek Pond C, Melba Green Street Wet Detention, and McCoy Creek Broward/Smith Pond, under construction. In addition, the Spruce/Pine and Westbrook Circle West drainage improvement projects are under design. The Ontario Street and Labelle Street drainage improvement projects are also under construction. These projects, once completed,

will reduce stormwater runoff in their respective areas, in turn reducing fecal coliform loading to the creek.

7.3.3.3 Ongoing COJ Programs and Activities

COJ has established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. In McCoy Creek, COJ has 2 routine monitoring stations that are sampled quarterly. A total of 108 samples were taken between 1995 and 2009. In addition to the routine sampling, COJ EQD also participates in the TAT and has collected 13 samples in 2009. They also took an additional 2 samples to follow up on high fecal coliform counts in an effort to identify potential sources.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 545 work orders for ditch and creek regrading, erosion control, and cleaning; 30 work orders for lake and pond maintenance; and 858 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. Of the 115 PICs identified by COJ in the watershed, none were confirmed as illicit connections. The status of 14 PICs is still pending investigation. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

COJ PWD has also conducted inspections in the watershed, including 19 investigations into illicit water discharges, 14 illegal discharges, 5 sewer lines that drained into a yard or ditch, 59 SSOs, and 9 private lift stations. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

In addition, COJ has worked with WSEA to extend sewer lines to remove 29 septic tanks in the watershed, helping to reduce fecal coliform loading from septic tanks along the creek. WSEA uses the septic tank failure and nuisance areas ranking information for justification when seeking funding for phasing out septic tanks and transferring homes to central sewer. JEA takes these lines over once they have been installed (PBS&J, January 2010a).

Table 42 provides additional information on COJ's activities in the McCoy Creek watershed.

TABLE 42: COJ ACTIVITIES IN THE MCCOY CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	ESTIMATED COMPLETION	PROJECT STATUS
Capital Improvement Projects							
COJ-21	Lenox Avenue (Highway to McDuff) (Main Stem COJ-32)	Wet detention	108 acres	Unknown	COJ	Completed	Complete
COJ-22	McCoy Creek (Main Stem COJ-3)	Ponds A & B	680 acres	Unknown	COJ	Completed	Complete
COJ-23	McCoy Creek (Main Stem COJ-4)	Pond F	11 acres	Unknown	COJ	Completed	Complete
COJ-24	McCoy Creek (Main Stem COJ-22)	Pond D	27 acres	Unknown	COJ	Completed	Complete
COJ-25	McCoy Creek - Air Liquid site	Pond and drainage retrofit	8 acres	\$1,000,000	COJ	2010	Design
COJ-26	McCoy Creek Pond "C"	Construct pond, Hollybrook Park	Unknown	\$3,400,000	COJ	2011	Construction
COJ-27	Melba Street and Green Street	Wet detention	278 acres	\$2,701,500	COJ	Unknown	Construction
COJ-28	McCoy Creek	Broward/Smith Pond	14 acres	\$97,000	COJ	2010	Construction
Drainage System Rehab Projects							
COJ-29	Ontario Street Drainage Improvements	Property at 795 Ontario floods	Unknown	Unknown	COJ	Unknown	Construction
COJ-30	Spruce/Price Drainage Improvements	Intersection floods during heavy rains	Unknown	Unknown	COJ	Unknown	Design
COJ-31	Correct Drainage at Westbrook Circle West	Property at 1025 Westbrook is flooding	Unknown	Unknown	COJ	Unknown	Design
COJ-32	Correct Road Flooding at Labelle Street	Inadequate underdrain system allows flooding	Unknown	Unknown	COJ	Unknown	Construction
COJ-33	Winter Street	Ponding water	Unknown	Unknown	COJ	Completed	Complete
COJ-34	Barber Street and Broadway Avenue	Intersection flooding	Unknown	Unknown	COJ	Completed	Complete
COJ-35	Dignan Street/Day Avenue	Reconstruction of ditches and culverts to provide positive drainage	Unknown	\$63,408	COJ	Completed	Complete
COJ-36	Acorn Street S/W and Drainage	Replacement of sidewalks, new curbing, and new drainage infrastructure on Acorn between McQuade Street and Windle Street	Unknown	\$100,507	COJ	Completed	Complete
MS4 Maintenance Activities							
COJ-37	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	545 (for 2005-09)	\$90,183	COJ	Ongoing	Ongoing
COJ-38	Lake or Pond Problem		30 (for 2005-09)	\$2,799	COJ	Ongoing	Ongoing
COJ-39	Structure Blocked/Repair/General Flooding		858 (for 2005-09)	\$58,355	COJ	Ongoing	Ongoing
Inspection, Enforcement, and Sampling							
COJ-40	Illicit Water Discharge	CARE initiated	19 (for 2005-07)	\$7,201	COJ	Ongoing	Ongoing
COJ-41	Pollution - Water - Illegal Discharge	CARE initiated	14 (for 2000-07)	\$5,306	COJ	Ongoing	Ongoing
COJ-42	Sewer drains into yard/ditch	CARE initiated	5 (for 2005-09)	\$1,895	COJ	Ongoing	Ongoing
COJ-43	Sewer Overflow	CARE initiated	59 (for 1999-2009)	\$22,361	COJ	Ongoing	Ongoing
COJ-44	Private Lift Station Inspection	3 private lift stations in WBID	9 (for 2005-08)	\$3,411	COJ	Ongoing	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	ESTIMATED COMPLETION	PROJECT STATUS
COJ-45	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing	Unknown	COJ	2010	Planned
COJ-46	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (20016 Druid Street/4121 Dylan Street)	Unknown	COJ	2011	Planned
COJ-47	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	2 stations (CSX Warehouse 334, 1315 Canal Street)	Unknown	COJ	2011	Planned
COJ-48	Illicit Discharge Detection and Elimination	14 open, 0 illicit	115 (for 2001-07)	\$43,585	COJ	Ongoing	Ongoing
COJ-49	Follow Up on Outstanding PICs	Follow up on the 14 open PICs in the watershed	14 (for 2010-2011)	Unknown	COJ	2011	Planned
COJ-50	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	108 (for 1995-2009)	Unknown	COJ	Ongoing	Ongoing
COJ-51	TAT Sampling	Conducted by EQD to assess bacteria levels in the creek and help identify potential fecal bacteria sources	13 (for 2009)	Unknown	COJ	Ongoing	Ongoing
COJ-52	Source ID Sampling	Source identification sampling conducted when high levels of fecal coliform bacteria are noted	2 (for 2007-09)	Unknown	COJ	Ongoing	Ongoing
COJ-53	Follow Up on Thermal Anomalies	Using the thermal imagery, followed up on anomalies in the WBID; none were fecal coliform sources	2009	Unknown	COJ	Completed	Completed
Septic Tank Phase-Out Program							
COJ-54	Murray Hill A Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	58 tanks, 0 connected	Unknown	COJ	Ongoing	Ongoing
COJ-55	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	287 tanks, 29 connected	Unknown	COJ	Ongoing	Ongoing
COJ-56	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing	Ongoing
Management and Reduction of Pet and Animal Waste							
COJ-57	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing	Ongoing

¹ COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study, or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023. For the 15 tributaries addressed in this BMAP, the failing tanks within 300 meters of surface waters will be included in the COJ plan and schedule to phase out tanks and will be identified as Tributaries BMAP-related tanks.

7.3.4 FDOT ACTIVITIES IN THE MCCOY CREEK WATERSHED

7.3.4.1 FDOT Projects under Construction

FDOT has a wet detention pond located at the I-10 and I-95 intersection under construction that will treat stormwater from 119 acres. By capturing and treating stormwater in this area, the project will help reduce additional fecal coliform loading to the creek from runoff.

7.3.4.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT Drainage Connection permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 2 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. A total of 34 PICs have been identified with 32 determined to be illicit and removed and 2 PICs pending investigation. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund 2 monitoring stations in the McCoy Creek watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 43** lists FDOT's activities in the watershed.

TABLE 43: FDOT ACTIVITIES IN THE MCCOY CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-7	PIC Program	Search for illicit connections	Effort is continuous in this WBID	See Note 1	FDOT/COJ	Ongoing
FDOT-8	PIC Program	Illicit connections identified and removed if found to be true illicit	34 identified, 32 found to be true illicit and removed, 2 pending further investigation	See Note 1	FDOT/COJ	Ongoing
FDOT-9	Follow Up on Outstanding PICs	Follow up on the 2 open PICs in the watershed	2 PICs (for 2010-2011)	See Note 1	FDOT/COJ	Planned
FDOT-10	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	108 (for 1995-2009)	See Note 1	FDOT/COJ	Ongoing
FDOT-11	TAT Sampling	Conducted by EQD to assess bacteria levels in the creek and help identify potential fecal bacteria sources	13 (for 2009)	See Note 2	FDOT/COJ	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-12	Source ID Sampling	Source identification sampling conducted when high levels of fecal coliform bacteria are noted	2 (for 2007-09)	See Note 2	FDOT/ COJ	Ongoing
FDOT-13	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-14	Stormwater Management Systems	I-10 and I-95	119 acres, wet ponds	Unknown	FDOT	Under construction; completion 2011
FDOT-15	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 2 miles of roadway and associated stormwater conveyance systems currently being maintained in this WBID; a portion of this area is under construction and there are no routine maintenance activities	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

7.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 40 through **Table 43** show the projects and programs to reduce fecal coliform loading in the McCoy Creek watershed. Several key efforts completed in the WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in McCoy Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the McCoy Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

7.4.1 OSTDS

OSTDS Inspection – Based on the GIS current database, there are approximately 316 septic tanks within the WBID. Fifty-eight OSTDS are eligible for sewer connection due to their inclusion in the Murray Hill A failure area. COJ committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. The failing tanks in the Murray Hill A failure area in the McCoy Creek watershed that are within 300 meters of a surface water will be included in the COJ phase-out plan and schedule, as

described in the Main Stem BMAP, and will be identified in the plan as Tributaries BMAP-related efforts.

Capital Improvement Projects – Several COJ flood control projects have reduced high-water conditions that can contribute to septic tank failure from improperly treated waste. Flood control projects in OSTDS areas include Ontario Street Drainage Improvements, Spruce/Price Drainage Improvements, Westbrook Circle West, Labelle Street, Winter Street, Barber Street and Broadway Avenue, and Acorn Street. COJ PWD should continue to evaluate flooding in the McCoy Creek WBID, and if frequent flooding is an issue in areas with high concentrations of OSTDS, capital improvement projects should be implemented, depending on available funding to address those problems.

Program Implementation – The Walk the WBIDs effort did not reveal any additional septic tank problems. City ordinances, inspections, and program implementation, combined with DCHD permit review processes and inspections, proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure areas and to prevent the creation of new OSTDS sources.

7.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there are 3 private lift stations that are inspected by COJ annually. In accordance with COJ's private lift station inspection program, COJ is committed to the continued inspection of private lift stations in its jurisdiction to ensure that privately owned infrastructure is monitored and properly maintained by its owners. There is 1 private lift station on the WBID boundary located at 20016 Druid/4121 Dylan. COJ will report whether or not this station is located in the McCoy Creek watershed in the first annual BMAP report. In addition, there are 2 stations, CSX Warehouse 334 and 1315 Canal Street, located close to surface waters. COJ will inspect these stations to ensure they are functioning properly and take any necessary enforcement actions. The status of these inspections will be provided for the annual BMAP report.

Sewer Infrastructure Projects – JEA has completed several pipe bursting, CIPP, and open cut projects. In addition, they have upgraded 1 of the 10 lift stations and rehabilitated 3 of the 5 ARVs in the watershed. JEA also has a contract to clean HDPE pipe and, to date, more than 36,000 feet of pipe has been cleaned within the watershed. In addition, JEA addressed an SSO at 3rd Street and Bartram that was caused by a broken force main by repairing the pipe and designing a project to replace this main. The design is currently at 30% completion. These efforts have helped to reduce SSO occurrences in the WBID and have resulted in lower fecal coliform counts in the creek. JEA has 3 lift stations near surface waters: (1) Westbrook on Webster Street; (2) McCoys at McCoy Creek Boulevard; and (3) 3113 Plum Street. JEA will inspect these stations to ensure they are functioning properly and perform any necessary maintenance. The status of these inspections will be provided for the annual BMAP report.

Program Implementation – Continued program implementation is needed in the watershed. The implementation of systemwide SSO prevention programs, such as the Root Cause Program, FOG, and CMOM, should continue. JEA will report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to demonstrate that the system is monitored and maintained.

LSJR Tributary Assessment Project – During the LSJR Tributary Assessment Project, JEA was asked to inspect the drop inlet at Nelson and Plum and to determine the cause of the SSOs

at the manhole at Cherokee Street and Edison Avenue. JEA will implement quarterly sampling at the drop inlet until it is determined that this is not a source of fecal coliform contamination. In addition, JEA will look at the SCADA and pump times of the lift stations upstream of the Cherokee Street and Edison Avenue manhole to determine if the station operations can be modified to prevent future overflows at the manhole.

7.4.3 STORMWATER

Illicit Connection Removal – Through the PIC Program, FDOT has removed addressed 32 illicit connections to the MS4. COJ has 14 outstanding PIC investigations and FDOT has 2. Both COJ and FDOT will follow up and provide information on the status these outstanding PICs in the first annual BMAP progress report. COJ and FDOT have committed to continue the PIC Program, which includes identifying additional illicit connections and removing those connections in a timely manner.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. The permit program will continue, and FDOT will periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections.

Capital Improvement Projects – FDOT constructed a stormwater improvement project at I-10 and I-95 that treats 119 acres of roadway and urban runoff through a wet pond. COJ also completed 4 wet pond projects with 3 additional projects planned, and multiple drainage system rehabilitation project that are expected to relieve flooding and provide additional acres of stormwater treatment. These projects have reduced the amount of stormwater-related fecal coliform bacteria entering the creek.

7.4.4 WILDLIFE AND OTHER ANTHROPOGENIC SOURCES

During the LSJR Tributary Assessment Project, waterfowl (10 ducks) were observed at a stormwater pond that empties into the main channel just downstream of Leland Street, signifying that wildlife may be a factor contributing to the fecal pollution observed in this area. In addition, during the Walk the WBIDs field investigations, a homeless man was observed in a wooded area along the north fork's southern branch, between Orchard Street and Broadway Avenue. It is therefore possible that homeless populations contribute to the fecal contamination along this segment of the north fork's southern branch (PBS&J, January 2010a). COJ should be aware of this potentially significant source and prepare recommendations on how to address the homeless population in the BMAP annual reports until the issue is resolved.

TABLE 44: SUMMARY OF RESTORATION ACTIVITIES FOR THE MCCOY CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	√	X	-	X
Capital Projects/Stormwater Water Quality BMPs	√	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	+	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	√	X	√	X
Tributary Assessment Team (TAT)	√	X	√	X
Microbial Source Tracking (MST)	^	X	√	X
Thermal Imagery To Identify PICs	^	X	√	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.
+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.
^ These source assessment efforts were completed by FDEP Northeast District Office for this WBID.

CHAPTER 8: WILLIAMSON CREEK (WBID 2316)

8.1 WBID DESCRIPTION

Williamson Creek, WBID 2316, is located in Duval County, west of the Lower St. Johns River within the Ortega River Planning Unit, as designated by SJRWMD (**Figure 6**). The “headwaters” of Williamson Creek are presumably comprised of stormwater runoff that appears to originate from its associated forks and branches near Bo Peep Drive North, Betsy Court, at a stormwater pond at Oriely Drive, just southeast of the Frye Avenue and MacGregor Drive intersection, and near Ballejo Court (**Figure 7**). The creek generally flows east in a single channel with the exception of contributing branches and forks that join Williamson Creek from the south (“southwest fork”, “southeast fork”, “southern branch”) and north (“north fork”). The creek divides just west of Hugh Edwards Drive to form the north fork and the south forks. The north fork continues north until it branches west (“north fork’s western branch”) and east (“north fork’s eastern branch”) just west of the Hugh Edwards Drive and Betsy Drive intersection. The north fork’s eastern branch continues north to Betsy Court. Field investigations during the Walk the WBIDs effort (October 1, 2008) indicated that the headwaters of this branch appear to begin at Betsy Court and are piped underground to Bo Peep Drive North where they resurface. The north fork’s western branch extends west before turning north to Bo Peep Drive North. Upstream of the confluence of the main channel and the north fork, the south fork branches into the southwest and southeast forks. The headwaters of the southwest fork originate at a pond located at Oriely Drive. The water from the pond appears to flow west before turning north just west of Peter Rabbit Drive. The southeast fork headwaters are located just south of the Frye Avenue and MacGregor Drive intersection near the southern WBID boundary. One small branch joins the southeast fork from the west between Frye Avenue and Cotton Tail Lane. Lastly, the southern branch extends south from the main channel, east of the Wilson Boulevard and Aldington Drive intersection. This branch continues south and eventually curves northwest south of Cambay Place to Ballejo Court. The waters of Williamson Creek continue northeast and merge with Cedar River just north of Ormsby Circle. Cedar River empties into the St. Johns River, just east of San Juan Avenue (PBS&J, January 2010b).

The spatial distribution and acreage of different land use categories in the Williamson Creek watershed were identified using 2004 land use coverage data from SJRWMD (**Table 45**). The dominant land use (631.5 acres; 68.0% of total coverage) in the Williamson Creek watershed is classified as medium-density residential, and is located throughout the WBID. The next two most abundant land cover categories are: (1) low-density residential (62 acres; 6.7%), located in patches: (i) in the western portion of the WBID between Interstate 295 and Kohn Road from Thurston Road south to Wilson Boulevard; (ii) in close proximity to the north fork’s western branch just east of Tinkerbell Lane; (iii) north of the main channel just southwest of the Lucente Drive and Jammes Road intersection; and (iv) adjacent to the confluence of the main channel and southern branch; and (2) commercial/utility and institutional areas (57.6 acres; 6.2% of total coverage), located in areas: (i) just west of the southwest fork between Tinkerbell Lane and Wilson Boulevard; (ii) near the southwestern WBID boundary; (iii) along the northern WBID boundary at the San Juan Road and Lane Avenue intersection; and (iv) in two small areas just south of the main channel along Wilson Boulevard (PBS&J, January 2010b).

Wetlands and upland forest account for approximately 9% of the total land coverage of the Williamson Creek watershed and form a boundary around segments of the main channel, southern branch, southeast fork, and southwest fork. As wetlands serve as habitat for various species of wildlife, and are in close proximity to surface waters, there is a potential for wildlife to

contribute to the fecal pollution in these areas. Signs of wildlife were observed in medium-density residential areas during the LSJR Tributary Assessment Project (2008-2009). For example, raccoon tracks were noted during the January 2009 sampling event and a pair of ducks was observed during the February and May 2009 sampling events downstream at Hyde Park Road. A pair of ducks was also seen at the southwest fork at Wilson Boulevard during the March 2009 sampling event. Raccoon tracks were observed along the banks of the southwest fork near Peter Rabbit Drive and the southeast fork between Frye Avenue and Cottontail Lane during the Walk the WBIDs effort (October 1, 2008); small animal burrows were also observed along the banks of the southeast fork at this time (PBS&J, January 2010b).

According to the 2000 Census, there are 2,230 households within the watershed, averaging 2.83 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 892 dogs in the watershed.

TABLE 45: LAND USES IN THE WILLIAMSON CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
Medium Density Residential	631.5	68.0
Low Density Residential	62.0	6.7
Commercial/ Utility/ Institutional	57.6	6.2
Upland Forest	56.0	6.0
Wetlands	28.6	3.1
Transportation	28.0	3.0
Water	24.7	2.7
Recreational	19.2	2.1
Non-Forested Upland	13.9	1.5
Disturbed Land	7.2	0.8
TOTAL:	928.7	100

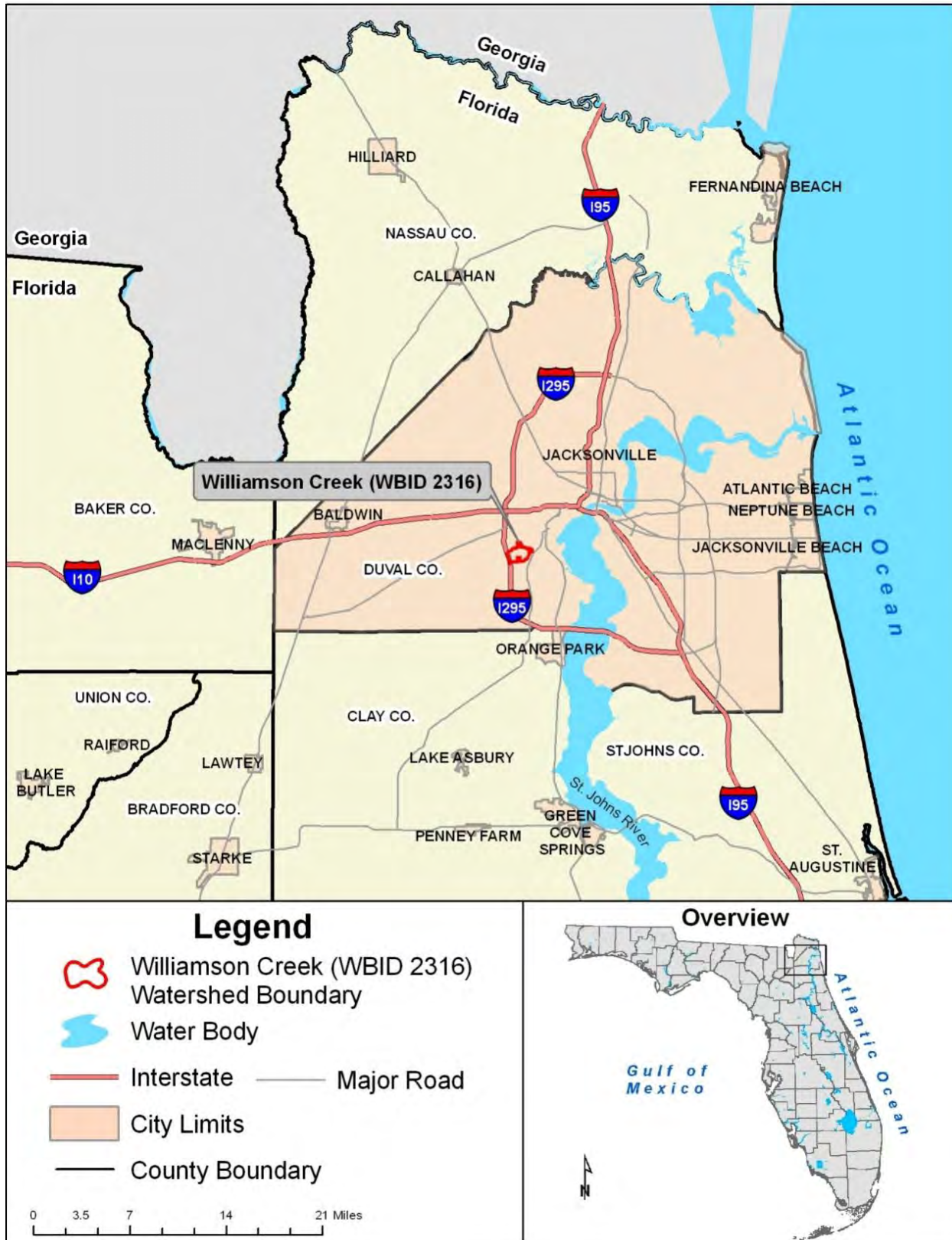


FIGURE 6: LOCATION OF THE WILLIAMSON CREEK WATERSHED

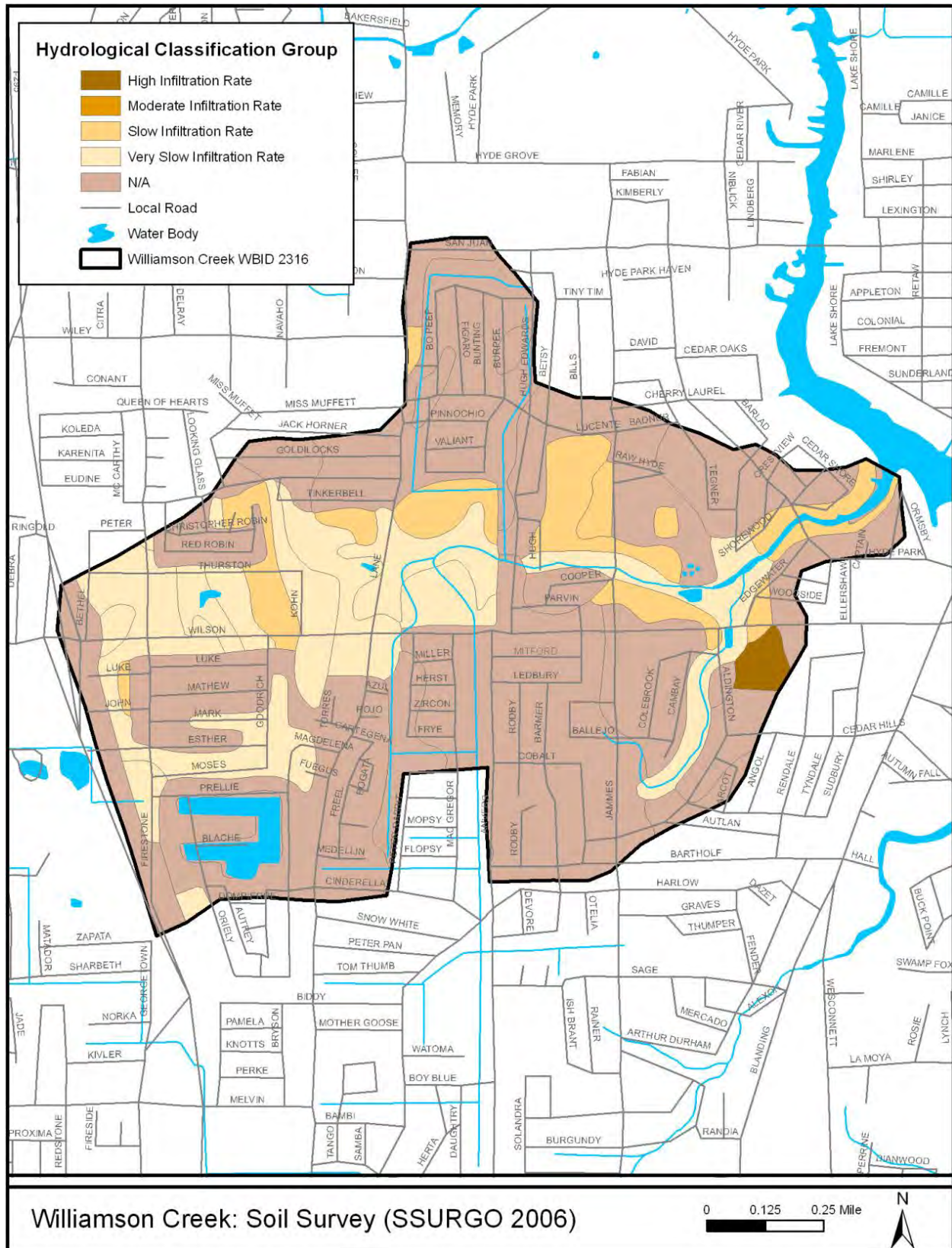


FIGURE 7: WILLIAMSON CREEK WBID LOCATOR MAP

8.2 POTENTIAL SOURCES

8.2.1 *POINT SOURCES*

There are no industrial or domestic WWTFs, CAFOs, application sites for septic residuals, or landfills permitted to discharge to the Williamson Creek watershed. The COJ/FDOT MS4 permit includes the Williamson Creek watershed (PBS&J, January 2010b).

8.2.2 *ILLICIT DISCHARGES*

COJ EQD is continuing a program to identify, confirm, and respond to illicit connection issues in Jacksonville. Seven PICs were identified within the Williamson Creek watershed and 1 PIC was determined to be illicit and was removed. There are 5 PICs that are still pending investigation.

8.2.3 *CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS*

The Williamson Creek watershed is located within the JEA Southwest WWTF service area. There are an estimated 1,888 households (approximately 85% of households) connected to the sanitary sewer system within the Williamson Creek WBID. This watershed supports over 123 kilometers (76 miles) of sewer lines and 4 sanitary sewer lift stations (including 2 private), as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters (PBS&J, January 2010b).

Available GIS data indicate that sewer infrastructure is generally located in close proximity to surface waters west of the Aldington Drive and main channel intersection. Collection (gravity) lines and associated manholes parallel and/or cross Williamson Creek surface waters along multiple segments of the creek: (1) at the southeast and southwest forks; (2) at the north fork's eastern and western branches; (3) along the southern branch; and (4) in areas of the main channel between Hugh Edwards Drive and Jammes Road. Force mains cross the southern branch and southeast and southwest forks at Wilson Boulevard and cross the main channel near Hugh Edwards Drive. Two JEA lift stations are in close proximity to the main channel's surface waters: (1) just downstream of the confluence of the north and south fork's at Hugh Court; and (2) farther downstream at Aldington Drive. The remaining private lift stations within the Williamson Creek watershed are relatively distant from any contributing surface waters. The overall close proximity of sanitary sewer infrastructure to Williamson Creek increases the possibility that potential spills and/or unidentified sewer infrastructure leaks could impact surface waters (PBS&J, January 2010b).

There have been a total of 9 SSOs reported by JEA within the Williamson Creek WBID boundaries between March 2001 and July 2008 (**Table 46**); one area with 4 repetitive SSO events (2001-2005) is located near the upstream segment of the southern branch. Three of the repetitive SSOs occurred in approximately the same location near the downstream segment of the southern branch at Wilson Boulevard. These SSOs were due to a power outage at a lift station, a hole in a gravity line caused by rust (since replaced), and a grease blockage in a gravity line (since replaced). Another SSO was located just upstream near Aldington Road; this spill was due to a grease blockage. The estimated volume of spills associated with the overflows throughout Williamson Creek ranged from 75 to 96,750 gallons and averaged approximately 20,809 gallons; 6 SSOs were reported to have potentially impacted surface waters (PBS&J, January 2010b).

TABLE 46: SSOs REPORTED IN THE WILLIAMSON CREEK WATERSHED, MARCH 2001–JULY 2008

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Williamson Creek (2316)	14-Nov-01*	10,000	Yes
Williamson Creek (2316)	4-Sep-02	400	No
Williamson Creek (2316)	9-Jul-04*	480	Yes
Williamson Creek (2316)	5-Oct-04*	500	Yes
Williamson Creek (2316)	21-Dec-04	75	No
Williamson Creek (2316)	7-Jan-05*	4,000	Yes
Williamson Creek (2316)	24-May-05	75	No
Williamson Creek (2316)	27-Apr-08*	96,750	Yes
Williamson Creek (2316)	2-Jul-08*	75,000	Yes

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

8.2.4 OSTDS

WSEA estimates that there are 264 OSTDS in the Williamson Creek watershed. The majority of households that utilize OSTDS near surface waters are located along the main channel east of Aldington Drive. In addition, according to DCHD, 12 septic system repair permits were issued within this area. The permits and presumably failed septic systems are located primarily in the far eastern corner of the WBID boundary in close proximity to the main channel. As parcels that possibly utilize OSTDS are located in close proximity to surface waters, there is a potential for OSTDS to contribute to the fecal pollution in these areas of the creek (PBS&J, January 2010b).

No failing systems were identified within the Williamson Creek watershed during the course of the LSJR Tributary Assessment Project (2008-2009); however, homes on San Juan Avenue, Lane Avenue South, Wilson Boulevard, Oriely Drive, Jammes Road, Aldington Drive, and Aldington Road located in close proximity to the surface waters of Williamson Creek were identified as potentially using OSTDS. According to JEA, these homes are not billed for sewer, which may indicate that they utilize OSTDS. Over the duration of the project sampling period, monitoring sites near these properties showed periodic elevated levels of fecal coliforms (>400 CFU/100mL), though no human-specific markers were detected. Sediments collected at nearby sites also exhibited high levels of indicator organisms. Although these systems have not been identified as failing, it is possible that they are contributing to the local bacterial contamination in these areas and should be investigated further (PBS&J, January 2010b).

8.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the Williamson Creek WBID contains areas composed predominantly of 10% to 25% impervious surface. Areas with less than 10% impervious surface generally correspond to wetland, upland forest, and non-forested upland land use classifications. Areas with 10% to 25% impervious surface occur throughout the watershed. Areas of the WBID with greater than 25% impervious surface are typically consistent with commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) along the north fork's western branch in the northern portion of the WBID; (2) near the southwest fork just south of Wilson Boulevard; and (3) in a small area in close proximity to the main channel just north of Wilson Boulevard (PBS&J, January 2010b).

Furthermore, the calculation of runoff coefficients demonstrates stormwater runoff coefficients within the WBID range from low-to-high depending on the area of the watershed. Lower runoff coefficients were calculated primarily in areas classified as wetlands, upland forest, and

recreational. The highest runoff coefficients correlated with transportation, recreational, and commercial/utility and institutional land use classifications and are located in close proximity to surface waters in the same locations as the greater than 25% impervious surface areas. The exception to this is the high stormwater runoff potential at commercial/utility and institutional land use areas north of the main channel, just northeast of the Jammes Road and Wilson Boulevard intersection. High stormwater coefficients indicate that there is a potential for stormwater to impact surface waters in these areas (PBS&J, January 2010b).

The storm sewer network in the Williamson Creek watershed includes 10 permitted stormwater treatment areas, encompassing approximately 5.82% to 21.32% of the WBID area. Stormwater infrastructure within the WBID includes 74 outfalls by receiving waters (none are classified by FDEP as “major outfalls”) and 419 inlets. Although closed conveyances are common throughout the WBID, there are fewer open ditch systems present in the watershed. Ditches are located: (1) forming segments of the north fork’s western branch from Pinocchio Drive north to North Bo Peep Drive; (2) forming segments of the north fork’s eastern branch from Lucente Drive north to North Bo Peep Drive; (3) forming the southeast fork from Wilson Boulevard extending south of the southern WBID boundary (flow changes direction at approximately this location); and (4) parallel to Jammes Road in the southeastern portion of the WBID (PBS&J, January 2010b).

There are also several ponds located in close proximity to Williamson Creek surface waters: (1) west of the southwest fork at Oriely Drive; (2) slightly north of Wilson Boulevard; and (3) at the main channel at Jammes Road. The stormwater pond at Jammes Road appears to outfall into the main channel. Field investigations during the Walk the WBIDs effort on October 1, 2008 verified that the stormwater pond located at Oriely Drive is piped to Lane Avenue where it outfalls into a ditch that flows west into the southwest fork. FDEP collected a sample at the Lane Avenue outfall to determine potential fecal coliform contributions to the southwest fork. Sampling results showed elevated levels of fecal coliforms (810 CFU/100mL) and suggests that the pond and associated conveyance system contributes to the fecal contamination of the southwest fork. Another sample collected at this location by JEA on July 15, 2009 demonstrated lower fecal coliform levels (400 CFU/100mL). Also during the Walk the WBIDs effort, COJ PWD reported that the pond located just north of Wilson Boulevard only discharges to the southeast fork after large rainfall events. North of the pond, the southeast and southwest forks flow through a wetland area before merging into the main channel of Williamson Creek (PBS&J, January 2010b).

Concentrations were not different during the “wet” and “dry” season in this WBID, suggesting a constant source of fecal coliform bacteria to the creek through non-point source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. It is possible that higher loadings occur in the “wet” season and are diluted by increased volumes of water, resulting in fecal coliform concentrations that appear to be independent of rainfall (PBS&J, January 2010b).

8.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

8.3.1 *JEA ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED*

8.3.1.1 **Completed JEA Projects**

JEA completed several projects between December 1998 and March 2004. The Cedar Hills Southeast pipe bursting project included the rehabilitation of approximately 40,000 linear feet of sanitary sewer lines. The Southwest Jacksonville improvement project rehabilitated

approximately 28,600 linear feet of deteriorated 8-inch to 18-inch gravity sewer lines via the CIPP method. The Tinkerbell Lane project included areas from Lane Avenue South to Miss Muffet Lane South. The Lucente project replaced water mains, sanitary sewer lines, fire hydrants, and storm drainage pipes in the neighborhood. The project also included water service transfers to new mains and several sanitary sewer reversals on private property (PBS&J, January 2010b).

As part of the LSJR Tributary Assessment Project, JEA performed supplemental sampling (January 22, 2009) and dye testing of the gravity lines associated with the manhole that overflowed at the southwest fork and Wilson Boulevard intersection. These efforts were prompted by the detection of elevated fecal coliform levels and human-specific markers at the sampling station in the area. JEA also collected samples along the southwest fork between Lane Avenue and Wilson Boulevard (July 15, 2009) to determine if specific areas along the southwest fork were contributing to the fecal pollution of Williamson Creek. In an effort to determine if a possible sewer leak was responsible for the extremely elevated bacteria levels observed in the sediments, JEA inspected the gravity line that crosses just beneath surface waters at the Aldington Drive and southern branch intersection. In addition, JEA completed a manhole riser section repair and performed CIPP to replace tuberculated ductile iron pipe along Wilson Boulevard in response to the July 2008 manhole SSO (PBS&J, January 2010b).

8.3.1.2 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA conducts several types of activities to replace or rehabilitate failing or leaking infrastructure, including pipe bursting and CIPP. A total of 41.10% of the sewer lines in the WBID have been pipe burst and 2.28% have CIPP. In addition, JEA conducts activities to help prevent future infrastructure problems. During FY09, JEA inspected 2,382 LF of pipe using a closed circuit television system, pipe cleaned 3,472 LF, and cleaned 84,262 LF of HPDE pipe to prevent blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 47** provides additional information on JEA's activities in the Williamson Creek watershed.

TABLE 47: JEA ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-37	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 164,940	\$12,165,035	JEA	Ongoing
JEA-38	CIPP - Install New Inner Lining	Rehabilitation of failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 9,168	\$495,491	JEA	Ongoing
JEA-39	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-40	ARV Inspection and Rehab	See Appendix E	3 of 6 ARVs replaced	\$100,000*	JEA	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-41	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-42	Inspect Force Main Discharge Manholes, Repair/ Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-43	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-44	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	2,382 feet of pipe inspected in FY09	Unknown	JEA	Ongoing
JEA-45	HDPE Pipe Cleaning - Contractor	Clean existing HDPE pipes to avoid blockages	84,262 ft of HDPE pipe cleaned in watershed	\$105,328	JEA	Ongoing
JEA-46	Pipe Cleaning	Clean existing pipes to avoid blockages	3,472 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-47	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-48	Manhole Monitoring	See Appendix E	1 monitor	Unknown	JEA	Ongoing
JEA-49	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-50	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-51	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing
JEA-52	Walk the WBID – Manhole SSO at Wilson Boulevard	Repaired manhole riser section, CIPP along Wilson Blvd, dye testing showed no problems	Not applicable	Unknown	JEA	Complete
JEA-53	Walk the WBID – Inspections at Aldington Road	Inspection showed no problems, past SSOs in areas that had been addressed	Not applicable	Unknown	JEA	Complete
JEA-54	Walk the WBID – Investigations on Blanco Court	Investigate the residential area on Blanco Court that has shallow lines and manhole problems	Complete inspection and report in first annual BMAP report	Unknown	JEA	Planned

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

8.3.2 DCHD ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program, (2) training programs, and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer (**Appendix E**). As of July 28, 2008, DCHD updated the listing of failure and nuisance areas. There is currently 1 designated failure area, Williamson Creek, in the watershed. Approximately 25.6% of this failure area is located in the WBID.

As part of the OSTDS Program, DCHD has issued 8 new construction permits, 12 repair permits, and 3 abandonment permits in the WBID. In addition, 2 annual operating permits have been issued for PBTS in the watershed. DCHD has also performed 20 plan reviews and 4 complaint investigations. DCHD will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 48** shows the DCHD project table for Williamson Creek.

TABLE 48: DCHD ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-14	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 8 new construction permits, 12 repair permits, and 3 abandonment permits issued	\$10,200	FDOH/LSJR SWIM Grant	Ongoing
DCHD-15	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	Approximately 2 annual operating permits issued for commercial properties	\$5,000	FDOH/LSJR SWIM Grant	Ongoing
DCHD-16	SWIM Project	Implementation of broad-ranging septic tank ordinance	Approximately 25.6% of Cedar Creek Septic Tank Failure Area exists within this WBID	\$73,800	FDOH/LSJR SWIM Grant	Ongoing
DCHD-17	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-18	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 20 plan reviews and site evaluations have been performed based upon permitting history	\$5,000	FDOH/LSJR SWIM Grant	Ongoing
DCHD-19	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update.	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-20	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	4 complaint investigations have been performed	\$1,350	FDOH/LSJR SWIM Grant	Ongoing

8.3.3 COJ ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED

8.3.3.1 Ongoing COJ Programs and Activities

COJ has also established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. As part of this plan, COJ has 1 routine monitoring station in the watershed that is sampled quarterly. A total of 51

samples were taken at this station between 1995 and 2009. In addition to the routine sampling, COJ EQD also participates in the TAT and has collected 19 samples in the watershed.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 130 work orders for ditch and creek regrading, erosion control, and cleaning; 1 work order for lake and pond maintenance; and 128 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. A total of 7 PICs were identified, with 1 confirmed as illicit and removed, and 5 still pending investigation. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

COJ PWD also conducts inspections in the watershed that are initiated through the CARE database. Between 1995 and 2009, PWD conducted 4 investigations into illicit water discharges, 2 illegal discharges, 3 sewer lines that drained into a yard or ditch, 11 SSOs, and 5 private lift station inspections. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 49 provides additional details on COJ's activities in the watershed.

TABLE 49: COJ ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
MS4 Maintenance Activities						
COJ-58	Ditch/Creek Regrade/Erosion/Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	130 (for 2005-09)	\$26,231	COJ	Ongoing
COJ-59	Lake or Pond Problem		1 (for 2005-09)	\$281.35	COJ	Ongoing
COJ-60	Structure Blocked/Repair/General Flooding		128 (for 2005-09)	\$21,013	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-61	Illicit Water Discharge	CARE initiated	4 (for 2006-07)	\$1,516	COJ	Ongoing
COJ-62	Pollution - Water - Illegal Discharge	CARE initiated	2 (for 2002)	\$758	COJ	Ongoing
COJ-63	Sewer drains into yard/ditch	CARE initiated	3 (for 2008-09)	\$1,137	COJ	Ongoing
COJ-64	Sewer Overflow	CARE initiated	11 (for 2000-09)	\$4,169	COJ	Ongoing
COJ-65	Private Lift Station Inspection	2 private lift stations in the WBID	5 (for 1997-2009)	\$1,895	COJ	Ongoing
COJ-66	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-67	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (6561 San Juan Ave)	Unknown	COJ	Planned
COJ-68	Illicit Discharge Detection and Elimination	5 open, 1 illicit	7 (for 2004)	\$2,653	COJ	Ongoing
COJ-69	Follow Up on Outstanding PICs	Follow up on the 5 open PICs in the watershed	5 (for 2010-2011)	Unknown	COJ	Planned
COJ-70	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	51 (for 1995-2009)	Unknown	COJ	Ongoing
COJ-71	TAT Sampling	Conducted by EQD to assess bacteria levels in the creek and help identify potential fecal bacteria sources	19 (for 2008-09)	Unknown	COJ	Ongoing
COJ-72	Walk the WBIDS	Participated in the Walk the WBIDs reconnaissance efforts and TAT sampling.	2008-2009	Unknown	COJ	Complete
Septic Tank Phase-Out Program						
COJ-73	Cedar Creek Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	128 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-74	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	136 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-75	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-76	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

¹ COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study, or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023. For the 15 tributaries addressed in this BMAP, the failing tanks within 300 meters of surface waters will be included in the COJ plan and schedule to phase out tanks and will be identified as Tributaries BMAP-related tanks.

8.3.4 *FDOT ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED*

8.3.4.1 **Completed FDOT Projects**

FDOT has completed two wet pond projects in the watershed: (1) Lane Avenue that treats 7 acres; and (2) Wilson Avenue that treats 72 acres. These projects collect and treat stormwater, which helps to reduce the amount of fecal coliform that reaches the creek through runoff. In addition, during the Walk the WBIDs on October 1, 2008, trash was found in the FDOT pond at Lane Avenue. FDOT removed the trash from the pond later in the month, which helped prevent potential fecal coliform regrowth on the trash.

8.3.4.2 **Ongoing FDOT Programs and Activities**

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT Drainage Connection permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT supports the Adopt-A-Highway Program in the watershed and collects trash from 2 miles of roadway. Street sweeping also occurs on 1.5 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 1.5 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund a monitoring station in the Williamson Creek watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 50** lists FDOT's activities in the watershed.

TABLE 50: FDOT ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-16	PIC Program	Search for illicit connections	Effort is continuous in WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-17	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-18	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	51 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-19	TAT Sampling	Conducted by EQD to assess bacteria levels in the creek and help identify potential fecal bacteria sources	19 (for 2008-09)	See Note 2	FDOT/COJ	Ongoing
FDOT-20	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 2 miles	Unavailable	Not applicable	Ongoing
FDOT-21	Stormwater Management Systems	Lane Ave	7 acres, wet ponds	Unknown	FDOT	Complete
FDOT-22	Stormwater Management Systems	Wilson Ave	72 acres, wet ponds	Unknown	FDOT	Complete
FDOT-23	Maintain FDOT stormwater systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 1.5 miles of roadway and associated stormwater conveyance systems currently maintained in this WBID; approximately 1.5 miles of roadway swept	See Note 4	FDOT	Ongoing
FDOT-24	Maintain FDOT stormwater systems	Maintain pond at 3613 Lane Avenue	During Walk the WBIDs, trash was found in this pond that was then removed	See Note 4	FDOT	Completed

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

8.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 47 through **Table 50** list the projects and programs to reduce fecal coliform loading in the Williamson Creek watershed. Several key efforts completed in the WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Williamson Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Williamson Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

8.4.1 OSTDS

Failure Area – Of approximately 264 septic tanks within the WBID boundary, 128 systems are located within the Cedar Creek failure area and are eligible to receive sewer connection. COJ committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. The failing tanks in the Williamson Creek failure area in the Williamson Creek watershed within 300 meters of surface waters will be included in the COJ phase-out plan and schedule, as described in the Main Stem BMAP, and will be identified in the plan as Tributaries BMAP-related efforts.

Program Implementation – The Walk the WBIDs effort did not reveal any additional septic tank problems in the watershed. City ordinances, inspections, and program implementation, combined with DCHD permit review processes and inspections, proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure areas and to prevent the creation of new OSTDS sources.

8.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there are 2 private lift stations that are inspected by COJ annually. In accordance with COJ's private lift station inspection program, COJ is committed to the continued inspection of private lift stations in its jurisdiction to ensure that privately owned infrastructure is monitored and properly maintained by its owners. In addition, there is 1 private lift station on the WBID boundary that COJ will confirm whether it is included in the Williamson Creek watershed. The results of this investigation will be provided in the first annual BMAP report.

Sewer Infrastructure Projects – JEA replaced 3 ARVs in the watershed, preventing line failure from corrosive gases. JEA has also conducted pipe bursting and CIPP projects in the watershed to prevent problems with the sewer infrastructure. Through a contract, more than 84,000 linear feet of HDPE pipe has been cleaned in the WBID to proactively prevent problems with the sewer system. In addition, 3 past SSOs at 6217 Wilson Boulevard were addressed by replacing and upsizing the line in the area and adding a manhole monitor. There is also a project in design to replace 500 feet of ductile iron pipe near 2195 Lane Avenue to fix the fracture in the force main. Continuation of JEA's maintenance efforts and its systemwide programs along with the follow up on the LSJR Tributary Assessment request (see below) will be sufficient to address potential sewer sources in the WBID at this time.

Program Implementation – Program implementation, including inspections and line cleaning coupled with the Root Cause Program, are proactive activities preventing fecal coliform loading. Systemwide SSO prevention programs, such as FOG and CMOM, should be continued. JEA will be expected to report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to ensure that the system is being monitored and maintained.

LSJR Tributary Assessment Project – As part of follow up efforts, JEA will conduct periodic inspections along Blanco Court, which is an area that has shallow sewer lines and manhole problems. The results of the inspections and any corrective actions will be included in the first annual BMAP report.

8.4.3 STORMWATER

Illicit Connection Removal – The PIC Program has removed 1 illicit discharge; however, 5 inspections are currently still pending. COJ must complete the PIC investigations and report the results in the annual BMAP progress report.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. In addition, FDOT sweeps 1.5 miles of roadway monthly and supports Adopt-A-Highway along 2 miles of roadways, preventing sediments from entering the stormwater conveyance system. FDOT will continue stormwater infrastructure maintenance, as these efforts prevent potential regrowth in the MS4 conveyances. During Walk the WBIDs, trash was found in the FDOT pond at Lane Avenue. FDOT removed this trash and conducted other necessary maintenance activities.

COJ Program Implementation – COJ continues to maintain ditches, ponds, and stormwater infrastructure to prevent problems and fecal coliform loading from the MS4 system. Since 2005, it has completed 256 work orders for maintenance of the stormwater system in the watershed. The continuation of maintenance activities is sufficient to address stormwater in the watershed at this time.

8.4.4 WILDLIFE AND OTHER ANTHROPOGENIC SOURCES

During the LSJR Tributary Assessment Project, signs of wildlife were observed along the southwest fork throughout the project duration. For example, raccoon tracks were observed along the banks near Peter Rabbit Drive during the Walk the WBIDs effort in October 2008 and a pair of ducks was observed at Wilson Boulevard during the March 2009 sampling event. In addition, dogs were found in this area and could be a source of fecal coliform to the creek (PBS&J, January 2010b). COJ should consider targeting their pet waste management educational activities in this area. Evidence of a homeless camp was also observed on the north side of Wilson Boulevard, which could be a significant source of human fecal contamination to Williamson Creek. COJ should be aware of this potential source and prepare recommendations on how to address the homeless population in the BMAP annual reports until the issue is resolved.

TABLE 51: SUMMARY OF RESTORATION ACTIVITIES FOR THE WILLIAMSON CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	-	X	-	X
Capital Projects/Stormwater Water Quality BMPs	-	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	-	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	√	X	√	X
Tributary Assessment Team (TAT)	√	X	√	X
Microbial Source Tracking (MST)	√	X	√	X
Thermal Imagery To Identify PICs	^	X	^	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

^ These source assessment efforts were completed by FDEP Northeast District Office for this WBID.

CHAPTER 9: FISHING CREEK (WBID 2324)

9.1 WBID DESCRIPTION

Fishing Creek, WBID 2324, is located in Duval County, west of the Lower St. Johns River within the Ortega River Planning Unit, as designated by the SJRWMD (**Figure 8**). The “headwaters” of Fishing Creek are presumably comprised of stormwater runoff that appears to originate from its associated forks and branches near Ricker Road, Jammes Road, Enchanted Drive, Interstate 295, Timuquana Road, 118th Street, Wesconnett Boulevard, 101st Street, Lofty Pines Circle, and Ortega Farms Boulevard (**Figure 9**). The main channel of the creek generally flows northeast in a single channel with the exception of a primary divergence at Talton Lane into a “south fork” and a “north fork”, and four contributing branches that join Fishing Creek from the east (“southeastern branch”, “eastern branch”, and “northeastern branch”) and west (“western branch”). The western branch originates near Wesconnett Boulevard and merges with the main channel east of Dian Wood Drive East. The southeastern branch joins the main channel west of the Eulace Road and 94th Street intersection and terminates near 101st Street. The eastern branch extends southeast from the main channel just north of Rossie Lane to Seaboard Avenue where it forks south and southeast to 101st Street and Lofty Pine Circle East, respectively. The northeastern branch originates near Ortega Farms Boulevard and merges with Fishing Creek just northeast of Ortega Farms Circle. At Talton Lane the main channel divides to form the south fork and north fork. The south fork meanders south from Talton Lane to Nancy Drive then turns southwest where it continues west into a wetlands area and diverges into several branches. One branch, the “south fork southern branch” extends southwest from the south fork at Nancy Drive and terminates at 118th Street. The north fork stretches west to just west of Tampico Road where it turns sharply south to the Interstate 295 and Morse Road intersection. There are multiple contributing branches (“north fork northern branch”, “north fork central branch”, and “north fork southern branch”) that merge with the north fork of Fishing Creek. The north fork northern branch extends from the main channel just east of Tampico Road near the Jacksonville Heights WWTF and continues north to the Wendell Drive and Ricker Road intersection. There are numerous sub-branches that contribute to the north fork’s northern branch. The two largest, “western sub-branch” and “eastern sub-branch” extend west from Sonora Drive North to Enchanted Drive, and east from Daughtry Boulevard South to Jammes Road, respectively. The north fork central branch extends north from the main channel to Timuquana Road. The north fork southern branch terminates at Jammes Road and flows northeast to join the main channel west of Blanding Boulevard. The north fork central branch and segments of the north fork northern branch are classified as ditches. The waters of Fishing Creek flow into the Ortega River approximately 500 meters (1,640 feet) northeast of Confederate Point Road and join the St. Johns River east of Highway 211 (PBS&J, February 2009a).

The spatial distribution and acreage of different land use categories in the Fishing Creek watershed were identified using 2004 land-use coverage data from the SJRWMD (**Table 52**). The dominant land use (942.1 acres; 25.8% of total coverage) in the Fishing Creek watershed is classified as medium-density residential. The next two most abundant land cover categories are: (1) low-density residential (519.3 acres; 14.2% of total coverage); and (2) upland forests (457.2 acres; 12.5% of total coverage) located primarily in the south central portion of the WBID. There are also high-density residential areas located in close proximity to surface waters: (1) in the northwest corner of the WBID; (2) at the south fork in the residential community at Gentle Oaks Drive; and (3) along the west side of the main channel north of Bull Run Road. Wetlands and upland forests account for approximately 22% of the total land coverage of Fishing Creek

and form a boundary around the main channel of the creek and several of its branches. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Fishing Creek in these areas (PBS&J, February 2009a).

A specialty farm, Windemere Equestrian Center, is located just south of Morse Road near the southern WBID boundary. As this area is approximately 183 meters (600 feet) south of the south fork of the creek and is only partially buffered by wetlands, there is a potential for stormwater runoff from horse pastures to contribute to the surface waters. A small area (0.8 acres), located on the southern WBID boundary is classified as cropland and pastureland. A tree nursery is also located just east of the Timuquana Road and Seaboard Avenue intersection (PBS&J, February 2009a).

According to the 2000 Census, there are 5,738 households within the watershed, averaging 2.4 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 2,295 dogs in the watershed.

TABLE 52: LAND USES IN THE FISHING CREEK WATERSHED

2004 LAND USE	ACRES	% OF TOTAL
Medium Density Residential	942.1	25.8
Low Density Residential	519.3	14.2
Upland Forest	457.2	12.5
High Density Residential	440.1	12.0
Wetlands	373.0	10.2
Commercial/ Utility/ Institutional	353.5	9.7
Recreational	200.5	5.5
Transportation	127.7	3.5
Non-Forested Upland	74.6	2.0
Water	68.0	1.9
Disturbed Land	50.8	1.4
Specialty Farms	27.8	0.8
Nurseries and Vineyards	9.8	0.3
Industrial	8.8	0.2
Open Land	1.6	0.04
Cropland and Pastureland	0.8	0.02
TOTAL:	3,655.4	100

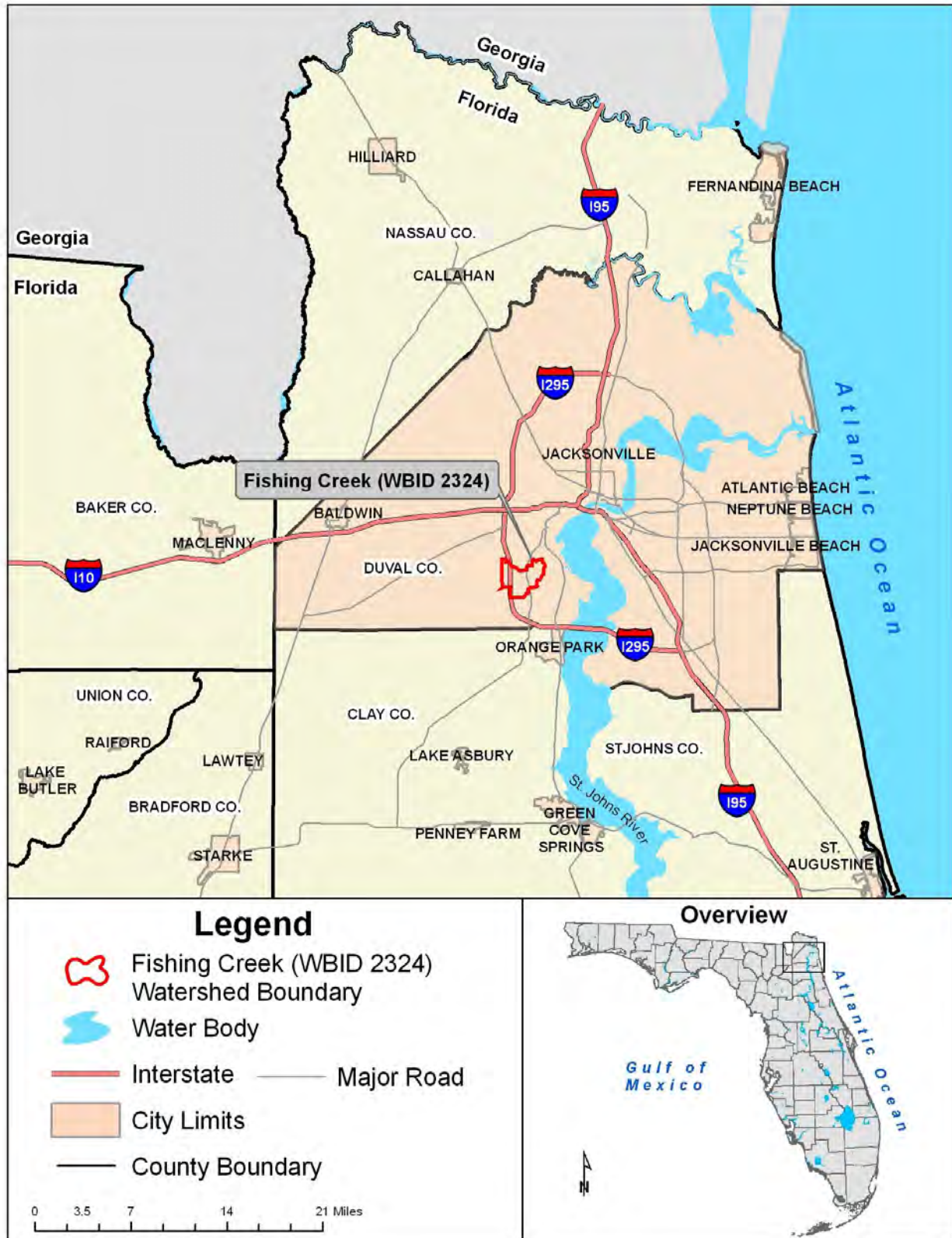


FIGURE 8: LOCATION OF THE FISHING CREEK WATERSHED

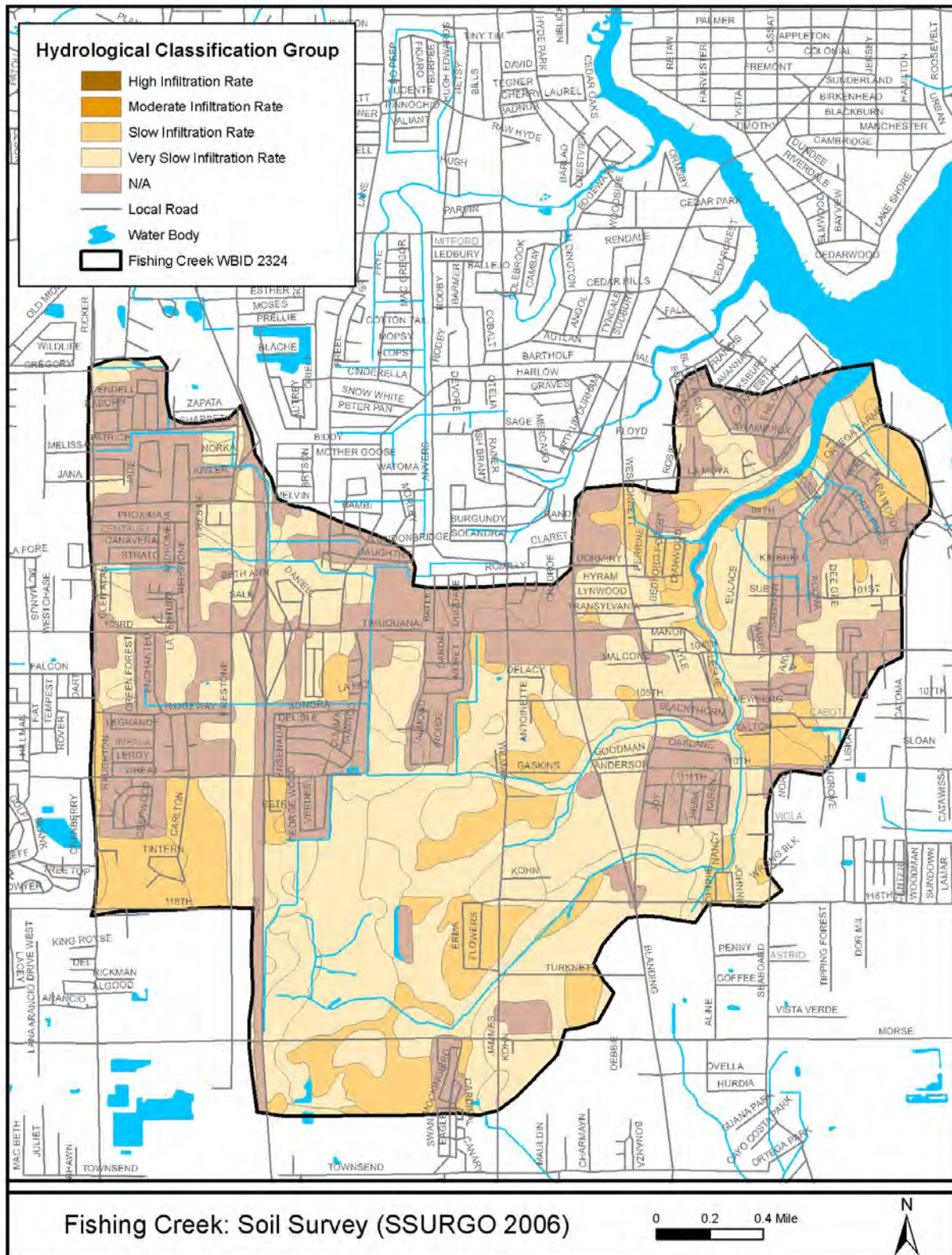


FIGURE 9: FISHING CREEK WBID LOCATOR MAP

9.2 POTENTIAL SOURCES

9.2.1 POINT SOURCES

The Jacksonville Heights WWTF has a domestic wastewater permit at two sites located just west of Hannah Stables Court and east of the Tampico Road South and Hafford Lane intersection. The WWTF also has an industrial MSGP just west of Hannah Stables Court. The Jacksonville Heights WWTF has a design flow of 2.5 million gallons per day (MGD). Treated effluent is discharged to the north fork's northern branch just east of the Tampico Road South and Hafford Lane intersection. The COJ/FDOT MS4 permit includes the Fishing Creek watershed (PBS&J, February 2009a).

9.2.2 ILLICIT DISCHARGES

COJ EQD is continuing a program to identify, confirm, and respond to illicit connection issues in Jacksonville. Through this program, EQD identified 46 PICs, of which 7 were determined to be illicit and removed. There are 30 PICs still pending investigation in this watershed.

9.2.3 CENTRALIZED SEWER INFRASTRUCTURE AND OVERFLOWS

The Fishing Creek watershed is located within the Southwest WWTF Service Area. There are an estimated 3,995 households (approximately 70% of households) connected to the sanitary sewer system within the Fishing Creek watershed. This WBID supports nearly 355 kilometers (221 miles) of sewer lines and 28 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is scattered in patches found throughout the watershed. There have been 21 sanitary sewer overflows reported by JEA within the Fishing Creek WBID boundaries (see **Table 53**). The estimated volume of spills associated with these overflows ranged from 20 to 11,520 gallons and averaged approximately 885 gallons; 10 SSOs were reported to have potentially impacted surface waters (PBS&J, February 2009a).

TABLE 53: SSOs REPORTED IN THE FISHING CREEK WATERSHED, 2001–07

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Fishing Creek (2324)	27-Jan-02	400	No
Fishing Creek (2324)	2-Feb-02*	700	Yes
Fishing Creek (2324)	10-Jun-02	150	No
Fishing Creek (2324)	27-Jun-02*	20	Yes
Fishing Creek (2324)	18-Feb-03	30	No
Fishing Creek (2324)	10-Mar-03	50	No
Fishing Creek (2324)	13-Jun-03	150	No
Fishing Creek (2324)	18-Jun-03*	400	Yes
Fishing Creek (2324)	19-Jun-03*	600	Yes
Fishing Creek (2324)	20-Mar-04*	11,520	Yes
Fishing Creek (2324)	10-Oct-04	200	No
Fishing Creek (2324)	22-Apr-05	544	No
Fishing Creek (2324)	6-May-05	200	No
Fishing Creek (2324)	25-Jun-05	50	No
Fishing Creek (2324)	26-Jun-05*	200	Yes
Fishing Creek (2324)	17-Jul-05*	500	Yes
Fishing Creek (2324)	2-Aug-05*	1,000	Yes

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Fishing Creek (2324)	6-Mar-06	50	No
Fishing Creek (2324)	6-Mar-06	25	No
Fishing Creek (2324)	8-Sep-06*	300	Yes
Fishing Creek (2324)	7-Dec-06*	1,800	Yes

9.2.4 OSTDS

WSEA estimates that there are 769 OSTDS in the Fishing Creek watershed. According to DCHD, 76 septic system repair permits were issued within this WBID. Numerous parcels with septic system repair permits are located in close proximity to Fishing Creek surface waters, which suggests that septic systems potentially affect the water quality of Fishing Creek in these areas of the WBID. No DCHD-designated septic system failure areas are located in the watershed; however, a nuisance area (Pernecia/Johnnie Circle) was located in the southeastern corner of the WBID between Blackhorn Road and 118th Street prior to the transition to sewer in November 2003 (PBS&J, February 2009a).

9.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the Fishing Creek WBID contains predominately 10 to 25% impervious surfaces. Areas with less than 10% impervious surface correspond to wetland and upland forestland use classifications. Areas with 10% to 25% impervious surface are located throughout the watershed. Portions of the watershed with greater than 25% impervious surface area correspond to commercial/utility and institutional land use classifications located along Timuquana Road and Blanding Boulevard. Areas with greater than 25% impervious surface are in close proximity to the surface waters of Fishing Creek: (1) from Daughtry Boulevard south to Alcona Court; (2) just west of Interstate 295; (3) on the north fork at Blanding Boulevard; (4) along the south fork at Blanding Boulevard; and (5) at the main channel at Timuquana Road. Furthermore, the potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients vary within the WBID from low to high. The highest runoff coefficients correlate with transportation and commercial/utility and institutional land use classifications and are predominantly located along Interstate 295, Timuquana Road, and Blanding Boulevard. Low runoff coefficients correspond to wetland and upland forest land use classifications and are primarily located in the south central portion of the WBID and along the surface waters of Fishing Creek (PBS&J, February 2009a).

The storm sewer network in the Fishing Creek watershed includes 43 permitted stormwater treatment areas, encompassing approximately 14% to 22% of the WBID area. Stormwater infrastructure within the WBID includes 144 outfalls by receiving water (1 classified by FDEP as a “major outfall”) and 1,050 inlets. Although closed conveyances are common throughout the WBID primarily along Timuquana Road, Blanding Boulevard, and Wesconnett Boulevard, fewer ditch systems are in the watershed. A few ponds are also within the watershed. Those in close proximity to Fishing Creek surface waters are located: (1) near the headwaters of the north fork immediately north of Sharbeth Drive North; (2) on the north fork slightly east of East Norde Drive; (3) at Hannah Stables Drive; (4) near the south fork at Gentle Oaks Drive; and (5) near the headwaters of the western branch west of Wesconnett Boulevard. As these ponds are in close proximity to Fishing Creek, there is a potential for their waters to merge with the surface waters of Fishing Creek (PBS&J, February 2009a).

Fecal coliform concentrations were not found to differ significantly between seasons, suggesting a constant source of fecal coliform bacteria to Fishing Creek through nonpoint source

discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. Considering the possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were higher than they appeared to be (PBS&J, February 2009a).

9.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

9.3.1 JEA ACTIVITIES IN THE FISHING CREEK WATERSHED

9.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA has conducted maintenance activities in the watershed that have resulted in pipe bursting of 0.59% of the sewer lines, CIPP of 0.04%, and open cut of 0.02% of the lines. In addition, JEA rebuilt 1 of the 28 (3.57%) of the lift stations in the WBID. During FY09, JEA inspected 2,191 LF of pipe using a closed circuit television system and pipe cleaned 5,759 LF to prevent blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 54** provides additional information on JEA’s activities in the Fishing Creek watershed.

TABLE 54: JEA ACTIVITIES IN THE FISHING CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-55	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 6,852	\$898,346	JEA	Ongoing
JEA-56	CIPP - Install an New Inner Lining	Rehabilitation of failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 437	\$1,731,285	JEA	Ongoing
JEA-57	Open Cut - Removal and Replacement	Replacement of failing/leaking infrastructure	Total footage of open cut replacement in watershed since 2001: 200	\$50,000	JEA	Ongoing
JEA-58	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-59	ARV Inspection and Rehab	See Appendix E	14 of 15 ARVs replaced to date	\$100,000*	JEA	Ongoing
JEA-60	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-61	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-62	Pump Station Class I/II Rebuilding	Repair or replace components of existing pump stations	1 project in watershed	\$102,665	JEA	Ongoing
JEA-63	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	3 stations (Somerton Court, Bricker Road, Sharbeth Road)	Unknown	JEA	Planned
JEA-64	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	4 stations (Wescon Elementary, 5940 Perrine Drive, Para Woods, Rossie LA)	Unknown	JEA	Planned
JEA-65	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-66	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	2,191 feet of pipe inspected in FY09	Unknown	JEA	Ongoing
JEA-67	Pipe Cleaning	Clean existing pipes to avoid blockages	5,759 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-68	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-69	Manhole Monitoring	See Appendix E	2 monitors	Unknown	JEA	Ongoing
JEA-70	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-71	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-72	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

9.3.2 DCHD ACTIVITIES IN THE FISHING CREEK WATERSHED

9.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As part of the OSTDS Program, DCHD has issued 78 new construction permits, 76 repair permits, and 173 abandonment permits in the watershed. In addition, 25 annual operating permits have been issued for PBTS in the watershed. DCHD has also performed 155 plan reviews and 104 complaint investigations. DCHD will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 55** lists DCHD's projects in the Fishing Creek watershed.

TABLE 55: DCHD ACTIVITIES IN THE FISHING CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-21	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 78 new construction permits, 76 repair permits, and 173 abandonment permits issued	\$90,675	FDOH/LSJR SWIM Grant	Ongoing
DCHD-22	SWIM Project	Implementation of broad-ranging septic tank ordinance	100% of Pernecia Septic Tank Failure Area exists within this WBID	Unknown	FDOH/LSJR SWIM Grant	Ongoing
DCHD-23	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	25 annual operating permits issued for commercial properties; one PBTS is monitored annually	\$65,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-24	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-25	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 155 plan reviews and site evaluations have been performed based upon permitting history	\$38,750	FDOH/LSJR SWIM Grant	Ongoing
DCHD-26	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-27	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	104 complaint investigations have been performed	\$34,600	FDOH/LSJR SWIM Grant	Ongoing
DCHD-28	Intensive Inspection Program	Intensive geospecific inspections in selected WBIDs based on repair permit applications, water quality information, and site conditions; additional WBIDs may be identified in future based on assessment efforts	Approximately 51 tanks from Eulace Road to 94 th Street, south to 103 rd Street; 73 tanks west of Ortega Farms Boulevard to Benlocke Road to the creek	\$19,220	Unknown	Planned

9.3.3 COJ ACTIVITIES IN THE FISHING CREEK WATERSHED

9.3.3.1 Completed COJ Projects

COJ has completed the La Moya Roadway Wet Detention Project that treats 17 acres and the Wesconnett Boulevard Wet Detention Project that treats 396 acres. The Redstone Drive

Drainage Project to improve the drainage system in this area has also been completed. In addition, the Perrine Drive Project to replace the crossdrain to improve drainage is under construction. These projects capture and treat stormwater to help reduce fecal coliform loading to Fishing Creek from these areas.

COJ has also worked with WSEA to extend sewer lines to remove a total of 356 septic tanks in the watershed, helping to reduce fecal coliform loading from septic tanks along the creek. All of the septic tanks in the watershed that were located in the Pernecia failure area have been removed.

9.3.3.2 Ongoing COJ Programs and Activities

COJ has also established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. In Fishing Creek, COJ has 4 routine monitoring stations that are sampled quarterly. A total of 161 samples were collected at this station between 1995 and 2009. In addition to the routine sampling, COJ EQD has also collected 5 samples as part of the TAT effort.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 439 work orders for ditch and creek regrading, erosion control, and cleaning; 24 work orders for lake and pond problems; and 369 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. Forty-six PICs have been identified in the Fishing Creek watershed, with 7 PICs confirmed as illicit and removed. There are 30 PICs currently pending investigation. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

COJ PWD also conducts inspections that are initiated through the CARE database. In the Fishing Creek watershed, between 1995 and 2009, these included 12 investigations into illicit water discharges, 15 illegal discharges, 12 sewer lines that drained into a yard or ditch, 37 SSOs, and 1 private lift station. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 56 provides additional details on COJ's activities in the watershed.

TABLE 56: COJ ACTIVITIES IN THE FISHING CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Capital Improvement Projects						
COJ-77	La Moya Roadway Project (Main Stem COJ-42)	Wet detention	17 acres	Unknown	COJ	Complete
COJ-78	Wesconnett Blvd (Blanding to Blanding) (Main Stem COJ-33)	Wet detention	396 acres	Unknown	COJ	Complete
Drainage System Rehab Projects						
COJ-79	Replace Crossdrain at Perrine Drive	Crossdrain is too small to handle the drainage area	Unknown	Unknown	COJ	Construction
COJ-80	Redstone Drive Drainage	Installation of cross drain and improvement of ditches	Unknown	\$150,000	COJ	Complete
MS4 Maintenance Activities						
COJ-81	Ditch/Creek Regrade/Erosion/Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	439 (for 2005-09)	\$94,284	COJ	Ongoing
COJ-82	Lake or Pond Problem		24 (for 2005-09)	Unknown	COJ	Ongoing
COJ-83	Structure Blocked/Repair/General Flooding		369 (for 2005-09)	\$51,649	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-84	Illicit Water Discharge	CARE initiated	12 (for 2005-07)	\$4,548	COJ	Ongoing
COJ-85	Pollution - Water - Illegal Discharge	CARE initiated	15 (for 2002-08)	\$5,685	COJ	Ongoing
COJ-86	Sewer drains into yard/ditch	CARE initiated	12 (for 2008-09)	\$4,548	COJ	Ongoing
COJ-87	Sewer Overflow	CARE initiated	37 (for 1999-2009)	\$14,023	COJ	Ongoing
COJ-88	Septic Tank Inspection	CARE initiated	1 (for 2006)	\$379	COJ	Ongoing
COJ-89	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (103 rd Street and Bricker Road)	Unknown	COJ	Planned
COJ-90	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	1 station (5951 Wilmar Road)	Unknown	COJ	Planned
COJ-91	Private Lift Station Inspection	13 private lift stations in the WBID	64 (for 1997-2009)	\$24,256	COJ	Ongoing
COJ-92	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-93	Illicit Discharge Detection and Elimination	30 open, 7 illicit	46 (for 2000-06)	\$17,434	COJ	Ongoing
COJ-94	Follow Up on Outstanding PICs	Follow up on the 30 open PICs in the watershed	30 (for 2010-2011)	Unknown	COJ	Planned
COJ-95	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	161 (for 1995-2009)	Unknown	COJ	Ongoing
COJ-96	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	5 (for 2007-09)	Unknown	COJ	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Septic Tank Phase-Out Program						
COJ-97	Pernecia Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas - completed	186 tanks, 186 connected	Unknown	COJ	Complete
COJ-98	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	939 tanks, 170 connected	Unknown	COJ	Ongoing
COJ-99	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-100	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

9.3.4 FDOT ACTIVITIES IN THE FISHING CREEK WATERSHED

9.3.4.1 Completed FDOT Projects

FDOT has completed a retention/detention systems project along Interstate-295 in the watershed. This project treats 72 acres and helps to reduce bacterial loading from stormwater runoff to the creek.

9.3.4.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. FDOT supports the Adopt-A-Highway Program in the watershed, in which trash is collected from 2 miles of roadway. Street sweeping also occurs monthly on 14 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 7 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT has found 4 PICs in the WBID, 1 of which was determined to be illicit and removed. The remaining 3 PICs are pending investigation. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also contributes funding for 4 monitoring stations in the Fishing Creek watershed that are sampled quarterly as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 57** lists FDOT's activities in the watershed.

TABLE 57: FDOT ACTIVITIES IN THE FISHING CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-25	PIC Program	Search for illicit connections	Effort is continuous in this WBID	See Note 1	FDOT/COJ	Ongoing
FDOT-26	PIC Program	Illicit connections identified and removed if found to be true illicit	4 identified, 1 found to be true illicit and was removed, 3 pending investigation	See Note 1	FDOT/COJ	Ongoing
FDOT-27	PIC Program	Follow up on outstanding PICs	3 (for 2010-2011)	See Note 1	FDOT/COJ	Planned
FDOT-28	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	161 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-29	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	5 (for 2007-09)	See Note 2	FDOT/COJ	Ongoing
FDOT-30	Stormwater Management Systems	I-295 retention/detention systems	72 acres	Not applicable	FDOT	Complete
FDOT-31	Drainage Connection Permit (DCP) Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-32	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 2 miles	Unavailable	Not applicable	Ongoing
FDOT-33	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 7 miles of roadway and associated stormwater conveyance systems currently maintained; approximately 14 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

9.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 54 through **Table 57** list the projects and programs to reduce fecal coliform loading in the Fishing Creek watershed. Several key efforts completed in the WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Fishing Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Fishing Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

9.4.1 OSTDS

Failure Area – WSEA estimates that there are approximately 769 OSTDS in the watershed. There were previously 186 tanks located within the Pernecia failure area, which have all been phased out. In addition, there were 170 tanks outside the failure area that were also removed. The watershed does still include many OSTDS near surface waters and these areas do have repair permits.

Program Implementation – City ordinances, inspections, and program implementation, combined with DCHD permit review processes and inspections, proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures

the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure areas and to prevent the creation of new OSTDS sources.

However, there are discrete portions of the WBID that have a higher probability of OSTDS-related problems based on the number of repair permits issued, water quality data, and site conditions. These areas are: (1) Eulace Road to 94th Street, south to 103rd Street; and (2) west of Ortega Farms Boulevard to Benlocke Road to the creek. DCHD will intensively inspect these specific areas within the WBID boundary and will report the results of the inspection in an annual BMAP progress report. Additional areas may be identified for intensive inspections based on the assessment efforts discussed in the BMAP. If additional areas are designated in the future for inclusion in the program, these areas will also be inspected as funding becomes available. Currently, COJ ordinances, the septic tank failure program in partnership with WSEA, and DCHD program implementation address OSTDS as a source of fecal coliform loading. Inspections need to be continued and fully enforced to manage potential impacts from existing systems outside failure areas and to prevent new sources from reaching surface waters.

Capital Improvement Projects – COJ completed two flood control projects at Perrine Drive and Redstone Drive, which are both located in OSTDS areas. In addition, COJ completed a wet detention project on La Moya Road, which is also a septic tank area. These projects have helped reduce high-water conditions that can contribute to septic tank failure. COJ PWD should continue to evaluate flooding in the Fishing Creek WBID, and if frequent flooding is an issue in areas with high concentrations of OSTDS, capital improvement projects should be implemented, depending on available funding to address those problems.

9.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there are 13 private lift stations within the WBID boundaries. COJ EQD has performed 64 annual inspections on private lift stations since 1997 and will continue to inspect these stations annually. There is 1 station, 103rd Street and Bricker Road, on the WBID boundary. COJ will determine whether or not this station is located in the Fishing Creek WBID and provide the result in the first annual BMAP report. In addition, there is 1 station, 5951 Wilmar Road, located in close proximity to surface waters. COJ will inspect this station to ensure it is functioning properly and take any necessary enforcement. This inspection will be discussed in the first annual report.

Sewer Infrastructure Projects – JEA has conducted pipe bursting, CIPP, and open cut projects to repair the sewer mains in the WBID. JEA has also upgraded 1 lift station and replaced 14 of the 15 ARVs in the watershed. There were multiple SSOs at 5529 Enchanted Drive due to grease and JEA pipe burst the lines 2008, installed a manhole monitor, and smoke tested the lines in 2009. An SSO also occurred at 103rd Street and Firestone due to a grease blockage and JEA cleaned the area and has a project in design to reduce flows. In addition, there was a neighborhood in the watershed with 4 previous SSOs. To address this issue, JEA constructed weirs to reroute flow, the line on Firestone was cleaned and televised, and the entire area was smoke tested. Additionally, the lines in the area were CIPP lined, a manhole monitor was installed, and a project is in design to redirect flow starting in 2011.

JEA also has 3 lift stations located on the WBID boundary at Somerton Court, Bricker Road, and Sharbeth Road. In addition, there are 4 stations located close to surface waters that should be inspected and maintained, if necessary. These stations are located at Wescon Elementary on 105th Street, 5940 Perrine Drive, Para Woods, and Rossie LA. JEA will provide the results of these investigations for the first annual BMAP report.

Program Implementation – Program implementation, including inspections and line cleaning coupled with the Root Cause Program, are proactive measures preventing fecal coliform loading. In addition, the implementation of systemwide SSO prevention programs, such as FOG and CMOM, should be continued. JEA will report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to demonstrate that the system is monitored and maintained.

9.4.3 STORMWATER

Illicit Connection Removal – As part of the PIC Program, COJ has identified and removed 7 illicit connections and FDOT has removed 1 illicit connection. However, COJ has 30 open PIC cases and FDOT has 3 cases. Both COJ and FDOT should investigate these PICs and take any necessary enforcement action. The status will be discussed in the first annual report. COJ and FDOT have committed to continue the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its conveyances to prevent unpermitted connections. FDOT will continue stormwater infrastructure maintenance, as these efforts prevent potential regrowth in the MS4 conveyances. Additionally, 14 miles of roads are swept monthly and trash is collected along 2 miles of roadway through the Adopt-A-Highway Program, proactively preventing fecal coliform loading to the stormwater system. This effort is expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID.

COJ Program Implementation – COJ PWD conducts activities to maintain the MS4 system. In the last 5 years, COJ completed 439 work orders for ditch maintenance and cleaning, 24 for lake or pond problems, and 369 for structures. It will continue its maintenance activities in the watershed to prevent future problems and fecal coliform loadings.

TABLE 58: SUMMARY OF RESTORATION ACTIVITIES FOR THE FISHING CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	√	X	-	X
Capital Projects/Stormwater Water Quality BMPs	√	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	+	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	√	X	√	X
Tributary Assessment Team (TAT)	√	X	√	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 10: DEEP BOTTOM CREEK (WBID 2361)

10.1 WBID DESCRIPTION

Deep Bottom Creek, WBID 2361, is located in Duval County, east of the Lower St. Johns River within the South Mainstem Planning Unit, as designated by the SJRWMD (**Figure 10**). The “headwaters” of Deep Bottom Creek are presumably comprised of stormwater that originates from its associated branches near Tobin Drive, Pine Acres Road, and Big Tree Circle (**Figure 11**). The main channel of the creek generally flows southwest in a single channel with the exception of three branches that join Deep Bottom Creek from the east (“northeastern branch” and “southeastern branch”) and north (“northern branch”). The northeastern branch diverges from the main channel just north of Anchorage Cove Lane and continues approximately 40 meters (131 feet) to the east where it forks east to the eastern WBID boundary and north for 53 meters (174 feet) before turning 90 degrees to the east near Old St. Augustine Road. The southeastern branch extends from the main channel just north of Cedar Cove Lane and terminates immediately west of Pine Acres Road. The northern branch appears to originate at a pond located south of Big Tree Circle and merges with the main channel just east of Interstate 295. The waters of Deep Bottom Creek eventually flow into the St. Johns River, just west of Riverport Drive West (PBS&J, February 2009b).

The spatial distribution and acreage of different land use categories in the Deep Bottom Creek watershed were identified using 2004 land-use coverage data from the SJRWMD (**Table 59**). The dominant land use (415.5 acres; 34% of total coverage) in the Deep Bottom Creek watershed is classified as medium-density residential and is predominantly located east of Interstate 295 in the central portion of the WBID. The next two most abundant land cover categories are: (1) commercial/utility and institutional areas (276.6 acres; 22.6% of total coverage), located primarily along San Jose and Interstate 295, and scattered in areas along the eastern portion of the WBID; and (2) low-density residential areas (208.9 acres; 17.1% of total coverage) located: (i) in the western portion of the WBID, west of San Jose Boulevard, forming a boundary around the majority of the creek; (ii) just north of Burnett Park Road; and (iii) between Arrow Lakes Drive South and Hartley Road. Wetlands and upland forests accounted for approximately 7.2% of the total land coverage of Deep Bottom Creek and form a boundary around the main channel in areas west of San Jose Boulevard. Upland forests are also located in close proximity to surface waters between Hampton Road and Pine Acres Road, along the southeast branch. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Deep Bottom Creek in these areas. No agricultural or specialty farm land uses (e.g., dog kennels, horse farms) were identified within the Deep Bottom Creek watershed, though two horses have been observed to be stabled at a residence in the southeastern portion of the watershed at Dimsdale Road (PBS&J, February 2009b).

It is also important to note that high-density residential areas, including two apartment complexes, were identified within the watershed in close proximity to surface waters just east of the San Jose Boulevard and Interstate 295 intersection. In addition, several PICs and trash were observed near one of these apartment complexes (Woods of Mandarin). An additional apartment complex is located in the northern portion of the watershed at Arrowhead Drive (PBS&J, February 2009b).

According to the 2000 Census, there are 2,841 households within the watershed, averaging 2.29 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 1,136 dogs in the watershed.

TABLE 59: LAND USES IN THE DEEP BOTTOM CREEK WATERSHED

2004 LAND USE	ACRES	% OF TOTAL
Medium Density Residential	415.5	34.0
Commercial/ Utility/ Institutional	276.6	22.6
Low Density Residential	208.9	17.1
High Density Residential	124.1	10.1
Upland Forest	62.3	5.1
Transportation	41.3	3.4
Water	39.8	3.3
Wetlands	26.8	2.2
Recreational	14.4	1.2
Non-Forested Upland	12.7	1.0
TOTAL:	1,222.4	100

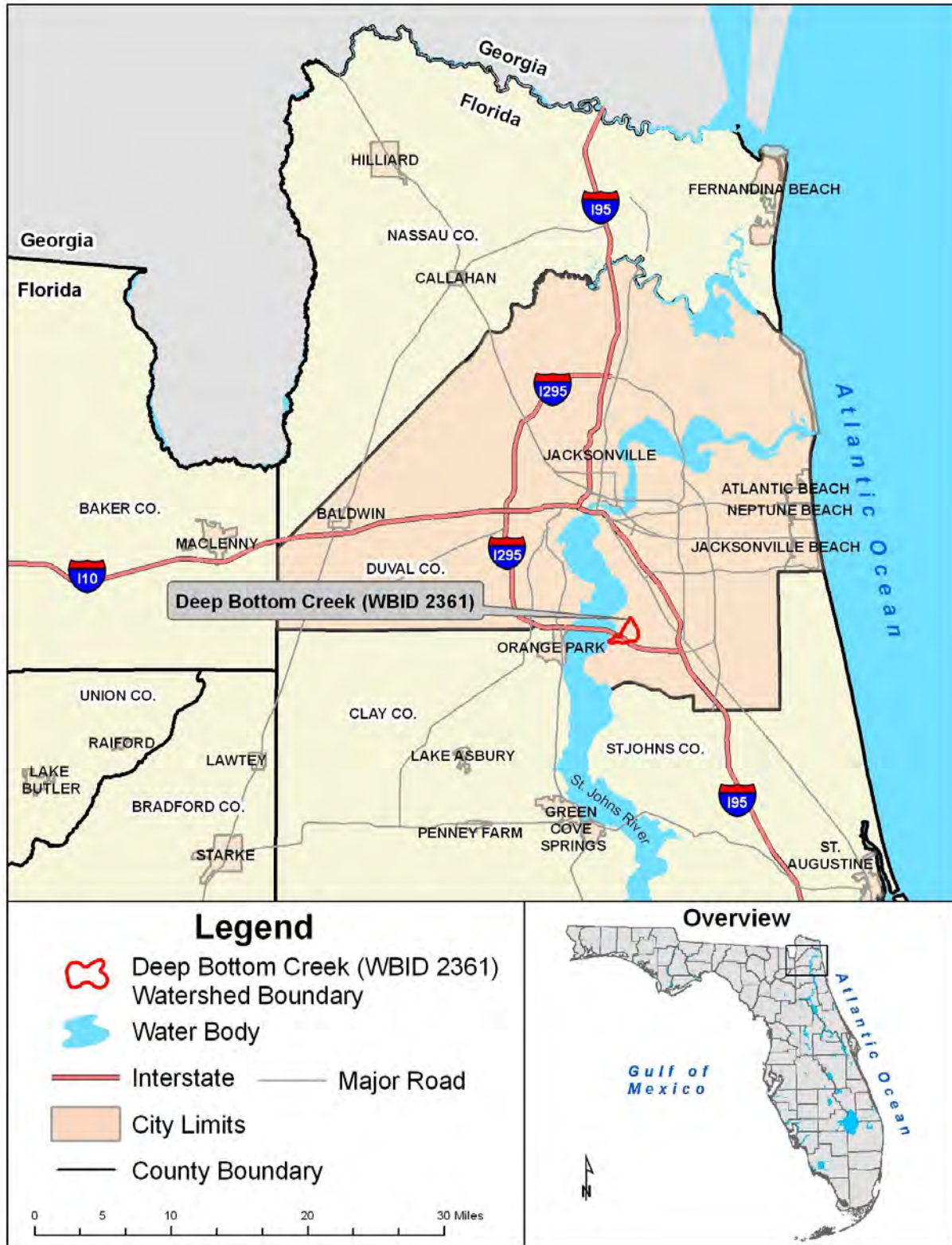


FIGURE 10: LOCATION OF THE DEEP BOTTOM CREEK WATERSHED

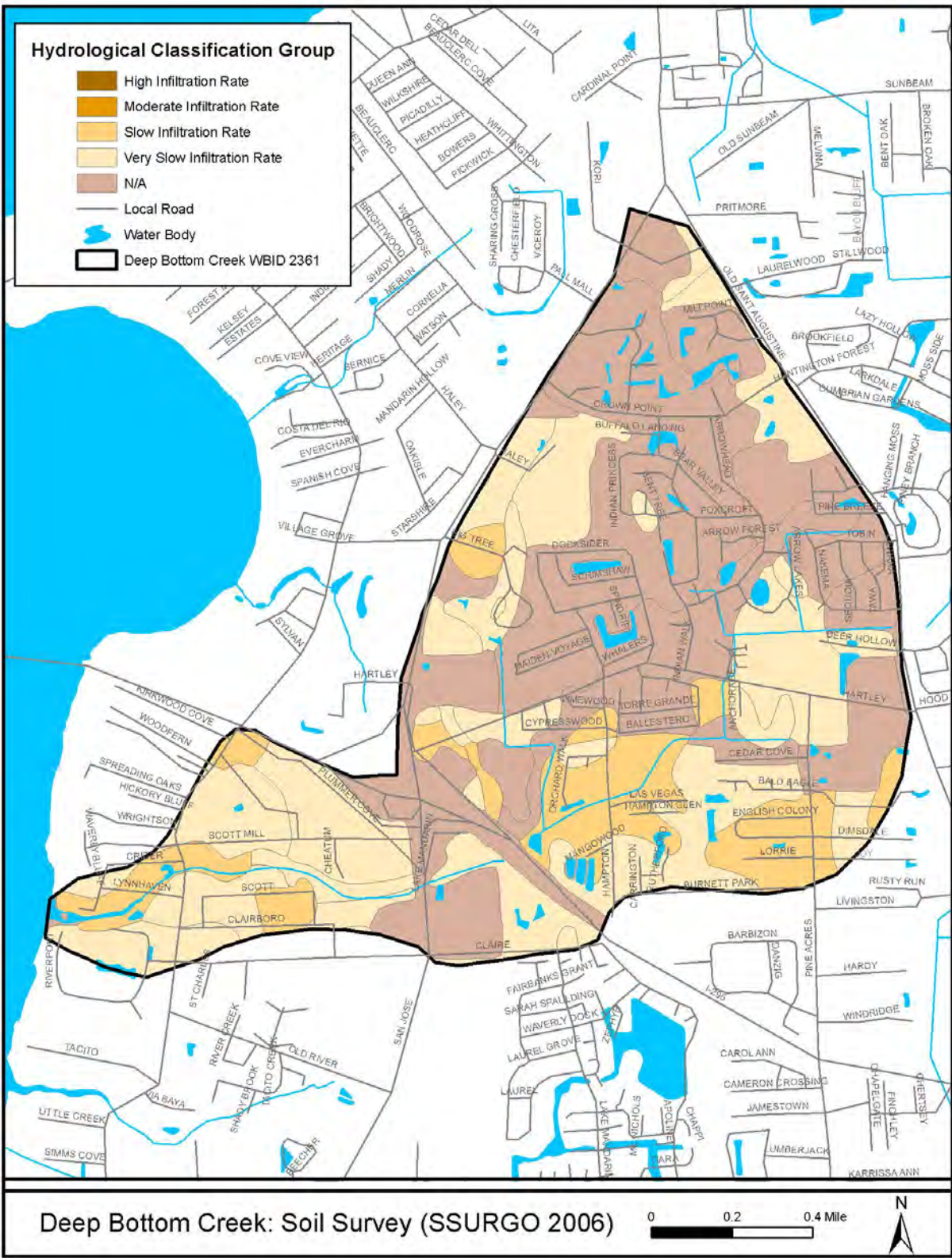


FIGURE 11: DEEP BOTTOM CREEK WBID LOCATOR MAP

10.2 POTENTIAL SOURCES

10.2.1 POINT SOURCES

The Mandarin Water Reclamation Facility, located just southeast of the Interstate 295 and Deep Bottom Creek intersection, is the only domestic WWTF within the Deep Bottom Creek watershed. The COJ/FDOT MS4 includes this WBID (PBS&J, February 2009b).

10.2.2 ILLICIT DISCHARGES

COJ EQD is continuing a program to identify, confirm, and respond to illicit connection issues in Jacksonville. A total of 32 PICs have been identified in the Deep Bottom Creek watershed with 6 PICs verified as illicit and removed. There are 5 PICs currently pending investigation in the WBID.

10.2.3 CENTRALIZED SEWER INFRASTRUCTURE AND OVERFLOWS

The Deep Bottom Creek watershed is located within the Mandarin WWTF Service Area. There are an estimated 1,867 households (approximately 66% of households) connected to the sanitary sewer system within Deep Bottom Creek. This watershed supports approximately 51 kilometers (32 miles) of sewer lines and eight sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is located throughout areas of the watershed east of San Jose Boulevard and in close proximity to surface waters. Furthermore, sewer mains parallel a large portion of Deep Bottom Creek surface waters and span across the width of the creek either above or below surface waters in numerous areas east of San Jose Boulevard, thereby increasing the likelihood that unidentified sewer infrastructure leaks (e.g., from underground sewer mains) may impact surface waters in this area of the watershed (PBS&J, February 2009b).

There have been 8 sanitary sewer overflows reported by JEA within the Deep Bottom Creek WBID boundaries (**Table 60**). One location, 10991 San Jose Boulevard, had 3 repetitive SSO events. The estimated volume of spills associated with these overflows ranged from 150 to 55,000 gallons and averaged approximately 12,279 gallons; however, only 2 SSOs were reported to have potentially impacted surface waters (PBS&J, February 2009b).

TABLE 60: SSOs REPORTED IN THE DEEP BOTTOM CREEK WATERSHED, 2001–07

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Deep Bottom Creek (2361)	8-Aug-01*	55,000	Data not available prior to October 2001
Deep Bottom Creek (2361)	3-Dec-02	600	No
Deep Bottom Creek (2361)	17-Dec-02	150	No
Deep Bottom Creek (2361)	23-Oct-04	480	No
Deep Bottom Creek (2361)	6-Dec-04*	2,000	Yes
Deep Bottom Creek (2361)	28-Mar-05*	3,500	No
Deep Bottom Creek (2361)	28-Aug-05	500	No
Deep Bottom Creek (2361)	13-Jun-06*	40,000	Yes

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

10.2.4 OSTDS

WSEA estimates that there are 130 OSTDS in the Deep Bottom Creek watershed. According to DCHD, 14 septic system repair permits were issued within this area. The permits, and

presumably failed septic systems, were primarily located west of San Jose Boulevard within the Scott Mill Hill nuisance area. Few parcels with repair permits were also located along Hartley Road, between Anchorage Cove Lane and Old St. Augustine Road and at Las Vegas Road. Many of the parcels with septic system repair permits in all of these areas are located in close proximity to Deep Bottom Creek surface waters. The proximity of these parcels to surface waters suggests that septic systems potentially affect the water quality of Deep Bottom Creek primarily in the downstream and upstream portions of the WBID. In addition, 1 nuisance area, Scott Mill, is located in the western portion of the WBID west of San Jose Boulevard. The Scott Mill nuisance area began the transition to centralized sewer on December 15, 2008 (PBS&J, February 2009b).

10.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the Deep Bottom Creek WBID contains predominantly 10% to 25% impervious surface and is located throughout the watershed. Areas with less than 10% impervious surface are scattered throughout the watershed and primarily correspond to upland forest and wetland land use classifications. The WBID also contains greater than 25% impervious surface areas that generally correspond to commercial/utility and institutional land use classifications, located mostly along San Jose Boulevard. An analysis was also conducted demonstrating that the majority of the WBID contains a moderate-to-high potential for stormwater runoff, which includes areas in close proximity to the creek. Low stormwater runoff coefficients primarily correspond to upland forests, wetlands, and recreational land use classifications. The highest runoff coefficients correlated with commercial/utility and institutional and transportation land use classifications and were predominantly calculated in areas along San Jose Boulevard and Interstate 295. As the main channel of Deep Bottom Creek flows through high runoff coefficient areas at San Jose Boulevard and I-295 and the northern branch is located in close proximity to high runoff coefficients along San Jose Boulevard, there is a potential for stormwater runoff to impact surface waters at these locations (PBS&J, February 2009b).

The storm sewer network in the Deep Bottom Creek watershed includes 31 permitted stormwater treatment areas, encompassing approximately 12.33% to 29.17% of the WBID area. Stormwater infrastructure within the WBID includes 100 outfalls by receiving water (none are classified by FDEP as a “major outfall”) and 413 inlets. Closed conveyances are common and are located throughout the watershed. All branches of Deep Bottom Creek, as well as all surface waters of the main channel upstream of Hampton Road, are classified as ditches. Numerous ponds are also within the watershed, the majority of which are located north of Hartley Road. Those in close proximity to Deep Bottom Creek surface waters are located: (1) at a ditch just south of the Crown Point Road and Old St. Augustine Road intersection; (2) just north of the southeastern branch at Arrow Lakes Drive South; (3) at a ditch that parallels Bald Eagle Lane; and (4) in areas along the main channel. As these ponds are in close proximity to Deep Bottom Creek, there is a potential for their waters to impact the surface waters of Deep Bottom Creek (PBS&J, 2009b).

Fecal coliform concentrations were not found to be different during the “wet” and “dry” seasons suggesting a constant source of fecal coliform bacteria through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. Considering the possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were higher than they appeared to be (PBS&J, February 2009b).

10.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

10.3.1 JEA ACTIVITIES IN THE DEEP BOTTOM CREEK WATERSHED

10.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

A total of 0.19% of the sewer lines in the watershed have been pipe burst and 2 of the 6 ARVs have been replaced. JEA will continue their maintenance activities for the sanitary sewer system to prevent future problems. **Table 61** provides additional information on JEA's activities in the Deep Bottom Creek watershed.

TABLE 61: JEA ACTIVITIES IN THE DEEP BOTTOM CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-73	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 379	\$50,441	JEA	Ongoing
JEA-74	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-75	ARV Inspection and Rehab	See Appendix E	2 of 6 ARVs replaced	\$100,000*	JEA	Ongoing
JEA-76	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	1 station (Burger King on San Joe Boulevard)	Unknown	JEA	Planned
JEA-77	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-78	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-79	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-80	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-81	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-82	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-83	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

10.3.2 DCHD ACTIVITIES IN THE DEEP BOTTOM CREEK WATERSHED

10.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As of July 28, 2008, DCHD updated the listing of failure and nuisance areas. There is 1 nuisance area, Scott Mill, located in the watershed. This area has started the transition to sewer with 95 of the 145 tanks in the WBID removed.

As part of the OSTDS Program, DCHD has issued 21 new construction permits, 14 repair permits, and 50 abandonment permits in the watershed. DCHD has also performed 35 plan reviews and site evaluations and 10 investigations in response to complaints received. It will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 62** list DCHD's projects in the Deep Bottom Creek watershed.

TABLE 62: DCHD ACTIVITIES IN THE DEEP BOTTOM CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-29	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 21 new construction permits, 14 repair permits, and 50 abandonment permits issued	\$21,650	FDOH/LSJR SWIM Grant	Ongoing
DCHD-30	SWIM Project	Implementation of broad-ranging septic tank ordinance	Approximately 40% of Scott Mill Hill Septic Tank Failure Area exists within this WBID	Unknown	FDOH/LSJR SWIM Grant	Ongoing
DCHD-31	DCHD-sponsored training programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-32	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 35 plan reviews and site evaluations have been performed based upon permitting history	\$8,750	FDOH/LSJR SWIM Grant	Ongoing
DCHD-33	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-34	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	10 complaint investigations have been performed	\$3,350	FDOH/LSJR SWIM Grant	Ongoing

10.3.3 COJ ACTIVITIES IN THE DEEP BOTTOM CREEK WATERSHED

10.3.3.1 Completed COJ Projects

COJ has completed the Cypresswood and Silkwood Intersection Improvements Project to fix the crossdrain in the area. In addition, the Crown Point and Moorings Landing Drainage Project is under construction. These projects improve drainage and reduce flooding, which decreases the fecal coliform loading from stormwater runoff to the creek.

COJ has also worked with WSEA to extend sewer lines to remove 129 septic tanks in the watershed, helping to reduce fecal coliform loading from septic tanks along the creek. WSEA uses the septic tank failure and nuisance areas ranking information for justification when seeking funding for phasing out septic tanks and transferring homes to central sewer (PBS&J, February 2009b).

10.3.3.2 Ongoing COJ Programs and Activities

COJ has established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. In Deep Bottom Creek, COJ has 1 routine monitoring station that is sampled quarterly; a total of 50 samples were collected at this station between 1995 and 2009. In addition to the routine sampling, COJ EQD has collected 10 samples to follow up on high fecal coliform counts to help determine the source of the loading.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 134 work orders for ditch and creek regrading, erosion control, and cleaning; 23 work orders for lake and pond maintenance; and 211 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. There were 32 PICs identified in Deep Bottom Creek, of which 6 were confirmed as illicit and removed. The status of 5 PICs is pending investigation. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

In the Deep Bottom Creek watershed, COJ PWD conducted inspections between 1995 and 2009 that included 4 investigations into illicit water discharges, 6 illegal discharges, 1 sewer line that drained into a yard or ditch, 8 SSOs, and 14 private lift station inspections. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 63 provides additional detail on COJ's activities in the Deep Bottom Creek watershed.

TABLE 63: COJ ACTIVITIES IN THE DEEP BOTTOM CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Drainage System Rehab Projects						
COJ-101	Crown Point and Moorings Landing Drainage	Investigate ponds and design sewer across Crown Point	Unknown	Unknown	COJ	Construction
COJ-102	Cypresswood and Silkwood Intersection Improvements	Failing crossdrain causing road to wash out	Unknown	\$100,000	COJ	Complete
MS4 Maintenance Activities						
COJ-103	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	134 (for 2005-09)	\$35,818	COJ	Ongoing
COJ-104	Lake or Pond Problem		23 (for 2005-09)	\$1,329	COJ	Ongoing
COJ-105	Structure Blocked/Repair/General Flooding		211 (for 2005-09)	\$14,873	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-106	Illicit Water Discharge	CARE initiated	4 (for 2006-07)	\$1,516	COJ	Ongoing
COJ-107	Pollution - Water - Illegal Discharge	CARE initiated	6 (for 1999-2007)	\$2,274	COJ	Ongoing
COJ-108	Sewer drains into yard/ditch	CARE initiated	1 (for 2009)	\$379	COJ	Ongoing
COJ-109	Sewer Overflow	CARE initiated	8 (for 2000-07)	\$3,032	COJ	Ongoing
COJ-110	Private Lift Station Inspection	4 private lift stations in the WBID	14 (for 1997-2009)	\$5,306	COJ	Ongoing
COJ-111	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-112	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	2 stations (1210 San Jose Blvd, 11100 San Jose Blvd)	Unknown	COJ	Planned
COJ-113	Illicit Discharge Detection and Elimination	5 open, 6 illicit	32 (for 1999-2003)	\$12,128	COJ	Ongoing
COJ-114	Follow Up on Outstanding PICs	Follow up on the 5 open PICs in the watershed	5 (for 2010-2011)	Unknown	COJ	Planned
COJ-115	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	50 (for 1995-2009)	Unknown	COJ	Ongoing
COJ-116	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	10 (for 2007-09)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-117	Scott Mill Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	145 tanks, 95 connected	Unknown	COJ	Ongoing
COJ-118	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	114 tanks, 34 connected	Unknown	COJ	Ongoing
COJ-119	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-120	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

¹ COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study, or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023. For the 15 tributaries addressed in this BMAP, the failing tanks within 300 meters of surface waters will be included in the COJ plan and schedule to phase out tanks and will be identified as Tributaries BMAP-related tanks.

10.3.4 FDOT ACTIVITIES IN THE DEEP BOTTOM CREEK WATERSHED

10.3.4.1 Completed FDOT Projects

FDOT has completed the San Jose Boulevard Widening Project, which treats 105 acres. This project reduces the bacteria loading from stormwater in this area to Deep Bottom Creek.

10.3.4.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. FDOT also supports the Adopt-A-Highway program in the watershed, in which trash is collected from 2 miles of roadway. Street sweeping occurs monthly on 2.5 miles of roadway, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system as needed. This maintenance occurs in 2.5 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ; no illicit connections to FDOT conveyances have been identified. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also contributes funding for 1 monitoring station in the Deep Bottom Creek watershed that is sampled quarterly as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 64** lists FDOT's activities in the watershed.

TABLE 64: FDOT ACTIVITIES IN THE DEEP BOTTOM CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-34	PIC Program	Search for illicit connections	Effort is continuous in this WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-35	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	50 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-36	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	10 (for 2007-09)	See Note 2	FDOT/COJ	Ongoing
FDOT-37	Stormwater Management Systems	San Jose Blvd Widening	105 acres	Not applicable	FDOT	Complete
FDOT-38	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-39	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 2 miles	Unavailable	Not applicable	Ongoing
FDOT-40	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 2.5 miles of roadway and associated stormwater conveyance systems currently being maintained; approximately 2.5 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

10.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 61 through **Table 64** list the projects and programs to reduce fecal coliform loading in the Deep Bottom Creek watershed. Several key efforts completed in the WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Deep Bottom Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Deep Bottom Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

10.4.1 OSTDS

Failure Areas – There are approximately 130 OSTDS in the watershed; 50 of which are located within the Scott Mill failure area. COJ and WSEA have begun sewerage efforts with 95 tanks connected in the failure area and 34 tanks outside of the failure area. The majority repair permits are located in the failure area. COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. The failing tanks in the Scott Mill failure area in the Deep Bottom Creek watershed within 300 meters of surface waters will be included in the COJ phase-out plan and schedule, as described in the Main Stem BMAP, and will be identified as Tributaries BMAP-related efforts.

Program Implementation – City ordinances, inspections, and program implementation, combined with DCHD permit review processes and inspections, proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure areas and to prevent the creation of new OSTDS sources.

10.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there are 4 private lift stations in the watershed that are inspected annually. COJ will continue to inspect the private lift stations on an annual basis to ensure they are operating properly and should take enforcement action when necessary. There are 2 private lift stations, 1210 San Joe Boulevard and 11100 San Jose Boulevard, which are located on the WBID boundary. COJ will determine whether or not these stations are located in the Deep Bottom Creek watershed and provide the results for the first annual BMAP report.

Sewer Infrastructure Projects – JEA has pipe burst 0.19% of the sewer lines in the watershed and replaced 2 ARVs. These efforts rehabilitated older infrastructure, helping to prevent future problems. Repetitive SSOs occurred at 10991 San Jose Boulevard. JEA made repairs to the station after each event and the station is scheduled to be decommissioned in 2012. There is 1 lift station, Burger King on San Jose Boulevard, located in close proximity to surface waters. JEA will inspect this station to ensure it is functioning properly and will report on the status in the first annual BMAP progress report. The continuation of maintenance activities, program implementation, and the confirmation of reporting boundaries is sufficient to address private lift stations in the watershed at this time.

Program Implementation – Program implementation, including inspections and line cleaning coupled with the Root Cause Program, are proactive measures preventing fecal coliform loading. In addition, the implementation of systemwide SSO prevention programs, such as FOG and CMOM, should be continued. JEA will report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to demonstrate that the system is monitored and maintained.

10.4.3 STORMWATER

Illicit Connection Removal – COJ has removed 6 illicit connections as part of the PIC Program. However, COJ has 5 PIC cases open and these cases will be investigated and the status reported in the first annual BMAP progress report. COJ and FDOT have committed to continue the program, which includes identifying additional illicit connections and removing those connections in a timely manner.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. The FDOT Adopt-A-Highway Program removes trash from 2 miles of roadway, and street sweeping is performed monthly on 2.5 miles of roadway. FDOT will continue stormwater infrastructure maintenance to help prevent potential regrowth in the MS4 conveyances. The trash removal efforts are expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID.

COJ Program Implementation – COJ has completed 23 work orders to repair stormwater pond problems, in addition to 345 work orders for other MS4 maintenance activities. COJ has also completed one drainage system rehab project with another under construction in the watershed. The continuation of maintenance activities is sufficient to address stormwater in the watershed at this time.

TABLE 65: SUMMARY OF RESTORATION ACTIVITIES FOR THE DEEP BOTTOM CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	√	X	-	X
Capital Projects/Stormwater Water Quality BMPs	-	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	-	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	√	X	√	X
Tributary Assessment Team (TAT)	√	X	√	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.
+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 11: MONCRIEF CREEK (WBID 2228)

11.1 WBID DESCRIPTION

Moncrief Creek, WBID 2228, is located in Duval County, west of the Lower St. Johns River within the Trout River Planning Unit, as designated by the SJRWMD (**Figure 12**). The “headwaters” of Moncrief Creek are presumably comprised of stormwater runoff that appears to originate just southwest of West 6th Street and from its associated branches near West 13th Street, Spring Grove Road, Grunthal Street, West 45th Street, Elwood Avenue, and Sunset Drive (**Figure 13**). The main channel of the creek generally flows northeast in a single channel with the exception of seven branches that join Moncrief Creek from the west (“southwestern branch”, “western branch”, and “northwestern branch”) and east (“southeastern branch”, “central branch”, “eastern branch”, and “northeastern branch”). The southwestern branch extends west from the main channel just north of West 18th Street and then turns sharply south where it parallels Dawson Street south to West 13th Street. Farther downstream the western branch stretches west from the main channel at Leonard Circle to Spring Grove Road. The southeastern branch appears to originate just north of the West 29th Street and Grunthal Street intersection and merges with the main channel north of West 33rd Street. The northwestern branch continues northwest from the main channel to near the MacLean Road and Spring Grove Road intersection where it forks. The western fork heads southwest before turning sharply to the north to West 44th Street while the north fork extends north to just south of the West 45th Street and Spellman Road intersection. The central branch joins the main channel just north of North Shore Drive and extends southeast before it forks slightly south and east, to just north of Elwood Avenue, and farther southeast to the Elwood Avenue and West 31st Street intersection. The eastern branch parallels the Millennium Inorganic Chemicals Company, located west of Elwood Avenue, and terminates east of the Crestwood Street and Lanark Avenue intersection. The northeastern branch, merges with the main channel north of Elwood Avenue and extends southeast near the Perry Street and Sunset Drive intersection. The waters of Moncrief Creek flow into the Trout River north of Highway 111/Tallulah Avenue and join the St. Johns River east of North Main Street (PBS&J, February 2009c).

The spatial distribution and acreage of different land use categories in the Moncrief Creek watershed were identified using 2004 land-use coverage data from the SJRWMD (**Table 66**). The dominant land use (1,471.4 acres; 38.9% of total coverage) in the watershed is classified as high-density residential. The next 2 most abundant land cover categories are: (1) medium-density residential (624.4 acres; 16.5% of total coverage); and (2) commercial/utility and institutional areas (424.1 acres; 11.2% of total coverage). Wetlands and upland forests accounted for approximately 8% of the total land coverage and form a boundary around the main channel from Golfbrook Drive north to Tallulah Avenue, and around the northwestern and central branches. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Moncrief Creek in these areas (PBS&J, February 2009c).

According to the 2000 Census, there are 8,769 households within the watershed, averaging 2.38 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 3,508 dogs in the watershed.

TABLE 66: LAND USES IN THE MONCRIEF CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
High Density Residential	1,471.4	38.9
Medium Density Residential	624.4	16.5
Commercial/ Utility/ Institutional	424.1	11.2
Recreational	373.8	9.9
Transportation	214.1	5.7
Wetlands	200.0	5.3
Industrial	117.7	3.1
Low Density Residential	106.3	2.8
Upland Forest	99.5	2.6
Water	81.6	2.2
Non-Forested Upland	55.0	1.5
Open Land	13.8	0.4
Disturbed Land	5.5	0.1
TOTAL:	3,787.2	100

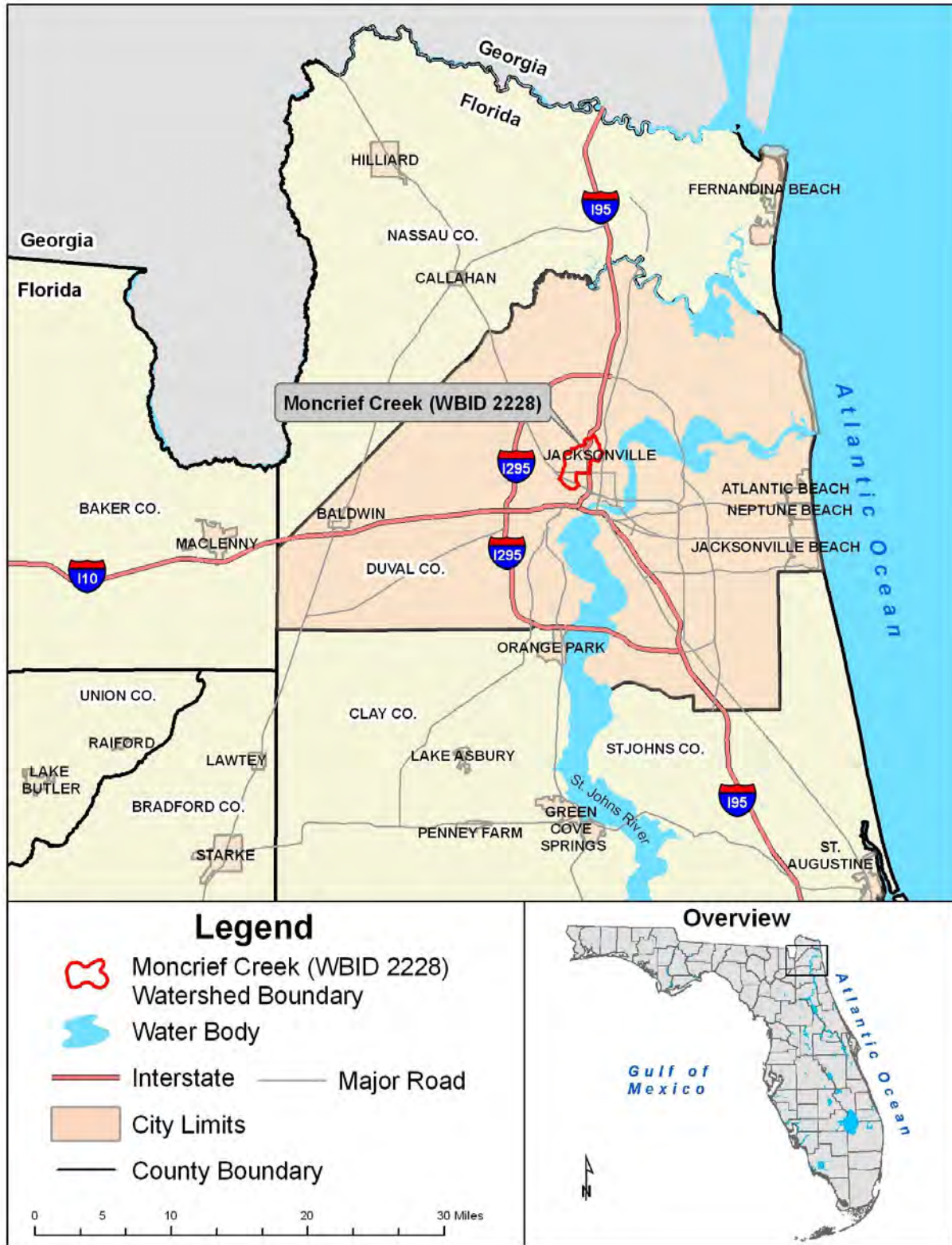


FIGURE 12: LOCATION OF THE MONCRIEF CREEK WATERSHED

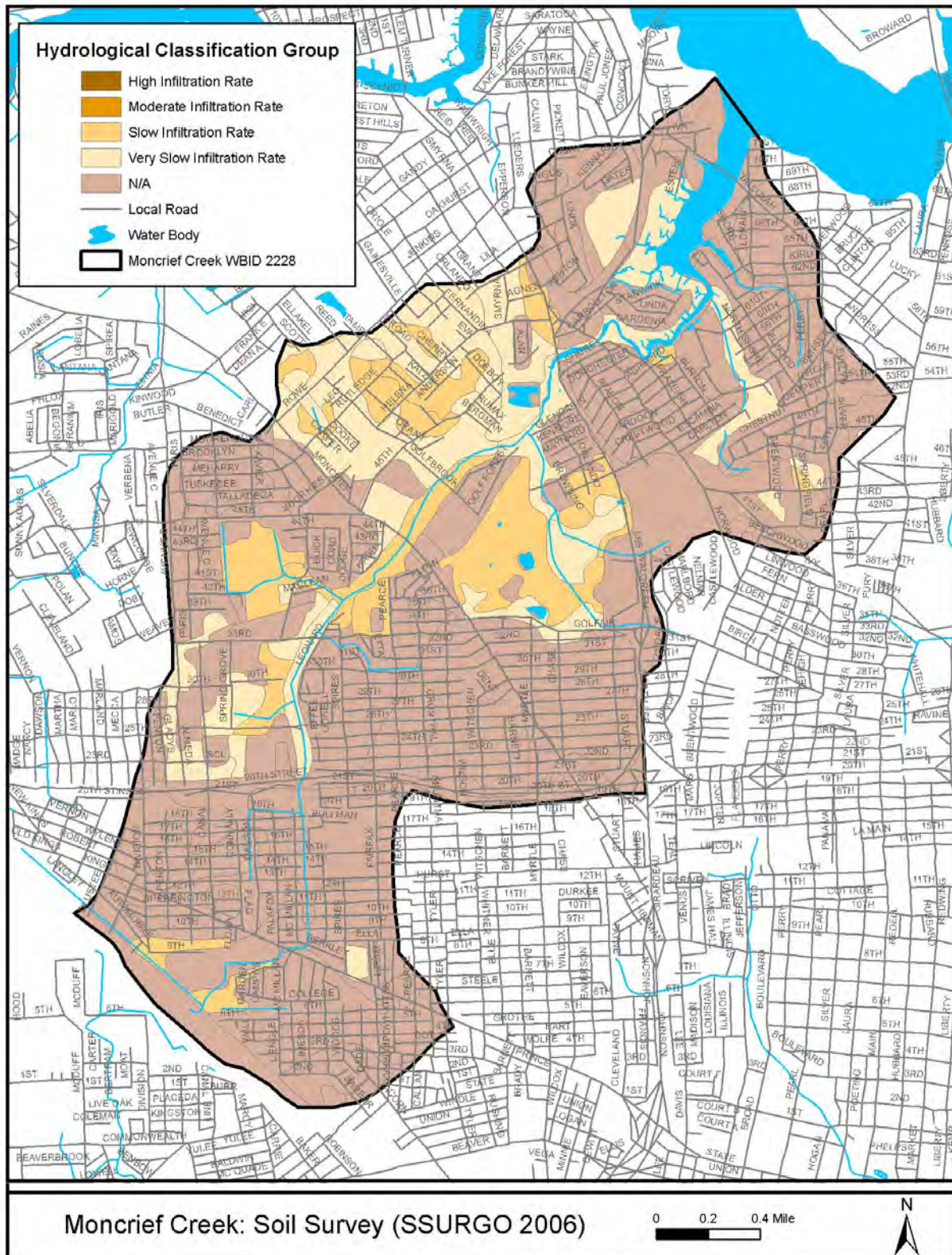


FIGURE 13: MONCRIEF CREEK WBID LOCATOR MAP

11.2 POTENTIAL SOURCES

11.2.1 POINT SOURCES

First Student, Inc. has an industrial MSGP located near the headwaters of Moncrief Creek just northwest of 6th Street. Millennium Specialty Chemicals, located in a large area along the eastern branch between West 61st Street and Crestwood Street, is also permitted to discharge industrial wastewater into Moncrief Creek. Lastly, two industrial car wash facilities are located just north of the Interstate 95 and Lem Turner Road intersection. The COJ/FDOT MS4 permit includes the Moncrief Creek watershed (PBS&J, February 2009c).

11.2.2 ILLICIT DISCHARGES

COJ has identified 15 PICs in the Moncrief Creek watershed, 3 of which were determined to be illicit and removed. There are 10 PICs that are currently pending investigation in the WBID.

11.2.3 CENTRALIZED SEWER INFRASTRUCTURE AND OVERFLOWS

The Moncrief Creek watershed is located within the Buckman WWTF Service Area. There are an estimated 7,902 households (approximately 90% of households) connected to the sanitary sewer system within the Moncrief Creek WBID. This watershed supports nearly 513 kilometers (319 miles) of sewer lines and 10 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is found throughout the watershed and is most concentrated in areas west of Moncrief Road, between Moncrief Road and Interstate 95, south of Golfair Boulevard, and east of Interstate 95. There have been 17 sanitary sewer overflows reported by JEA within the Moncrief Creek WBID boundaries (**Table 67**). The estimated volume of spills associated with these overflows ranged from 30 to 720 gallons and averaged approximately 93 gallons; 5 SSOs were reported to have potentially impacted surface waters (PBS&J, February 2009c).

TABLE 67: SSOs REPORTED IN THE MONCRIEF CREEK WATERSHED, 2001–07

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Moncrief Creek (2228)	15-Jan-02	50	No
Moncrief Creek (2228)	2-Feb-02	200	No
Moncrief Creek (2228)	4-Jun-02*	300	Yes
Moncrief Creek (2228)	20-Jan-03*	100	Yes
Moncrief Creek (2228)	26-Feb-03	25	No
Moncrief Creek (2228)	15-Jul-03	400	No
Moncrief Creek (2228)	20-Oct-03*	20	Yes
Moncrief Creek (2228)	22-Jul-04	200	No
Moncrief Creek (2228)	22-Jan-05	50	No
Moncrief Creek (2228)	6-Apr-05	10	No
Moncrief Creek (2228)	15-Apr-05	50	No
Moncrief Creek (2228)	6-Jun-05	25	No
Moncrief Creek (2228)	17-Nov-05	100	No
Moncrief Creek (2228)	29-Nov-05	25	No
Moncrief Creek (2228)	7-Mar-06	30	No
Moncrief Creek (2228)	10-Jun-06*	720	Yes
Moncrief Creek (2228)	24-Jul-06*	100	Yes

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

11.2.4 *OSTDS*

WSEA estimates that there are 989 OSTDS in the Moncrief Creek watershed. According to DCHD, 82 septic system repair permits were issued within this area. The permits, and presumably failed septic systems, were primarily located on the west side of the creek north of West 33rd Street. Numerous parcels with septic system repair permits are located in close proximity to Moncrief Creek surface waters: (1) along the main channel from Moncrief Road south to the confluence with the Trout River; (2) to the west of the eastern branch at Long Street; (3) at Crestwood Street west of the central branch; and (4) near the headwaters of the southeastern branch at 29th Street West. The proximity of these parcels to surface waters suggests that septic systems potentially affect the water quality of Moncrief Creek primarily in the midstream and downstream portions of the WBID (PBS&J, February 2009c).

In addition, 3 DCHD-designated septic system failure areas (Royal Terrace, Christobel, and Lake Forest) are located in the western portion of the WBID just west of Moncrief Road, in an area from Lem Turner Road south to Golfbrook Drive, and between Lem Turn Road and Interstate 95, respectively. It is important to note that 6 previously designated nuisance areas were removed from the list in July 2007, including Lake Forest, which completed the transition to sewer (PBS&J, February 2009c).

11.2.5 *NONPOINT SOURCES*

An analysis of impervious surface indicates that the Moncrief Creek WBID contains predominantly 10% to 25% impervious surfaces. Areas with less than 10% impervious surface are primarily located along the surface waters of Moncrief Creek and correspond to wetland and upland forest land use classifications. Areas with 10% to 25% impervious surface are located throughout the watershed. Portions of the watershed with greater than 25% impervious surface area correspond to transportation and commercial/utility and institutional land use classifications and are located in close proximity to the surface waters of Moncrief Creek: (1) near the headwaters from the railroad north to Kings Road between West 10th Street and West 6th Street; (2) between West 18th Street and West 30th Street; (3) along Moncrief Creek Road; (4) along Interstate 95 at the central branch; and (5) along Norwood Avenue. An analysis was also conducted that demonstrates that the majority of the WBID contains primarily a moderate-to-high potential for stormwater runoff that covers almost the entire watershed. Exceptions include low runoff coefficients that correspond primarily with wetland and upland forest land use classifications (PBS&J, February 2009c).

The storm sewer network in the Moncrief Creek watershed includes 37 permitted stormwater treatment areas, encompassing approximately 23% of the WBID area. Stormwater infrastructure within the WBID includes 97 outfalls by receiving water (5 classified by FDEP as a “major outfall”) and 2,032 inlets. Although closed conveyances are common throughout the WBID, primarily west of Moncrief Road, few ditch systems are in the watershed. Numerous ponds are also within the watershed. Those in close proximity to Moncrief Creek surface waters are primarily located: (1) just west of the Spring Grove Avenue and Maclean Road intersection; (2) northeast of the Moncrief Road and Golfair Boulevard intersection at the First Tee Golf Course; (3) just east of the Doeboy Street and West 45th Street intersection; and (4) near the Millennium Inorganic Chemicals Company immediately southeast of Crestwood Street and Lanark Avenue. As these ponds are in close proximity to Moncrief Creek, there is a potential for their waters to merge with the surface waters of Moncrief Creek (PBS&J, February 2009c).

Fecal coliform concentrations were not different during the “wet” and “dry” seasons suggesting a constant source of fecal coliform bacteria through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. Considering the

possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were higher than they appeared to be (PBS&J, February 2009c).

11.3 PROJECTS TO REDUCE FECAL COLIFORM LOADINGS

11.3.1 JEA ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

11.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA conducts activities to maintain the sanitary sewer infrastructure in the watershed, including pipe bursting 8.14% of the sewer lines and CIPP on 0.20%. JEA has also replaced 7 of the 10 (70%) of the ARVs. During FY09, JEA inspected 7,056 LF of pipe using a closed circuit television system, pipe cleaned 19,118 LF, and cleaned 54,478 LF of HPDE pipe to prevent blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 68** contains additional information on JEA’s activities in the watershed.

TABLE 68: JEA ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-84	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 137,181	\$12,349,037	JEA	Ongoing
JEA-85	CIPP - Install an New Inner Lining	Rehabilitation of failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 3,446	\$874,211	JEA	Ongoing
JEA-86	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-87	ARV Inspection and Rehab	See Appendix E	7 of 10 ARVs replaced to date	\$100,000*	JEA	Ongoing
JEA-88	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (Lake Forest Elementary)	Unknown	JEA	Planned
JEA-89	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	5 stations (McMillan, Spring Grove Avenue, Public Housing on Golfair Boulevard, Norwood, Lorrain)	Unknown	JEA	Planned

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-90	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-91	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-92	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-93	HDPE Pipe Cleaning - Contractor	Clean existing HDPE pipes to avoid blockages	54,478 ft of HDPE pipe cleaned in watershed	\$68,098	JEA	Ongoing
JEA-94	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	7,056 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-95	Pipe Cleaning	Clean existing pipes to avoid blockages	19,118 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-96	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-97	Manhole Monitoring	See Appendix E	1 monitor	Unknown	JEA	Ongoing
JEA-98	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-99	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-100	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

11.3.2 DCHD ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

11.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As of July 28, 2008, DCHD updated the listing of failure and nuisance areas. There are 2 DCHD-designated septic system failure areas, Royal Terrace and Christobel, located in the watershed. Approximately 77.28% of the Royal Terrace and 62.97% of the Christobel failure areas are located in the WBID. In addition, the Lake Forest nuisance area was located in the watershed and it has completed the transition to sewer.

As part of the OSTDS Program, DCHD has issued 51 new construction permits, 82 repair permits, and 140 abandonment permits in the WBID. In addition, 9 annual operating permits have been issued for PBTS in the watershed. DCHD has also performed 133 plan reviews and 152 investigations in response to complaints received. It will continue these efforts in the future

to reduce and prevent issues related to OSTDS. **Table 69** lists DCHD's projects in the Moncrief Creek watershed.

TABLE 69: DCHD ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-35	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 51 new construction permits, 82 repair permits, and 140 abandonment permits issued	\$77,050	FDOH/LSJR SWIM Grant	Ongoing
DCHD-36	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	There are 9 annual operating permits issued for commercial properties	\$22,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-37	SWIM Project	Implementation of broad-ranging septic tank ordinance	Approximately 77.28% of the Royal Terrace, 62.97% of the Christobel, and 22% of the Lake Forest Septic Tank Failure Area exists within this WBID	\$40,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-38	DCHD-sponsored training programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-39	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 133 plan reviews and site evaluations have been performed based upon permitting history	\$33,250	FDOH/LSJR SWIM Grant	Ongoing
DCHD-40	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-41	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	152 complaint investigations have been performed	\$50,600	FDOH/LSJR SWIM Grant	Ongoing
DCHD-42	Intensive Inspection Program	Intensive geospecific inspections in selected WBIDs based on repair permit applications, water quality information, and site conditions; additional WBIDs may be identified in future based on assessment efforts	Approximately 100 tanks west of Lem Turner and south of I-95; 80 tanks off Edgewood Avenue from Valley Forge Road south to Espys Road	\$27,900	Unknown	Planned

11.3.3 COJ ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

11.3.3.1 Completed COJ Projects

COJ has completed 2 projects to capture and/or treat stormwater in the Moncrief Creek watershed: (1) Moncrief Creek Wet Detention Project that treats 619 acres; and (2) Royal Terrace Phases A, B, C, D, E, 1, 2, 3, and 4, which is a wet detention project that treats 332 acres. These projects reduce stormwater-associated fecal coliform loading to the creek.

In addition, COJ has worked with WSEA to extend sewer lines to remove 210 septic tanks in the watershed, helping to reduce fecal coliform loading from septic tanks along the creek. The WBID contains the Lake Forest failure area, which has since been removed from the ranking list due to the sewerage efforts.

11.3.3.2 COJ Projects in Design or Construction

COJ also currently has the 49th Street and Pearl Street Project under construction and the Barber/Broadway Drainage System in design. These projects, once completed, will help control flooding in the project areas, reducing the amount of fecal coliform loading that goes into the creek from stormwater.

11.3.3.3 Ongoing COJ Programs and Activities

COJ has also established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. As part of this monitoring plan, COJ has 2 sampling stations in the Moncrief Creek watershed and collected 99 samples between 1995 and 2009. In addition to the routine sampling, COJ EQD collected 18 samples as part of the TAT effort and also collected 6 samples as a follow up on a high fecal coliform count to help with source identification.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 426 work orders for ditch and creek regrading, erosion control, and cleaning; 26 work orders for lake and pond maintenance; and 655 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. Of the 15 PICs identified by the COJ in the Moncrief Creek watershed, 3 were confirmed as illicit connections and were removed; the status of 10 PICs is currently pending.

COJ PWD also conducts inspections, which are initiated through the CARE database. In the Moncrief Creek watershed, these inspections between 1995 and 2009 included 13 investigations into illicit water discharges, 9 illegal discharges, 1 sewer line that drained into a yard or ditch, 60 SSOs, 126 septic tanks, and 23 private lift station inspections. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 70 provides additional detail on COJ's activities in the watershed.

TABLE 70: COJ ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Capital Improvement Projects						
COJ-121	Moncrief Creek (Main Stem COJ-27)	Wet detention at 30 th Street West and Leonard Circle West	619 acres	Unknown	COJ	Complete
COJ-122	Royal Terrace Phases A, B, C, D, E, 1, 2, 3, 4 (Main Stem COJ-18)	Wet detention at 45 th Street West and Avenue B	332 acres	Unknown	COJ	Complete
Drainage System Rehab Projects						
COJ-123	49th and Pearl	Ponding water floods yard	Unknown	Unknown	COJ	Construction
MS4 Maintenance Activities						
COJ-124	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	426 (for 2005-09)	\$30,279.18	COJ	Ongoing
COJ-125	Lake or Pond Problem		26 (for 2005-09)	Unknown	COJ	Ongoing
COJ-126	Structure Blocked/Repair/General Flooding		655 (for 2005-09)	\$24,365.67	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-127	Illicit Water Discharge	CARE initiated	13 (for 2005-08)	\$4,927	COJ	Ongoing
COJ-128	Pollution - Water - Illegal Discharge	CARE initiated	9 (for 2001-09)	\$3,411	COJ	Ongoing
COJ-129	Sewer drains into yard/ditch	CARE initiated	1 (for 2009)	\$379	COJ	Ongoing
COJ-130	Sewer Overflow	CARE initiated	60 (for 2000-09)	\$22,740	COJ	Ongoing
COJ-131	Septic Tank Inspection	CARE initiated	126 (for 2006-08)	\$47,754	COJ	Ongoing
COJ-132	Private Lift Station Inspection	5 private lift stations in the WBID	23 (for 1997-2009)	\$8,717	COJ	Ongoing
COJ-133	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-134	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	2 stations (4811 Payne Stuart Drive, Stuart and Golfair)	Unknown	COJ	Planned
COJ-135	Illicit Discharge Detection and Elimination	10 open, 3 illicit	15 (for 2001-09)	\$5,685	COJ	Ongoing
COJ-136	Follow Up on Outstanding PICs	Follow up on the open PICs in the watershed	10 (for 2010-2011)	Unknown	COJ	Planned
COJ-137	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	99 (for 1995-2009)	Unknown	COJ	Ongoing
COJ-138	TAT Sampling	Conducted by EQD to assess bacteria levels in the creek and help identify potential fecal bacteria sources	18 (for 2008-09)	Unknown	COJ	Ongoing
COJ-139	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	6 (for 2007-09)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-140	Lake Forest Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas - completed	136 tanks, 136 connected	Unknown	COJ	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
COJ-141	Cristobel Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	164 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-142	Royal Terrace Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	76 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-143	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	823 tanks, 74 connected	Unknown	COJ	Ongoing
COJ-144	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-145	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

¹ COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study, or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023. For the 15 tributaries addressed in this BMAP, the failing tanks within 300 meters of surface waters will be included in the COJ plan and schedule to phase out tanks and will be identified as Tributaries BMAP-related tanks.

11.3.4 FDOT ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

11.3.4.1 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they are reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT periodically performs site inspections as part of the MS4 NPDES permit. FDOT participates in the Adopt-A-Highway Program in the watershed and trash is collected from 6 miles. FDOT also sweeps 8 miles of roadways in the watershed monthly, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system as needed. This maintenance occurs on 4 miles of roadway and associated stormwater conveyance systems.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT It participates in the PIC Program in conjunction with COJ. FDOT has found 2 PICs, 1 of which was determined to be illicit and removed and the other is currently pending investigation. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also contributes funding for 2 monitoring stations in the Moncrief Creek watershed. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 71** lists FDOT's activities in the watershed.

TABLE 71: FDOT ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-41	PIC program	Search for illicit connections	Effort is continuous in this WBID	See Note 1	FDOT/COJ	Ongoing
FDOT-42	PIC Program	Illicit connections identified and removed if found to be true illicit	2 identified, 1 found to be true illicit and removed, 1 pending further investigation	See Note 1	FDOT/COJ	Ongoing
FDOT-43	PIC Program	Follow up on outstanding PICs	1 (for 2010-2011)	See Note 1	FDOT/COJ	Planned
FDOT-44	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	99 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-45	TAT Sampling	Conducted by EQD to assess bacteria levels in the creek and help identify potential fecal bacteria sources	18 (for 2008-09)	See Note 2	FDOT/COJ	Ongoing
FDOT-46	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	6 (for 2007-09)	See Note 2	FDOT/COJ	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-47	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-48	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 6 miles	Unavailable	Not applicable	Ongoing
FDOT-49	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 4 miles of roadway and associated stormwater conveyance systems currently being maintained; approximately 8 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

11.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 68 through **Table 71** list the projects and programs to reduce fecal coliform loading in the Moncrief Creek watershed. Several key efforts completed in this WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Moncrief Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Moncrief Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

11.4.1 OSTDS

Failure Area – The Lake Forest, Cristobel, and Royal Terrace failure areas are located in the WBID. All of the 136 tanks in the Lake Forest failure area in the watershed have been converted to sewer with an additional 74 tanks outside the failure areas also connected. Approximately, 989 tanks remain in the WBID boundaries. Of these, 240 tanks are eligible for connection to sewer due to their inclusion in a failure area. COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. The failing tanks in the failure areas in the Moncrief Creek watershed within 300 meters of surface waters will be included in the COJ phase-out plan and schedule, as described in the Main Stem BMAP, and will be identified as Tributaries BMAP-related efforts.

Program Implementation – While the recent connection of so many septic tanks to the sewer system should help to improve water quality in the watershed, there are two discrete portions of the WBID that have a higher probability of OSTDS-related problems based on the number of repair permits issued, water quality data, and site conditions. DCHD will intensively inspect a specific geographic area within the WBID boundary and will report the results of the inspection

in an annual BMAP progress report. Additional areas may be identified for intensive inspections based on the assessment efforts discussed in the BMAP. If additional areas are designated in the future for inclusion in the program, these areas will also be inspected as funding becomes available.

11.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there are 5 private lift stations in the watershed. COJ EQD performed 23 annual lift station inspections in the watershed and will continue inspections annually. There are 2 private lift stations, 4811 Payne Stuart Drive and Stuart and Golfair, which are located in close proximity to surface waters. COJ will inspect these stations to ensure they are functioning properly and provide a status update for the first annual BMAP report. COJ's annual inspections and investigation of lift stations near surface waters are sufficient to address private infrastructure in the watershed at this time.

Sewer Infrastructure Projects – JEA has completed pipe bursting and CIPP projects within the watershed and replaced 7 ARVs. JEA is also planning to install a manhole monitor at the lift station located at 1646 West 45th Street in 2010. There is 1 lift station, Lake Forest Elementary on Edgewood Avenue West, which is on the WBID boundary. JEA will confirm whether or not this station is located in the Moncrief Creek watershed. In addition, there are 5 lift stations close to surface waters that should be inspected to ensure they are functioning properly. These stations are McMillan, Spring Grove Avenue, Public Housing on Golfair Boulevard, Norwood, and Lorrain. JEA will report on these investigations in the first annual BMAP progress report. JEA will continue these efforts and its systemwide programs, and this will be sufficient to address potential sewer sources in the WBID at this time.

11.4.3 STORMWATER INFRASTRUCTURE

Illicit Connection Removal – COJ has removed 3 illicit connections and FDOT has removed 1 connection in the Moncrief Creek watershed. However, COJ has 10 open PIC cases and FDOT has 1 open case. Both entities will investigate these PICs and provide the results for the first annual BMAP progress report. They have committed to continue the PIC Program, which includes identifying additional illicit connections and removing those connections in a timely manner.

FDOT Project Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue and FDOT will continue to periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. The FDOT Adopt-A-Highway Program removes trash from 6 miles of roadway, and street sweeping is performed monthly on 8 miles of roadway. FDOT will continue stormwater infrastructure maintenance to help prevent potential regrowth in the MS4 conveyances. The trash removal efforts are expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID.

COJ Project Implementation –COJ has added 951 acres of wet detention treatment in the watershed and has a drainage system rehab project under construction along 49th Street and Pearl. In addition, COJ PWD has worked extensively in the watershed, completing 426 work orders for ditch maintenance, repairing 26 stormwater pond problems, and addressing 655 work orders for improperly operating stormwater infrastructure. This reflects a significant amount of effort in the watershed that is expected to result in water quality improvements in the creek.

TABLE 72: SUMMARY OF RESTORATION ACTIVITIES FOR THE MONCRIEF CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	√	X	-	X
Capital Projects/Stormwater Water Quality BMPs	√	X	-	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	-	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	+	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	√	X	√	X
Tributary Assessment Team (TAT)	√	X	√	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 12: BLOCKHOUSE CREEK (WBID 2207)

12.1 WBID DESCRIPTION

Blockhouse Creek, WBID 2207, is located in Duval County, northwest of the Lower St. Johns River within the Trout River Planning Unit, as designated by the SJRWMD (**Figure 14**). The “headwaters” of Blockhouse Creek are presumably comprised of stormwater that originates southwest of Interstate 295 at the northeastern corner of the WBID (**Figure 15**). The main channel of the creek generally flows southward in a single channel with several contributing branches that join Blockhouse Creek from all directions. The largest branches appear to include three from the east (“northeastern branch”, “eastern branch” and “southeastern branch”) and three from the west (“northwestern branch”, “western branch” and “southwestern branch”). Just west of the “headwaters” the creek branches slightly southwest of the most upstream extent of the main channel and then bends northeast, merging with the main channel and forming a “loop.” The northeastern branch diverges from the main channel downstream of the loop and continues southeast. Just south of Armsdale Road, the eastern branch extends southeast from the main channel and ends just south of Duval Road. The northwestern branch is located just downstream of the eastern branch and stretches north from the main channel and terminates just north of Armsdale Road. Further downstream, the southwestern branch stretches from just north of Acorn Park Drive North and continues southeast, merging with the main channel just west of Tulsa Road North. The most downstream contributor, southeastern branch, extends from outside the WBID boundaries, just east of Pine Estates Road South, and continues southwest to Blockhouse Creek. The waters of Blockhouse Creek flow into the Trout River, just south of Broward Road, which merges with the St. Johns River east of US Highway 17 (PBS&J, October 2008).

The spatial distribution and acreage of different land use categories in the Blockhouse Creek watershed were identified using 2004 land-use coverage data from the SJRWMD (**Table 73**). The dominant land use (344.2 acres; 21.4% of total coverage) in the Blockhouse Creek watershed is classified as upland forest and is predominantly located north of Dunn Avenue. The next two most abundant land cover categories are: (1) medium-density residential areas (336.1 acres; 20.9% of total coverage); and (2) wetland areas (270.8 acres; 16.8% of total coverage), which form a boundary around the majority of the creek. As upland forests and wetlands serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Blockhouse Creek (PBS&J, October 2008).

Croplands and pasturelands were identified in the northeastern corner of the WBID, extending from Interstate 295 south to the Duval Road and Alexander Drive intersection. According to COJ EQD, a small farm (Forshee Farms) with less than 50 head of cattle is located just southwest of the corner of Duval Road and Armsdale Road, and parallels segments of the eastern branch. As croplands and pasturelands that support livestock are adjacent to the “headwaters” and northeastern and eastern branches of Blockhouse Creek, there is an increased potential for agricultural runoff (e.g., from cattle) to impact surface waters in these areas. It is also important to note that high-density residential areas were identified within the watershed in close proximity to surface waters at two apartment complexes located: (1) at Dunn Avenue, and (2) from Capper Road south to Centerwood Courts, between Lem Turner Road and Blockhouse Creek (PBS&J, October 2008).

According to the 2000 Census, there are 1,155 households within the watershed, averaging 2.15 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 462 dogs in the watershed.

TABLE 73: LAND USES IN THE BLOCKHOUSE CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
Upland Forest	344.2	21.4
Medium Density Residential	336.1	20.9
Wetlands	270.8	16.8
Low Density Residential	190.8	11.8
Commercial/ Utility/ Institutional	152.6	9.5
Cropland and Pastureland	149.6	9.3
Transportation	53.6	3.3
High Density Residential	49.9	3.1
Water	31.4	1.9
Non-Forested Upland	21.0	1.3
Recreational	9.6	0.6
Disturbed Land	1.3	0.1
TOTAL:	1,610.9	100

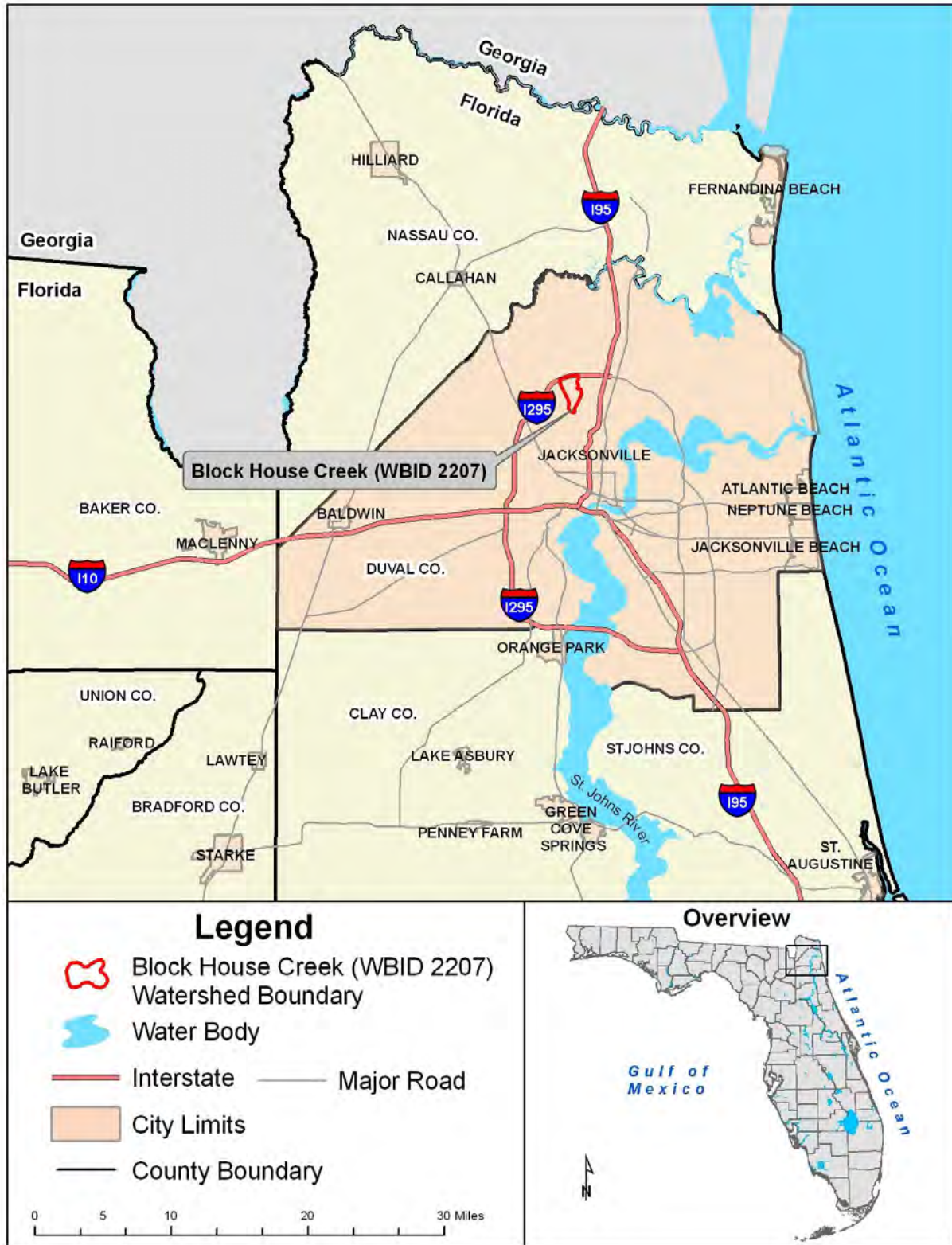


FIGURE 14: LOCATION OF THE BLOCKHOUSE CREEK WATERSHED

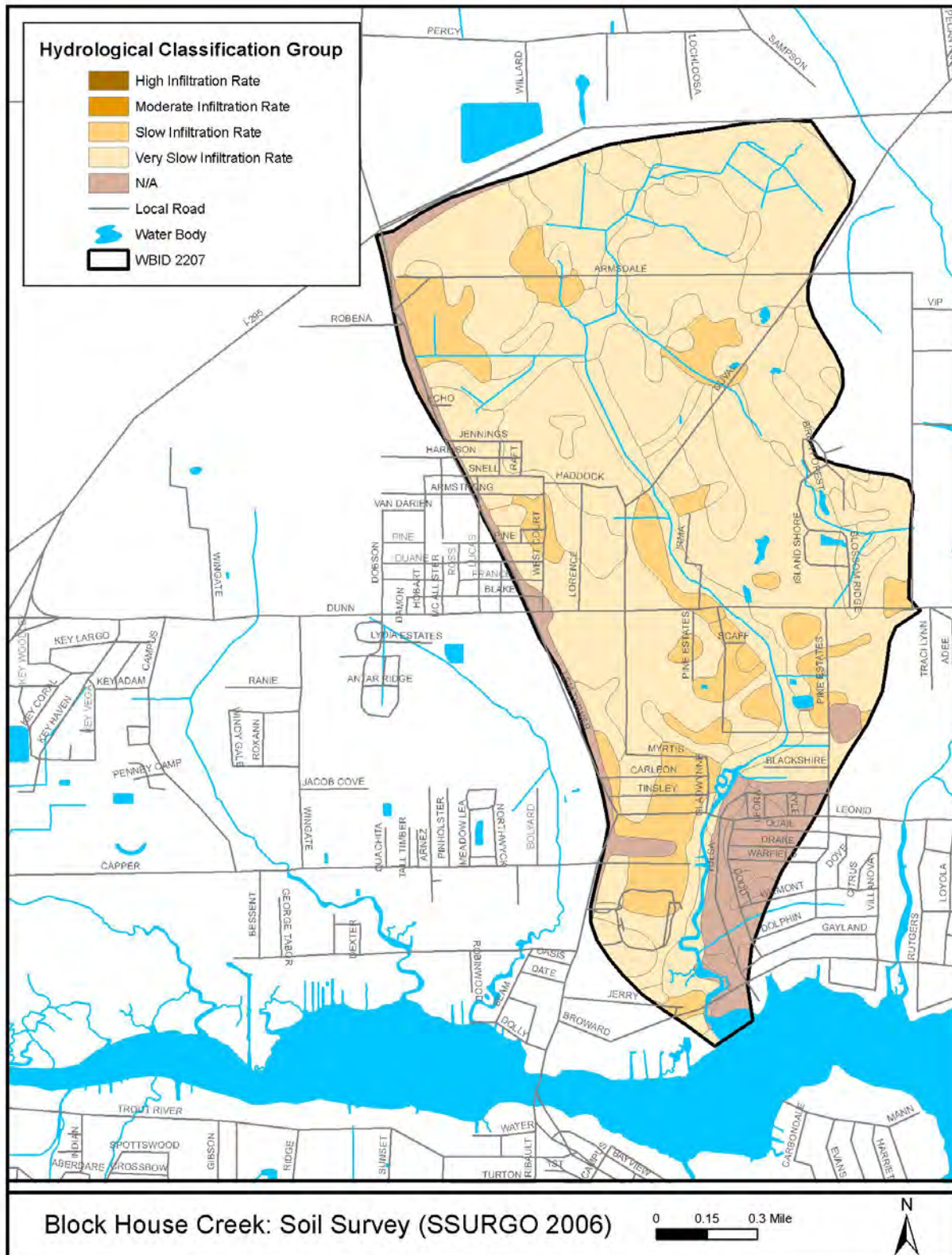


FIGURE 15: BLOCKHOUSE CREEK WBID LOCATOR MAP

12.2 POTENTIAL SOURCES

12.2.1 *POINT SOURCES*

There are no industrial or domestic wastewater facilities, CAFOs, application sites for septic residuals, or landfills permitted to discharge to the Blockhouse Creek watershed. The COJ/FDOT MS4 permit includes the Blockhouse Creek watershed (PBS&J, October 2008).

12.2.2 *ILLICIT DISCHARGES*

In the Blockhouse Creek watershed, 5 PICs have been identified. One PIC was verified as illicit and removed and the other 4 PICs were determined to not be illicit.

12.2.3 *CENTRALIZED SEWER INFRASTRUCTURE AND OVERFLOWS*

The Blockhouse Creek watershed is located within the JEA District II WWTF Service Area. There are an estimated 1,026 households (approximately 89% of households) connected to the sanitary sewer system within Blockhouse Creek. This watershed supports 24.4 kilometers (15.2 miles) of sewer lines and 13 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is found in multiple locations throughout the watershed: (1) in a small area in the northwestern corner of the WBID that includes the Home Depot shopping center; (2) in close proximity to surface waters, east of the main channel, from Armsdale Road south to Dunn Avenue; (3) at the western WBID boundary from Dunn Avenue south to just west of Myrtis Road; (4) at a housing community just south of Pine Estates Drive, between Duval Road and Pine Estates Road West; and (5) in close proximity to the downstream segment of Blockhouse Creek from Tulsa Road North to Gayland Road. Two lift stations are also located west of this downstream area on the west side of Blockhouse Creek. Sewer mains span across the width of the creek either above or below surface waters at Dunn Avenue, Leonid Road, and at the southwestern branch, thereby increasing the likelihood that unidentified sewer infrastructure leaks will impact surface waters at these locations. There have been no SSOs reported by JEA within the Blockhouse Creek WBID boundaries (PBS&J, October 2008).

12.2.4 *OSTDS*

WSEA estimates that there are 411 OSTDS in the Blockhouse Creek watershed. According to DCHD, 24 septic system repair permits were issued within this area. Septic system repair permits were located at parcels in close proximity to Blockhouse Creek surface waters at Armsdale Road, Dunn Avenue, Capper Road, and Carleon Road, indicating that failing OSTDS may contribute to the fecal pollution in these areas (PBS&J, October 2008).

12.2.5 *NONPOINT SOURCES*

An analysis of impervious surface indicates that the Blockhouse Creek WBID contains predominantly less than 10% and 10% to 25% impervious surfaces. Areas with less than 10% impervious surface are primarily located in the northern portion of the WBID and correspond to cropland and pastureland, upland forest, and wetland land use classifications. The majority of areas with 10% to 25% impervious surface are located south of Dunn Avenue. The WBID also contains greater than 25% impervious surface areas that generally correspond to industrial and commercial/utility and institutional land use classifications located along Dunn Avenue, in the northwestern corner of the WBID, and north of the Lem Turner Road and Leonid Road intersection (PBS&J, October 2008).

Additionally, an analysis was conducted demonstrating that the majority of the WBID contains a low-to-moderate potential for stormwater runoff, which includes areas in close proximity to the creek. Low stormwater runoff coefficients are primarily located in the northern portion of the WBID, north of Dunn Avenue, and coincide with land use classifications of croplands and pasturelands, upland forests, and wetlands. The highest runoff coefficients are predominantly located along Armsdale Road, Dunn Avenue, and Lem Turner Road. As a small farm with cattle is located just south of Armsdale Road, there is a potential for stormwater runoff to flow across pasturelands into the eastern branch of Blockhouse Creek. A high stormwater runoff coefficient was calculated just north of Capper Road. This area has had previous septic system repair permits and is adjacent to the surface waters of Blockhouse Creek, increasing the possibility for contributions to stormwater runoff from failing septic systems in this segment of the creek (PBS&J, October 2008).

The storm sewer network in the Blockhouse Creek watershed includes 32 permitted stormwater treatment areas, encompassing approximately 40.17% of the WBID area. Stormwater infrastructure within the WBID includes 68 outfalls by receiving water (none are classified by the FDEP as a “major outfall”) and 331 inlets. Closed conveyances are primarily located along Lem Turner Road, Dunn Avenue, and Leonid Road. Numerous ditch systems are also found within the Blockhouse Creek watershed (PBS&J, October 2008).

According to COJ EQD, a small farm (Forshee Farms) of less than 50 head of cattle is located just southwest of the corner of Duval Road and Armsdale Road in the same area as several stormwater ponds. One pond, located at the southeast corner of Duval Road and Victoria Point Drive, has an overflow that discharges into Blockhouse Creek. Two other ponds are situated within the Victoria Preserve Development on Alexandria Drive which is still being constructed (according to COJ EQD, construction of a few houses has been completed while the majority of remaining property has been cleared and overgrown). It is possible that stormwater runoff from pasturelands supporting livestock (e.g., Forshee Farms) may enter the pond at the southeast corner of Duval Road and Victoria Point Drive and flow into Blockhouse Creek during periods of elevated rainfall (PBS&J, October 2008).

Fecal coliform concentrations were not different during the “wet” and “dry” season suggesting a constant source of fecal coliform bacteria to Blockhouse Creek through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. It is possible that higher loadings occur in the “wet” season and are diluted by increased volumes of water, resulting in fecal coliform concentrations that appear to be independent of rainfall (PBS&J, October 2008).

12.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

12.3.1 JEA ACTIVITIES IN THE BLOCKHOUSE CREEK WATERSHED

12.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

In the Blockhouse Creek watershed, JEA has pipe burst 13.33% of the sewer lines. In addition, JEA replaced 4 of the 11 ARVs in the watershed. During FY09, JEA inspected 300 LF of pipe using a closed circuit television system and pipe cleaned 300 LF to prevent blockages. The maintenance activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 74** contains additional information on JEA's activities in the watershed.

TABLE 74: JEA ACTIVITIES IN THE BLOCKHOUSE CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-101	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 10,695	\$792,195	JEA	Ongoing
JEA-102	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-103	ARV Inspection and Rehab	See Appendix E	4 of 11 ARVs replaced to date	\$100,000*	JEA	Ongoing
JEA-104	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	2 stations (North Ridge, Gladwynne Road)	Unknown	JEA	Planned
JEA-105	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,00*	JEA	Complete
JEA-106	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-107	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-108	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	300 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-109	Pipe Cleaning	Clean existing pipes to avoid blockages	300 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-110	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-111	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-112	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-113	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

12.3.2 DCHD ACTIVITIES IN THE BLOCKHOUSE CREEK WATERSHED

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As part of the OSTDS Program, DCHD has issued 47 new construction permits, 24 repair permits, and 13 abandonment permits in the WBID. In addition, 12 annual operating permits have been issued for PBTS in the watershed. DCHD has also performed 72 plan reviews and 30 investigations in response to complaints received. It will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 75** lists DCHD's projects in the Blockhouse Creek watershed.

TABLE 75: DCHD ACTIVITIES IN THE BLOCKHOUSE CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-43	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 47 new construction permits, 24 repair permits, and 13 abandonment permits issued	\$36,050	FDOH/LSJR SWIM Grant	Ongoing
DCHD-44	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	There are 12 annual operating permits issued for commercial facilities	\$30,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-45	DCHD-sponsored training programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-46	Application/ Plan Review/ Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 72 plan reviews and site evaluations have been performed based upon permitting history	\$18,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-47	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-48	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	30 complaint investigations have been performed	\$9,950	FDOH/LSJR SWIM Grant	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-49	Intensive Inspection Program	Intensive geospecific inspections in selected WBIDs based on repair permit applications, water quality information, and site conditions; additional WBIDs may be identified in future based on assessment efforts	Approximately 13 tanks, west of Gladwynne Road to the creek (MST hits in the area)	\$2,015	Unknown	Planned

12.3.3 COJ ACTIVITIES IN THE BLOCKHOUSE CREEK WATERSHED

12.3.3.1 Completed COJ Projects

COJ has completed the Jennings Road/Lem Turner Road Project in the watershed. The project, repair of a failed crossdrain to improve drainage, has helped to reduce the amount of stormwater-associated bacterial loading to Blockhouse Creek.

12.3.3.2 Ongoing COJ Programs and Activities

COJ has established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. As part of this monitoring plan, COJ has 1 monitoring site in the watershed and collected 48 samples between 1995 and 2009.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 121 work orders for ditch and creek regrading, erosion control, and cleaning; 2 work orders for lake and pond maintenance; and 67 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. Of the 5 PICs identified by COJ in the Blockhouse Creek watershed, 1 was confirmed as illicit connection and removed. The other 4 PICs were determined to not be illicit.

Between 1995 and 2009, COJ PWD conducted inspections that included 5 investigations into illicit water discharges, 2 illegal discharges, 3 sewer lines that drained into a yard or ditch, 7 SSOs, and inspection of 23 private lift stations. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 76 provides additional details on COJ's activities in the watershed.

TABLE 76: COJ ACTIVITIES IN THE BLOCKHOUSE CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Drainage System Rehab Projects						
COJ-146	Jennings Road/ Lem Turner Road	Failed cross drain	Unknown	\$23,000	COJ	Complete
MS4 Maintenance Activities						
COJ-147	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	121 (for 2005-09)	\$10,822.14	COJ	Ongoing
COJ-148	Lake or Pond Problem		2 (for 2005-09)	Unknown	COJ	Ongoing
COJ-149	Structure Blocked/Repair/General Flooding		67 (for 2005-09)	\$3,262.64	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-150	Illicit Water Discharge	CARE initiated	5 (for 2005-07)	\$1,895	COJ	Ongoing
COJ-151	Pollution - Water - Illegal Discharge	CARE initiated	2 (for 2003-05)	\$758	COJ	Ongoing
COJ-152	Sewer drains into yard/ditch	CARE initiated	3 (for 2009)	\$1,137	COJ	Ongoing
COJ-153	Sewer Overflow	CARE initiated	7 (for 2003-07)	\$2,653	COJ	Ongoing
COJ-154	Private Lift Station Inspection	23 private lift stations in the WBID	80 (for 1997-2009)	\$30,320	COJ	Ongoing
COJ-155	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-156	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (2100 Dunn Avenue)	Unknown	COJ	Planned
COJ-157	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	1 station (2631 Dunn Avenue)	Unknown	COJ	Planned
COJ-158	Illicit Discharge Detection and Elimination	0 open, 1 illicit	5 (for 2004)	\$1,895	COJ	Ongoing
COJ-159	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	48 (for 1995-2009)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-160	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	426 tanks, 15 connected	Unknown	COJ	Ongoing
COJ-161	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-162	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

12.3.4 FDOT ACTIVITIES IN THE BLOCKHOUSE CREEK WATERSHED

12.3.4.1 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. FDOT also sweeps 7.5 miles of roadways monthly, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system as needed. This maintenance occurs 3.75 miles of roadway and associated stormwater conveyance systems in the watershed.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund 1 monitoring station in the Moncrief Creek watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 77** lists FDOT's activities in the watershed.

TABLE 77: FDOT ACTIVITIES IN THE BLOCKHOUSE CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-50	PIC Program	Search for illicit connections	Effort is continuous in this WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-51	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-52	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	48 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-53	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 2.2 miles	Unavailable	Not applicable	Ongoing
FDOT-54	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 3.75 miles of roadway and associated stormwater conveyance systems currently being maintained; approximately 7.5 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

12.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 74 through **Table 77** list the projects and programs to reduce fecal coliform loading in the Blockhouse Creek watershed. Several key efforts completed in the WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Blockhouse Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Blockhouse Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

12.4.1 OSTDS

Program Implementation – There are no failure areas in the watershed; however, there are approximately 411 OSTDS in the WBID. COJ and WSEA have connected 15 tanks in the watershed. DCHD has performed 30 complaint investigations and 72 plan reviews, and issued 24 repair permits, 13 abandonment permits, and 47 new construction permits in the watershed. However, there is a discrete portion of the WBID that has a higher probability of OSTDS-related problems based on the number of repair permits issued, water quality data, site conditions, and positive MST results indicating human contamination. DCHD will intensively inspect these specific areas within the WBID boundary and will report the results of the inspection in an annual BMAP progress report. Additional areas may be identified for intensive inspections based on the assessment efforts discussed in the BMAP. If additional areas are designated in the future for inclusion in the program, these areas will also be inspected as funding becomes available.

Capital Improvement Projects – COJ completed a flood control project at Jennings Road and Lem Turner Road, which is an area with OSTDS. This project has helped reduce high-water conditions that can contribute to septic tank failure. COJ PWD should continue to evaluate flooding in the Fishing Creek WBID, and where frequent flooding is an issue in areas with high concentrations of OSTDS, capital improvement projects should be implemented, depending on available funding to address those problems.

12.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there are 23 private lift stations in the watershed. COJ EQD performed 80 annual lift station inspections in the watershed and will continue inspections annually. There is 1 private lift station, 2100 Dunn Avenue, located on the WBID boundary. COJ will determine whether or not this station is located in the Blockhouse Creek watershed and report on the findings in the first annual BMAP report. In addition, there is a station, 2631 Dunn Avenue, which is located in close proximity to surface waters. COJ will inspect this station to ensure it is functioning properly and provide a status update for the first annual BMAP report. COJ's annual inspections and the above investigations are sufficient to address private infrastructure in the watershed at this time.

Sewer Infrastructure Projects – JEA has pipe burst 13.33% of the sewer pipes in the watershed and replaced 4 of 11 ARVs. One of the ARVs replaced addressed an SSO, which occurred at 2751 Leonid Road. Of the 13 JEA lift stations in the watershed, 2 are located close to surface waters. These stations are North Ridge on Blossom Ridge and Gladwynne Road. JEA will inspect these lift stations to ensure they are operating properly and report on the results

in the first annual BMAP progress report. JEA will continue maintenance efforts and systemwide programs, and this will be sufficient to address potential sewer sources in the WBID at this time.

Program Implementation – Program implementation, including inspections and line cleaning coupled with the Root Cause Program, are proactive measures preventing fecal coliform loading. In addition, the implementation of systemwide SSO prevention programs, such as FOG and CMOM, should be continued. JEA will report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to demonstrate that the system is monitored and maintained.

12.4.3 STORMWATER

Illicit Connection Removal – The PIC Program removed 1 illicit connection in the watershed. COJ and FDOT have committed to continue the PIC Program, which includes identifying additional illicit connections and removing those connections in a timely manner.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue and FDOT will continue to periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. In addition, the FDOT Adopt-A-Highway Program removes trash from 2.2 miles of roadway, and street sweeping is performed monthly on 7.5 miles of roadway. FDOT will continue stormwater infrastructure maintenance to help prevent potential regrowth in the MS4 conveyances. The trash removal efforts are expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID.

COJ Project Implementation – COJ PWD has worked extensively in the watershed, completing 121 work orders for ditch maintenance, repairing 2 stormwater pond problems, and addressing 67 work orders for improperly operating stormwater infrastructure. The continuation of maintenance activities is sufficient to address stormwater in the watershed at this time.

TABLE 78: SUMMARY OF RESTORATION ACTIVITIES FOR THE BLOCKHOUSE CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	-	-	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	-	X	-	X
Capital Projects/Stormwater Water Quality BMPs	√	X	-	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	-	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	-	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	-	X	-	X
Tributary Assessment Team (TAT)	-	X	-	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.
+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 13: HOPKINS CREEK (WBID 2266)

13.1 WBID DESCRIPTION

Hopkins Creek, WBID 2266, is located in Duval County, south of the Lower St. Johns River within the Intracoastal Waterway Planning Unit, as designated by the SJRWMD (**Figure 16**). The “headwaters” of Hopkins Creek are presumably comprised of stormwater runoff that originates at the upstream extents of its branches (**Figure 17**). The main channel of the creek generally flows westward with numerous contributing branches that join from all directions. The largest branches appear to be two from the north (“northeastern branch” and “northwestern branch”) and two from the south (“southeastern branch” and “southwestern branch”). The southeastern branch extends from the main channel from Myra Street south to just north of Barbara Lane. The northeastern branch originates just southwest of the Atlantic Boulevard and 3rd Street intersection and runs due south to Florida Boulevard where it splits into two sub-branches. Both sub-branches eventually merge with the main channel just east of Forest Circle and at Neptune Circle, respectively. Both the southwestern and northwestern branches diverge from the main channel in a wetland between Kings Road and Penman Road. The southwestern branch extends south from the main channel to 9th Avenue North. The northwestern branch continues north from the main channel just north of Atlantic Boulevard where it forks northwest to Mayport Road and north to Plaza Street. Wetlands form a buffer around the midstream and downstream segments of the northwestern branch, upstream segment of the southwestern branch, and at the main channel west of Penman Street. A network of branches located at the downstream extent of the main channel also flow through wetland areas. The waters of Hopkins Creek flow into Pablo Creek, which merges with the St. Johns River at Chicopit Bay (PBS&J, October 2008).

The spatial distribution and acreage of different land use categories in the Hopkins Creek watershed were identified using 2004 land-use coverage data from the SJRWMD (**Table 79**). The dominant land use (1,027.1 acres; 43.3% of total coverage) in the Hopkins Creek watershed, adjacent to surface waters of the creek, is classified as high-density residential and is located primarily: (1) in the southern portion of the WBID, south of Seagate Avenue; (2) in the most northwest corner of the WBID, north of Atlantic Boulevard; (3) along 3rd Street; and (4) in patches throughout the WBID. The next two most abundant land cover categories are: (1) medium-density residential areas (585.5 acres; 24.7% of total coverage), located predominantly in the central portion of the WBID from Seagull Cove west to 5th Street, between Seagate Avenue and Atlantic Boulevard; and (2) commercial/utility and institutional areas (443.5 acres; 18.7% of total coverage), which are primarily located along Atlantic Boulevard, 3rd Street, and Beach Boulevard, as well as in patches throughout the watershed. Although wetlands and upland forests only comprise a small percentage of the land use classification (approximately 7%) within the Hopkins Creek WBID, wetlands form a boundary around surface waters. As wetlands serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal contamination of Hopkins Creek in these areas (PBS&J, October 2008).

According to the 2000 Census, there are 6,205 households within the watershed, averaging 1.96 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 2,482 dogs in the watershed.

TABLE 79: LAND USES IN THE HOPKINS CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
High Density Residential	1027.1	43.3
Medium Density Residential	585.5	24.7
Commercial/ Utility/ Institutional	443.5	18.7
Wetlands	163.8	6.9
Low Density Residential	44.9	1.9
Transportation	40.6	1.7
Water	36.1	1.5
Recreational	17.3	0.7
Upland Forest	8.3	0.4
Communication	5.3	0.2
Non-Forested Upland	0.1	0.004
TOTAL:	2,372.5	100

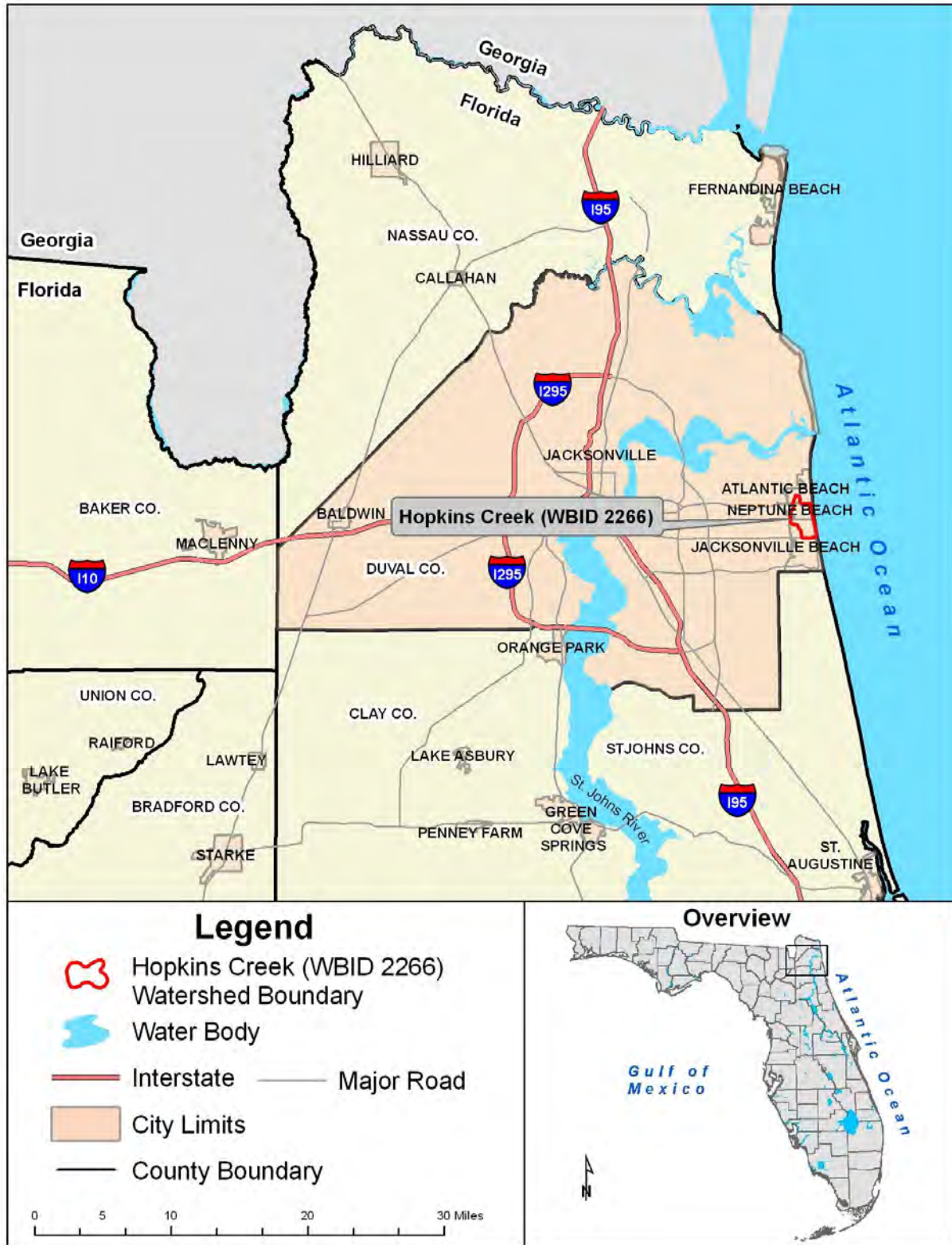


FIGURE 16: LOCATION OF THE HOPKINS CREEK WATERSHED

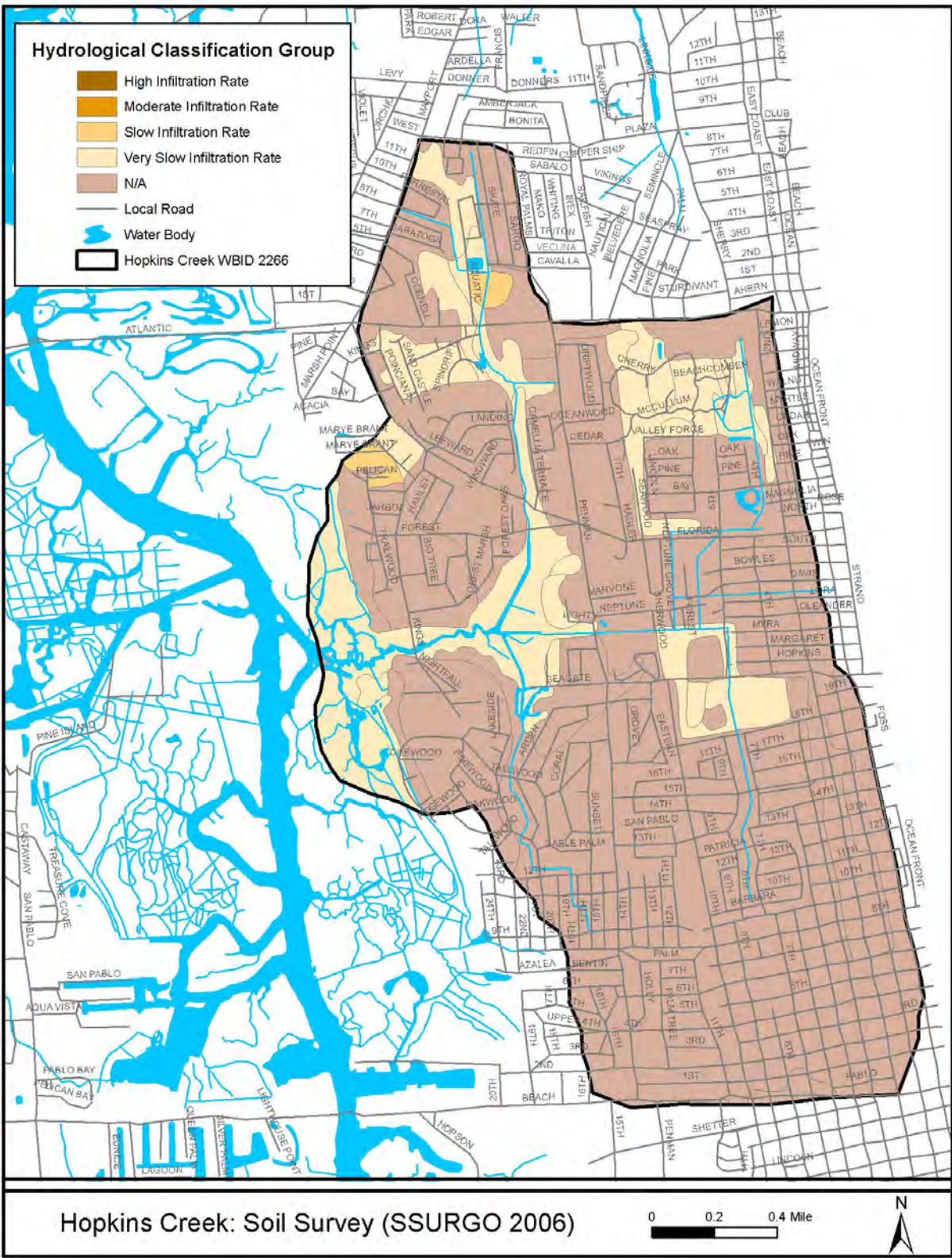


FIGURE 17: HOPKINS CREEK WBID LOCATOR MAP

13.2 POTENTIAL SOURCES

13.2.1 *POINT SOURCES*

The City of Neptune Beach WWTF, located at 2010 Forest Avenue, is the only domestic wastewater facility within the Hopkins Creek watershed. This facility is permitted to discharge 1.50 MGD annual average daily flow of treated wastewater to the St. Johns River at Sherman Point, located outside the WBID boundaries near Helen Floyd Cooper Park. The cities of Jacksonville, Neptune Beach, and Atlantic Beach, and FDOT share an MS4 permit that includes the Hopkins Creek watershed north of Seagate Avenue. In addition, the City of Jacksonville Beach has its own MS4 permit that includes this WBID (PBS&J, October 2008).

13.2.2 *ILLICIT DISCHARGES*

COJ EQD has identified 12 PICs in the Hopkins Creek watershed. None of these were determined to be illicit connections.

13.2.3 *CENTRALIZED SEWER INFRASTRUCTURE AND OVERFLOWS*

The wastewater system in the watershed is managed by the cities of Atlantic Beach, Jacksonville Beach, and Neptune Beach. The City of Neptune Beach has 13 lift stations within the Hopkins Creek watershed, of which 9 are in close proximity to the surface waters. The City of Atlantic Beach has 3 lift stations in the watershed and available GIS data indicate that sewer infrastructure is in close proximity to surface waters north of Atlantic Boulevard (PBS&J, October 2008). Jacksonville Beach also has 14 lift stations and there are an additional 4 private lift stations in the watershed.

13.2.4 *OSTDS*

According to DCHD, 7 septic system repair permits were issued within the Hopkins Creek watershed. The majority of the permits, and presumably failed septic systems, were located in the western portion of the WBID south of the Kings Road and Nightfall Drive intersection. Several of the parcels with septic system repair permits in this area are located in close proximity to the downstream surface waters of Hopkins Creek. The proximity of these parcels to surface waters suggests that septic systems potentially affect the water quality of Hopkins Creek in this area. No DCHD-designated septic system failure areas are located in close proximity to the boundary of the watershed (PBS&J, October 2008).

13.2.5 *NONPOINT SOURCES*

An analysis of impervious surface indicates that the Hopkins Creek WBID contains predominantly 10% to 25% impervious surface located throughout the watershed. Areas with less than 10% impervious surface correlate with land use classifications of wetlands and upland forests. Land areas of greater than 25% are located in close proximity to the surface waters of Hopkins Creek: (1) at the northeastern branch along 3rd Street, just north of Florida Boulevard; and (2) at the northwestern branch just north and south of Atlantic Boulevard (PBS&J, October 2008).

An analysis was also conducted demonstrating that the majority of the WBID contains a moderate to high potential for stormwater runoff, which includes areas in close proximity to the creek. The highest runoff coefficients located near surface waters are: (1) at the southeastern branch from 18th Avenue north to Seagate Avenue; (2) along the northeastern branch from Magnolia Street north to its “headwaters”; (3) at the main channel north of the Seagate Avenue

and 5th Street intersection; and (4) at the northwestern branch just upstream and downstream of Atlantic Boulevard, and at Florida Boulevard (PBS&J, October 2008).

The storm sewer network in the Hopkins Creek watershed includes 63 permitted stormwater treatment areas, encompassing approximately 28% of the WBID area. Closed conveyances are primarily located (1) along Atlantic Boulevard, 3rd Street North, 15th Avenue North, 4th Street North, 5th Avenue North, and Beach Boulevard; and (2) in the northern corner of the WBID, north of Atlantic Boulevard. A closed conveyance system that extends north from Beach Boulevard appears to connect to the southeastern branch at 13th Avenue North. The majority of outfalls are located in the vicinity of the confluence of the northeastern branch and main channel and along the southeastern branch from 13th Avenue North, north to Margaret Street. Numerous ditch systems and ponds are also found within the Hopkins Creek watershed. A pond is located adjacent to the southeastern branch at San Pablo Park. There are also three ponds located adjacent to the northeastern branch just north of Beachcomber Drive, north of Oak Street, and at Jarboe Park. There is a ditch that extends east from the northeastern branch at East Neptune Grove Drive and terminates outside of the WBID boundary at 1st Street. Two more ponds are located along the northwestern branch just west of Cavalla Road, and south of Summer Sands Drive. A ditch also extends from the northwestern branch just north of Golden Rod Lane, east to Penman Road (PBS&J, October 2008).

Fecal coliform concentrations were not different during the “wet” and “dry” season suggesting a constant source of fecal coliform bacteria to Hopkins Creek through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. It is possible that higher loadings occur in the “wet” season and are diluted by increased volumes of water, resulting in fecal coliform concentrations that appear to be independent of rainfall (October, 2008).

13.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

13.3.1 DCHD ACTIVITIES IN THE HOPKINS CREEK WATERSHED

13.3.1.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As part of the OSTDS Program, DCHD has issued 10 new construction permits, 7 repair permits, and 19 abandonment permits in the WBID. In addition, 1 annual operating permit has been issued for a PBTS in the watershed. DCHD has also performed 18 plan reviews and 1 complaint investigation. It will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 80** lists DCHD's projects in the Hopkins Creek watershed.

TABLE 80: DCHD ACTIVITIES IN THE HOPKINS CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-50	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 10 new construction permits, 7 repair permits, and 19 abandonment permits issued	\$10,050	FDOH/LSJR SWIM Grant	Ongoing
DCHD-51	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	There is 1 annual operating permit issued for commercial property	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-52	DCHD-sponsored training programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-53	Application/ Plan Review/ Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 18 plan reviews and site evaluations have been performed based upon permitting history	\$4,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-54	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-55	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	1 complaint investigation has been performed	>\$500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-56	Intensive Inspection Program	Intensive geospecific inspections in selected BMAP WBIDs based on repair permit applications, water quality information, and site conditions; additional WBIDs may be identified in future based on ongoing assessment efforts	2 tanks on Neptune Lane near creek (have a history of repair permits)	\$310	Unknown	Planned

13.3.2 COJ ACTIVITIES IN THE HOPKINS CREEK WATERSHED

13.3.2.1 Ongoing COJ Programs and Activities

COJ has established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. As part of this monitoring plan, COJ has 1 monitoring site in the watershed and collected 52 samples between 1995 and 2009.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 23 work orders for ditch and creek regrading, erosion control, and cleaning; and 17 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. COJ identified 12 PICs in the Hopkins Creek watershed in 2007, none of which were determined to be illicit.

COJ PWD also conducts inspections in the watershed that are initiated through the CARE database. In the Hopkins Creek watershed, these inspections between 1995 and 2009 included 1 investigation into an illicit water discharge, 1 illegal discharge, 2 sewer lines that drain into a yard or ditch; 7 SSOs, and 20 private lift station inspections. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 81 provides additional details on COJ's activities in the watershed.

TABLE 81: COJ ACTIVITIES IN THE HOPKINS CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
MS4 Maintenance Activities						
COJ-163	Ditch/Creek Regrade/ Erosion/Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	23 (for 2005-09)	\$2,318	COJ	Ongoing
COJ-164	Structure Blocked/ Repair/General Flooding		17 (for 2005-09)	\$217.41	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-165	Illicit Water Discharge	CARE initiated	1 (for 2005)	\$379	COJ	Ongoing
COJ-166	Pollution - Water - Illegal Discharge	CARE initiated	1 (for 2009)	\$379	COJ	Ongoing
COJ-167	Sewer drains into yard/ditch	CARE initiated	2 (for 2008)	\$758	COJ	Ongoing
COJ-168	Sewer Overflow	CARE initiated	7 (for 2000-07)	\$2,653	COJ	Ongoing
COJ-169	Private Lift Station Inspection	4 private lift stations in the WBID	20 (for 1997-2009)	\$7,580	COJ	Ongoing
COJ-170	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-171	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (Beach and 15 th Street)	Unknown	COJ	Planned
COJ-172	Illicit Discharge Detection and Elimination	0 open, 0 illicit	12 (for 1999)	\$4,548	COJ	Ongoing
COJ-173	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	52 (for 1995-2009)	Unknown	COJ	Ongoing

13.3.3 FDOT ACTIVITIES IN THE HOPKINS CREEK WATERSHED

13.3.3.1 Completed FDOT Projects

FDOT has completed the Mayport Flyover project in the watershed. This project is a wet pond that treats 14 acres, which helps to reduce fecal coliform loading to Hopkins Creek from this area.

13.3.3.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. FDOT also sweeps 16 miles of roadways monthly, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system as needed. This maintenance occurs 8 miles of roadway and associated stormwater conveyance systems in the watershed.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has found 10 PICs, 1 of which was determined to be illicit and was removed. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund 1 monitoring station in the Hopkins Creek watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 82** lists FDOT activities in the watershed.

TABLE 82: FDOT ACTIVITIES IN THE HOPKINS CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-55	PIC Program	Search for illicit connections	Effort is continuous in this WBID	See Note 1	FDOT/COJ	Ongoing
FDOT-56	PIC Program	Illicit connections identified and removed if found to be true illicit	10 identified, 1 found to be true illicit and removed	See Note 1	FDOT/COJ	Ongoing
FDOT-57	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	52 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-58	Stormwater Management Systems	Mayport Flyover	14 acres, wet ponds	Not applicable	FDOT	Complete
FDOT-59	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-60	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 8 miles	Unavailable	Not applicable	Ongoing
FDOT-61	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 8 miles of roadway and associated stormwater conveyance systems currently being maintained; approximately 16 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

13.3.4 ATLANTIC BEACH ACTIVITIES IN THE HOPKINS CREEK WATERSHED

13.3.4.1 Completed Atlantic Beach Projects

The City of Atlantic Beach has completed several projects that help address fecal coliform loading to Hopkins Creek through upgrades to the sewer system. Atlantic Beach has phased out 9 septic tanks through a resolution that required connection to sewer by a certain date. They have completed sewer line upgrades along Mayport Road, in the Royal Palms subdivision, near Aquatic Drive, and along Donner Road. These projects a total of 34,392 linear feet of sewer main that were replaced, repaired through CIPP, or were lined. In addition, manhole rehabilitation projects have been completed involving a total of 114 manholes. Valve improvements were made on 3 pump stations and emergency generators were added at 2 lift stations. The sewer system has also been cleaned and televised in two areas and an inflow/infiltration analysis was conducted to help prevent future SSOs.

Atlantic Beach has also completed several stormwater projects in the watershed. The Hopkins Creek Regional Stormwater Facility is a 1.7 acre wet detention pond that treats 54 acres. This project captures and treats stormwater runoff, helping to reduce fecal coliform loading to the creek. In addition, two drainage projects were completed along Ardella Road and in the Royal Palms subdivision, which help control flooding issues in these areas.

13.3.4.2 Ongoing Atlantic Beach Programs and Activities

The City of Atlantic Beach has several ongoing programs including: (1) sewer pump station inspections and maintenance; (2) FOG program; (3) stormwater system ditch and canal inspections and maintenance; (4) stormwater treatment ponds inspections and maintenance; (5) stormwater control structure inspections and maintenance; (6) stormwater pump station inspections and maintenance; (7) stormwater inlets/catch basins/grates inspections and maintenance; (8) stormwater pipe inspections and maintenance; and (9) right-of-way maintenance and litter control. Details for these programs can be found in **Appendix E**.

Table 83 outlines the efforts in the Hopkins Creek watershed.

TABLE 83: ATLANTIC BEACH ACTIVITIES IN THE HOPKINS CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-1	Septic Tank Inspections and Enforcement	When septic tanks fail, City Code requires connection to sewer system if available	1	Unknown	Paid by property owner	Complete
AB-2	Septic Tank Phase-Out	Septic to Sewer Resolution by Commission requiring connection at various dates. Includes Septic Conversion Assistance Policy, passed by City Commission May 2000. Provides City financing of septic to sewer conversions and contracting coordination and assistance	9 septic to sewer conversions	\$23,000	CDBG/ homeowners	Complete
AB-3	Sewer Line Upgrades	Sewer and manhole repairs near Lift Station E, near 799 Mayport Road	700 LF sewer main, 3 manholes	\$49,170	Atlantic Beach	Complete
AB-4	Sewer Line Upgrades	Replace sewer force main at Mayport Road and Forrestal	100 LF of force main	\$10,000	Atlantic Beach	Complete
AB-5	Sewer Line Upgrades	CIPP of sanitary sewer in the entire Royal Palms subdivision	30,042 LF of sewer main	\$747,143	Atlantic Beach	Complete
AB-6	Sewer Line Upgrades	Replace sewer main crossing a drainage ditch near Lift Station F - Behind 720 Aquatic Drive	1,000 LF	\$10,715	Atlantic Beach	Complete
AB-7	Sewer Line Upgrades	Sewer lining in easement from Donner Road to Stanley Road, Donner subdivision, includes 12 manholes lined	1,275 LF	\$91,370	Atlantic Beach	Complete
AB-8	Sewer Line Upgrades	Replaced force main from Lift Station C to WWTF - Donner Road	1,275 LF	\$94,257	Atlantic Beach	Complete
AB-9	Manhole Inspections and Rehab	Rehabilitation/Spectrashield coating of all manholes in the Royal Palms subdivision	85 manholes	\$81,653	Atlantic Beach	Complete
AB-10	Manhole Inspections and Rehab	Engineering analysis of failing manholes - Donner subdivision	20 manholes	\$2,500	Atlantic Beach	Complete
AB-11	Manhole Inspections and Rehab	Manhole rehabilitation and replacement - Ardella Road area	5 manholes	\$36,135	Atlantic Beach	Complete
AB-12	Manhole Inspections and Rehab	Manhole rehabilitation and replacement - Donner Subdivision	11 manholes	\$58,205	CDBG	Complete
AB-13	Manhole Inspections and Rehab	Manholes lined during sewer lining in easement from Donner to Stanley	12 manholes	Unknown	Atlantic Beach	Complete
AB-14	Manhole Inspections and Rehab	Replace effluent outfall manhole at Mayport and Donner Road	1 manhole on 21" effluent outfall	\$12,800	Atlantic Beach	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-15	Pump Station Inspections and Maintenance	Inspected and maintained daily Monday-Friday; all monitored by SCADA system with automatic callout 24 hours/day, 7 days/week, with a technician on call; stations designed with redundancy; large stations have on-site emergency generators with automatic transfer switch; portable genset and pumps available for smaller stations; all mechanical/electrical problems are addressed immediately	3 lift stations	Unknown	Atlantic Beach	Ongoing
AB-16	Pump Station Inspections and Maintenance	Lift Stations C, E, F (65 Donner Road, 799 Mayport Road, 858 Cavalla Road) - valve improvements	3 lift stations	\$40,000	Atlantic Beach	Complete
AB-17	Pump Station Inspections and Maintenance	Replace emergency generator at Cavalla Road Lift Station, 858 Cavalla Road	1 lift station	\$24,000	Atlantic Beach	Complete
AB-18	Pump Station Inspections and Maintenance	Replace emergency generator Lift Station F, 858 Cavalla Road	1 lift station	\$24,000	Atlantic Beach	Complete
AB-19	Pump Station Inspections and Maintenance	Installed SCADA system for all lift stations. Those in Hopkins Creek are Lift Stations C, E, and F (65 Donner Road, 799 Mayport Road, 858 Cavall Road)	3 lift stations	\$19,500	Atlantic Beach	Complete
AB-20	SSO Investigations - Preventive	Clean and televise sewer main, ditch crossings near Lift Station E and F - Behind 720 Aquatic Drive and behind 39 Saratoga Circle North	2,000 LF	\$1,780	Atlantic Beach	Complete
AB-21	SSO Investigations – Preventive	Inflow/infiltration analysis of entire collection system, preparation of GIS system, GPS locations of all manholes, analysis of lift station needs, recommended CIP	Not applicable	\$60,000	Atlantic Beach	Complete
AB-22	SSO Investigations – Preventive	Clean and televise sewer mains crossing Mayport Road	5,000 LF	\$6,700	Atlantic Beach	Complete
AB-23	SSO Investigations – Preventive	Sewer Master Plan Update - Analysis of entire sewer system for prioritizing capital improvement program, including review of inflow/infiltration analysis	1	\$58,100	Atlantic Beach	Complete
AB-24	SSO Investigations - Preventive	FOG Program implemented to monitor grease trap maintenance at restaurants	25 food service establishments	Unknown	Atlantic Beach	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-25	1999 Stormwater Improvements Project	Flood control capital projects and stormwater water quality BMPs on Donner Road and Aquatic Gardens	663.5 LF of RCP various sizes; 4 inlets; 1 mitered end section	\$414,711	Atlantic Beach	Complete
AB-26	Jordan Street Paving and Drainage	Flood control capital projects; located off Frances Street, north Donners Road	450 Lf of pipe; various sizes; 5 inlets; 1 concrete headwall	\$109,129	CDBG	Complete
AB-27	Hopkins Creek Regional Stormwater Facility	Stormwater water quality BMPs; located just north of Atlantic Blvd, off Aquatic Drive	1.7 acre wet detention pond with 54 acre drainage basin; 1314 LF of pipe; 7 RCP MES; 6 manholes; 6 inlets; 150 LF box culvert; 1 endwall	\$2,058,694	Atlantic Beach/ Legislative Appropriation	Complete
AB-28	Hopkins Creek Regional Stormwater Facility	Water sampling - 319 grant requires one year of inlet and outlet water grab samples taken monthly, includes fecal coliform	Monthly sampling and laboratory testing	Unknown	Atlantic Beach/ Legislative Appropriation	Ongoing
AB-29	Public Education Through WAV	Stormwater water quality BMPs; public education through WAV for stormwater and sewer	525 participants	\$10,000 per year	Atlantic Beach	Ongoing
AB-30	Stormwater System Ditch and Canal Inspections	Weekly visual inspections, corrective action taken 'as needed;' mowing, weedeating and litter pickup weekly during growing season, as needed in colder months	1,120,415 LF	Unknown	Atlantic Beach	Ongoing
AB-31	Stormwater System Ditch and Canal Maintenance	Routine ditch cleaning and maintenance required by MS4 permit	715,700.75 LF	Unknown	Atlantic Beach	Ongoing
AB-32	Stormwater Treatment Ponds Inspections	Routine pond inspection required by MS4 permit	148	Unknown	Atlantic Beach	Ongoing
AB-33	Stormwater Treatment Ponds Cleaning and Maintenance	Routine pond maintenance required by MS4 permit	99	Unknown	Atlantic Beach	Ongoing
AB-34	Stormwater Treatment Ponds, Ditch and Canal Aquatic Weed Control	Weed control by Bluewater Environmental	Not applicable	Annual budget - \$21,000	Atlantic Beach	Ongoing
AB-35	Stormwater Control Structure Inspections	Routine control structure inspections required by MS4 permit	117	Unknown	Atlantic Beach	Ongoing
AB-36	Stormwater Control Structure Cleaning and Maintenance	Done only when inspection shows additional effort required; routine cleaning and maintenance required by MS4 permit	76	Unknown	Atlantic Beach	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-37	Stormwater Pump Station Inspections	Routine inspections of Town Center pump station required by MS4 permit	83	Unknown	Atlantic Beach	Ongoing
AB-38	Stormwater Pump Station Maintenance	Routine maintenance of Town Center pump station required by MS4 permit	71	Unknown	Atlantic Beach	Ongoing
AB-39	Stormwater Inlets/Catch Basins/Grates Inspected	Routine check of inlets and catch basins required by MS4 permit	278	Unknown	Atlantic Beach	Ongoing
AB-40	Stormwater Inlets/Catch Basins/Grates Maintained	Required by MS4 permit	257	Unknown	Atlantic Beach	Ongoing
AB-41	Stormwater Pipe Inspection and Maintenance	Stormwater pipe cleaning, routine scheduled and in response to complaints; required by MS4 permit	2,440.75 LF	Unknown	Atlantic Beach	Ongoing
AB-42	Stormwater Pipe Maintenance (Repair/Replacement)	Stormwater pipe repaired or replaced	77.5 LF	Unknown	Atlantic Beach	Ongoing
AB-43	Total Miles of Right of Way Maintained	Miles of right of way maintained	13.08 miles	Unknown	Atlantic Beach	Ongoing
AB-44	Collect Litter	Annual estimate of total pounds of litter collected	44,257.5	Unknown	Atlantic Beach	Ongoing
AB-45	Ardella Road Drainage Project	Located between Mayport Road and Richardson Lane; pipebursting because existing pipe crossed two parcels of private property where no drainage easement existed	290 LF HDPE pipebursting; 1 inlet; 1 box and grate	\$36,332	Atlantic Beach	Complete
AB-46	Royal Palms Drainage Rehabilitation Project	Flood control capital project; Royal Palms is a major (600 home) subdivision between Mayport Road and Seminole Road; completion 10/2010	13,004 LF RCP various sizes; 35 manholes; 25 inlets; 7 endwalls	\$3,193,823	Atlantic Beach	Construction
AB-47	Royal Palms Drainage System Point Repairs	Stormwater system point repairs necessitated by spot failures; anticipate need in Royal Palms to be minimal once above improvements completed	As needed	Unknown	Atlantic Beach	Complete
AB-48	Pet Feces Control	Install, maintain and stock Dogi-Pot stations throughout city	More than 30 installed to date	\$5,000	Atlantic Beach	Ongoing

13.3.5 JACKSONVILLE BEACH ACTIVITIES IN THE HOPKINS CREEK WATERSHED

13.3.5.1 Completed Jacksonville Beach Projects

The City of Jacksonville Beach has completed several projects for OSTDS and the sewer system in the watershed to reduce fecal coliform loading from these sources. They have phased out 85 septic tanks and connected those homes to the sewer system. Jacksonville Beach has cleaned 13,000 linear feet of pipe, rehabilitated 36 manholes, and rehabilitated 14 pump stations. In addition, 5 sewer system improvement projects have been completed to upgrade the sewer lines in several areas of the city.

Jacksonville Beach has completed numerous stormwater projects that help capture, treat, and mitigate stormwater runoff and any associated fecal coliform. They have completed 24 flood control projects and 2 additional projects are underway with completion scheduled for 2010. They also completed a stormwater pond at Fletcher Middle School that treats the area between 18th Avenue North and Seagate Avenue.

13.3.5.2 Ongoing Jacksonville Beach Programs and Activities

Jacksonville Beach has several ongoing programs including: (1) private lift station inspections; (2) sewer system and manhole inspections; (3) pump station inspections and maintenance; (4) restaurant grease trap inspections; (5) stormwater system ditch and canal maintenance; (6) stormwater pond maintenance; (7) stormwater pump station inspections; (8) identification and removal of illicit connections; and (9) a pet waste ordinance.

Jacksonville Beach also conducts street sweeping on a monthly basis throughout the city with weekly street sweeping in the area from east of 3rd Street from Beach Boulevard to Seagate Avenue. There are also stormwater public education efforts and annual water quality sampling at 5 locations.

Table 84 lists Jacksonville Beach's efforts in the Hopkins Creek watershed.

TABLE 84: JACKSONVILLE BEACH ACTIVITIES IN THE HOPKINS CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JB-1	Septic Tank Phase Out	Section "A"-16th Street North to 20th Street North to 8th Avenue North to 12th Avenue North	Phased out 85 septic tanks, 5,229 LF of 8" PVC sewer pipe, lift station and 673 LF of 4" force main	\$337,730	Jacksonville Beach	Complete
JB-2	Sewer System Inspection	Cleaning of existing sanitary sewer system	Cleaned approximately 13,000 LF of existing sanitary sewer system	\$26,000	Jacksonville Beach	Complete
JB-3	Sewer System Inspection	Maintenance of existing sewer system	Cleaning of approximately 10,000 LF per year citywide	\$25,000	Jacksonville Beach	Ongoing
JB-4	Manhole inspections and rehab	Rehabilitation of existing sewer manholes	Coated interior of 36 manholes with Spectrashield in Hopkins Creek area	\$55,757	Jacksonville Beach	Complete
JB-5	Manhole inspections and rehab	Maintenance of existing sewer manholes	Coat interior of 5 manholes per year with Spectrashield citywide	\$20,000	Jacksonville Beach	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JB-6	Sewer Lift Station Wetwells Inspections and Rehab	Rehabilitation of interior surface of existing sewer lift station wetwells with Spectrashield Coating System	Coated interior of existing LS 5, 12, 24, 26 and 27 wetwells with Spectrashield	\$34,707	Jacksonville Beach	Complete
JB-7	Pump Station Inspections and Maintenance	Sewer lift station no. 10 improvements	Installation of new fiberglass wetwell and submersible pumps, controls, odor control equipment, 1 new fiberglass manhole and related piping and equipment	\$736,481	Jacksonville Beach	Complete
JB-8	SSO Investigations	Arden Way Sewer System Improvements	Installation of 7 new sewer manholes, 1,500 lf of gravity sewer main, abandonment and grout fill of approximately 800 LF of gravity sewer main and construction of 1,000 LF of new 6 inch force main, eliminated SSO at 1827 Arden Way (3 occurrences)	\$342,000	Jacksonville Beach	Complete
JB-9	SSO Investigations	2000 3rd Street North- 1 occurrence	Minor impact, wet conditions, manhole wet around frame and cover	\$1,000	Jacksonville Beach	Complete
JB-10	SSO Investigations	300 Palm Tree Road-2 occurrences	Minor impact, dry conditions, contractor contained second spill on site	\$5,000	Jacksonville Beach	Complete
JB-11	Pump Station Inspections and Maintenance	City inspects existing pump station on a weekly basis	City inspects/maintains existing pump station on a weekly basis	Unknown	Jacksonville Beach	Ongoing
JB-12	Pump Station Inspections and Maintenance	Lift Stations No. 2, 7, 8, 9, 18, 19, and 23	Coated wetwell	\$47,230	Jacksonville Beach	Complete
JB-13	Pump Station Inspections and Maintenance	Lift Station No. 37 (Jarrett Point Unit II)	New wetwell	\$183,541	Jacksonville Beach	Complete
JB-14	Private Lift Stations	9th Avenue North between 10th and 11th Street North	Residential	\$5,000	Private	Complete
JB-15	Private Lift Stations	Beach Marine (Beach Boulevard and Intracoastal Waterway)	Commercial	\$25,000	Private	Complete
JB-16	Private Lift Stations	Crazy Fish Restaurant (2nd Avenue North Extension)	Commercial	\$10,000	Private	Complete
JB-17	Private Lift Stations	Boys and Girls Club (18th Avenue North and 8th Street North)	Commercial	\$12,000	Private	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JB-18	Grease Traps	Inspect restaurant grease traps	Inspect 52 restaurant interior grease traps on a monthly basis and exterior grease traps on a two month basis on average	Unknown	Jacksonville Beach	Ongoing
JB-19	Sewer System Replacement	Sewer system improvements from Barbara Lane to 14th Avenue North and 8th Street to 13th Street North	Construct 6,200 LF of 8" sanitary sewer main; 16 sewer manholes; 124 sewer services; 13,800 square yards asphalt pavement	\$1,065,000	Jacksonville Beach	Complete
JB-20	Sewer System Replacement	Sewer system improvements from Patricia Lane to 18th Avenue North and 4th Street to 7th Street North	Construct 1,200 LF of 10" sanitary sewer main; 5,000 LF of 8" sanitary sewer main; 16 sewer manholes; 124 sewer services; lift station and force main; 13,800 square yards asphalt pavement	\$1,310,000	Jacksonville Beach	Complete
JB-21	Sewer System Replacement	Sewer system improvements from Barbara Lane to 12th Avenue North and Patricia Lane to 7th Street North	Construct 2,000 LF of 8" sanitary sewer main; 5 sewer manholes; 40 sewer services; 4,500 square yards asphalt pavement	\$386,000	Jacksonville Beach	Complete
JB-22	Sewer System Replacement	Sewer system improvements from 2nd Street North to 3rd Street North and from easement to 6th Avenue North; 3rd Street North from easement to 7th Avenue North	Construct 500 LF of 8" sanitary sewer main; 2 sewer manholes; 10 sewer services; 1,100 square yards asphalt pavement	\$88,000	Jacksonville Beach	Complete
JB-23	Flood Control Capital Project	Ocean Forest Drainage Study - limits from 12th Avenue North to Penman Rd. to Seagate Avenue to Intracoastal Waterway	Clean and televise existing stormwater system, prepare report describing proposed rehabilitation methods, recommendations and costs	\$167,000	Jacksonville Beach	Underway; 2010
JB-24	Flood Control Capital Project	18th Street North, Stormwater Improvements (Tall Pine Park), perforated stormwater pipe	35 drainage structures, 5543 feet of drainage pipes	\$667,472	Jacksonville Beach	Complete
JB-25	Flood Control Capital Project	1st Street North and 18th Avenue North stormwater improvements, stormwater piping	Removed/replaced existing stormwater drainage system piping; 338 feet of drainage piping, 6 drainage structures	\$128,817	Jacksonville Beach	Complete
JB-26	Flood Control Capital Project	North 2nd Street stormwater improvements between 6th Avenue North to 13th Avenue North	Installation of new stormwater pump station, force main, drainage piping system and drainage inlets	\$3,500,00	Jacksonville Beach/ EPA Grant	Underway; 2010

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JB-27	Flood Control Capital Project	11th Avenue North stormwater Improvements- new stormwater pump station, new drainage system piping, new drainage structures	Installation of new stormwater pump station, 2,000 feet of drainage pipe, 18 drainage structures	\$450,000	Jacksonville Beach	Complete
JB-28	Flood Control Capital Project	11th Street North improvements, swale grading, impervious parking	Reconstruction of existing roadway with swale grading along edge of roadway and impervious block parking at Gonzales Park area	\$670,000	Jacksonville Beach	Complete
JB-29	Flood Control Capital Project	Jacksonville Beach Golf Course retention pond and infrastructure improvements; pond construction was in association with the construction of the Second Street North stormwater improvement project	Construction of another stormwater retention pond and enlargement of two existing retention ponds, treats Beach Boulevard to 13 th Avenue from 1 st Street to 3 rd Street	\$645,754	Jacksonville Beach/ SJRWMD Grant	Complete
JB-30	Flood Control Capital Project	Paving, drainage, water and sewer improvements for downtown development area	Re-construction of existing water, drainage system, sewer and paving of the downtown area consisting of 15 city blocks east of 3rd Street, between Beach Blvd and 5th Avenue North; new stormwater pump station, 4,761 feet of drainage pipe, 80 drainage structures, 6,545 feet of 30" stormwater force main piping between pump station to golf course retention ponds	\$6,831,192	Jacksonville Beach	Complete
JB-31	Flood Control Capital Project	19th Street North at 2nd Avenue North	200 LF of 18" PVC pipe, 2 concrete endwalls, asphalt pavement rehab	\$25,000	Jacksonville Beach	Complete
JB-32	Flood Control Capital Project	19th Street North between 2nd Avenue North and 5th Avenue North	30 LF of 15" PVC, 1 inlet, asphalt pavement rehab	\$7,000	Jacksonville Beach	Complete
JB-33	Flood Control Capital Project	Easement west of Penman Road from 6th Avenue North to 16th Street North	640 LF of 15" PVC, connect to exist. structures, asphalt pavement rehab	\$45,000	Jacksonville Beach	Complete
JB-34	Flood Control Capital Project	17th Street North from 9th Avenue North to existing ditch	420 LF of 6" PVC perforated underdrain, connect to existing structure	\$10,000	Jacksonville Beach	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JB-35	Flood Control Capital Project	11th Avenue North from 16th Street North to Penman Road	165 LF of 12" PVC, connections to existing structures	\$14,000	Jacksonville Beach	Complete
JB-36	Flood Control Capital Project	16th Street North from 11th to 12th Avenue North	140 LF of 10" PVC, 1 inlet	\$10,000	Jacksonville Beach	Complete
JB-37	Flood Control Capital Project	11th Avenue North from 17th to 18th Street North	210 LF of 24" RCP, 1 inlet	\$15,000	Jacksonville Beach	Complete
JB-38	Flood Control Capital Project	21 st Street from 9th Ave. to 12th Ave. N.	515 LF of 15" PVC, 3 inlets, asphalt pavement rehab	\$35,000	Jacksonville Beach	Complete
JB-39	Flood Control Capital Project	12th Avenue North at 20th Street North	100 LF of 24" PVC, asphalt pavement rehab	\$10,000	Jacksonville Beach	Complete
JB-40	Flood Control Capital Project	Tanglewood Road from Pinewood Lane to Sable Palm Lane	165 LF of 24" PVC, 2 inlets	\$18,000	Jacksonville Beach	Complete
JB-41	Flood Control Capital Project	Tanglewood Road at Sable Palm Lane	75 LF of 18" PVC, 1 inlet, asphalt pavement rehab	\$10,000	Jacksonville Beach	Complete
JB-42	Flood Control Capital Project	Birchwood Road at Coral Way	85 LF of 15" PVC, 3 inlets, asphalt pavement rehab	\$14,000	Jacksonville Beach	Complete
JB-43	Flood Control Capital Project	Coral Way between Sunset Drive and Birchwood Road	45 LF of 15" PVC, 2 inlets, asphalt pavement rehab	\$10,000	Jacksonville Beach	Complete
JB-44	Flood Control Capital Project	Pinewood Road between Arden Way and Oakwood Road	60 LF of 42" CMP, asphalt pavement rehab	\$10,000	Jacksonville Beach	Complete
JB-45	Flood Control Capital Project	1st Avenue North from 3rd to 4th Street North	170 LF of 15" PVC, 2 inlets	\$10,000	Jacksonville Beach	Complete
JB-46	Flood Control Capital Project	3rd Avenue North from 4th to 5th Street North	50 LF of 12" ductile iron pipe, 2 inlets	\$10,000	Jacksonville Beach	Complete
JB-47	Flood Control Capital Project	3rd Avenue North from 5th to 6th Street North	225 LF of 12x18 ERCP, 1 inlet	\$15,000	Jacksonville Beach	Complete
JB-48	Flood Control Capital Project	3rd Avenue North at 6th Street North	75 LF of 8" PVC underdrain, asphalt pavement	\$4,000	Jacksonville Beach	Complete
JB-49	Flood Control Capital Project	Cilewood Court at Tallwood Road	20 LF of 18" PVC underdrain, 1 inlet	\$4,000	Jacksonville Beach	Complete
JB-50	Flood Control Capital Project	Lois Lane and Seagate Avenue	700 LF of drainage swales	\$14,000	Private Developer	Complete
JB-51	Flood Control Capital Project	King Oaks Subdivision-Kings Road and Seagate Avenue	670 LF of drainage swales	\$12,000	Private Developer	Complete
JB-52	Stormwater Water Quality BMPs	Fletcher Middle School Pond	Stormwater Pond along FDOT drainage ditch between 18th Avenue North and Seagate Avenue, 0.95 acres	\$122,471	Duval County School Board	Complete
JB-53	Stormwater Water Quality BMPs	Beaches Terraces Condoms Onsite Treatment	Stormwater treatment for 1 st Street North to 2 nd Street North from 18 th Avenue North and 19 th Avenue North	Unknown	Private Developer	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JB-54	Stormwater Water Quality BMPs	Fairfield Inn Onsite Treatment	Stormwater treatment for 1 st Street North and 2 nd Street North from 15 th Avenue North and 16 th Avenue North	Unknown	Private Developer	Complete
JB-55	Stormwater Water Quality BMPs	Pier Point Condominiums Onsite Treatment	Stormwater treatment for 2 nd Street North and 3 rd Street North from 4 th Avenue North and 5 th Avenue North	Unknown	Private Developer	Complete
JB-56	Stormwater System Ditch and Canal Maintenance	Drainage Ditch at 12th Avenue North and 22nd Street North	Ditch spraying for aquatic weeds	Unknown	Jacksonville Beach	Ongoing
JB-57	Stormwater System Ditch and Canal Maintenance	Erosion control along ditches and ponds	Install erosion control along ditches and ponds	Unknown	Jacksonville Beach	Complete
JB-58	Stormwater System Pond Maintenance	Inspections of ponds after each significant rainfall event	Inspect on Mondays and after each significant rainfall event; clean as necessary	Unknown	Jacksonville Beach	Ongoing
JB-59	Stormwater System Pond Maintenance	Annual Inspection per MS4 NPDES permit	Annual Inspection per MS4 NPDES permit	Unknown	Jacksonville Beach	Ongoing
JB-60	Stormwater Pump Stations	Inspections of stormwater pumps after each significant rainfall event	Inspect on Mondays and after each significant rainfall event; clean as necessary	Unknown	Jacksonville Beach	Ongoing
JB-61	Identification and Removal of Illicit Connections	Identification and removal of illicit connections	Contract training conducted for Water Plant and Stormwater Divisions	Unknown	Jacksonville Beach	Complete
JB-62	Stormwater Education and Outreach Efforts	WAV Public Education, inlet marking, public notices, and stormwater flyer for residential and commercial permits	WAV public education, inlet marking, public notices, and stormwater flyer	Unknown	Jacksonville Beach	Complete
JB-63	Pet Waste Management	Gonzales Park, Tallwood Pines Park and Dog Park	City provides dog bags at Gonzales Park, Tallwood Pines Park and Dog Park	Unknown	Jacksonville Beach	Complete
JB-64	Pet Waste Ordinance	Ordinance No. 7468-32-91, Section 32-106	Prohibits discharge of feces to MS4, establishes right of inspection and fines	Unknown	Jacksonville Beach	Complete
JB-65	Pet Waste Ordinance	Ordinance No. 2005-7903, 24-18-05, Section 5-34	Prohibits leaving of pet waste and requires proper disposal; establishes citation base fine	Unknown	Jacksonville Beach	Complete
JB-66	Street sweeping	Street sweeping of entire City limits	Sweep city streets on a monthly basis	Unknown	Jacksonville Beach	Ongoing
JB-67	Street sweeping	Street sweep east of 3rd Street from Beach Boulevard to Seagate Avenue	Sweep on a weekly basis	Unknown	Jacksonville Beach	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JB-68	Water Quality Sampling	Annual Sampling for NPDES Permit	Dry weather field screening once during first term of NPDES permit, annual sampling at 5 locations	\$21,000	Jacksonville Beach	Ongoing
JB-69	Noncontributing Basins	Area from Bentin Drive North to Beach Boulevard, to 11 th Street and west to WBID boundary; and area from Rosewood Drive, Oakwood Road, Pinewood Road to west WBID boundary that do not flow to Hopkins Creek	Not applicable	Not applicable	Not applicable	Not applicable

13.3.6 NEPTUNE BEACH ACTIVITIES IN THE HOPKINS CREEK WATERSHED

13.3.6.1 Completed Neptune Beach Projects

The City of Neptune Beach has phased out 70 septic tanks in the watershed. In addition, they have upgraded 10 lift stations and upgrades to 3 additional stations are underway with completion in 2010. Five miles of sewer mains were piped burst along 3rd Street and 5 manholes were rehabilitated throughout the watershed. These projects help to prevent fecal coliform from failing or faulty sewer infrastructure.

13.3.6.2 Planned Neptune Beach Projects

Neptune Beach plans to create GIS mapping systems for the remaining septic tank areas, lift stations, sanitary sewer system, private lift stations, and the stormwater system. These databases should be completed in 2010 and will allow Neptune Beach to better maintain their system to prevent future problems and sources of fecal coliform. In addition, Neptune Beach plans to organize a Walk the WBIDs effort for Hopkins Creek to identify and address sources in the watershed.

13.3.6.3 Ongoing Neptune Beach Programs and Activities

Neptune Beach has several ongoing programs and activities including: (1) sanitary sewer system operation and maintenance; (2) SSO investigations; (3) daily inspections of lift stations; (4) FOG program; (5) stormwater ditch, canal, and pond maintenance; (6) public education and outreach; (7) pet waste ordinance; and (8) street sweeping.

Table 85 lists the efforts for Neptune Beach in the Hopkins Creek WBID.

TABLE 85: NEPTUNE BEACH ACTIVITIES IN THE HOPKINS CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
NB-1	Septic Tank Phase-Out	Phase-outs along Acacia Road, Bay Road, Florida Blvd, Marsh Point Road, Oleander Place, Rosewood Drive, Sherwood Lane, and Pine Place	70	\$105,000	Neptune Beach	Complete
NB-2	Create GIS Mapping System Inventory Remaining Septic Tank Areas	Put together GIS mapping system and collect data to inventory remaining septic tank areas	60 lots on septic	\$5,000	Neptune Beach	Underway; 2010
NB-3	Gravity Sanitary Sewer Collection system Operation and Maintenance	Normal operation and maintenance of the gravity sewer collection system within the City	Entire City	\$350,000/YR	Neptune Beach	Ongoing
NB-4	SSO Investigations	Investigate SSOs as needed	Entire City	\$1,000/YR	Neptune Beach	Ongoing
NB-5	ARV Replacement	Replacement of broken ARVs	Entire City	Unknown	Neptune Beach	Complete
NB-6	Light Lane Lift Station Renovation	Upgrades and rehabilitation of the existing wet well and station piping	1 lift station	\$13,000	Neptune Beach	Complete
NB-7	Fletcher Lift Station	Upgrades and rehabilitation of the existing wet well and station piping	1 lift station	\$13,000	Neptune Beach	Complete
NB-8	New Tara Court Lift Station	New lift station installation	1 lift station	\$80,000	Developer	Complete
NB-9	New Emma Lane Lift Station	New lift station installation	1 lift station	\$80,000	Developer	Complete
NB-10	Bay Street Lift Station Renovation	Upgrades and rehabilitation of the existing wet well and station piping	1 lift station	\$13,000	Neptune Beach	Complete
NB-11	Florida Lift Station Renovation	Upgrades and rehabilitation of the existing pumps	1 lift station	\$11,000	Neptune Beach	Complete
NB-12	Bal Harbor Lift Station Renovation	Upgrades and rehabilitation of the existing wet well and station piping	1 lift station	\$13,000	Neptune Beach	Complete
NB-13	5 th Street Lift Station renovation	Upgrades and rehabilitation of the existing station piping	1 lift station	\$8,000	Neptune Beach	Complete
NB-14	Oceanwood Lift Station Renovation	Upgrades and rehabilitation of the existing station piping	1 lift station	\$8,000	Neptune Beach	Complete
NB-15	Oceanwood Lift Station Renovation	Upgrades and rehabilitation of the existing wet well	1 lift station	\$5,000	Neptune Beach	Planned; 2009/2010
NB-16	Summer Sands Lift Station renovation	Upgrades and rehabilitation of the existing wet well and station piping	1 lift station	\$13,000	Neptune Beach	Planned; 2009/2010
NB-17	Penman Terrace Lift Station renovation	Upgrades and rehabilitation of the existing station piping	1 lift station	\$8,000	Neptune Beach	Complete
NB-18	Penman Terrace Lift Station renovation	Upgrades and rehabilitation of the existing wet well	1 lift station	\$5,000	Neptune Beach	Planned; 2009/2010

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
NB-19	Leeward Landing Lift Station Renovation	Upgrades and rehabilitation of the existing pumps and station piping	1 lift station	\$10,000	Neptune Beach	Complete
NB-20	1 st Street Lift Station Renovation	Upgrades and Rehabilitation of the existing station valves	1 lift station	\$3,500	Neptune Beach	Complete
NB-21	Daily Inspection of Lift Stations	Lift Station Visual Inspection	13 lift stations	\$65,000/YR	Neptune Beach	Ongoing
NB-22	Pipe Burst Existing Sewer Lines East of 3 rd Street	Replace existing gravity sewer lines east of 3 rd Street by means of pipe bursting and spray manhole liners on existing man holes within the work area to reduce infiltration and inflows.	5 miles of gravity sewer mains, 85 manholes and associated service taps	\$3,000,000	FDEP Revolving Fund Loan	Complete
NB-23	Rehabilitation of Manhole #57 on Hamlet Court	Rehabilitation of existing manhole to reduce infiltration an inflows	1 manhole	\$4,500	Neptune Beach	Complete
NB-24	Rehabilitation of Manhole #52 on Hamlet Court	Rehabilitation of existing manhole to reduce infiltration an inflows	1 manhole	\$4,500	Neptune Beach	Complete
NB-25	Rehabilitation of Manhole #119 on Penman Road	Rehabilitation of existing manhole to reduce infiltration an inflows	1 manhole	\$4,500	Neptune Beach	Complete
NB-26	Rehabilitation of Manhole #85 on 3 rd Street and Davis Blvd	Rehabilitation of existing manhole to fix sagging/dropping manhole	1 manhole	\$4,500	Neptune Beach	Complete
NB-27	Rehabilitation of Manhole #23 on 1 st Street at South Street	Rehabilitation of existing manhole to reduce infiltration an inflows	1 manhole	\$4,500	Neptune Beach	Complete
NB-28	Create GIS Mapping System for City Lift Station Inventory	Put together GIS mapping system and collect data for the City's sanitary sewer lift station facilities	Entire City	\$2,000	Neptune Beach	Underway; 2010
NB-29	Create GIS mapping system for City gravity sanitary sewer inventory	Put together GIS mapping system and collect data for the City's gravity sanitary sewer facilities	Entire City	\$5,000	Neptune Beach	Underway; 2010
NB-30	Create GIS Mapping System of Private Lift Station Inventory	Put together GIS mapping system and collect data for private lift station facilities within the City	Entire City	\$2,500	Neptune Beach	Underway; 2010
NB-31	FOG Program	Routine inspections of grease traps and downstream sanitary sewer primarily at restaurant locations within the City	Restaurant areas within the City	\$5,000/yr	Neptune Beach	Ongoing
NB-32	Stormwater System Ditch and Canal Maintenance	Continual inspection and maintenance of the city's ditches; routinely inspect, mow, pick up litter, and repair as needed	9.3 miles of gravity storm sewer, 351 stormwater inlets	\$90,000	Neptune Beach	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
NB-33	Stormwater System Pond Maintenance	Continual inspection and maintenance of the city's 4 ponds; routinely inspect, mow, pick up litter, and repair as needed	4 ponds	\$2,500/YR	Neptune Beach	Ongoing
NB-34	Stormwater Education and Outreach Efforts	Participation in the WAV Program	Entire City stormwater system	\$5,000/yr	Neptune Beach	Ongoing
NB-35	Pet Waste Management/Ordinance	Sec. 6-30. Defecation disposal. It shall be a violation for any owner of a dog to allow such dog to defecate on any property within the city other than the owner's private property without immediately removing such defecation with some sort of material, utensil or suitable container and depositing the defecation in a trash container. When walking a dog on any property within the city, other than the owner's property, the owner of that dog shall carry some sort of material, utensil or suitable container with which to depose of the defecation. The owner in violation of this chapter shall pay a civil penalty to the department of public safety as set forth in section 6-5. (Ord. No. 1998-01, § 1, 4-6-98; Ord. No. 2005-09, § 5, 5-2-05)	Entire City	\$5,000/yr	Neptune Beach	Ongoing
NB-36	Street sweeping	Street sweeping of roads with curb and gutter inside the city limits	Entire City	Unknown	Neptune Beach	Ongoing
NB-37	Public Works Employee Training	Annual training covering topics such as stormwater, illicit discharges, and SWPPP	Approximately 10.9 miles of roads	\$35000/YR	Neptune Beach	Ongoing
NB-38	Testing and Sampling	Increased water sampling of Hopkins Creek	Public Works Employees	Unknown	Neptune Beach	Ongoing
NB-39	Stormwater Pollution Prevention Plan	Quarterly and annual inspections of the Public Works facility	Hopkins Creek within the City of Neptune Beach	\$5,000.00	Neptune Beach	Planned
NB-40	Stormwater Education and Outreach Efforts	Participation in the WAV Program	Public works and WWTP Facilities	\$3500/YR	Neptune Beach	Ongoing
NB-41	Organize a Walk the WBID for Hopkins Creek	Organize and participate in Walk the WBID for Hopkins Creek	Hopkins Creek	\$6,000.00	Neptune Beach	Planned
NB-42	Create GIS Mapping System for City Stormwater Related Inventory	Put together GIS mapping system and collect data for the city's stormwater facilities; completion in 2010	Entire City	\$5,000.00	Neptune Beach	Underway; 2010

13.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 80 through **Table 85** list the projects and programs to reduce fecal coliform loading in the Hopkins Creek watershed. Several key efforts completed in the WBID are summarized below, as well as activities that are expected to continue or be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Hopkins Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Hopkins Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

13.4.1 OSTDS

Program Implementation – There are no failure areas in the watershed and many of the tanks in the WBID have been phased out. Atlantic Beach has removed 9 septic tanks, Jacksonville Beach has removed 85, and Neptune Beach has removed 70. There are still approximately 60 tanks still in Neptune Beach and the City is working to create a GIS inventory of the remaining tanks to determine what areas should be sewerred. There are 2 tanks located on Neptune Lane, adjacent to the creek, which both have a history of repair permits. DCHD will intensively inspect this area and will report the results of the inspection in an annual BMAP progress report. Additional areas may be identified for intensive inspections based on the assessment efforts discussed in the BMAP. If additional areas are designated in the future for inclusion in the program, these areas will also be inspected as funding becomes available.

13.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there are 4 private lift stations in the watershed. COJ EQD performed 20 annual lift station inspections in the watershed and will continue inspections annually. There is 1 private lift station located at Beach Boulevard and 15th Street, which is on the WBID boundary. COJ will determine whether or not this station is located in the Hopkins Creek watershed and report on the findings in the first annual BMAP report. COJ's annual inspections and the above investigation are sufficient to address private infrastructure in the watershed at this time.

Sewer Infrastructure Projects – Atlantic Beach, Jacksonville Beach, and Neptune Beach have all completed several projects to upgrade sewer lines and to rehabilitate manholes. In addition, Atlantic Beach has cleaned and televised portions of the sewer main in the city and conducted an inflow/infiltration analysis of the entire collection system. Jacksonville Beach has also cleaned portions of their system and rehabilitated several lift stations. Neptune Beach has replaced broken ARVs and renovated several lift stations. These efforts help to maintain the sewer systems and proactively prevent problems.

Program Implementation – Atlantic Beach, Jacksonville Beach, and Neptune Beach each have programs for inspection and maintenance of lift stations, manholes, and the sewer system. In addition, each city also has a FOG program to prevent grease from restaurants clogging the sewer systems. The cities will report their inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to demonstrate that the system is monitored and maintained.

13.4.3 STORMWATER

Illicit Connection Removal – FDOT, through the PIC Program, removed 1 illicit connection in the watershed. COJ and FDOT have committed to continue the PIC Program, which includes identifying additional illicit connections and removing those connections in a timely manner. In addition, Jacksonville Beach has trained staff to identify and remove illicit connections to their MS4 conveyances.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue and FDOT will continue to periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. In addition, the FDOT Adopt-A-Highway Program removes trash from 8 miles of roadway, and street sweeping is performed monthly on 16 miles of roadway. FDOT will continue stormwater infrastructure maintenance to help prevent potential regrowth in the MS4 conveyances. The trash removal efforts are expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID.

Program Implementation – COJ PWD has completed 23 work orders for ditch maintenance and 17 work orders for structures. Atlantic Beach conducts weekly inspections of their ditches, canals, and ponds and conducts maintenance as necessary on these conveyances. They also routinely maintain their right-of-ways and pick up litter, which prevents trash from entering the creek. In addition, they city has also completed several capital projects to reduce fecal coliform loading to the creek through stormwater runoff. Neptune Beach has routine inspections of the ditches, canals, and 4 stormwater ponds, with maintenance and repairs occurring as needed. Neptune Beach also conducts street sweeping throughout the city and they have a pet waste ordinance to prevent waste from reaching surface waters.

Jacksonville Beach also has routine inspections and maintenance of their system and has a pet waste ordinance. In addition, they have completed numerous flood control projects and those located near surface waters include: (1) Arden Way Sewer System Improvements; (2) Ocean Forest Drainage Study; (3) 18th Street North, Stormwater Improvements; (4) 11th Avenue North stormwater Improvements; (5) easement west of Penman Road from 6th Avenue North to 16th Street North; (6) 11th Avenue North from 16th Street North to Penman Road; (7) 11th Avenue North from 17th to 18th Street North; (8) 21st Street from 9th Avenue to 12th Avenue North; (9) 12th Avenue North at 20th Street North; (10) Tanglewood Road from Pinewood Lane to Sable Palm Lane; (11) Tanglewood Road at Sable Palm Lane; (12) Pinewood Road between Arden Way and Oakwood Road; (13) Fletcher Middle School Pond; and (14) drainage ditch at 12th Avenue North and 22nd Street North.

Walk the WBID – Neptune Beach will organize a Walk the WBID effort to learn more about the watershed and the potential sources. This effort will occur in the first year after BMAP implementation and will include FDEP and the other stakeholders in the watershed. Considerations for conducting a Walk the WBID are included in **Appendix F**.

TABLE 86: SUMMARY OF RESTORATION ACTIVITIES FOR THE HOPKINS CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	ATL BCH	JAX BCH	NEP BCH
OSTDS						
Ordinances	√	X	X	√	-	-
Enforcement	√	√	X	√	-	-
Program Implementation	√	√	X	√	-	-
Permit Review (new and repair permits)	X	√	X	X	X	X
Failure Area Evaluation	-	-	X	X	X	X
Failure Area Ranking	√	√	X	X	X	X
Septic Tank Inspection	-	√	X	X	X	X
Septic Tank Phase-Out	-	-	X	√	√	√
Public Education (PSA)	-	X	X	-	-	-
Surface Water Sampling for Conditions and Trends	√	X	X	X	X	X
Sewer System						
Sewer Line Upgrades	X	X	X	√	√	√
Manhole Inspection and Rehab	X	X	X	√	√	√
Pump Station Inspection and Maintenance	X	X	X	√	√	√
Pump Station Rebuild	X	X	X	√	√	√
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√	√	√
Program Implementation	X	X	X	√	√	√
Private Lift Station Inspections and Enforcement	√	X	X	X	√	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√	√	
Surface Water Sampling for Conditions and Trends	X	X	X	X	X	X
Stormwater						
Flood Control Capital Projects	-	X	-	√	√	-
Capital Projects/Stormwater Water Quality BMPs	-	X	√	√	√	-
Stormwater System Ditch and Canal Maintenance	√	X	√	√	√	√
Stormwater Pond Maintenance	-	X	√	√	√	√
Stormwater Pipe Cleaning and Maintenance	√	X	√	√	√	√
Potential Illicit Connection (PIC) Identification	√	X	+	-	√	-
Illicit Connection Removal	-	X	+	-	-	-
Public Education and Outreach	-	X	-	√	√	√
Surface Water Sampling for Conditions and Trends	√	X	+	-	√	√
Program Implementation	-	X	√	√	√	√
Pet Waste Management						
Ordinances and Enforcement	-	X	X	-	√	√
Public Education and Outreach	-	X	X	-	√	√
Special Source Assessment Activities						
Intensive Water Quality Sampling to Track Sources	-	X	-	X	X	X
Tributary Assessment Team (TAT)	-	X	-	X	X	X
Microbial Source Tracking (MST)	-	X	-	X	X	X
Thermal Imagery to Identify PICs	-	X	-	X	X	X

Note: Shaded cells (marked with X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 14: CORMORANT BRANCH (WBID 2381)

14.1 WBID DESCRIPTION

Cormorant Branch, WBID 2381, is located in Duval County, east of the Lower St. Johns River within the Julington Creek Planning Unit, as designated by the SJRWMD (**Figure 18**). The “headwaters” of Cormorant Branch are presumably comprised of stormwater runoff that appears to originate from a complex of ponds located in a residential community northeast of Ricky Drive (**Figure 19**). The creek generally flows south in a single channel with the exception of two branches that join Cormorant Branch from the west (“western branch”) and east (“eastern branch”). The western branch originates at a pond located outside the western WBID boundary and joins the main channel at Marbon Road. The segment of the western branch within the current WBID boundary is classified as an underground conveyance system, whereas the segment outside of the WBID boundary is classified as a ditch. The eastern branch extends northeast from the main channel at Julington Creek Road. The waters of Cormorant Branch flow into Julington Creek south of Julington Creek Road. Julington Creek merges with the St. Johns River west of San Jose Boulevard (PBS&J, January 2009).

The spatial distribution and acreage of different land use categories in the Cormorant Branch watershed were identified using 2004 land-use coverage data from the SJRWMD (**Table 87**). The dominant land use (528 acres; 36% of total coverage) in the Cormorant Branch watershed is classified as medium-density residential and is primarily located: (1) covering the majority of the southern portion of the watershed south of Marbon Road; (2) from Tea Rose Drive south to Blue Spruce Court between Swooping Willow Court West and Mountain Ash Road East; (3) in the vicinity between Ricky Drive and Purdom Drive, between the western WBID boundary and Gwynford Lane; and (4) in the northern portion of the watershed between Fair Banks Grant Road North and Laurel Grove North, just east of Mandarin Circle West. The next two most abundant land cover categories are: (1) high density residential (292.8 acres; 20% of total coverage), predominantly located: (i) covering the northern portion of the watershed north of Ricky Drive, and (ii) at Marbon Estates; and (2) low-density residential areas (206.7 acres; 14.1% of total coverage) located primarily in scattered areas between Cormorant Branch and the eastern WBID border between Fairbanks Road and Marbon Road. Wetlands and upland forests accounted for approximately 14% of the total land coverage of Cormorant Branch and form a boundary around the main channel from Loretto Road south to the confluence with Julington Creek and along the length of the eastern branch. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Cormorant Branch in these areas (PBS&J, January 2009).

According to the 2000 Census, there are 2,831 households within the watershed, averaging 2.52 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 1,132 dogs in the watershed.



FIGURE 18: LOCATION OF THE CORMORANT BRANCH WATERSHED

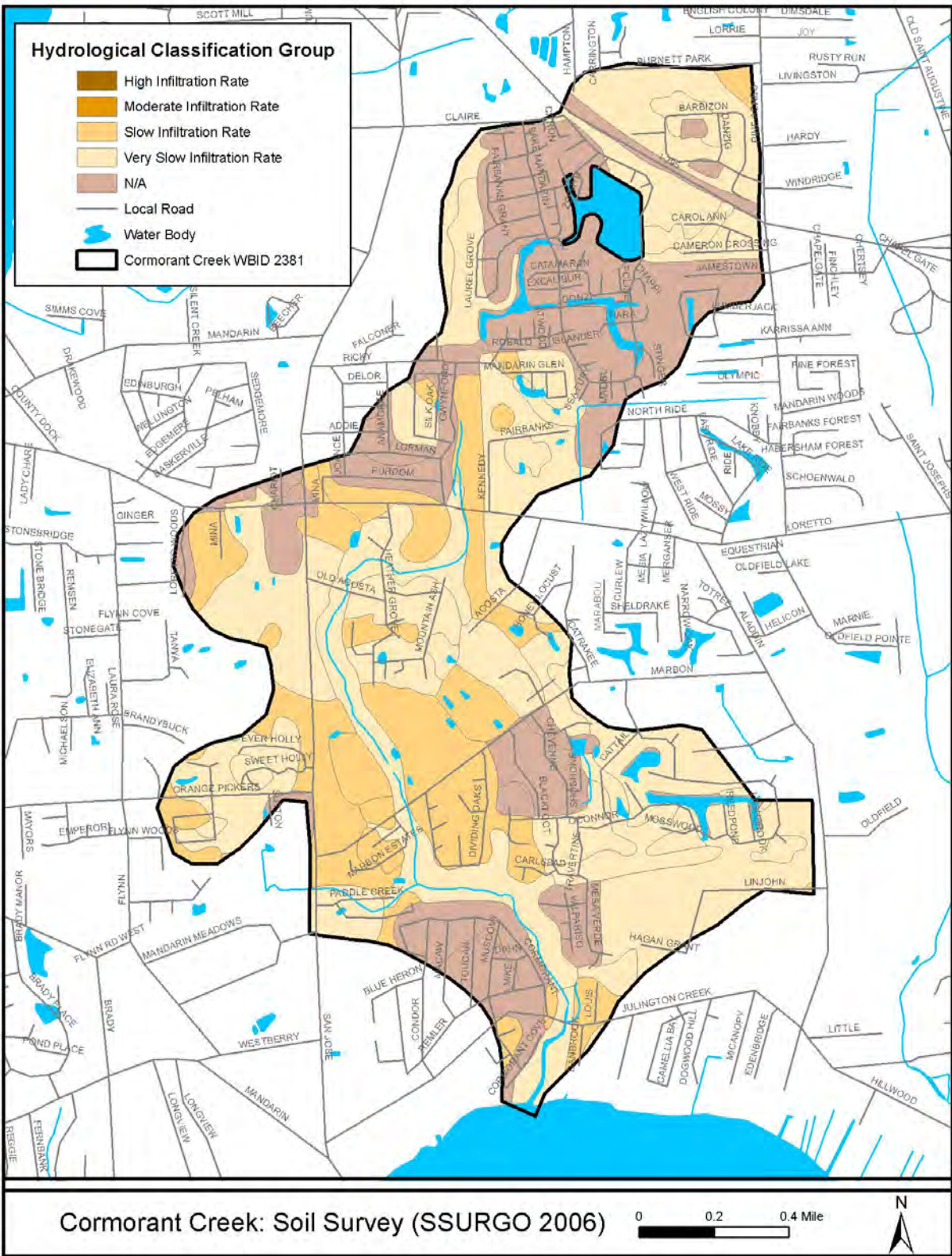


FIGURE 19: CORMORANT BRANCH WBID LOCATOR MAP

TABLE 87: LAND USES IN THE CORMORANT BRANCH WATERSHED

LAND USE	ACRES	% OF TOTAL
Medium Density Residential	528.0	36.0
High Density Residential	292.8	20.0
Low Density Residential	206.7	14.1
Wetlands	107.8	7.4
Upland Forest	102.4	7.0
Commercial/ Utility/ Institutional	88.2	6.0
Water	54.3	3.7
Transportation	33.7	2.3
Recreational	27.0	1.8
Non-Forested Upland	15.4	1.1
Cropland and Pastureland	7.5	0.5
Disturbed Land	2.4	0.2
TOTAL:	1,466.3	100

14.2 POTENTIAL SOURCES

14.2.1 POINT SOURCES

There are no industrial or domestic wastewater facilities, CAFOs, application sites for septic residuals, or landfills permitted to discharge to the Cormorant Creek watershed. The COJ/FDOT MS4 permit includes the Cormorant Branch watershed (PBS&J, January 2009).

14.2.2 ILLICIT DISCHARGES

COJ EQD is continuing a program to identify, confirm, and respond to illicit connection issues in Jacksonville. Of the 17 PICs found in the Cormorant Branch watershed, 5 were determined to be illicit in nature and 1 is pending investigation. None of the illicit connections were identified as being bacterial related and all 5 connections were removed by February 16, 2006 (PBS&J, January 2009).

14.2.3 CENTRALIZED SEWER INFRASTRUCTURE AND OVERFLOWS

The Cormorant Branch watershed is located within the Mandarin WWTF Service Area. There are an estimated 2,483 households (approximately 88% of households) connected to the sanitary sewer system within the Cormorant Branch WBID. This watershed supports nearly 152 kilometers (94 miles) of sewer lines and 13 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is found throughout the watershed and is most concentrated in areas north of Loretto Road. There have been 3 sanitary sewer overflows reported by JEA within the Cormorant Branch WBID boundaries. The estimated volume of spills associated with these overflows ranged from 30 to 1,200 gallons and averaged approximately 420 gallons; however, only 1 SSO was reported to have potentially impacted surface waters (PBS&J, January 2009).

TABLE 88: SSOs REPORTED IN THE CORMORANT BRANCH WATERSHED, 2001–07

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Cormorant Branch (2381)	23-Nov-01*	1,200	Yes
Cormorant Branch (2381)	23-Feb-05	30	No
Cormorant Branch (2381)	10-May-05	30	No

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

14.2.4 *OSTDS*

WSEA estimates that there are 440 OSTDS in the Cormorant Branch watershed. According to DCHD, 47 septic system repair permits were issued within this area. Numerous parcels with septic system repair permits are located in close proximity to Cormorant Branch surface waters. These are primarily located in areas along the creek south of Cormorant Drive and at Marbon Road. The proximity of these parcels to surface waters suggests that septic systems potentially affect the water quality of Cormorant Branch primarily in the midstream and downstream portions of the WBID (PBS&J, January 2009).

14.2.5 *NONPOINT SOURCES*

An analysis of impervious surface indicates that the Cormorant Branch WBID contains predominantly 10% to 25% impervious surfaces. Areas with less than 10% impervious surface are primarily located along the surface waters of Cormorant Branch and correspond to wetland and upland forest land use classifications. Areas with 10% to 25% impervious surface are located throughout the watershed. Portions of the watershed along San Jose Boulevard contain greater than 25% impervious surface area that correspond to commercial/utility and institutional land use classifications and are located in close proximity to the surface waters of Cormorant Branch (PBS&J, January 2009).

Furthermore, the potential for stormwater runoff was analyzed and demonstrates that the majority of the WBID contains primarily a low-to-moderate potential for stormwater runoff, in areas south of Ricky Drive and a predominantly high potential for stormwater runoff north of Ricky Drive. The highest runoff coefficients correlated with commercial/utility and institutional and transportation land use classifications and were calculated in areas along San Jose Boulevard and Interstate 295 (PBS&J, January 2009).

The storm sewer network in the Cormorant Branch watershed includes 31 permitted stormwater treatment areas, encompassing approximately 11% to 49% of the WBID area. Stormwater infrastructure within the WBID includes 109 outfalls by receiving water (5 classified by FDEP as a “major outfall”) and 520 inlets. Although closed conveyances are common throughout the WBID, few ditch systems are in the watershed. These are located: (1) paralleling Ricky Drive, just north of Sweetwater Oaks Drive North, between the western WBID boundary and Cormorant Branch; (2) between the western WBID boundary and San Jose Boulevard north of Orange Picker Road; (3) along the western branch, west of the western WBID boundary; (4) just west of the eastern WBID boundary extending south from Marbon Road; and (5) extending from Travertine Trail southwest to the wetlands of Cormorant Branch, just south of Mesa Verde Trail. Numerous ponds are also within the watershed and are primarily located: (1) in areas north of Ricky Drive; (2) in the central portion of the WBID between Loretto Road and Marbon Road; and (3) at a housing community near the southeastern WBID boundary between Cranefoot Drive and Cattail Drive South. As many of these ponds are in close proximity to Cormorant Branch, there is a potential for their waters to merge with the surface waters of the creek (PBS&J, January 2009).

Fecal coliform concentrations were not different during the “wet” and “dry” seasons suggesting a constant source of fecal coliform bacteria through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. Considering the possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were higher than they appeared to be (PBS&J, January 2009).

14.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

14.3.1 JEA ACTIVITIES IN THE CORMORANT BRANCH WATERSHED

14.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA has pipe burst 2.81% of the sewer lines in the watershed. During FY09, JEA inspected 650 LF of pipe using a closed circuit television system and pipe cleaned 857 LF to prevent blockages. JEA will continue their maintenance activities for the sanitary sewer system to prevent future problems. **Table 89** contains additional information on JEA's activities in the watershed.

TABLE 89: JEA ACTIVITIES IN THE CORMORANT BRANCH WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-114	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total major pipe project footage of pipe burst in watershed since 2001:13,970	\$1,083,290	JEA	Ongoing
JEA-115	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-116	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	2 stations (Livingston Estates, Beth Shalom)	Unknown	JEA	Planned
JEA-117	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	4 stations (Paddle Boat, Heather Grove Lane, Mandarin Terrace, Lake Mandarin)	Unknown	JEA	Planned
JEA-118	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-119	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-120	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-121	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	650 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-122	Pipe Cleaning	Clean existing pipes to avoid blockages	857 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-123	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-124	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-125	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-126	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

** Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

14.3.2 DCHD ACTIVITIES IN THE CORMORANT BRANCH WATERSHED

14.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As part of the OSTDS Program, DCHD has issued 15 new construction permits, 47 repair permits, and 5 abandonment permits in the WBID. DCHD has also performed 63 plan reviews and 9 complaint investigations. It will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 90** lists DCHD's projects in the Cormorant Branch watershed.

TABLE 90: DCHD ACTIVITIES IN THE CORMORANT BRANCH WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-57	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 15 new construction permits, 47 repair permits, and 5 abandonment permits issued	\$30,275	FDOH/LSJR SWIM Grant	Ongoing
DCHD-58	SWIM Project	Implementation of broad-ranging septic tank ordinance	Approximately 50.40% of Julington Hills Septic Tank Failure Area exists within this WBID	\$146,150	FDOH/LSJR SWIM Grant	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-59	DCHD-sponsored training programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-60	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 63 plan reviews and site evaluations have been performed based upon permitting history	\$15,750	FDOH/LSJR SWIM Grant	Ongoing
DCHD-61	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-62	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	9 complaint investigations have been performed	\$3,150	FDOH/LSJR SWIM Grant	Ongoing

14.3.3 COJ ACTIVITIES IN THE CORMORANT BRANCH WATERSHED

14.3.3.1 Completed COJ Projects

COJ has completed the Loretto Road from SR 13 to Old St. Augustine Road Project in the watershed. This project is a wet detention pond that treats 55 acres. This project treats stormwater runoff in this area, reducing the amount of stormwater-associated fecal coliform loading to Cormorant Branch.

14.3.3.2 Ongoing COJ Programs and Activities

The COJ MS4 permit requires COJ and its co-permittees to implement a Stormwater Monitoring Plan. As part of this plan, COJ has 1 routine monitoring station in the watershed that is sampled quarterly. A total of 54 samples were taken between 1995 and 2009.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 90 work orders for ditch and creek regrading, erosion control, and cleaning; 16 work orders for lake and pond maintenance; and 158 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. Of the 17 PICs identified by the COJ in the Cormorant Branch watershed, 5 were confirmed as illicit connections and were removed; the status of 1 PIC is currently pending investigation. Also as part of the PIC Program, COJ EQD provides

public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

COJ PWD also conducts inspections, which included 3 investigations into illicit water discharges, 6 illegal discharges, 9 sewer lines that drained into a yard or ditch, and inspections of the 7 private lift stations in the watershed. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 91 provides additional detail on COJ’s activities in the watershed.

TABLE 91: COJ ACTIVITIES IN THE CORMORANT BRANCH WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Capital Improvement Projects						
COJ-174	Lorretto Road (SR 13 to Old St. Augustine Rd) (Main Stem COJ-16)	Wet detention	55 acres	Unknown	COJ	Complete
MS4 Maintenance Activities						
COJ-175	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	90 (for 2005-09)	\$16,945.26	COJ	Ongoing
COJ-176	Lake or Pond Problem		16 (for 2005-09)	\$205.24	COJ	Ongoing
COJ-177	Structure Blocked/Repair/General Flooding		158 (for 2005-09)	\$3,251.74	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-178	Illicit Water Discharge	CARE initiated	3 (for 2005-07)	\$1,137	COJ	Ongoing
COJ-179	Pollution - Water - Illegal Discharge	CARE initiated	6 (for 2001-08)	\$2,274	COJ	Ongoing
COJ-180	Sewer Overflow	CARE initiated	9 (for 2000-08)	\$3,411	COJ	Ongoing
COJ-181	Private Lift Station Inspection	7 private lift stations in the WBID	30 (for 1997-2009)	\$11,370	COJ	Ongoing
COJ-182	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-183	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (3740 Burnett Park Road)	Unknown	COJ	Planned
COJ-184	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	1 station (12015 San Joe Boulevard)	Unknown	COJ	Planned
COJ-185	Illicit Discharge Detection and Elimination	1 open, 5 illicit	17 (for 2000-07)	\$6,443	COJ	Ongoing
COJ-186	PIC Program	Follow up on outstanding PICs	1 (for 2010-11)	Unknown	COJ	Planned
COJ-187	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	54 (for 1995-2009)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-188	Julington Hills Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	303 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-189	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	137 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-190	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-191	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

¹ COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study, or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023. For the 15 tributaries addressed in this BMAP, the failing tanks within 300 meters of surface waters will be included in the COJ plan and schedule to phase out tanks and will be identified as Tributaries BMAP-related tanks.

14.3.4 FDOT ACTIVITIES IN THE CORMORANT BRANCH WATERSHED

14.3.4.1 Completed FDOT Projects

FDOT has completed the State Road 13 Widening Project in the watershed, which is a wet detention pond that treats 27 acres. The project has helped to reduce fecal coliform loading to the creek by capturing and treating stormwater runoff.

14.3.4.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. FDOT supports the Adopt-A-Highway program in the watershed, in which trash is collected from 2 miles of roads. Street sweeping also occurs monthly on 4 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system as needed. This maintenance occurs on 2 miles of roadway and associated stormwater conveyance systems.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund 1 monitoring station in the Cormorant Branch watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 92** lists FDOT's activities in the watershed.

TABLE 92: FDOT ACTIVITIES IN THE CORMORANT BRANCH WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-62	PIC Program	Search for illicit connections	Effort is continuous in this WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-63	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	54 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-64	Stormwater Management Systems	SR 13 Widening	27 acres, wet ponds	Not applicable	FDOT	Complete
FDOT-65	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-66	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 2 miles	Unavailable	Not applicable	Ongoing
FDOT-67	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 2 miles of roadway and associated stormwater conveyance systems currently being maintained; approximately 4 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

14.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 89 through **Table 92** list the projects and programs to reduce fecal coliform loading in the Cormorant Branch watershed. Several key efforts completed in the WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Cormorant Branch based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Cormorant Branch watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

14.4.1 OSTDS

Failure Area – There are 303 tanks eligible for sewerage due to their inclusion in the Julington Hills failure area. COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. The failing tanks in the Julington Hills failure area in the Cormorant Branch watershed within 300 meters of surface waters will be included in the COJ phase-out plan and schedule, as described in the Main Stem BMAP, and will be identified in the plan as Tributaries BMAP-related efforts.

Program Implementation – City ordinances, inspections, and program implementation combined with DCHD permit review processes and inspections proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure areas and to prevent the creation of new OSTDS sources.

14.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, COJ inspects 7 private lift stations in the watershed annually. There is 1 private lift station on the WBID boundary located at 3740

Burnett Park Road. COJ will determine whether or not this station is located in the Cormorant Branch WBID. In addition, there is a station in close proximity to an inlet that leads to a ditch that discharges to the creek. This station is located at 12015 San Jose Boulevard and COJ should inspect this station to ensure it is functioning properly. The results of these investigations will be included in the first annual BMAP progress report.

Sewer Infrastructure Projects – JEA addressed an SSO on Gwynford Lane, near surface waters, by making a point repair to the gravity sewer main, which helped prevent future SSOs in the area. JEA has 2 lift stations located on the WBID boundary: (1) Livingston Estates on Pine Acres Road; and (2) Beth Shalom on Marbon Road. In addition, there are 4 stations located near surface waters: (1) Paddle Boat on Paddle Boat Lane; (2) Heather Tree on Heather Grove Lane; (3) Mandarin Terrace on Kennedy Lane; and (4) Lake Mandarin on Lake Mandarin Circle West. JEA will confirm the WBID the location of the 2 stations and the boundary and inspect the 4 stations near surface waster to ensure they are functioning properly. These results will be discussed in the first annual BMAP progress report.

Program Implementation – Continued inspection, repair, and maintenance activities in conjunction with the systemwide programs are sufficient to address potential sewer sources in the WBID at this time. The Root Cause Program and other SSO prevention efforts, such as FOG and CMOM, should be continued so that any additional infrastructure problems that develop will be identified and repaired. JEA will be expected to report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to ensure that the system is being monitored and maintained.

14.4.3 STORMWATER

Illicit Connection Removal – The PIC Program has removed 5 illicit connections. COJ and FDOT have committed to continue the PIC Program, which includes identifying additional illicit connections and removing those connections in a timely manner. For the stormwater activities to be sufficient, COJ must resolve the 1 open PIC investigation. COJ will provide the status of the investigation for the annual BMAP progress report.

Capital Improvement Projects – FDOT completed a wet pond project along State Road 13 that treats 27 acres, and COJ completed a wet detention project that treats 55 acres along Loretto Road. These projects capture and treat stormwater runoff, reducing fecal coliform loading to Cormorant Branch from stormwater in these areas.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. The FDOT Adopt-A-Highway Program removes trash from 2 miles of roadway. This effort is expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID. FDOT will continue stormwater infrastructure maintenance, as these efforts prevent potential bacteria regrowth in the MS4 conveyances. In addition, FDOT sweeps 4 miles of roadway every month, helping to reduce sediments entering the stormwater conveyance systems.

COJ Program Implementation – COJ PWD has invested an immense amount of time in work orders since 2005 to clean ditches, rectify stormwater pond problems, and repair blocked structures. Program implementation is addressing stormwater sources at this time.

TABLE 93: SUMMARY OF RESTORATION ACTIVITIES FOR THE CORMORANT BRANCH WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehab	X	X	X	-
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	-	X	-	X
Capital Projects/Stormwater Water Quality BMPs	√	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	-	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	-	X	-	X
Tributary Assessment Team (TAT)	-	X	-	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.
+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 15: WILLS BRANCH (WBID 2282)

15.1 WBID DESCRIPTION

Wills Branch, WBID 2282, is located in Duval County, west of the Lower St. Johns River within the Ortega River Planning Unit, as designated by the SJRWMD (**Figure 20**). The “headwaters” of Wills Branch are presumably comprised of stormwater runoff that appears to originate from its associated branches (including WBIDs 2277 and 2305, which are also portions of Wills Branch) near Pascal Street, Hammond Boulevard, Trinity Church Road, Herlong Road, and Interstate 295 (**Figure 21**). The creek generally flows southeast in a single channel with the exception of several contributing branches that join Wills Branch from the west (“northern branch”, “WBID 2277”, and “WBID 2305”). The northern branch appears to originate at a large pond located just west of Trinity Church Road and extends east to the creek just north of Hickory Hills Drive. The surface waters of WBID 2277 continue west from the main channel south of Lennox Avenue and extend outside of the western WBID boundary to Rose Hill Drive South where it forks north to Interstate 10 and south just past Herlong Road. WBID 2305 stretches west from the main channel north of the Navaho Drive and main channel intersection and terminates at stormwater ponds located south of the Interstate 295 and Wilson Boulevard intersection. The waters of Wills Branch continue southeast to the Cedar River just east of Watergate Lane and merge with the St. Johns River north of Highway 211 (PBS&J, July 2009).

The spatial distribution and acreage of different land use categories in the Wills Branch watershed were identified using 2004 land use coverage data from the SJRWMD (**Table 94**). The dominant land use (612.3 acres; 29.8% of total coverage) in the Wills Branch watershed is classified as medium-density residential and is primarily located: (1) along the upstream segments of the main channel from Hammond Boulevard east to Cahoon Road; (2) in the central portion of the watershed between the main channel and northern WBID boundary from Knoll Drive east to Interstate 295; (3) farther downstream from Old Middleburg Road east to Lane Avenue; and (4) in smaller patches throughout the watershed. The next two most abundant land cover categories are: (1) low-density residential areas (257.7 acres; 12.5% of total coverage), located primarily: (i) in close proximity to the headwaters of the main channel near the northeast corner of the WBID; (ii) from Victory Lake Drive east to Altman Road; (iii) in a small area at Lennox Avenue near station 21FLA 20030680; (iv) in the downstream portion of the WBID along the northern WBID boundary at the Memorial Park Road and Old Middleburg Road intersection; (v) near the downstream segment of the creek along Hyde Park Circle; and (vi) in several small patches throughout the watershed; and (2) upland forest (228.1 acres; 11.1% of total coverage) located primarily: (i) in small patches in the northwestern portion of the WBID; and (ii) in small patches throughout various areas of the watershed. Wetlands and upland forests accounted for nearly 20% of the total land coverage of Wills Branch and form a boundary around the main channel and associated branches. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Wills Branch in these areas (PBS&J, July 2009).

There are three areas within the watershed classified as cropland and pasturelands. These are located: (1) in close proximity to the main channel west of the Cahoon Road and Gordean Road intersection; (2) near a stormwater pond at the northern terminus of Victory Lake Drive; and (3) just northwest of the Coral Springs Road and Hammond Boulevard intersection near the southern WBID boundary. The agricultural operations of these areas are currently not known.

In addition, a tree nursery was identified in close proximity to the headwaters at the western end of Hassel Road (PBS&J, July 2009).

According to the 2000 Census, there are 2,587 households within the watershed, averaging 2.4 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 1,035 dogs in the watershed.

TABLE 94: LAND USES IN THE WILLS BRANCH WATERSHED

LAND USE	ACRES	% OF TOTAL
Medium Density Residential	612.3	29.8
Low Density Residential	257.7	12.5
Upland Forest	228.1	11.1
Commercial/ Utility/ Institutional	207.1	10.1
Recreational	172.7	8.4
Wetlands	171.9	8.4
Transportation	96.6	4.7
Water	93.1	4.5
High Density Residential	70.0	3.4
Disturbed Land	55.6	2.7
Cropland and Pastureland	37.1	1.8
Industrial	30.3	1.5
Nurseries and Vineyards	12.1	0.6
Non-Forested Upland	10.3	0.5
TOTAL:	2,055.1	100

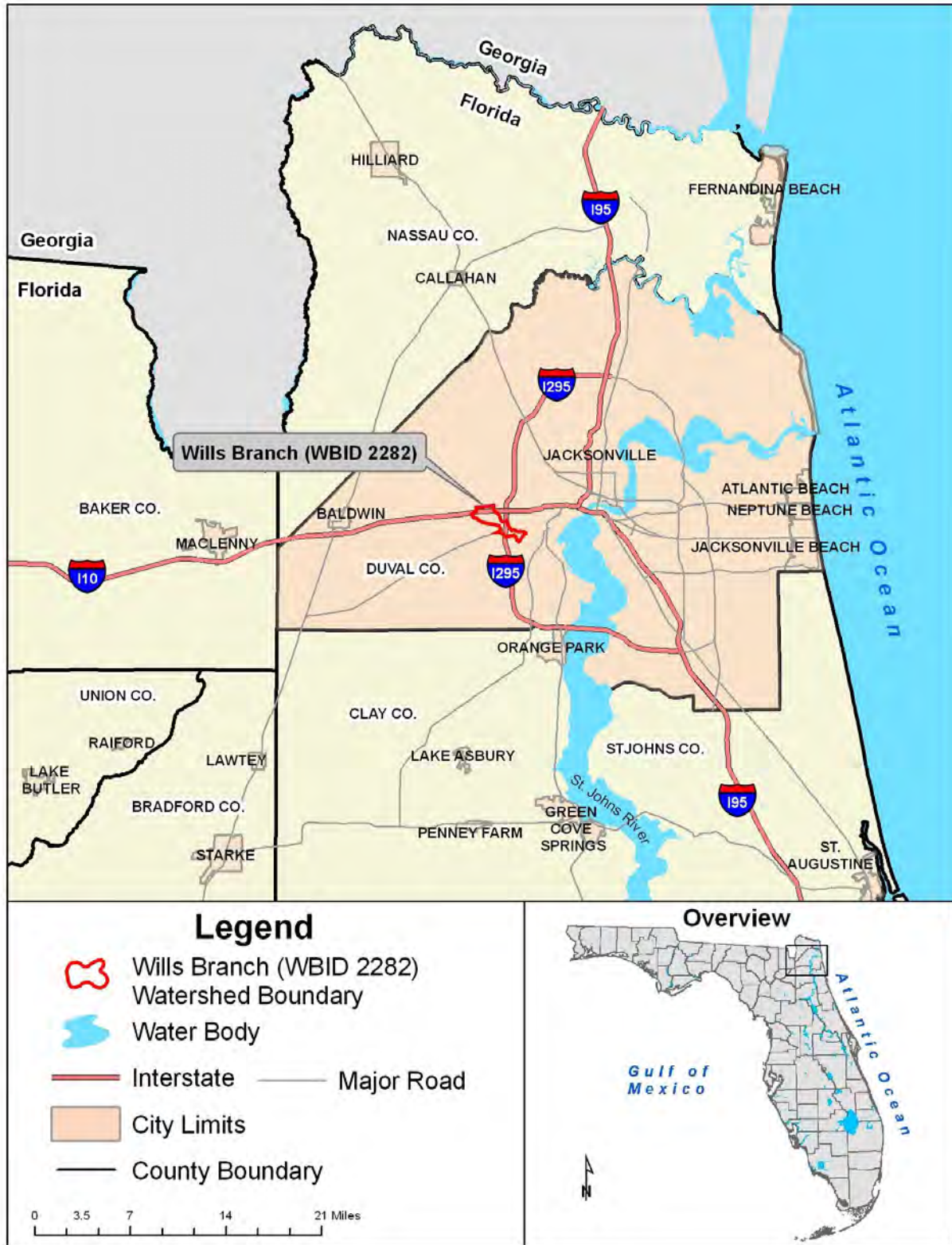


FIGURE 20: LOCATION OF THE WILLS BRANCH WATERSHED

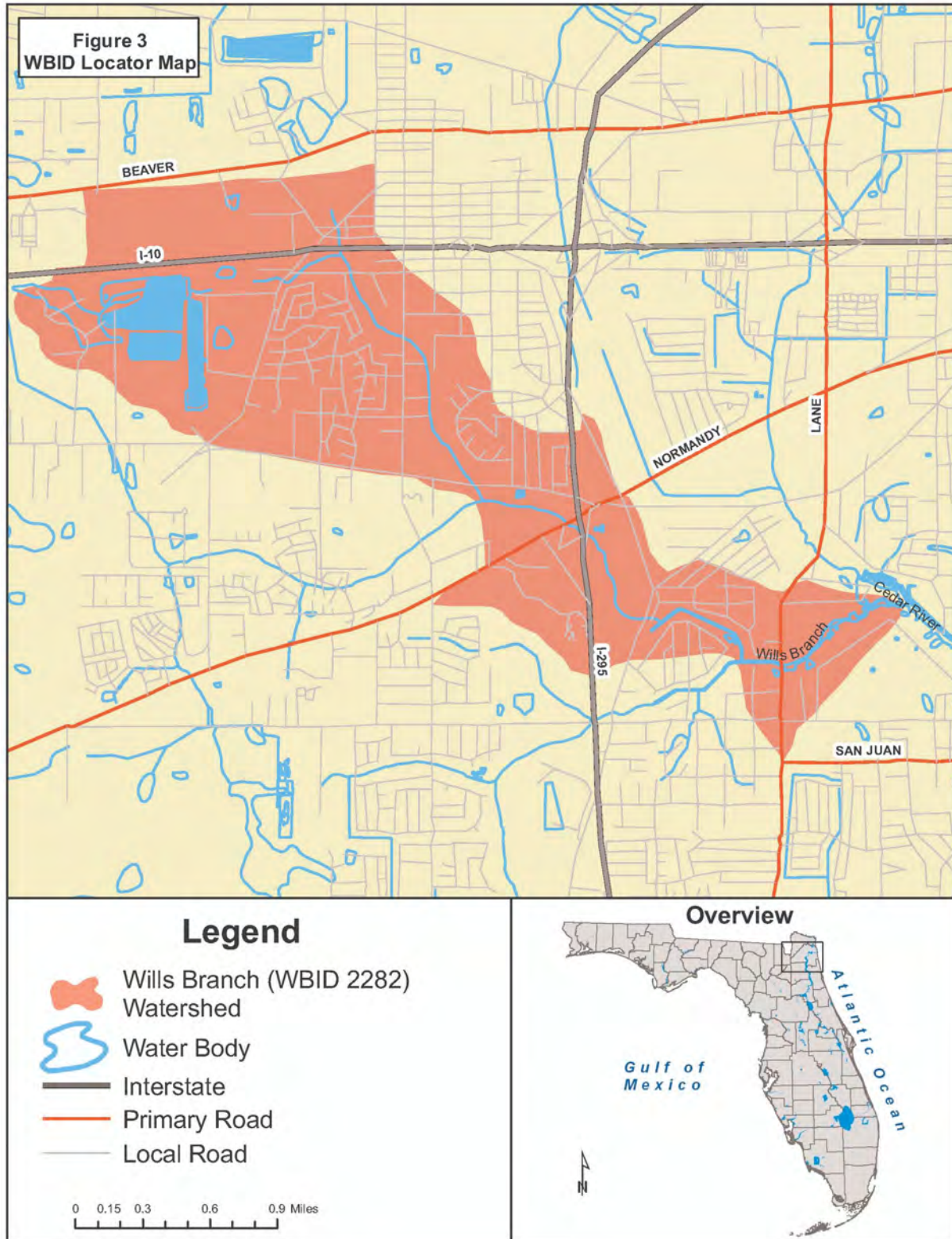


FIGURE 21: WILLS BRANCH WBID LOCATOR MAP

15.2 POTENTIAL SOURCES

15.2.1 POINT SOURCES

There are no industrial or domestic wastewater facilities, CAFOs, application sites for septic residuals, or landfills permitted to discharge to the Wills Branch watershed. The COJ/FDOT MS4 permit includes the Wills Branch watershed (PBS&J, July 2009).

15.2.2 ILLICIT DISCHARGES

COJ EQD identified 17 PICs in the watershed, of which 4 were confirmed to be illicit and removed. The status of 5 PICs is currently pending investigation.

15.2.3 CENTRALIZED SEWER INFRASTRUCTURE AND OVERFLOWS

Wills Branch is located within JEA's Buckman and Southwest WWTF Service Areas. There are an estimated 1,566 households (approximately 61% of households) connected to the sanitary sewer system within the Wills Branch watershed. This watershed supports nearly 131 kilometers (81 miles) of sewer lines and 16 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is found primarily: (1) at the northwest WBID boundary, in close proximity to a large pond, along Chandler Oak Drive and Victory Lake Drive; (2) from Hammond Boulevard east to Cahoon Road between Ramona Boulevard and Lenox Avenue; (3) in close proximity to the main channel along Knoll Drive; (4) in areas near the main channel between Sallie Avenue and the southern WBID boundary from Hanson Drive east to Lane Avenue South; and (5) near the downstream segment of the main channel at Londontowne Lane. There have been 14 SSOs reported by JEA within the Wills Branch WBID boundaries. The estimated volume of spills associated with these overflows ranged from 10 to 35,000 gallons and averaged approximately 1,902 gallons; 7 SSOs were reported to have potentially impacted surface waters (PBS&J, July 2009).

TABLE 95: SSOs REPORTED IN THE WILLS BRANCH WATERSHED, 2001–07

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Wills Branch (2282)	18-Aug-01	500	Data not available prior to October 2001
Wills Branch (2282)	15-Dec-01*	900	Yes
Wills Branch (2282)	13-Jan-03	750	No
Wills Branch (2282)	9-Jul-03*	7,200	Yes
Wills Branch (2282)	9-Jun-04*	6,500	Yes
Wills Branch (2282)	28-Sep-04*	700	Yes
Wills Branch (2282)	28-Sep-04*	7,500	Yes
Wills Branch (2282)	13-Oct-04	10	No
Wills Branch (2282)	28-Mar-05	500	No
Wills Branch (2282)	7-Nov-05	50	No
Wills Branch (2282)	7-Jan-06	15	No
Wills Branch (2282)	14-Aug-06*	300	Yes
Wills Branch (2282)	17-Sep-06*	35,000	Yes
Wills Branch (2282)	31-Dec-06*	2,000	No

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

15.2.4 OSTDS

WSEA estimates that there are 401 OSTDS in the Wills Branch watershed. According to DCHD, 23 septic system repair permits were issued in this area. The permits, and presumably failed septic systems, are located in close proximity to surface waters: (1) along the headwaters of the main channel at Devoe Street; (2) at the main channel near Cahoon Road; (3) at the main channel and confluence with WBID 2277 near Lennox Avenue; and (4) at the downstream segments of the main channel from Coulee Avenue to the confluence of the main channel and the Cedar River. As parcels with OSTDS repair permits are located in close proximity to surface waters, there is a potential for OSTDS to contribute to the fecal pollution in these areas of the creek (PBS&J, July 2009).

15.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the Wills Branch WBID contains predominantly 10% to 25% impervious surface. Areas with less than 10% impervious surface primarily correspond to wetland and upland forest land use classifications. Areas with 10% to 25% impervious surface occur throughout the watershed. Areas of the WBID with greater than 25% impervious surface primarily correspond to commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) near the headwaters of the main channel northwest of Hammond Boulevard; and (2) just southeast of the confluence of the main channel of Wills Branch and WBID 2277 (PBS&J, July 2009).

Furthermore, the potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients within the WBID range from low-to-high depending on the area of the watershed. Lower runoff coefficients were calculated primarily in areas classified as wetlands and upland forests. Moderate runoff coefficients were calculated for areas throughout the watershed. The highest runoff coefficients correlated with transportation and commercial/utility and institutional land use classifications and are located in close proximity to surface waters of the main channel: (1) at the headwaters along Interstate 10; (2) just south of the Burma Road and Greenland Avenue intersection; (3) southwest of the Normandy Boulevard and Interstate 295 intersection; and (4) downstream along Lane Avenue. High stormwater coefficients indicate that there is a potential for stormwater to impact the surface waters in these areas (PBS&J, July 2009).

The storm sewer network in the Wills Branch watershed includes 31 permitted stormwater treatment areas, encompassing approximately 18.08% to 34.82% of the WBID area. Stormwater infrastructure within the WBID includes 50 outfalls by receiving water (none are classified by FDEP as “major outfalls”) and 419 inlets. Although there are many closed conveyances within the watershed, there are few open ditch systems present in the watershed located: (1) in the upstream portion of the watershed between Rockland Drive and Frost Street North; (2) parallel to Sky Drive in the midstream part of the watershed; and (3) in areas at the Normandy Boulevard and Interstate 295 intersection. It appears that the ditch system located between Rockland Drive and Frost Street North connects to a closed conveyance system that outfalls in the upstream portion of the main channel east of Hickory Hills Drive. The ditch system located in areas near the Normandy Boulevard and Interstate 295 intersection merge with the creek; the remaining ditch along Skye Drive does not appear to merge with the surface waters of Wills Branch directly or via closed conveyances. There are also several ponds located in close proximity to Wills Branch surface waters: (1) near the headwaters of the northern branch just west of Trinity Church Road; (2) at the main channel in the vicinity of the Normandy Boulevard and Interstate 295 intersection; and (3) near the Hyde Park Golf Club located northwest of Hyde Park Road near the downstream segment of the main channel. As these ponds are in close proximity to Wills Branch, there is a potential for their waters to merge with Wills Branch surface waters (PBS&J, July 2009).

In the watershed, fecal coliform concentrations were not different during the “wet” and “dry” season suggesting a constant source of fecal coliform bacteria to Wills Branch through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. Considering the possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were even higher than they appeared to be (PBS&J, July 2009).

15.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

15.3.1 JEA ACTIVITIES IN THE WILLS BRANCH WATERSHED

15.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA conducts maintenance activities to replace or rehabilitate failing or leaking infrastructure. In the Wills Branch watershed, JEA has pipe burst 0.11% of the sewer lines. In addition, JEA replaced 14 of the 21 ARVs in the watershed. During FY09, JEA inspected 2,999 LF of pipe using a closed circuit television system and pipe cleaned 11,037 LF to prevent blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 96** provides additional information on JEA's activities in the watershed.

TABLE 96: JEA ACTIVITIES IN THE WILLS BRANCH WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-127	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total major pipe project footage of pipe burst in watershed since 2001: 450	\$54,824	JEA	Ongoing
JEA-128	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-129	ARV Inspection and Rehab	See Appendix E	14 of 21 ARVs replaced	\$100,000*	JEA	Ongoing
JEA-130	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (Racetrack Gas on Normandy Boulevard)	Unknown	JEA	Planned
JEA-131	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	3 stations (Heritage Hills, Knoll Drive, 6927 Hanson Drive South)	Unknown	JEA	Planned

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-132	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-133	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-134	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-135	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	2,999 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-136	Pipe Cleaning	Clean existing pipes to avoid blockages	11,037 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-137	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-138	Manhole Monitoring	See Appendix E	2 monitors	Unknown	JEA	Ongoing
JEA-139	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-140	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-141	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$200,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

15.3.2 DCHD ACTIVITIES IN THE WILLS BRANCH WATERSHED

15.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As part of the OSTDS Program, DCHD has issued 45 new construction permits, 23 repair permits, and 17 abandonment permits in the WBID. In addition, 13 annual operating permits have been issued for PBTS. DCHD has also performed 68 plan reviews and 37 complaint investigations. It will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 97** lists DCHD's projects in the Wills Branch watershed.

TABLE 97: DCHD ACTIVITIES IN THE WILLS BRANCH WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-63	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 45 new construction permits, 23 repair permits, and 17 abandonment permits issued	\$36,100	FDOH/LSJR SWIM Grant	Ongoing
DCHD-64	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	Approximately 13 annual operating permits issued for commercial properties	\$32,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-65	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-66	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 68 plan reviews and site evaluations have been performed based upon permitting history	\$17,000	FDOH/LSJR SWIM Grant	Ongoing
DCHD-67	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update.	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-68	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations.	37 complaint investigations have been performed	\$12,300	FDOH/LSJR SWIM Grant	Ongoing
DCHD-69	Intensive Inspection Program	Intensive geospecific inspections in selected BMAP WBIDs based on repair permit applications, water quality information, and site conditions; additional WBIDs may be identified in future based on ongoing assessment efforts	Approximately 29 tanks west of Calhoon Road to Wills Branch; 20 tanks along Memory Lane and between Hyde Park Circle and Wills Branch	\$7,595	Unknown	Planned

15.3.3 COJ ACTIVITIES IN THE WILLS BRANCH WATERSHED

15.3.3.1 Ongoing COJ Programs and Activities

The COJ MS4 permit requires COJ and its co-permittees to implement a Stormwater Monitoring Plan. As part of this plan, COJ has 2 routine monitoring stations that are sampled quarterly in the Wills Branch watershed. A total of 112 samples were collected at this station between 1995 and 2009.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance included 106 work orders for ditch and

creek regrading, erosion control, and cleaning; 7 work orders for lake and pond maintenance; and 159 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2008. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. Seventeen PICs were identified in the Wills Branch watershed; 4 were determined to be illicit and removed, and the status of 5 PICs is still pending.

COJ PWD also conducts inspections in the watershed, including 3 investigations into illicit water discharges, 11 illegal discharges, 3 sewer lines that drained into a yard or ditch, 11 SSOs, and 37 private lift station inspections. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 98 provides additional details on COJ’s activities in the watershed.

TABLE 98: COJ ACTIVITIES IN THE WILLS BRANCH WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
MS4 Maintenance Activities						
COJ-192	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	106 (for 2005-09)	\$10,492.43	COJ	Ongoing
COJ-193	Lake or Pond Problem		7 (for 2005-09)	Unknown	COJ	Ongoing
COJ-194	Structure Blocked/Repair/General Flooding		159 (for 2005-09)	\$13,593.91	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-195	Illicit Water Discharge	CARE initiated	3 (for 2005-06)	\$1,137	COJ	Ongoing
COJ-196	Pollution - Water - Illegal Discharge	CARE initiated	11 (for 2001-09)	\$4,169	COJ	Ongoing
COJ-197	Sewer drains into yard/ditch	CARE initiated	3 (for 2008-09)	\$1,137	COJ	Ongoing
COJ-198	Sewer Overflow	CARE initiated	11 (for 1999-2009)	\$4,169	COJ	Ongoing
COJ-199	Private Lift Station Inspection	8 private lift stations in the WBID	37 (for 1997-2009)	\$14,023	COJ	Ongoing
COJ-200	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-201	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	2 stations (7885 Normandy Blvd, 7242 Normandy Blvd)	Unknown	COJ	Planned
COJ-202	Illicit Discharge Detection and Elimination	5 open, 4 illicit	17 (for 1999-2005)	\$6,443	COJ	Ongoing
COJ-203	PIC Program	Follow up on outstanding PICs	4 (for 2010-11)	Unknown	COJ	Planned
COJ-204	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	112 (for 1995-2009)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-205	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	417 tanks, 16 connected	Unknown	COJ	Ongoing
COJ-206	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-207	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

15.3.4 FDOT ACTIVITIES IN THE WILLS BRANCH WATERSHED

15.3.4.1 Completed FDOT Projects

FDOT has completed a wet pond that treats 21 acres at the I-295 and Normandy intersection. The project captures and treats stormwater runoff from the roadway and surrounding area, helping to reduce the amount of fecal coliform loading to Wills Branch.

15.3.4.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a DCP Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT supports the Adopt-A-Highway Program in the watershed and collects trash from 2 miles of roadway. Street sweeping also occurs monthly on 4 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 2 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund 2 monitoring stations in the Wills Branch watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system.

Table 99 lists FDOT's activities in the watershed.

TABLE 99: FDOT ACTIVITIES IN THE WILLS BRANCH WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-68	PIC Program	Search for illicit connections	Effort is continuous in this WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-69	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	112 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-70	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-71	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 2 miles	Unavailable	Not applicable	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-72	Stormwater Management Systems	I-295 and Normandy	21 acres, wet ponds	Not applicable	FDOT	Complete
FDOT-73	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 2 miles of roadway and associated stormwater conveyance systems currently maintained in this WBID; approximately 4 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

15.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 96 through **Table 99** list the projects and programs to reduce fecal coliform loading in the Wills Branch watershed. Several key efforts completed in this WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Wills Branch based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Wills Branch watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

15.4.1 OSTDS

Program Implementation – There are approximately 401 septic tanks in the watershed and 23 repair permits have been issued. There are two discrete portions of the WBID that have a higher probability of OSTDS-related problems based on the number of repair permits issued, water quality data, and site conditions. DCHD will intensively inspect a specific geographic area within the WBID boundary and will report the results of the inspection in an annual BMAP progress report. Additional areas may be identified for intensive inspections based on the assessment efforts discussed in the BMAP. If additional areas are designated in the future for inclusion in the program, these areas will also be inspected as funding becomes available. Inspections need to be continued and fully enforced to manage potential impacts from existing systems and to prevent new sources from reaching surface waters.

15.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, COJ inspects 8 private lift stations in the watershed annually. There are 2 stations, 7885 Normandy Boulevard and 7242 Normandy Boulevard, located on the WBID boundary. COJ will verify which WBID these stations are located in and will provide an update in the first annual BMAP progress report. The continuation

of the inspection program and confirmation of reporting boundaries are sufficient to address private lift stations in the watershed at this time.

Sewer Infrastructure Projects – JEA conducted several projects to address SSOs in the watershed. Two SSOs occurred near 7702 Lenox Avenue and JEA replaced the ARV, made point repairs to the line, and has a project under construction to repair 500 feet of force main. There were also several SSOs along Knoll Cove and JEA pipe burst the lines in 1999, replaced the manhole in 2008, and replaced the ductile iron pipe under the ditch in 2007. In addition, JEA has 1 lift station, Racetrack Gas on Normandy Boulevard, located on the WBID boundary. JEA will verify which WBID this station is located in and will provide an update in the first annual BMAP progress report. In addition, there are 3 stations located in close proximity to surface waters: (1) Heritage Hills on Hickory Hills Drive; (2) Knoll Drive; and (3) 6927 Hanson Drive South. JEA will inspect these stations to ensure they are functioning properly and report the results in the first annual BMAP progress report. JEA will continue their maintenance efforts and its systemwide programs, and this will be sufficient to address potential sewer sources in the WBID at this time.

Program Implementation – Continued inspection, repair, and maintenance activities in conjunction with the systemwide programs are sufficient to address potential sewer sources in the WBID at this time. The Root Cause Program and other SSO prevention efforts, such as FOG and CMOM, should be continued so that any additional infrastructure problems that develop will be identified and repaired. JEA will be expected to report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to ensure that the system is being monitored and maintained.

15.4.3 STORMWATER

Illicit Connection Removal – COJ has confirmed and removed 4 illicit connections to the MS4; however, there are 5 outstanding PIC investigations. COJ will investigate these PICs and remove any connections that are confirmed illicit or close the case during the first year after BMAP adoption. The results of these investigations will be reported in the annual BMAP progress report. The removal of confirmed illicit connections reduces sources of fecal coliform to the MS4 conveyance system and, in turn, the creek. COJ and FDOT have committed to continue the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its facilities as part of its MS4 permit. The FDOT Adopt-A-Highway Program removes trash from 2 miles of roadway. This effort is expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID. FDOT will continue stormwater infrastructure maintenance, as these efforts prevent potential bacteria regrowth in the MS4 conveyances. In addition, FDOT sweeps 4 miles of roadway every month, helping to reduce sediments entering the stormwater conveyance systems.

COJ Program Implementation – COJ completed 106 work orders for ditch maintenance, 7 work orders for pond problems, and 159 repairs of structures. The continuation of current programs and maintenance activities in the watershed will help reduce and eliminate potential sources of fecal coliform loading.

TABLE 100: SUMMARY OF RESTORATION ACTIVITIES FOR THE WILLS BRANCH WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	-	-	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	-	X	-	X
Capital Projects/Stormwater Water Quality BMPs	-	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	-	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	-	X	-	X
Tributary Assessment Team (TAT)	-	X	-	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.
+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 16: SHERMAN CREEK (WBID 2227)

16.1 WBID DESCRIPTION

Sherman Creek, WBID 2227, is located in Duval County, south of the Lower St. Johns River within the Intracoastal Waterway Planning Unit, as designated by the SJRWMD (**Figure 22**). The “headwaters” of Sherman Creek are presumably comprised of stormwater runoff that appears to originate from its associated branches and forks north of the Mealy Street South and Levy Road intersection, at Seaspray Avenue, at Seminole Road, and between Perimeter Road and State Road 101 (**Figure 23**). The main channel of the creek generally flows west with the exception of the upstream segment that flows southward, beginning at Perimeter Road. The Mayport Canal, located along Perimeter Road, and artificial channels that parallel Naval Station Street 2, appears to merge with the main channel of Sherman Creek at Perimeter Road. Surface waters also extend east from the main channel at the State Road 101 and Perimeter Road intersection to Lake Wonderwood, located outside of the eastern WBID boundary east of Naval Station Street 11. Many sub-tributaries of Sherman Creek join the main channel within a wetland area located between State Road A1A and State Road 101 from Naval Station Street south to Wonderwood Drive (PBS&J, August 2009).

There are also two contributing branches that join Sherman Creek from the south (“Puckett Creek” and “southeastern branch”). Puckett Creek stretches south from the main channel to State Road A1A where it forks south near the Levy Road and Mealy Street South intersection (“Puckett Creek’s west fork”) and southeast to Seaspray Avenue (Puckett Creek’s east fork). The east fork of Puckett Creek divides just north of Assisi Lane and reunites as a single channel southwest of the Saturiba Drive and Selva Marina Drive intersection. This fork also splits slightly south of Plaza Street, south and southwest to Seaspray Avenue. The southeastern branch continues south from the main channel and merges with Puckett Creek’s east fork at Fleet Landing Boulevard. The waters of Sherman Creek continue west to Pablo Creek, which merge with the St. Johns River in Chicopit Bay (PBS&J, August 2009).

The spatial distribution and acreage of different land use categories in the Sherman Creek watershed were identified using 2004 land use coverage data from the SJRWMD (**Table 101**). The dominant land use (762.2 acres; 20.8% of total coverage) in the Sherman Creek watershed is classified as high-density residential and is primarily located: (1) between State Road 101 and the eastern WBID boundary from Moale Avenue south to Naval Station Street 35; and (2) in patches throughout areas of the watershed south of Wonderwood Drive. The next two most abundant land cover categories are: (1) wetlands (652.2 acres; 18.6% of total coverage), located primarily: (i) between Naval Station Street 2 and Wonderwood Drive from the western WBID boundary east to State Road 101; (ii) forming a border around the main channel of Puckett Creek; (iii) forming a border around Puckett Creek’s west fork from State Road A1A south to Pinta Drive; (iv) along downstream segments of the southeastern branch from F Street south to Fleet Landing Boulevard; (v) along upstream segments of the southeastern branch from Country Club Lane south to Plaza Street; and (vi) and in smaller patches throughout the watershed; and (2) medium-density residential areas (453.3 acres; 13.0% of total coverage) located throughout areas of the watershed south of Wonderwood Drive. Wetlands and upland forests accounted for 26% of the total land coverage of the Sherman Creek watershed, and form a boundary around the main channel and associated branches. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Sherman Creek in these areas (PBS&J, August 2009).

There are several mobile home parks located in close proximity to the surface waters of Sherman Creek: (1) at the Buccaneer Mobile Home Park near Puckett Creek's west fork, west of the Fairway Villas Drive and State Road A1A intersection; (2) at the Evergreen Communities Mobile Home Park located near Puckett Creek's west fork, west of Fairway Villas Lane; (3) at the Lakeside Mobile Park, located adjacent to the Puckett Creek main channel just south of State Road A1A; and (4) slightly west of the southeastern branch, just south of F Street (PBS&J, August 2009).

According to the 2000 Census, there are 5,861 households within the watershed, averaging 2.0 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 2,344 dogs in the watershed.

TABLE 101: LAND USES IN THE SHERMAN CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
High Density Residential	726.2	20.8
Wetlands	652.2	18.6
Medium Density Residential	453.3	13.0
Recreational	330.8	9.5
Commercial/ Utility/ Institutional	308.8	8.8
Upland Forest	271.2	7.8
Non-Forested Upland	259.9	7.4
Transportation	236.7	6.8
Water	145.4	4.2
Industrial	55.6	1.6
Low Density Residential	43.7	1.2
Disturbed Land	13.4	0.4
Open Land	2.0	0.1
TOTAL:	3,499.3	100

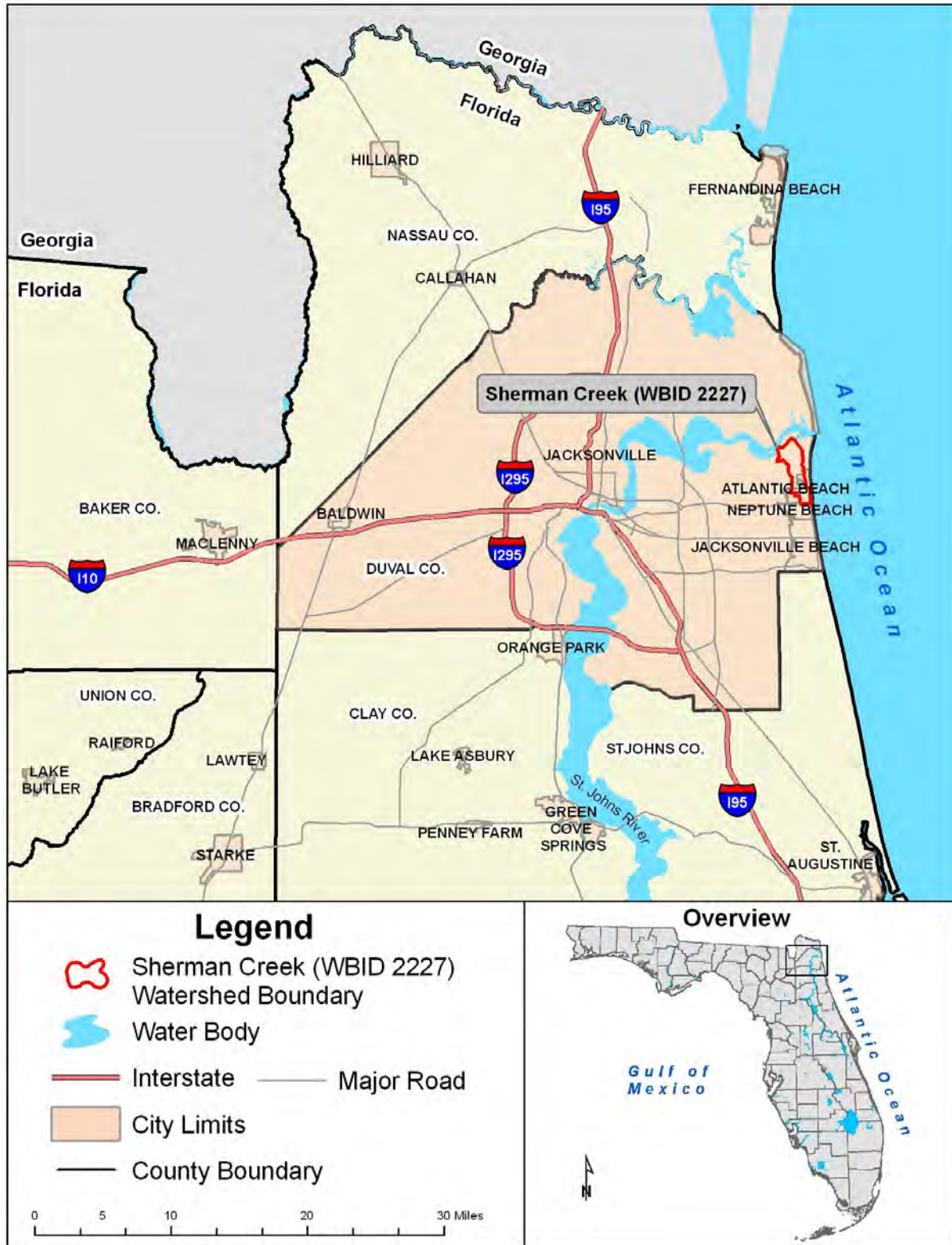


FIGURE 22: LOCATION OF THE SHERMAN CREEK WATERSHED

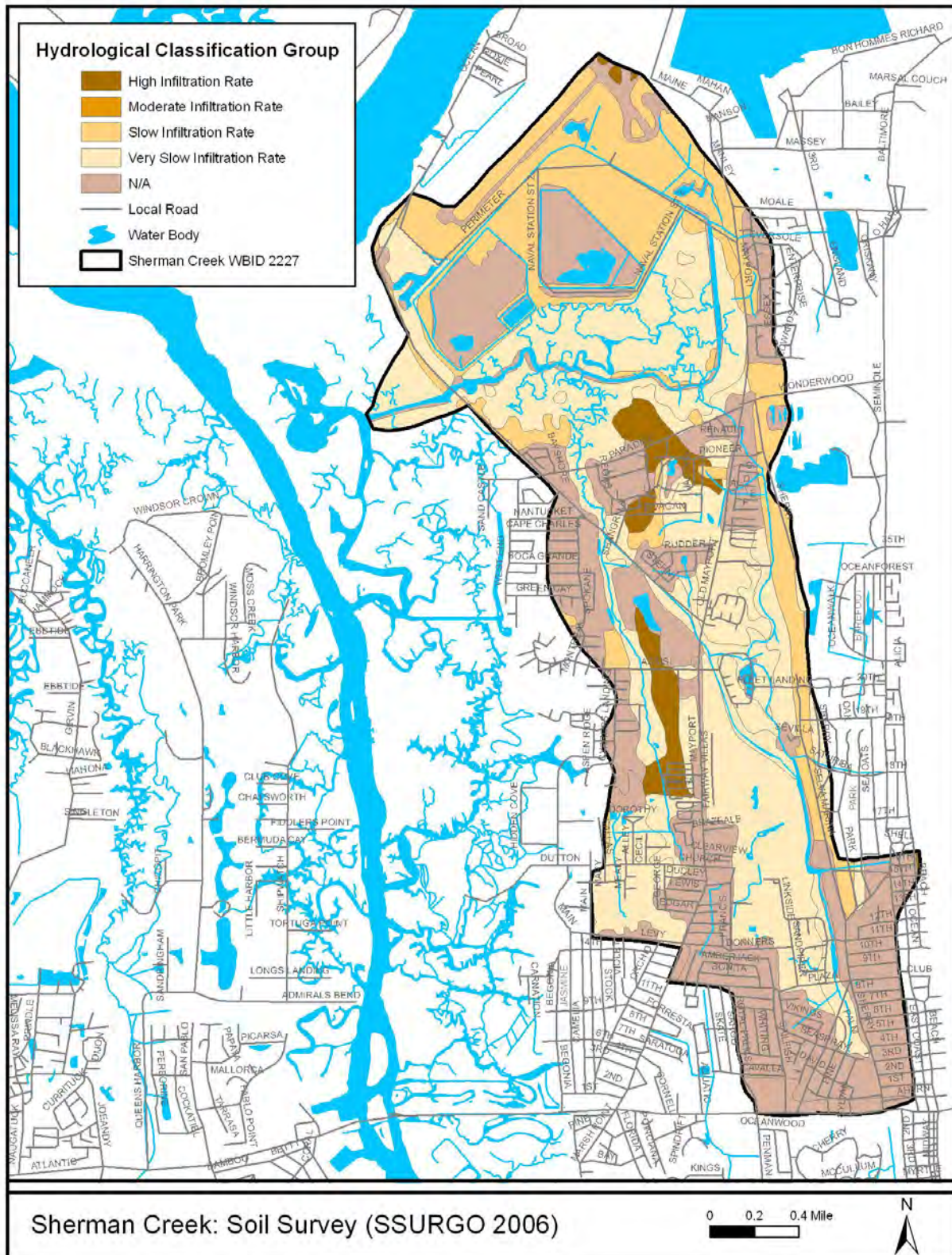


FIGURE 23: SHERMAN CREEK WBID LOCATOR MAP

16.2 POTENTIAL SOURCES

16.2.1 *POINT SOURCES*

The City of Atlantic Beach Buccaneer WWTF has a domestic wastewater permit at the Wonderwood Drive and southeastern branch intersection, in close proximity to the Wonderwood Drive station just west of State Road 101. The City of Atlantic Beach Main WWTF has two domestic wastewater permits with the same number, located approximately 445 meters (1,460 feet) west of the upstream segment of Puckett Creek's east fork at the Sandpiper Lane East and Donner Road intersection; and the second is located east of the 12th Street and 11th Street intersection nearly 280 meters (919 feet) east of Puckett Creek's east fork. The Atlantic Beach WWTFs discharge into the St. Johns River at the same location, just northwest of State Road A1A, outside of the northern WBID boundary. The NS Mayport WWTF is also located in the Sherman Creek watershed. In addition, FDOT and the cities of Jacksonville, Neptune Beach, and Atlantic Beach share an MS4 permit that includes the Sherman Creek watershed south of Wonderwood Drive. The NS Mayport MS4 permit includes the Sherman Creek watershed north of Wonderwood Drive and in smaller sections in the central portion of the watershed west of State Road 101 (PBS&J, August 2009).

16.2.2 *ILLICIT DISCHARGES*

COJ EQD identified 2 PICs in the Sherman Creek watershed. One PIC was located approximately 240 meters (787 feet) west of Puckett Creek's east fork on March 1, 2007 and it was determined to be a grease discharge. This PIC was removed on May 23, 2007 (PBS&J, August 2009). The status of the other PIC is still pending investigation.

16.2.3 *CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS*

The wastewater system in the watershed is managed by the City of Atlantic Beach south of Wonderwood Drive, and by NS Mayport in areas north of Wonderwood Drive. Atlantic Beach has 19 sanitary sewer lift stations, NS Mayport has 14, and there are also 29 private stations. These lift stations, as well as associated infrastructure that comprise the central sanitary sewer system, have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that City of Atlantic Beach sewer infrastructure is found in close proximity to surface waters along the length of Puckett Creek and its associated forks, and the southeastern branch (PBS&J, August 2009).

16.2.4 *OSTDS*

According to the DCHD, 7 septic system repair permits were issued within the Sherman Creek watershed. The permits, and presumably failed septic systems, are located in close proximity to surface waters: (1) along Puckett Creek's east fork at Selva Marina Drive; (2) near a sub-branch of Puckett Creek's west fork close to Lewis Street; (3) at Puckett Creek's west fork at Church Road; (4) at Puckett Creek's east fork near the Assisi Lane and State Road 101 intersection; and (5) at a ditch that merges with the southeastern branch near the State Road 101 and A Street intersection. As parcels with OSTDS repair permits are located in close proximity to surface waters, there is a potential for OSTDS to contribute to the fecal pollution in these areas of the creek (PBS&J, August 2009).

16.2.5 *NONPOINT SOURCES*

An analysis of impervious surface indicates that the Sherman Creek WBID contains predominantly 10% to 25% impervious surface. Areas with less than 10% impervious surface primarily correspond to wetland and upland forest land use classifications found primarily in

areas north of Wonderwood Drive and bordering surface waters of Puckett Creek and the southeastern branch south of Wonderwood Drive. Areas with 10% to 25% impervious surface occur throughout the watershed. Sections of the WBID with greater than 25% impervious surface primarily correspond to commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) at a ditch that merges with the southeastern branch at Pioneer Drive; (2) where the southeastern branch intersects Wonderwood Drive; (3) near the headwaters of Puckett Creek's west fork in areas next to the Levy Road and Mealy Street South intersection; (4) at Puckett Creek's east fork in areas near the State Road 101 and State Road A1A intersection; (5) at Puckett Creek in areas near the State Road A1A and Wonderwood Drive intersection; and (6) in the northern portion of the WBID along Naval Station Street 2 at the Mayport Canal and artificial channels that border Naval Station Street 2 (PBS&J, August 2009).

Furthermore, the potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients within the WBID range from low-to-high depending on the area of the watershed. Lower runoff coefficients were calculated primarily in areas classified as wetlands and upland forests. Moderate runoff coefficients were calculated primarily in medium-density residential and recreational areas. The highest runoff coefficients correlated with industrial, high-density residential, transportation, and commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) along the main channel of Puckett Creek; (2) next to the upstream and downstream segments of Puckett Creek's west fork and east fork; (3) at the southeastern branch at Fleet Landing Boulevard; (4) at the southeastern branch at Wonderwood Drive; and (5) at the Mayport Canal beside Perimeter Road. High stormwater coefficients indicate that there is a potential for stormwater to impact the surface waters in these areas (PBS&J, August 2009).

The storm sewer network in the Sherman Creek watershed includes 51 permitted stormwater treatment areas, encompassing approximately 9.30% to 18.71% of the WBID area. Closed conveyance systems are primarily located along State Road 101 and State Road A1A, and in the southern portion of the WBID south of Church Road. Closed conveyance systems in residential areas located along the western WBID boundary, south of Levy Road, appear to outfall into a ditch located west of the western WBID boundary. Ditch systems are located: (1) in the upstream portion of the watershed between State Road 101 and Puckett Creek's east fork from Linkside Drive south to Plaza Road; and (2) in areas in the southwestern portion of the WBID between State Road 101 and the western WBID boundary, from Church Road south to Levy Road. The southeastern branch and segments of Puckett Creek's east fork south of State Road 101 are also classified as ditch systems (PBS&J, August 2009).

There are numerous ponds located in close proximity to Sherman Creek surface waters: (1) just upstream of the headwaters of Puckett Creek's east fork at Selva Lakes Circle; (2) at Puckett Creek's east fork in multiple locations within the Selva Marina Country Club golf course, located between Fleet Landing Boulevard and Linkside Drive; (3) near Puckett Creek's east fork and southeastern branch confluence at Fleet Landing Boulevard; (4) outside of the eastern WBID boundary, slightly east of the southeastern branch just southeast of the Pioneer Drive and eastern WBID boundary intersection; (5) at the headwaters of Puckett Creek's west fork at Dorthy Circle; (6) on the east side of Puckett Creek's west fork at the Marsh Oaks Apartments, located just south of the State Road A1A and Puckett Creek's west fork intersection; (7) at the Lakes of Mayport Apartments located just upstream of Puckett Creek's east fork and west fork confluence; (8) at the main channel of Puckett Creek southeast of the Wonderwood Drive and State Road A1A intersection; (9) in several areas located in close proximity to the Mayport Canal along Perimeter Road; and (10) at Naval Station Street 2 in the northern portion of the

WBID. As these ponds are in close proximity to Sherman Creek, there is a potential for their waters to merge with Sherman Creek surface waters (PBS&J, August 2009).

Fecal coliform concentrations were not found to be different during the “wet” and “dry” season suggesting a constant source of fecal coliform bacteria to Sherman Creek through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. Considering the possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were even higher than they appeared to be (PBS&J, August 2009).

16.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

16.3.1 DCHD ACTIVITIES IN THE SHERMAN CREEK WATERSHED

16.3.1.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

As part of the OSTDS Program, DCHD has issued 14 new construction permits, 7 repair permits, and 11 abandonment permits in the WBID. In addition, 4 annual operating permits have been issued for PBTS. DCHD has also performed 21 plan reviews and 36 complaint investigations. It will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 102** lists DCHD’s projects in the Sherman Creek watershed.

TABLE 102: DCHD ACTIVITIES IN THE SHERMAN CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-70	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 14 new construction permits, 7 repair permits, and 11 abandonment permits issued	\$11,350	FDOH/LSJR SWIM Grant	Ongoing
DCHD-71	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	There are 4 annual operating permits issued for commercial properties	\$10,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-72	DCHD-sponsored training programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-73	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 21 plan reviews and site evaluations have been performed based upon permitting history	\$5,250	FDOH/LSJR SWIM Grant	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-74	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-75	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	36 complaint investigations have been performed	\$12,550	FDOH/LSJR SWIM Grant	Ongoing

16.3.2 COJ ACTIVITIES IN THE SHERMAN CREEK WATERSHED

16.3.2.1 Completed COJ Projects

COJ has worked with WSEA to extend sewer lines to remove 11 septic tanks in the watershed, helping to reduce fecal coliform loading from septic tanks along the creek. All of the septic tanks in the watershed have been phased-out and these areas are now served by sewer.

16.3.2.2 Ongoing COJ Programs and Activities

The COJ MS4 permit requires COJ and its co-permittees to implement a Stormwater Monitoring Plan. As part of this plan, COJ has 3 routine monitoring stations that are sampled quarterly in the Sherman Creek watershed. A total of 153 samples were collected at this station between 1995 and 2009.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance included 52 work orders for ditch and creek regrading, erosion control, and cleaning; 7 work orders for lake and pond maintenance; and 61 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. Two PICs were identified in the Sherman Creek watershed; 1 was determined to be illicit and removed, and the status of 1 PIC is still pending.

COJ PWD also conducts inspections in the watershed, including 53 investigations into illicit water discharges, 2 illegal discharges, 1 sewer line that drained into a yard or ditch, 16 SSOs, and inspections of 13 private lift stations. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 103 provides additional details on COJ's activities in the watershed.

TABLE 103: COJ ACTIVITIES IN THE SHERMAN CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
MS4 Maintenance Activities						
COJ-208	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	52 (for 2005-09)	\$6,132.21	COJ	Ongoing
COJ-209	Lake or Pond Problem		7 (for 2005-09)	Unknown	COJ	Ongoing
COJ-210	Structure Blocked/Repair/General Flooding		61 (for 2005-09)	\$10,042.15	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-211	Illicit Water Discharge	CARE initiated	5 (for 2006-07)	\$1,895	COJ	Ongoing
COJ-212	Pollution - Water - Illegal Discharge	CARE initiated	2 (for 2008-09)	\$758	COJ	Ongoing
COJ-213	Sewer drains into yard/ditch	CARE initiated	1 (for 2008)	\$379	COJ	Ongoing
COJ-214	Sewer Overflow	CARE initiated	16 (for 2002-09)	\$6,064	COJ	Ongoing
COJ-215	Private Lift Station Inspection	8 private lift stations in the WBID	38 (for 1997-2009)	\$14,402	COJ	Ongoing
COJ-216	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-217	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	2 stations (1600 Selva Marina Drive, 1 Fleet Landing Blvd)	Unknown	COJ	Planned
COJ-218	Illicit Discharge Detection and Elimination	1 open, 1 illicit	2 (for 2007)	\$379	COJ	Ongoing
COJ-219	PIC Program	Follow up on outstanding PICs	1 (for 2010-11)	Unknown	COJ	Planned
COJ-220	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	153 (for 1995-2009)	Unknown	COJ	Ongoing
COJ-221	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	8 (for 2007-209)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-222	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	11 tanks, 11 connected	Unknown	COJ	Complete
COJ-223	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-224	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

16.3.3 FDOT ACTIVITIES IN THE SHERMAN CREEK WATERSHED

16.3.3.1 Completed FDOT Projects

FDOT completed the Wonderwood Connector Project, which is a wet pond that treats 58 acres. This project captures and treats runoff in this area reducing the bacteria loading from stormwater runoff to Sherman Creek.

16.3.3.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a Drainage Connection Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. Street sweeping also occurs monthly on 8 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system as needed. This maintenance occurs on 4 miles of roadway and associated stormwater conveyance systems.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances found in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also contributes funding for 3 monitoring stations in the Sherman Creek watershed that are sampled quarterly as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system.

Table 104 lists FDOT's activities in the watershed.

TABLE 104: FDOT ACTIVITIES IN THE SHERMAN CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-74	PIC Program	Search for illicit connections	Effort is continuous in this WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-75	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	153 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-76	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	8 (for 2007-209)	See Note 2	FDOT/COJ	Ongoing
FDOT-77	Stormwater Management Systems	Wonderwood Connector	58 acres, wet ponds	Not applicable	FDOT	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-78	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-79	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 4 miles of roadway and associated stormwater conveyance systems currently being maintained; approximately 8 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

16.3.4 ATLANTIC BEACH ACTIVITIES IN THE SHERMAN CREEK WATERSHED

16.3.4.1 Completed Atlantic Beach Projects

The City of Atlantic Beach has completed several septic tank and sewer projects that helped to reduce fecal coliform loading to the creek by upgrading faulty systems. They have connected 4 septic tanks to sewer. They have upgraded, added, or repaired 64,228 linear feet of pipe and rehabilitated 101 manholes. A total of 10 the 19 lift stations have been repaired and 4 stations received new emergency generators. Atlantic Beach has clean and televised 72,030 linear feet of pipe and smoke tested 12,000 linear feet.

Atlantic Beach has also completed 9 flood control projects and 3 capital projects to reduce flooding and capture and treat stormwater, which prevents fecal coliform loading to Sherman Creek from these areas.

16.3.4.2 Atlantic Beach Projects under Construction

Atlantic Beach has a project under construction to remove 132 septic tanks and connect those areas to sewer by December 2012. This project will remove OSTDS that are contributing fecal coliform loading to the creek. In addition, there is a program underway to replace Orangeburg storm sewer pipe in the watershed that will be completed in 2014. These pipes are failing and replacing the pipe will improve the stormwater system.

16.3.4.3 Ongoing Atlantic Beach Programs and Activities

The City of Atlantic Beach has several ongoing programs including: (1) sewer pump station inspections and maintenance; (2) septic tank inspections and enforcement; (3) FOG program; (4) stormwater system ditch and canal inspections and maintenance; (5) stormwater treatment ponds inspections and maintenance; (6) stormwater control structure inspections and maintenance; (7) stormwater pump station inspections and maintenance; (8) stormwater inlets/catch basins/grates inspections and maintenance; (9) stormwater pipe inspections and maintenance; (10) public education and outreach; and (11) right-of-way maintenance and litter control. Details for several of these programs can be found in **Appendix E**.

Table 105 lists the Atlantic Beach efforts in the Sherman Creek watershed.

TABLE 105: ATLANTIC BEACH ACTIVITIES IN THE SHERMAN CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-49	Septic Tank Inspections and Enforcement	When septic tanks fail, City Code requires connection to sewer system if available	Ongoing	Unknown	Atlantic Beach	Ongoing
AB-50	Septic Tank Phase-Out	Septic to Sewer Resolution by Commission requiring connection at various dates. Includes Septic Conversion Assistance Policy, passed by City Commission May 2000. Provides City financing of septic to sewer conversions and contracting coordination and assistance. Project should be completed in December 2012	132 septic to sewer conversions	\$400,000	Atlantic Beach/ homeowners	Construction
AB-51	Septic Tank Phase-Out	Septic to sewer conversions through CDBG	4 septic to sewer conversions	\$4,900	CDBG	Complete
AB-52	Sewer Line Upgrades	New sewer system installation on Beach Ave., Seminole Rd. Ocean Grove, Dewees areas	4,794 LF sewer, 24 manholes, 155 connections	\$400,000	Atlantic Beach	Complete
AB-53	Sewer Line Upgrades	Sewer main replaced in area of Pioneer Drive	234 LF	\$17,000	Atlantic Beach	Complete
AB-54	Sewer Line Upgrades	Sliplined sewer on Sherry Drive, replaced sewer in part of Salt Air subdivision	1,600 LF lined, 3,175 LF replaced	\$643,000	Atlantic Beach	Complete
AB-55	Sewer Line Upgrades	Repair, line and rehabilitate sewer in Oak Harbor subdivision	17,200 LF	\$500,000	Atlantic Beach	Complete
AB-56	Sewer Line Upgrades	Repair sewer force main near Renault Drive and Mayport Road	640 LF	\$20,000	Atlantic Beach	Complete
AB-57	Sewer Line Upgrades	New sewer line on Church Road (now Dutton Island Road)	Unknown	Unknown	Atlantic Beach	Complete
AB-58	Sewer Line Upgrades	Repairs to effluent gravity outfall on Levy Road	5 point repairs	\$33,000	Atlantic Beach	Complete
AB-59	Sewer Line Upgrades	Replace sewer lines crossing Levy Road at Orchid, Rose, Violet and Hibiscus	365 LF	\$28,000	Atlantic Beach	Complete
AB-60	Sewer Line Upgrades	Sewer extension on Dudley Street	450 LF	\$25,000	Atlantic Beach	Complete
AB-61	Sewer Line Upgrades	Lining Sewers near Lift Station A, Palm Avenue	1,400 LF	\$40,000	Atlantic Beach	Complete
AB-62	Sewer Line Upgrades	Replacing sewer force main and sanitary sewer on Wonderwood Road	3,500 LF force main, 180 LF sewer main	\$604,609	Atlantic Beach	Complete
AB-63	Sewer Line Upgrades	Replace sewer main and manholes in Town Center – Ocean Blvd. From 1 st to 2 nd Street	234 LF sewer and 2 manholes	\$14,177	Atlantic Beach	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-64	Sewer Line Upgrades	Sewer lining and replaced services- Ahern Street through 10th Street from Sherry Dr./Seminole Rd. to East Coast Drive	12,000 LF sewer lined, 220 services replaced	\$1,079,800	Atlantic Beach/ Hazard Mitigation Grant	Complete
AB-65	Sewer Line Upgrades	Repairs to effluent force main Sherman Creek crossing pilings	2 crossings	\$54,701	Atlantic Beach	Complete
AB-66	Sewer Line Upgrades	New force main from Lift Station B, 465 11 th Street to 1100 Sandpiper Lane	450 LF	\$120,685	Atlantic Beach	Complete
AB-67	Sewer Line Upgrades	Replace sewer main and manholes on 11 th Street and 12 th Street	2,345 LF sewer main and 11 manholes	\$368,425	Atlantic Beach	Complete
AB-68	Sewer Line Upgrades	Clean and televise sewer main in Selva Marina subdivision, repair sewer mains, 19 th Street and side streets	5,292 LF	\$70,000	Atlantic Beach	Complete
AB-69	Sewer Line Upgrades	Sewer lining and replaced services Seminole Road and 11 th Street to Lift Station B	2,965 LF sewer lining and 45 services replaced	\$105,630	Atlantic Beach	Complete
AB-70	Sewer Line Upgrades	New sewer line for Sawgrass Chapel Place - Mealy Lane, north of Dutton Island Road	736 LF sewer main	\$66,808	Atlantic Beach	Complete
AB-71	Sewer Line Upgrades	Install new sewer main and abandon old lift station at Shangri La Drive	614 LF	\$146,572	Atlantic Beach	Complete
AB-72	Sewer Line Upgrades	Sewer main lining in Seaspray Subdivision	6,604 LF	\$239,997	Atlantic Beach	Complete
AB-73	Manhole Inspections and Rehab	Engineering analysis of failing manholes - Seminole Road area	30 manholes	\$2,500	Atlantic Beach	Complete
AB-74	Manhole Inspections and Rehab	Lining 5 manholes near Lift Station A – Palm Avenue	5 manholes	\$15,000	Atlantic Beach	Complete
AB-75	Manhole Inspections and Rehab	Rehabilitate (Spectrashield) manholes on Sherry Drive from Atlantic Blvd to Plaza	8 manholes	\$11,270	Atlantic Beach	Complete
AB-76	Manhole Inspections and Rehab	Rehabilitate (Spectrashield) manholes from Ahern through 10 th St. and Sherry Dr. to East Coast Drive	60 manholes	\$279,826	Atlantic Beach	Complete
AB-77	Manhole Inspections and Rehab	Rehabilitate (Spectrashield) all manholes in Seaspray subdivision	28 manholes	\$25,597	Atlantic Beach	Complete
AB-78	Pump Station Inspections and Maintenance	Lift Stations A, B and D (Palm Ave., 11th St., Selva Marina Blvd) valve improvements	3 lift stations	\$40,000	Atlantic Beach	Complete
AB-79	Pump Station Inspections and Maintenance	Wetwell rehabilitation at lift station at Courtyards Apartments	1 lift station	\$19,690	Atlantic Beach	Complete
AB-80	Pump Station Inspections and Maintenance	Lining wetwell at West End lift station, 2567 West End Street	1 lift station	\$18,900	Atlantic Beach	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-81	Pump Station Inspections and Maintenance	Lining wetwell at Selva Norte Lift Station, 404 20 th Street	1 lift station	\$21,900	Atlantic Beach	Complete
AB-82	Pump Station Inspections and Maintenance	Construct new master lift station to WWTP #1, 1100 Sandpiper Lane	1 lift station	\$676,500	Atlantic Beach	Complete
AB-83	Pump Station Inspections and Maintenance	Upgrade West End Lift Station – new pumps and electrical, 2567 West End Drive	1 lift station	\$47,000	Atlantic Beach	Complete
AB-84	Pump Station Inspections and Maintenance	Upgrade Lift Station H – 2301 Mayport Road, new pumps and electrical	1 lift station	\$120,281	Atlantic Beach	Complete
AB-85	Pump Station Inspections and Maintenance	Upgrade Lift Station I – 960 Park Street, new pumps and electrical	1 lift station	\$70,281	Atlantic Beach	Complete
AB-86	Pump Station Inspections and Maintenance	Replace emergency generator at Lift Station C, 65 Donner Road	1 lift station	\$24,000	Atlantic Beach	Complete
AB-87	Pump Station Inspections and Maintenance	Installed SCADA system at all lift stations - 19 lift stations in Sherman Creek watershed	19 lift stations	\$130,000	Atlantic Beach	Complete
AB-88	Pump Station Inspections and Maintenance	Replace emergency generator at Lift Station A, 460 Palm Avenue	1 lift station	\$27,161	Atlantic Beach	Complete
AB-89	Pump Station Inspections and Maintenance	Replace emergency generator at Lift Station B, 469 11 th Street	1 lift station	\$21,507	Atlantic Beach	Complete
AB-90	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	5 stations (2632 A1A, 404 20 th Street, 1799 Selva Marina Drive, 425 11 th Street, 460 Palm Avenue)	Unknown	Atlantic Beach	Planned
AB-91	Private Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	5 stations (2865 Mayport Road, Oaks at Atlantic Beach, DBA Associates, 2425 Mayport Road, 2130 Mayport Road)	Unknown	Atlantic Beach	Planned
AB-92	Pump Station Inspections and Maintenance	Replace emergency generator at Mimosa Cove Lift Station, 1030 Mimosa Cove Court	1 lift station	\$32,000	Atlantic Beach	Complete
AB-93	SSO Investigations – Preventive	Clean and televise effluent gravity outfall line from WWTP #1	2,000 LF	\$3,000	Atlantic Beach	Complete
AB-94	SSO Investigations – Preventive	Clean and televise sewer mains at SRA1A and Wonderwood Road	2,000 LF	\$1,200	Atlantic Beach	Complete
AB-95	SSO Investigations – Preventive	Clean and televise sewer mains in core city from east of East Coast Drive to the ocean, from Atlantic Blvd to 16 th Street	39,600 LF	\$30,834	Atlantic Beach	Complete
AB-96	SSO Investigations – Preventive	Smoke testing sewers in core city from Sherry Drive to East Coast Drive from Atlantic Blvd to 12 th Street	12,000 LF	\$0	Atlantic Beach	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-97	SSO Investigations – Preventive	Inflow/infiltration analysis of entire collection system, preparation of GIS system, GPS locations of all manholes, analysis of lift station needs, recommended CIP	Entire system	\$60,000	Atlantic Beach	Complete
AB-98	SSO Investigations – Preventive	Clean and televise sewer main on Selva Marina Drive and side streets	7,000 LF	\$9,000	Atlantic Beach	Complete
AB-99	SSO Investigations – Preventive	Root removal and tuberculation removal on Seminole Road	700 LF	\$2,400	Atlantic Beach	Complete
AB-100	SSO Investigations – Preventive	Clean and televise sewer main on Seminole Road, Selva Linkside and Selva Lakes Subdivisions	16,500 LF	\$27,094	Atlantic Beach	Complete
AB-101	SSO Investigations – Preventive	Clean and televise sewer main at Mayport Road crossings	4,930 LF	\$6,656	Atlantic Beach	Complete
AB-102	SSO Investigations – Preventive	Sewer Master Plan Update - Analysis of entire sewer system for prioritizing capital improvement program, including review of inflow/infiltration analysis	Entire system	\$58,100	Atlantic Beach	Complete
AB-103	SSO Investigations – Preventive	FOG Program implemented to monitor grease trap maintenance at restaurants	40 food service establishments	Unknown	Atlantic Beach	Ongoing
AB-104	1999 Stormwater Improvements Project	Flood control capital project and stormwater water quality BMPs on Pine Street, PW Yard, and Seminole	1990.5 LF of RCP various sizes; 13 inlets; 2 inlet modifications; 2 mitered end sections, 2 dry retention areas	\$414,711	Atlantic Beach	Complete
AB-105	Core City Improvements Project	Bounded by Sherry Drive and East Coast Drive, 1st Street and 12th Street - flood control capital project and stormwater water quality BMPs	216 acres. 14,753 LF of piping; 21 manholes; 69 inlets; 3 endwalls; 3 second generation baffle boxes; 1 weir	\$4,784,008	Atlantic Beach/ FDEP/ EPA	Complete
AB-106	Core City Improvements Project	Water sampling and public education	Monthly grab and continuous event monitoring as required by 319 grant; results submitted to FDEP with final report; public education through WAV	\$81,370	Atlantic Beach/ FDEP/ EPA	Ongoing
AB-107	Levy Road Improvements Project	Flood control capital project - Levy Road between Mayport Road and Orchid Street	236 LF of pipe; 6 mitered end sections	\$300,284	Atlantic Beach	Complete
AB-108	Sherry Drive Reconstruction Project	Flood control capital project - Sherry Drive between Atlantic Blvd and Seminole Road	3326 LF of pipe; 13 manholes; 24 curb inlets; 9 ditch bottom inlets; 13 junction boxes	\$1,371,530	Atlantic Beach	Complete

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PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-109	Flood control capital projects	Deweese, Coquina, Shell and Coral Drainage and Paving Project	1080 LF of pipe; 10 inlets; 2 manhole modifications; 1 new manhole with converted drain top	\$120,716	Atlantic Beach	Complete
AB-110	Church Road Extension (now Dutton Island Road)	Between George Street and Mealy Street - flood control capital project	2 Type E Inlets; 2 end walls; 65 LF of 48" RCP; 30 LF of 15" HDPE	\$152,180	Atlantic Beach	Complete
AB-111	Public Education Through WAV	Stormwater water quality BMPs; public education for stormwater and sewer	525 participants	\$10,000 per year	Atlantic Beach	Ongoing
AB-112	Stormwater System Ditch and Canal Inspections	Weekly visual inspections of stormwater systems, with corrective action taken on 'as needed' basis; mowing, weedeating and litter pickup are done weekly during the growing season and as needed during the colder months	3,361,245 LF	Unknown	Atlantic Beach	Ongoing
AB-113	Stormwater System Ditch and Canal Maintenance	Routine ditch cleaning and maintenance required by MS4 permit	2,147,102.25 LF	Unknown	Atlantic Beach	Ongoing
AB-114	Stormwater Treatment Ponds Inspections	Routine pond inspection required by MS4 permit	445	Unknown	Atlantic Beach	Ongoing
AB-115	Stormwater Treatment Ponds Cleaning and Maintenance	Routine pond maintenance required by MS4 permit	298	Unknown	Atlantic Beach	Ongoing
AB-116	Stormwater Treatment Ponds, Ditch and Canal Aquatic Weed Control	Weed control by Bluewater Environmental	Not applicable	Annual budget - \$21,000	Atlantic Beach	
AB-117	Stormwater Control Structure Inspections	Routine control structure inspections required by MS4 permit	351	Unknown	Atlantic Beach	Ongoing
AB-118	Stormwater Control Structure Cleaning and Maintenance	Done only when inspection shows additional effort required; routine cleaning and maintenance required by MS4 permit	230	Unknown	Atlantic Beach	Ongoing
AB-119	Stormwater Inlets/Catch Basins/Grates Inspected	Routine check of inlets and catch basins required by MS4 permit	834	Unknown	Atlantic Beach	Ongoing
AB-120	Stormwater Inlets/Catch basins/Grates Maintained	Required by MS4 Permit	771	Unknown	Atlantic Beach	Ongoing
AB-121	Stormwater Pipe Inspection and Maintenance	Stormwater pipe cleaning, routine scheduled and in response to complaints; required by MS4 permit	7,322.25 LF	Unknown	Atlantic Beach	Ongoing
AB-122	Stormwater Pipe Maintenance (Repair/Replacement)	Stormwater pipe repaired or replaced	232.5 LF	Unknown	Atlantic Beach	Ongoing
AB-123	Total Miles of Right of Way Maintained	Miles of right of way maintained	39.23 miles	Unknown	Atlantic Beach	Ongoing

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PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
AB-124	Collect Litter	Annual estimate of total pounds of litter collected	132,772.5	Unknown	Atlantic Beach	Ongoing
AB-125	George & Dudley Drainage Improvements	Stormwater water quality BMPs; located on Dudley Street between Mayport Road and George Street	777 LF of HDPE pipe; 5 Type C inlets, 1 Type C baffle inlet, 3 dry retention areas	\$97,930	CDBG	Complete
AB-126	County Club Lane Storm Pipe lining	Between Johansen Park and Selva Lagoon; flood control capital project; no septic tanks in project area	560 LF PVC line 24" RCP; 1 curb inlet; 1 headwall	\$83,574	Atlantic Beach	Complete
AB-127	Ocean and 13th Street Drainage Project	Flood control capital project	766 LF of 18" RCP; 9 ditch bottom Inlet-C; 1 curb inlet; 20 LF concrete flume	\$138,734	Atlantic Beach	Complete
AB-128	Seminole Ditch Headwall	800 block of Seminole Road - flood control capital project	Concrete headwall installation	\$12,974	Atlantic Beach	Complete
AB-129	Selva Tierra Ditch Improvements	North of Saturiba Drive, between Selva Grande and Tierra Verde - flood control capital project	Extend 24" CMP, 12" ADS and 12" PVC pipes going into a new ditch bottom inlet	\$25,953	Atlantic Beach	Complete
AB-130	Ocean Blvd. 14th -16th Drainage Improvements	Flood control capital projects and stormwater water quality BMPs	974 LF of RPC; 1 concrete endwall; 9 inlets; 1 manhole; 1 overflow structure	\$271,693	Atlantic Beach	Complete
AB-131	Orangeburg Pipe Replacement Program-	Annual funding (\$15,000/year) for replacement of obsolete/failing Orangeburg (fiber) storm sewer pipe; completion 9/2014	~3,200 LF of Orangeburg remaining in city system	\$75,000	Atlantic Beach	Construction
AB-132	Pet Feces Control	Install, maintain and stock Dogi-Pot stations throughout city	More than 30 installed to date	\$5,000	Atlantic Beach	Ongoing

16.3.5 *NS MAYPORT ACTIVITIES IN THE SHERMAN CREEK WATERSHED*

16.3.5.1 **Completed NS Mayport Projects**

NS Mayport has completed several projects in the Sherman Creek watershed. The septic tank that previously served Building 375 was closed and the building was connected to sanitary sewer. NS Mayport repaired the housing sewer mains and laterals by relining the pipes with CIPP. The manholes in the watershed were rehabilitated with cementitious coating and telemetry systems were added at the pump stations. These efforts prevented sewer infrastructure issues that could contribute fecal coliform loading.

In addition, NS Mayport has completed a project to excavate stormwater ditches and swales to design elevations, and clean out culverts. These efforts helped to maintain the stormwater conveyance system to reduce fecal coliform loading to Sherman Creek through stormwater runoff.

16.3.5.2 **Planned NS Mayport Projects**

NS Mayport has a project underway to clean and video their entire sewage collection system. This project will be completed in 2012 and is a proactive effort to prevent leaking sewer infrastructure. NS Mayport also plans to install and maintain pet waste collection stations in the 2 recreational vehicle parks in the watershed. Providing pet waste stations will help to reduce fecal coliform loading from pets through stormwater runoff.

16.3.5.3 **Ongoing NS Mayport Programs and Activities**

For the sewer collection system, NS Mayport engages in several maintenance activities. The 14 pump stations in the watershed are regularly inspected and maintained. NS Mayport investigates and documents all SSOs that occur in their system. In addition, they have a partnership with COJ on the Cooking Oil and Grease Recycling Program to prevent oil and grease blockages in the sewer system.

NS Mayport also conducts stormwater system maintenance activities including maintaining vegetation and structures in the system, removing trash and debris, and cleaning out swales and culverts. NS Mayport has an illicit discharge and detection elimination program to look for and remove any illicit connections to the MS4 system. Street sweeping occurs monthly in both the housing and non-housing areas of the station, which has removed 85,316 square yards/month and 1,462,497 square yards/month of debris, respectively. NS Mayport also conducts public education and outreach efforts and has a pet waste management ordinance. Details for several of these programs can be found in **Appendix E**.

Table 106 lists the NS Mayport activities in the Sherman Creek watershed.

TABLE 106: NS MAYPORT ACTIVITIES IN THE SHERMAN CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
NSM-1	Septic Tank Removal at Building 375	Close septic tank at Building 375 and connect facility to sanitary sewer	1 tank	\$12,000	Navy	Complete
NSM-2	Repair Housing Sewer Mains	Housing area sewer main pipes relined with CIPP	4,562 LF	\$228,100	Navy	Complete
NSM-3	Repair Housing Laterals	Housing unit laterals relined with CIPP	192 connections; 9,475 LF	\$480,000	Navy	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
NSM-4	Manhole Rehab	Manhole rehab with cementitious coating	147 manholes	\$86,490	Navy	Complete
NSM-5	Telemetry System	Install telemetry/ monitoring system at pump stations	4 pump stations	Unknown	Navy	Complete
NSM-6	Collection System Spill Prevention Program	Clean and video sewage collection system	Entire sewage collection system	Unknown	Navy	Underway; completion in 2012
NSM-7	Pump Station Inspections and Maintenance	Inspection, maintenance and cleaning of sewage pump stations.	14 pump stations	Unknown	Navy	Ongoing
NSM-8	SSO Investigations	Investigate and document all SSOs	Entire sewage collection system	Unknown	Navy	Ongoing
NSM-9	Cooking Oil and Grease Recycling Program	Program recycles oil and grease from all cooking facilities on Station; through an agreement with COJ, COJ removes the used cooking oil and grease and recycles it; COJ provided storage tanks, NS Mayport constructed spill containments	All food handling establishments and ships	\$28,600	Navy/ COJ	Ongoing
NSM-10	Stormwater System Maintenance	Maintain vegetation and structures in stormwater system; remove trash and debris	Entire stormwater conveyance system	Unknown	Navy	Ongoing
NSM-11	Clean Out Swales and Culverts	Excavate stormwater ditches and swales to design elevation and clean out culverts	3,350 LF	\$89,300	Navy	Complete
NSM-12	Debris Removal	Remove trash and debris from grounds areas	All Naval Station grounds	Unknown	Navy	Ongoing
NSM-13	Illicit Discharge Detection and Elimination	Systematic program to survey for and eliminate stormwater system illicit connections/discharges	Entire stormwater collection system	Unknown	Navy	Ongoing
NSM-14	Stormwater Public Education and Outreach Efforts	Quarterly articles in Station newspaper and housing newsletter; resident brochure	Entire Station	Unknown	Navy	Ongoing
NSM-15	Pet Waste Management/ Ordinance	Regulates pets in housing areas	All housing areas	Unknown	Navy	Ongoing
NSM-16	Pet Waste Collection Stations	Install and maintain pet waste collection stations in recreation areas	2 recreational vehicle parks	Unknown	Navy	Planned
NSM-17	Street Sweeping - Housing	Monthly on base and off base housing streets and cul-de-sacs	85,316 sq yd/mo	Unknown	Public Private Venture	Complete
NSM-18	Street Sweeping - Station	Monthly street sweeping of non-housing areas	1,462,497 sq yd/mo	Unknown	Navy	Ongoing

16.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 102 through **Table 106** list the projects and programs to reduce fecal coliform loading in the Sherman Creek watershed. Several key efforts completed in this WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years.

The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Sherman Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Sherman Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

16.4.1 OSTDS

Program Implementation – There are no failure areas in the watershed and many of the tanks in the WBID have been phased out. COJ has removed 11 septic tanks, Atlantic Beach has removed 136 septic tanks, and NS Mayport has removed 1. It does not appear that OSTDS are a major source in the WBID. DCHD will continue their inspection and permitting efforts in the watershed.

16.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, there are 8 private lift stations in the watershed. COJ EQD performed 38 annual lift station inspections in the watershed and will continue inspections annually. There are 2 private lift stations located in close proximity to surface waters at: (1) 1600 Selva Marina Drive; and (2) 1 Fleet Landing Boulevard. COJ will inspect these stations to ensure they are functioning properly and report on the findings in the first annual BMAP report. In addition, there are 5 private stations that Atlantic Beach is responsible for inspecting that are located near surface waters at: (1) 2865 Mayport Road; (2) Oaks at Atlantic Beach; (3) DBA Associates; (4) 2425 Mayport Road; and (5) 2130 Mayport Road. Atlantic Beach will inspect these stations and provide the results for the first annual report. COJ's annual inspections and the above investigations are sufficient to address private infrastructure in the watershed at this time.

Sewer Infrastructure Projects – Atlantic Beach and NS Mayport have completed several projects to upgrade sewer lines and to rehabilitate manholes. In addition, Atlantic Beach has cleaned and televised portions sewer main in the city, conducted an inflow/infiltration analysis of the entire collection system, and upgraded several lift stations. Atlantic Beach has 5 lift stations located near surface waters at: (1) 2632 A1A; (2) 404 20th Street; (3) 1799 Selva Marina Drive; (4) 425 11th Street; and (5) 460 Palm Avenue. The city will inspect these stations to ensure they are operating properly and will provide the results for the first annual report. NS Mayport has also cleaned and televised their entire collection system and they have repaired the housing laterals with CIPP.

Program Implementation – Atlantic Beach and NS Mayport each have programs for inspection and maintenance of lift stations, manholes, and the sewer system. In addition, each city also has a program to prevent grease from restaurants clogging the sewer systems. Atlantic Beach and NS Mayport will report their inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to demonstrate that the system is monitored and maintained.

16.4.3 STORMWATER

Illicit Connection Removal – COJ has removed 1 illicit connection in the watershed through the PIC Program. There is 1 PIC case that is open. COJ will complete the investigation and report the results in the first annual report. COJ and FDOT have committed to continue the PIC

Program, which includes identifying additional illicit connections and removing those connections in a timely manner. In addition, NS Mayport has a program to survey for and eliminate illicit connections to their MS4.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue and FDOT will continue to periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. In addition, the FDOT performs street sweeping monthly on 8 miles of roadway. FDOT will continue stormwater infrastructure maintenance to help prevent potential regrowth in the MS4 conveyances. The trash removal efforts are expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID.

Program Implementation – COJ PWD has completed 52 work orders for ditch maintenance, 7 for ponds, and 17 for structures. Atlantic Beach conducts weekly inspections of their ditches, canals, and ponds and conducts maintenance as necessary on these conveyances. Atlantic Beach has also completed several flood control and drainage improvement projects in the basin to reduce the amount of fecal coliform to the creek through stormwater runoff. NS Mayport has routine inspections of the ditches, canals, and stormwater ponds, with maintenance and repairs as needed. In addition, street sweeping occurs monthly throughout the base.

TABLE 107: SUMMARY OF RESTORATION ACTIVITIES FOR THE SHERMAN CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	ATL BCH	NS MAYPORT
OSTDS					
Ordinances	√	X	X	√	-
Enforcement	√	√	X	√	-
Program Implementation	√	√	X	√	-
Permit Review (new and repair permits)	X	√	X	X	X
Failure Area Evaluation	-	-	X	X	X
Failure Area Ranking	√	√	X	X	X
Septic Tank Inspection	√	√	X	X	X
Septic Tank Phase-Out	√	√	X	√	√
Public Education (PSA)	√	X	X	-	-
Surface Water Sampling for Conditions and Trends	√	X	X	X	X
Sewer System					
Sewer Line Upgrades	X	X	X	√	√
Manhole Inspection and Rehab	X	X	X	√	√
Pump Station Inspection and Maintenance	X	X	X	√	√
Pump Station Rebuild	X	X	X	√	-
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√	-
Program Implementation	X	X	X	√	√
Private Lift Station Inspections and Enforcement	√	X	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√	√
Surface Water Sampling for Conditions and Trends	X	X	X	X	X
Stormwater					
Flood Control Capital Projects	-	X	-	√	-
Capital Projects/Stormwater Water Quality BMPs	-	X	-	√	-
Stormwater System Ditch and Canal Maintenance	√	X	√	√	√
Stormwater Pond Maintenance	√	X	-	√	√
Stormwater Pipe Cleaning and Maintenance	√	X	√	√	√
Potential Illicit Connection (PIC) Identification	√	X	+	-	√
Illicit Connection Removal	√	X	-	-	-
Public Education and Outreach	√	X	+	√	√
Surface Water Sampling for Conditions and Trends	√	X	+	-	-
Program Implementation	√	X	√	√	√
Pet Waste Management					
Ordinances and Enforcement	√	X	X	-	√
Public Education and Outreach	√	X	X	√	√
Special Source Assessment Activities					
Intensive Water Quality Sampling To Track Sources	-	X	-	X	X
Tributary Assessment Team (TAT)	-	X	-	X	X
Microbial Source Tracking (MST)	-	X	-	X	X
Thermal Imagery To Identify PICs	-	X	-	X	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 17: GREENFIELD CREEK (WBID 2240)

17.1 WBID DESCRIPTION

Greenfield Creek, WBID 2240, is located in Duval County, south of the Lower St. Johns River within the North Mainstem Planning Unit, as designated by the SJRWMD (**Figure 24**). The “headwaters” of Greenfield Creek are presumably comprised of stormwater runoff that originates upstream from where the main channel forks at the southern WBID boundary and from contributing branches located between Queens Harbor Boulevard and Peregrine Street (**Figure 25**). The creek generally flows north in a single channel with the exception of four contributing forks and branches that join Greenfield Creek from the south (“southwestern fork” and “southeastern fork”) and east (“southern branch”, and “northern branch”). The southwestern fork diverges from the main channel just west of Hodges Boulevard and splits at Bent Pine Courts, forming two smaller branches that terminate just south of The Woods Drive East and slightly east of the Indian Spring Drive and Aztec Drive North intersection. The southeastern fork extends south from the main channel at Hodges Boulevard to just south of The Woods Park Drive and Hodges Drive intersection where it forks southeast and southwest to Fallen Tree Drive West and outside of the southern WBID boundary to Egret Key Lane, respectively. The southern branch originates at a pond east of Peregrine Courts and merges with the main channel just west of Peregrine Courts. Lastly, the northern branch extends from the main channel east of Queens Harbor Boulevard and ends just south of the Queens Harbor Boulevard and Sandringham Drive intersection. The waters of Greenfield Creek flow into the St. Johns River at Chicopit Bay (PBS&J, December 2008).

The spatial distribution and acreage of different land use categories in the Greenfield Creek watershed were identified using 2004 land-use coverage data from the SJRWMD (**Table 108**). The dominant land use (481.2 acres; 25.6% of total coverage) is classified as medium-density residential and is located: (1) in the southwestern corner of the WBID south of Atlantic Boulevard; (2) along the eastern WBID boundary north of Atlantic Boulevard; and (3) in small pockets between Greenfield Creek and the western WBID boundary north of Liahona Lane. The next two most abundant land cover categories are: (1) wetland areas (426.1 acres; 22.6% of total coverage), that form a boundary around the majority of the creek; and (2) high-density residential areas (413.4 acres; 22.0% of total coverage) located primarily: (i) between the western WBID boundary and Greenfield Creek from Atlantic Boulevard north to Staffordshire Drive South, and (ii) south of Atlantic Boulevard between The Woods Drive East and the eastern WBID boundary. As wetlands serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Greenfield Creek (PBS&J, December 2008).

According to the 2000 Census, there are 2,354 households within the watershed, averaging 2.37 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 942 dogs in the watershed.

TABLE 108: LAND USES IN THE GREENFIELD CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
Medium Density Residential	481.2	25.6
Wetlands	426.1	22.6
High Density Residential	413.4	22.0
Commercial/ Utility/ Institutional	168.3	8.9
Water	140.9	7.5
Recreational	115.0	6.1
Low Density Residential	63.8	3.4
Upland Forest	34.0	1.8
Transportation	16.3	0.9
Open Land	12.0	0.6
Non-Forested Upland	12.0	0.6
TOTAL:	1,882.9	100

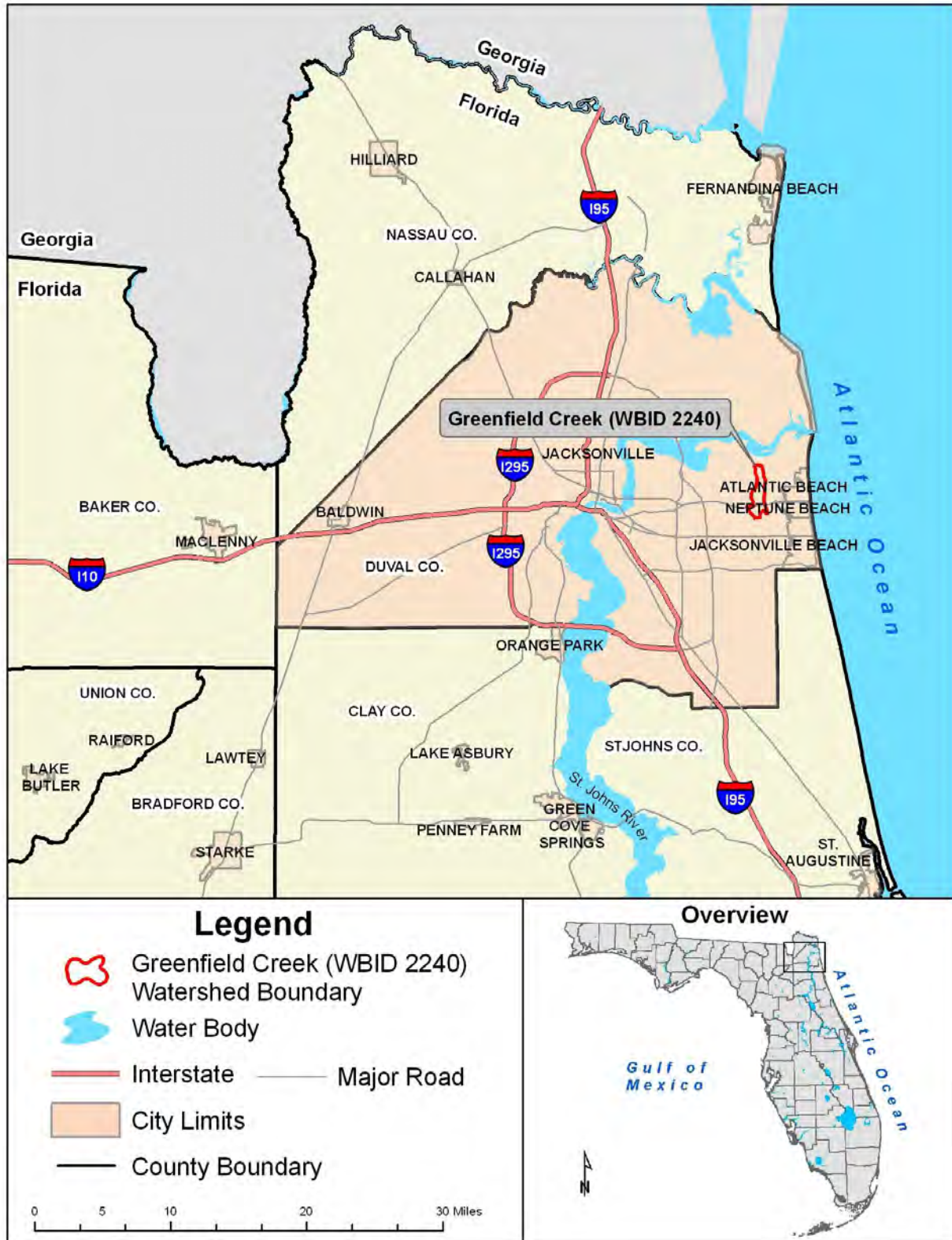


FIGURE 24: LOCATION OF THE GREENFIELD CREEK WATERSHED

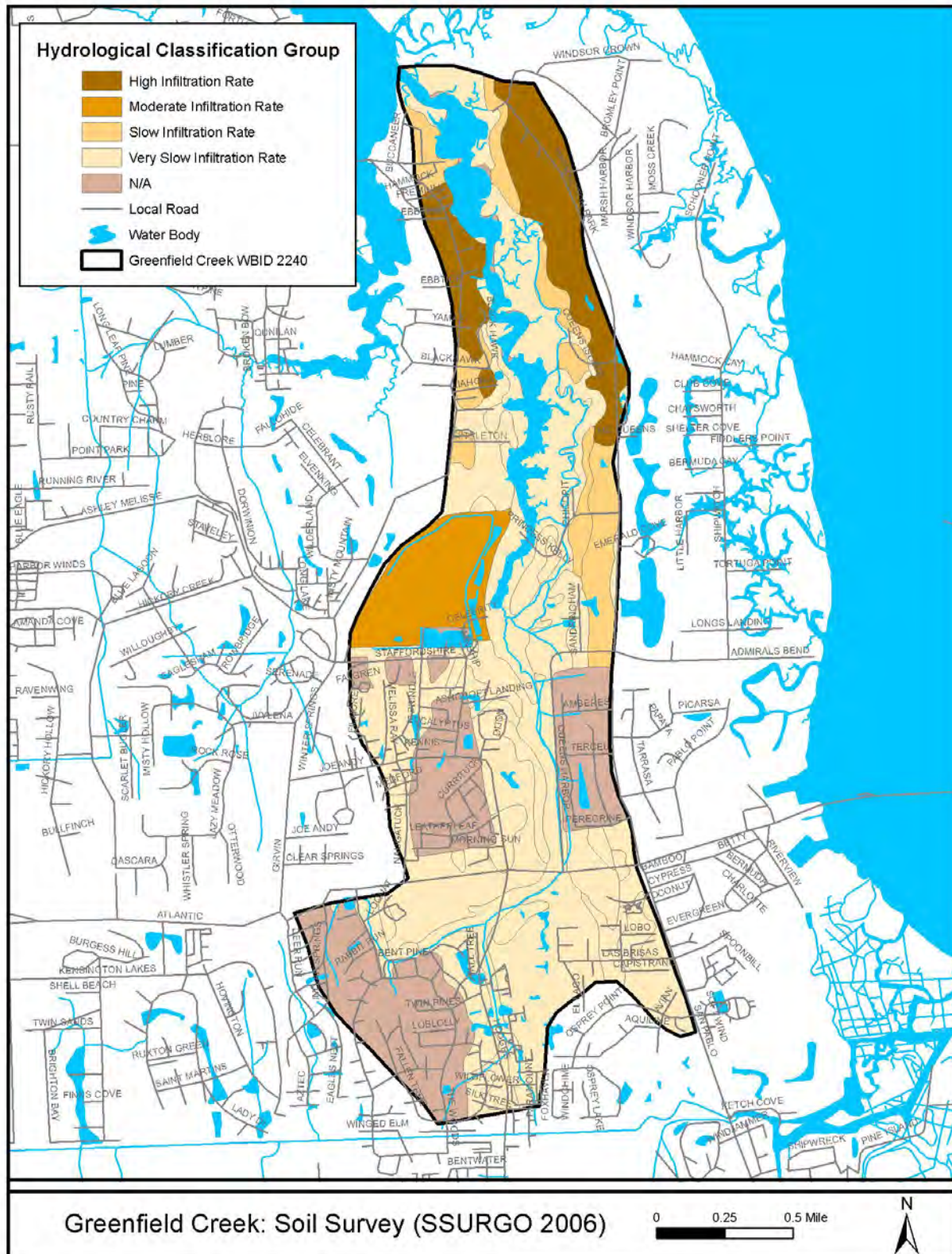


FIGURE 25: GREENFIELD CREEK WBID LOCATOR MAP

17.2 POTENTIAL SOURCES

17.2.1 POINT SOURCES

The Girvin Road Landfill, located just northeast of the Girvin Road and Staffordshire Drive South intersection, has been inactive since 1992. According to the City of Neptune Beach, Florida 2010 Comprehensive Land-Use Plan, prior to its closure, the landfill was a Class I, 71-acre high-rise landfill located on 137 acres, which received approximately 446,407 tons/year of solid waste. Sludge from the Neptune Beach Sewage Treatment Plant was also delivered to the landfill. In addition, the COJ/FDOT MS4 permit includes the Greenfield Creek watershed (PBS&J, December 2008).

17.2.2 ILLICIT DISCHARGES

COJ EQD identified 6 PICs in the Greenfield Creek watershed; however, upon further investigation these were determined not to be illicit and were confirmed as discharges from stormwater pipes, pond pipes, sprinkler drains, and air conditioner condensation. The PIC program did not include the inspection of closed conveyance systems; therefore, unidentified illicit connections may be present within this watershed (PBS&J, December 2008).

17.2.3 CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS

The Greenfield Creek watershed is located within the Arlington East WWTF Service Area. There are an estimated 1,986 households (approximately 84% of households) connected to the sanitary sewer system within the Greenfield Creek watershed. This watershed supports nearly 156 kilometers (97 miles) of sewer lines and 17 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is found throughout the watershed with the exception of areas west of the creek north of Staffordshire Drive South. There has been only 1 sanitary sewer overflow reported by JEA within the Greenfield Creek WBID boundaries, which spilled 40,000 gallons and potentially impacted surface waters (PBS&J, December 2008).

TABLE 109: SSOs REPORTED IN THE GREENFIELD CREEK WATERSHED, 2001-07

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Greenfield Creek (2240)	27-Dec 02*	40,000	Yes

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

17.2.4 OSTDS

WSEA estimates that there are 177 OSTDS in the Greenfield Creek watershed. DCHD has issued 10 septic system repair permits within this area. Numerous parcels with septic system repair permits are located in close proximity to Greenfield Creek surface waters. The proximity of these parcels to surface waters suggests that septic systems potentially affect the water quality of Greenfield Creek primarily in the midstream and downstream portions of the WBID. According to COJ EQD, even before the official septic system failure areas were identified and ranked in Duval County on November 1999, work was ongoing by city and state agencies to identify problem septic system areas. The Pablo Oaks Subdivision (comprising 73 lots located on Peregrine Street, Peregrine Court, Amberes Lane, Tercel Street and Cockatiel Drive) had 14 known failures as of 1991. Many of the drainfields in Pablo Oaks were mounded in an attempt to provide treatment in poor existing soils with a high water table. This subdivision was provided with centralized sewage infrastructure in 1998/1999. The failing septic systems could have

contributed to the high fecal coliform levels associated with the earlier water quality data in Greenfield Creek (PBS&J, December 2008).

17.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the Greenfield Creek WBID contains predominantly less than 10% and 10% to 25% impervious surfaces. Areas with less than 10% impervious surface are primarily located along the surface waters of Greenfield Creek and correspond to wetland land use classifications. Areas with 10% to 25% impervious surface are located throughout the watershed. Portions of the watershed along Atlantic Boulevard also contain greater than 25% impervious surface area that correspond to commercial/utility and institutional land use classifications (PBS&J, December 2008).

Furthermore, the potential for stormwater runoff analysis demonstrates that the majority of the WBID contains a low-to-moderate potential for stormwater runoff, in areas north of Singleton Street and a predominantly high potential for stormwater runoff in areas south of Singleton Street, which also includes areas in close proximity to the creek. The highest runoff coefficients were primarily calculated in areas south of Singleton Street at: (1) the inactive Girvin Road Landfill; (2) between Staffordshire Drive South and Atlantic Boulevard; (3) along Atlantic Boulevard; and (4) south of Atlantic Boulevard between The Woods Drive East and the eastern WBID boundary (PBS&J, December 2008).

The storm sewer network in the Greenfield Creek watershed includes 25 permitted stormwater treatment areas, encompassing approximately 100% of the WBID area. Stormwater infrastructure within the WBID includes 26 outfalls by receiving water (none are classified by FDEP as a “major outfall”) and 477 inlets. Although closed conveyances are common throughout the WBID, with the exception of areas west of the creek north of Staffordshire Drive South, few ditch systems are in the watershed. These are located: (1) paralleling Hodges Boulevard from the Arabella Drive intersection north to the convergence with the main channel, just south of the Atlantic Boulevard intersection; (2) just within the western WBID boundary south of the Joeandy Road North and Pindle Drive East intersection; (3) connecting to a closed conveyance system, directly south of Amberes Lane. According to COJ EQD, Hodges Boulevard is undergoing construction, which includes the installation of culverts to make the ditch system parallel to Hodges Boulevard an underground conveyance system. There is also an artificial channel and stormwater ponds that border the Girvin Road Landfill. Stormwater overflow from these ponds may discharge into the surface waters of Greenfield Creek. Numerous ponds are located throughout the watershed, especially south of Atlantic Boulevard and in the Queens Harbor area north of Atlantic Boulevard. As these ponds are in close proximity to Greenfield Creek, there is a potential for their waters to merge with the surface waters the creek (PBS&J, December 2008).

Fecal coliform concentrations were not different during the “wet” and “dry” seasons at the monitoring stations at the Girvin Road landfill and Wonderwood Drive, suggesting a constant source of fecal coliform bacteria to these locations through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. It is possible that higher loadings occur in the “wet” season and are diluted by increased volumes of water, resulting in fecal coliform concentrations that appear to be independent of rainfall. Unlike the more downstream locations, higher loadings were identified in the “wet” season at the Atlantic Boulevard station, suggesting that the majority of bacterial loading was delivered to this location of Greenfield Creek through nonpoint source discharges, failing wastewater conveyance systems, or septic systems during high rainfall. Considering the possibility for dilution during the

“wet” season, it is possible that loadings observed during this time of the year at the Atlantic Boulevard station were even higher than they appeared to be (PBS&J, December 2008).

17.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

17.3.1 JEA ACTIVITIES IN THE GREENFIELD CREEK WATERSHED

17.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA has pipe burst 0.06% of the sewer lines in the watershed. JEA has also replaced or repaired components on 1 of the 17 (5.88%) lift stations and replaced 4 of 11 (36.36%) of ARVs in the WBID. During FY09, JEA inspected 911 LF of pipe using a closed circuit television system and pipe cleaned 676 LF to prevent blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 110** lists the activities in the watershed.

TABLE 110: JEA ACTIVITIES IN THE GREENFIELD CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-142	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total major pipe project footage of pipe burst in watershed since 2001: 306	\$36,597	JEA	Ongoing
JEA-143	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-144	ARV Inspection and Rehab	See Appendix E	4 of 11 ARVs replaced	\$100,000*	JEA	Ongoing
JEA-145	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	3 stations (Queens Harbor, Bermuda Cove, Indian Springs)	Unknown	JEA	Planned
JEA-146	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	3 stations (581 #2 Queens Harbor Boulevard, 132 Peregrine Court, Woods #1)	Unknown	JEA	Planned
JEA-147	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-148	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-149	Pump Station Class I/II Rebuilding	Repair or replace components of existing pump stations	1 project in watershed in FY09	\$40,558	JEA	Ongoing
JEA-150	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-151	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	911 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-152	Pipe Cleaning	Clean existing pipes to avoid blockages	676 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-153	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-154	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-155	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-156	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

17.3.2 DCHD ACTIVITIES IN THE GREENFIELD CREEK WATERSHED

17.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

DCHD has implemented the OSTDS Program to address septic tanks as a potential source in the watershed. As part of this effort, it has issued 8 new construction permits, 10 repair permits, and 23 abandonment permits in the WBID. DCHD has conducted 18 plan reviews and site evaluations and 12 investigations in response to complaints received. DCHD will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 111** lists DCHD's projects in the Greenfield Creek watershed.

TABLE 111: DCHD ACTIVITIES IN THE GREENFIELD CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-76	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 8 new construction permits, 10 repair permits, and 23 abandonment permits issued	\$12,300	FDOH/LSJR SWIM Grant	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-77	Annual Operating Permits	Annual Operating Permits issued for PBTS), systems located within IMZ, and commercial systems	Approximately 1 annual operating permit issued for commercial properties	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-78	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-79	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 18 plan reviews and site evaluations have been performed based upon permitting history	\$4,500	FDOH/LSJR SWIM Grant	Ongoing
DCHD-80	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	FDOH/LSJR SWIM Grant	Ongoing
DCHD-81	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	12 complaint investigations have been performed	\$4,000	FDOH/LSJR SWIM Grant	Ongoing
DCHD-82	Intensive Inspection Program	Intensive geospecific inspections in selected BMAP WBIDs based on repair permit applications, water quality information, and site conditions; additional WBIDs may be identified in future based on ongoing assessment efforts	64 tanks located along San Pablo Road north to Shipwatch Drive, west to Peregrine Court	\$9,920	Unknown	Planned

17.3.3 COJ ACTIVITIES IN THE GREENFIELD CREEK WATERSHED

17.3.3.1 Ongoing COJ Programs and Activities

COJ has established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. In Greenfield Creek, COJ has 1 routine monitoring station that is sampled quarterly. A total of 86 samples were taken at this station between 1995 and 2009.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 52 work orders for ditch and creek regrading, erosion control, and cleaning; 7 work orders for lake and pond maintenance; and 32 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. Of the 6 PICs identified by COJ in the watershed, none were confirmed as illicit connections. As part of the PIC Program, COJ EQD provides public

outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

COJ PWD has also conducted inspections in the watershed, including 1 illegal discharge, 4 sewer lines that drained into a yard or ditch, 3 SSOs, and inspections of 10 private lift stations. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database. **Table 112** provides additional information on COJ's activities in the Greenfield Creek watershed.

TABLE 112: COJ ACTIVITIES IN THE GREENFIELD CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
MS4 Maintenance Activities						
COJ-225	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	52 (for 2005-09)	\$6,660	COJ	Ongoing
COJ-226	Lake or Pond Problem		7 (for 2005-09)	Unknown	COJ	Ongoing
COJ-227	Structure Blocked/Repair/General Flooding		32 (for 2005-09)	\$2,454	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-228	Pollution - Water - Illegal Discharge	CARE initiated	1 (for 2007)	\$379	COJ	Ongoing
COJ-229	Sewer drains into yard/ditch	CARE initiated	4 (for 2008-09)	\$1,516	COJ	Ongoing
COJ-230	Sewer Overflow	CARE initiated	3 (for 1999-2009)	\$1,137	COJ	Ongoing
COJ-231	Private Lift Station Inspection	3 private lift stations in the WBID	10 (for 1997-2009)	\$3,790	COJ	Ongoing
COJ-232	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-233	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	3 stations (San Pablo Road, Atlantic and Girvin Road, 12743 Atlantic Boulevard)	Unknown	COJ	Planned
COJ-234	Illicit Discharge Detection and Elimination	0 open, 0 illicit, 1 other	6 (for 2002-06)	\$2,274	COJ	Ongoing
COJ-235	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	86 (for 1995-2009)	Unknown	COJ	Ongoing
COJ-236	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	6 (for 2007-09)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-237	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	201 tanks, 24 connected	Unknown	COJ	Ongoing
COJ-238	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-239	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

17.3.4 FDOT ACTIVITIES IN THE GREENFIELD CREEK WATERSHED

17.3.4.1 Completed FDOT Projects

FDOT has completed the Atlantic Boulevard Widening project, which includes wet ponds that treat 51 acres. This project treats stormwater from this portion of the watershed, which helps to reduce the fecal coliform loading to Greenfield Creek.

17.3.4.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a Drainage Connection Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT Drainage Connection permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. Street sweeping occurs on 4 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 2 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund a monitoring station in the Greenfield Creek watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system.

TABLE 113: FDOT ACTIVITIES IN THE GREENFIELD CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-80	PIC Program	Search for illicit connections	Effort is continuous in WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-81	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	86 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-82	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	6 (for 2007-09)	See Note 2	FDOT/COJ	Ongoing
FDOT-83	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-84	Stormwater Management Systems	Atlantic Boulevard Widening	51 acres, wet ponds	Unknown	FDOT	Complete

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-85	Maintain FDOT stormwater systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 2 miles of roadway and associated stormwater conveyance systems currently maintained in this WBID; approximately 4 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

17.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 110 through **Table 113** list the projects and programs to reduce fecal coliform loading in the Greenfield Creek watershed. Several key efforts completed in this WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Greenfield Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Greenfield Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

17.4.1 OSTDS

Program Implementation – There are approximately 177 septic tanks in the watershed and 10 repair permits have been issued. There is a discrete portion of the WBID that has a higher probability of OSTDS-related problems based on the number of repair permits issued, water quality data, and site conditions. DCHD will intensively inspect a specific geographic area within the WBID boundary and will report the results of the inspection in an annual BMAP progress report. Additional areas may be identified for intensive inspections based on the assessment efforts discussed in the BMAP. If additional areas are designated in the future for inclusion in the program, these areas will also be inspected as funding becomes available. Inspections need to be continued and fully enforced to manage potential impacts from existing systems and to prevent new sources from reaching surface waters.

17.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, COJ inspects 3 private lift stations in the watershed annually. There are 3 stations located on the WBID boundary: (1) San Pablo Road; (2) Atlantic Boulevard and Girvin Road; (3) 12743 Atlantic Boulevard. COJ will verify which WBID these stations are located in and will provide an update in the first annual BMAP progress report. The continuation of the inspection program and confirmation of reporting boundaries are sufficient to address private lift stations in the watershed at this time.

Sewer Infrastructure Projects – JEA has 3 lift stations located on the WBID boundary at Queens Harbor off of Princess Kelly Drive, Bermuda Cove, and Indian Springs. JEA will verify

which WBID these stations are located in and will provide an update in the first annual BMAP progress report. In addition, there are 3 stations located in close proximity to surface waters: (1) 581 #2 Queens Harbor Boulevard; (2) 132 Peregrine Court; and (3) Woods #1 on Woods Drive. JEA will inspect these stations to ensure they are functioning properly and report the results in the first annual BMAP progress report.

Program Implementation – Continued inspection, repair, and maintenance activities in conjunction with the systemwide programs are sufficient to address potential sewer sources in the WBID at this time. The Root Cause Program and other SSO prevention efforts, such as FOG and CMOM, should be continued so that any additional infrastructure problems that develop will be identified and repaired. JEA will be expected to report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to ensure that the system is being monitored and maintained.

17.4.3 STORMWATER

Illicit Connection Removal – COJ has identified 6 PICs; however, none were determined to be illicit. COJ and FDOT have committed to continue the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its facilities as part of its MS4 permit. In addition, FDOT sweeps 4 miles of roadway every month, helping to reduce sediments entering the stormwater conveyance systems.

COJ Program Implementation – COJ completed 52 work orders for ditch maintenance, 7 work orders for pond problems, and 32 repairs of structures. The continuation of current programs and maintenance activities in the watershed will help reduce and eliminate potential sources of fecal coliform loading.

TABLE 114: SUMMARY OF RESTORATION ACTIVITIES FOR THE GREENFIELD CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	-	-	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	-	X	-	X
Capital Projects/Stormwater Water Quality BMPs	-	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	-	X	-	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	√	X	√	X
Tributary Assessment Team (TAT)	-	X	-	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 18: POTTSBURG CREEK (WBID 2265B)

18.1 WBID DESCRIPTION

Pottsburg Creek, WBID 2265B, is located in Duval County, southeast of the Lower St. Johns River within the North Mainstem Planning Unit, as designated by the SJRWMD (**Figure 26**). The “headwaters” of Pottsburg Creek are presumably comprised of stormwater runoff that appears to originate from its associated branches and forks (**Figure 27**). The general locations of the various headwaters are listed from upstream to downstream and include: J Turner Butler Boulevard; Hidden Lake Drive North; Bennett Branch (WBID 2172) at Phillips Highway and at Leo Place; the South Barnes Road and Knights Lane East intersection; Leeds Pond (WBID 2308) at Phillips Highway; Parental Home Road; the Hilsdale Road and Herring Road intersection; Touchton Road at Tiger Swamp North (WBID 2402); southwest of the Southside Boulevard and Tiffany Avenue intersection; Southside Estates Drain (WBID 2392) at Beach Boulevard, Jamaica Road East, and MacArthur Court; southwest of the Hogan Road and East Road intersection; and west of University Boulevard at Spring Glen Drain (WBID 2391) (PBS&J, September 2009).

The creek generally flows north in a single channel with the exception of contributing branches and forks that join Pottsburg Creek from the south (“south fork”, “southeastern branch”, and “northern branch”), the east (“Tiger Swamp,” “north fork”, “northeastern branch”, “Tiger Swamp North,” and “Southside Estates Drain”), and the west (“Bennett Branch,” “southwestern branch”, “Leeds Pond,” “northwestern branch”, and “Spring Glen Drain”). The most upstream branch, Tiger Swamp (WBID 2419), drains into a wetland area south of J Turner Butler Boulevard. The south fork and north fork diverge from the main channel at Belfort Road southeast to slightly south of J Turner Butler Boulevard, and northeast to Hidden Lake Drive North, respectively. Bennett Branch merges with the main channel south of Bowden Road. Farther downstream, the southwestern branch extends east from Knights Lane East and merges with the main channel slightly east of Parental Home Road. Field investigations conducted in September 2008 indicate that this branch flows west at the Knights Lane East and Barnes Road South intersection and connects to a ditch within the Leeds Pond watershed at the Barnes Road South and Kegler Drive intersection. Leeds Pond flows into the main channel of Pottsburg Creek farther downstream, east of Parental Home Road. The southeastern branch begins just west of the Hilsdale Road and Herring Road intersection and merges with the main channel upstream of Hogan Road. Tiger Swamp North drains into the main channel at Hogan Road. The northeastern branch stretches from just west of Southside Boulevard to the main channel. Southside Estates Drain merges with Pottsburg Creek north of Beach Boulevard. The northern branch extends north from Hogan Road and intersects the main channel north of Pottsburg Drive. The most downstream branch, Spring Glen Drain, merges with the main channel east of Ryar Road. The waters of Pottsburg Creek continue north to the Arlington River, which flows into the St. Johns River north of River Point Road (PBS&J, September 2009).

The spatial distribution and acreage of different land use categories in the Pottsburg Creek watershed were identified using 2004 land use coverage data from the SJRWMD (**Table 115**). The dominant land use (1,203.1 acres; 20.7% of total coverage) in the Pottsburg Creek watershed is classified as commercial/utility and institutional and is primarily located: (1) near the downstream portion of the watershed along Beach Boulevard; and (2) in the upstream portion of the watershed along Interstate 95 and J Turner Butler Boulevard. The next two most abundant land cover categories are: (1) medium-density residential areas (1,019.9 acres; 17.6% of total coverage), located throughout the watershed in areas north of Touchton Road; and (2)

wetlands (935.0 acres; 16.1% of total coverage) located primarily: (i) in the upstream portion of the WBID between J Turner Butler Boulevard and Baymeadows Road; (ii) bordering the south fork and the main channel from J Turner Butler Boulevard north to East Road; and (iii) in areas along the northeastern branch. Wetlands and upland forests accounted for over 22% of the total land coverage of the Pottsburg Creek watershed and form a boundary around segments of the main channel and associated forks and branches. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Pottsburg Creek in these areas. There is a specialty farm, Skinners' Dairy, located on the west side of the main channel at Bowden Road. According to SJRWMD, this dairy is no longer active and many areas of the dairy have undergone development (PBS&J, September 2009).

According to the 2000 Census, there are 9,317 households within the watershed, averaging 1.84 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 3,727 dogs in the watershed.

TABLE 115: LAND USES IN THE POTTSBURG CREEK WATERSHED

LAND USE	ACRES	% OF TOTAL
Commercial/ Utility/ Institutional	1,203.1	20.7
Medium Density Residential	1,019.9	17.6
Wetlands	935.0	16.1
High Density Residential	669.8	11.5
Low Density Residential	609.2	10.5
Upland Forest	354.8	6.1
Water	317.6	5.5
Transportation	217.6	3.7
Non-Forested Upland	160.9	2.8
Recreational	151.6	2.6
Open Land	101.3	1.7
Industrial	47.2	0.8
Specialty Farms	13.4	0.2
Communication	6.9	0.1
Disturbed Land	0.9	0.02
TOTAL:	5,809.3	100

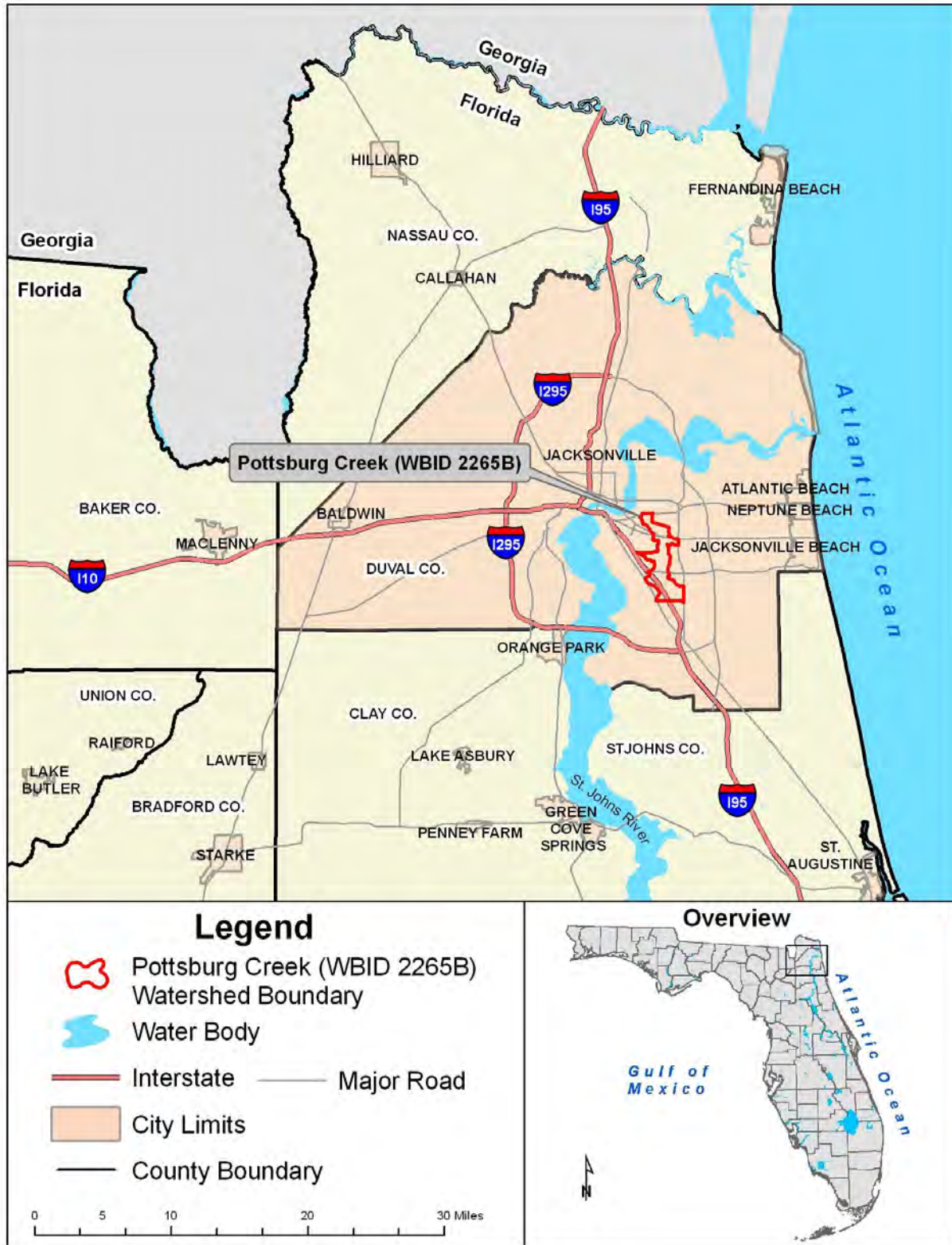


FIGURE 26: LOCATION OF THE POTTSBURG CREEK WATERSHED

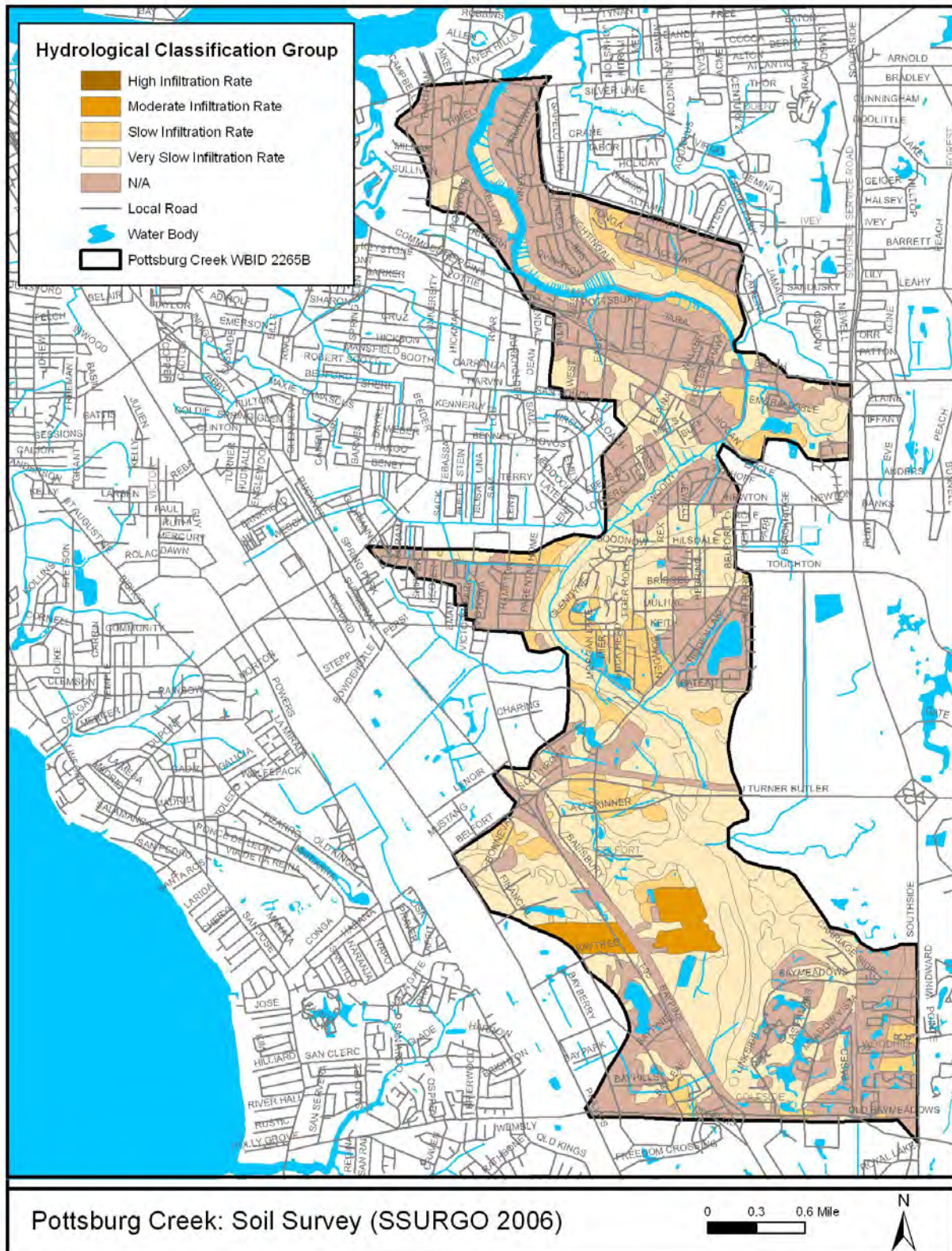


FIGURE 27: POTTSBURG CREEK WBID LOCATOR MAP

18.2 POTENTIAL SOURCES

18.2.1 POINT SOURCES

The Pantry #6224, a convenient store/gas station, has an industrial wastewater permit near the Belfort Road and Bridges Street intersection just northeast of the north fork headwaters. The COJ/FDOT MS4 permit includes the Pottsburg Creek watershed (PBS&J, September 2009).

18.2.2 ILLICIT DISCHARGES

COJ EQD has identified 62 PICs in the Pottsburg Creek watershed; 2 were determined to be illicit. The status of 21 PICs is currently pending investigation.

18.2.3 CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS

The Pottsburg Creek watershed is located within 3 JEA WWTF service areas. The Mandarin WWTF Service Area is located in the southern portion of the watershed from Glenn Abbey Way south to Baymeadows Road. The Arlington East WWTF Service Area covers two areas of the watershed located: (1) from Dorothea Terrace south to Glenn Abbey Way; and (2) on the east side of the creek from the northern WBID boundary south to Grant Owens Road. The Buckman WWTF Service Area covers the central portion of the watershed from Beach Boulevard south to Dorothea Terrace. There are an estimated 3,080 households (approximately 33% of households) connected to the sanitary sewer system within the Pottsburg Creek watershed. This watershed supports over 118 kilometers (73 miles) of sewer lines and 54 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is found scattered throughout all areas of the watershed in close proximity to surface waters with the exception of the wetland located between J Turner Butler Boulevard and Baymeadows Road. It is also worth noting that sewer infrastructure is in close proximity to Bennett Branch (WBID 2172), Leeds Pond (WBID 2308), Tiger Swamp North (WBID 2402), Southside Estates Drain (WBID 2392), and Spring Glen Drain (WBID 2391) (PBS&J, September 2009).

There have been 13 SSOs reported by JEA within the Pottsburg Creek WBID boundaries between March 2001 and May 2006. The estimated volume of spills associated with these overflows ranged from 50 to 45,000 gallons and averaged approximately 6,034 gallons; 7 SSOs were reported to have potentially impacted surface waters. Two of the SSOs occurred at 3048 Carrevero Drive West in 2002 (500 and 45,000 gallons). As this area is located to the west of the Knights Lane East and Barnes Road South intersection, these SSOs likely impacted the surface waters of Leeds Pond (PBS&J, September 2009).

TABLE 116: SSOs REPORTED IN THE POTTSBURG CREEK WATERSHED, 2001-07

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Pottsburg Creek (2265B)	9-Mar-01	600	No
Pottsburg Creek (2265B)	15-Jan-02	100	No
Pottsburg Creek (2265B)	17-Jan-02	50	No
Pottsburg Creek (2265B)	26-Apr-02*	500	Yes
Pottsburg Creek (2265B)	7-Sep-02*	45,000	Yes
Pottsburg Creek (2265B)	22-Apr-04*	500	Yes
Pottsburg Creek (2265B)	22-Jun-04*	4,500	No
Pottsburg Creek (2265B)	26-Oct-04*	300	Yes

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Pottsburg Creek (2265B)	29-Jan-05	750	No
Pottsburg Creek (2265B)	12-Feb-05*	4,320	Yes
Pottsburg Creek (2265B)	22-Apr-05*	500	Yes
Pottsburg Creek (2265B)	21-Jul-05	200	No
Pottsburg Creek (2265B)	6-May-06*	21,120	Yes

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

18.2.4 OSTDS

WSEA estimates that there are 1,585 OSTDS in the Pottsburg Creek watershed. According to DCHD, 177 septic system repair permits were issued within this area. The permits, and presumably failed septic systems, are located in close proximity to surface waters: (1) along segments of the main channel from Belfort Road north to the confluence of the main channel and Arlington River; (2) at the north fork beside Belfort Road; (3) next to the southwestern branch at Barnes Road; (4) along segments of the southeastern branch at Hilsdale Road and near the eastern WBID boundary at Belfort Road; (5) at segments of the northwestern branch north of Mills Drive; and (6) at the northern branch at Pottsburg Road. As parcels with OSTDS repair permits are located in close proximity to surface waters, there is a potential for OSTDS to contribute to the fecal pollution in these areas of the creek (September 2009).

One nuisance area, Glynlea, was located within the WBID on the east side of the creek from Nightingale Road north to the northern WBID boundary. As of October 2006, this nuisance area completed the transition from septic to sewer. The Oakhaven failure area is also located in the most downstream portion of the watershed on the west side of the creek from Pottsburg Drive north to the northern WBID boundary. Most of the OSTDS repair permits were located in the Oakhaven failure area and Glynlea nuisance area (PBS&J, September 2009).

18.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the Pottsburg Creek WBID contains predominantly 10% to 25% impervious surface. Areas with less than 10% impervious surface primarily correspond to wetland and upland forest land use classifications. Areas with 10% to 25% impervious surface occur from Hidden Lakes Drive north to the northern WBID boundary and in the southeast corner of the WBID. Areas of the WBID with greater than 25% impervious surface primarily correspond to commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) near the north and south fork confluence at Belfort Road; (2) at the northeastern branch west of Southside Boulevard; (3) at the main channel at Beach Boulevard; (4) at the northern branch at Beach Boulevard; and (5) at the main channel in areas near the northern WBID boundary (PBS&J, September 2009).

Furthermore, the potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients within the WBID range from low-to-high depending on the area of the watershed. Lower runoff coefficients were calculated primarily in areas classified as wetlands and upland forests. Moderate runoff coefficients were calculated for areas of the watershed located from Hidden Lake Drive South to the northern WBID boundary. The highest runoff coefficients correlated with transportation and commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) at the south fork at J Turner Butler Boulevard; (2) at the south fork and north fork confluence at Belfort Road; (3) at the main channel at Bowden Road; (4) at the northeastern branch just west of Southside Boulevard; (5) at the main channel at Beach Boulevard; (6) at the northern branch at Beach Boulevard; and (7)

at the downstream portion of the main channel along the northern WBID boundary. High stormwater coefficients indicate that there is a potential for stormwater to impact the surface waters in these areas (PBS&J, September 2009).

The storm sewer network in the Pottsburg Creek watershed includes 68 permitted stormwater treatment areas, encompassing approximately 18.72% to 54.58% of the WBID area. Stormwater infrastructure within the WBID includes 184 outfalls by receiving water (3 are classified by FDEP as “major outfalls”) and 1,384 inlets. Although there are many closed conveyances within the watershed, there are few open ditch systems present in the watershed: (1) forming segments of the northern fork along Hidden Lake Drive West; (2) along Brest Road; (3) between Merrie Anne Drive and Mills Court; (4) forming segments of the northern branch; (5) extending outside the eastern WBID boundary along Nightingale Road, forming segments of Silversmith Creek; (6) in 2 locations that outfall to the main channel near Wren Road; (7) parallel to Spring Forest Circle at the main channel; and (8) in close proximity to the Atlantic Boulevard Station parallel to Pottsburg Plantation Boulevard. Many of these ditch systems appear to merge directly with the main channel. A ditch located west of the Knights Lane East and Barnes Road South intersection appears to outfall into a closed conveyance system, which field investigations (September 2008) indicated then flows into ditches that form portions of the Leeds Pond watershed (PBS&J, September 2009).

There are also numerous ponds located in close proximity to Pottsburg Creek surface waters: (1) just south of the south fork at A C Skinner Parkway; (2) at the main channel at the Belfort Road and Gate Parkway West intersection; (3) at the main channel at Big Morgan Lake located just south of Bowden Circle South; (4) at the main channel at Little Morgan Lake located just south of Little Morgan Lake Court; (5) just east of the main channel at Glendyne Drive West; (6) slightly east of the main channel just south of Emerald Isle Circle South; (7) at an apartment complex located east of the main channel at Killarney Drive; and (8) west of the main channel at Love Grove Elementary School at University Boulevard South. As these ponds are in close proximity to Pottsburg Creek, there is a potential for their waters to merge with Pottsburg Creek surface waters (PBS&J, September 2009).

Higher fecal coliform loadings were not identified in the “wet” season at stations near the intersections of the creek with Beach Boulevard and Belfort Road, suggesting that the majority of bacterial loading was delivered to Pottsburg Creek through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. In contrast, higher loadings were identified in the “wet” season at the station near Hogan Road suggesting that the majority of bacterial loading was delivered to Pottsburg Creek through nonpoint source discharges, failing wastewater conveyance systems, or septic systems during rainfall. Waters from nearby contributing branches including the southeastern branch and Tiger Swamp North, as well as a closed conveyance system, that appear to merge with the main channel in this area may have contributed to the higher concentrations observed in the wet season. Considering the possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were even higher than they appeared to be (PBS&J, September 2009).

18.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

18.3.1 JEA ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

18.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1)

FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA has pipe burst 8.19% of the sewer lines in the watershed. JEA has also replaced 07 of the 24 ARVs in the WBID. During FY09, JEA inspected 3,617 LF of pipe using a closed circuit television system and pipe cleaned 5,130 LF to prevent blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 117** lists JEA's activities in the watershed.

TABLE 117: JEA ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-157	Pipe Bursting - Increase Carrying Capacity	Replacement of failing/leaking infrastructure	Total major pipe project footage of pipe burst in watershed since 2001: 31,562	\$2,460,622	JEA	Ongoing
JEA-158	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-159	ARV Inspection and Rehab	See Appendix E	7 of 24 ARVs replaced	\$200,000*	JEA	Ongoing
JEA-160	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	5 stations (ABC Jax Liquors, River Hill Condo, Glynlea Phase 2, Jenkins Brick, San Souci)	Unknown	JEA	Planned
JEA-161	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	7 stations (San Souci, Watson Realty Corp, Murray Hill Condo, Glynlea, South Brook Condo, Pottsborg Land, ACS-7200)	Unknown	JEA	Planned
JEA-162	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-163	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-164	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-165	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	3,617 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-166	Pipe Cleaning	Clean existing pipes to avoid blockages	5,130 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-167	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-168	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-169	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-170	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

18.3.2 DCHD ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

18.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

Failure and nuisance areas were first identified in 1999–2000. There is currently 1 designated failure area, Oakhaven, in the watershed. Approximately 34% of this failure area is located in the Pottsburg Creek WBID.

DCHD has implemented the OSTDS Program to address septic tanks as a potential source in the watershed. As part of this effort, it has issued 72 new construction permits, 177 repair permits, and 270 abandonment permits in the WBID. In addition, 28 annual operating permits have been issued for PBTS in the watershed. DCHD has conducted 252 plan reviews and site evaluations and 131 investigations in response to complaints received. DCHD will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 118** lists DCHD's projects in the Pottsburg Creek watershed.

TABLE 118: DCHD ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-83	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 72 new construction permits, 177 repair permits, and 270 abandonment permits issued	\$161,925	General Revenue/ DOH	Ongoing
DCHD-84	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems.	Approximately 28 annual operating permits issued for commercial properties; 1 PBTS is monitored annually	\$70,000	General Revenue/ DOH	Ongoing
DCHD-85	SWIM Project	Implementation of broad-ranging septic tank ordinance	Approximately 34% of Oakhaven and 85% of Glynlea Septic Tank Failure Areas exists within this WBID	\$98,000	General Revenue/ DOH	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-86	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	General Revenue/DOH	Ongoing
DCHD-87	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 252 plan reviews and site evaluations have been performed based upon permitting history	\$63,000	General Revenue/DOH	Ongoing
DCHD-88	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	General Revenue/DOH	Ongoing
DCHD-89	Failure Area Evaluation	Work with COJ to consider why area south of Glynlea is not ranked as a failure area	Consideration for adding a failure area	Unknown	General Revenue/DOH	Planned
DCHD-90	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	131 complaint investigations have been performed	\$43,600	General Revenue/DOH	Ongoing

18.3.3 COJ ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

18.3.3.1 Completed COJ Projects

COJ has completed 3 projects in the Pottsburg Creek Watershed: (1) Barnes Road Wet Detention, which treats 97 acres; (2) Parental Home Road Phase 2 Wet Detention, which treats 82 acres; and (3) Parental Home Road Phase 1 Wet Detention, which treats 28 acres. In addition, the Wren Road Drainage Improvements Project is under construction. These projects capture and treat stormwater runoff, which reduces the fecal coliform loading from these areas to the creek.

In addition, COJ has worked with WSEA to extend sewer lines to remove a total of 354 septic tanks in the watershed, helping to reduce fecal coliform loading from septic tanks along the creek. All of the septic tanks in the watershed that were located in the Glynlea failure area have been removed.

18.3.3.2 Ongoing COJ Programs and Activities

COJ has established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. In Pottsburg Creek, COJ has 2 routine monitoring stations that are sampled quarterly. A total of 112 samples were taken at this station between 1995 and 2009.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 344 work orders for ditch and creek regrading, erosion control, and cleaning; 19 work orders for lake and pond maintenance; and 405 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

As part of the PIC Program, COJ has identified 62 PICs. Two of these were confirmed as illicit and removed and 21 PICs are currently pending investigation. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

COJ PWD has also conducted inspections in the watershed, including 17 investigations into illicit water discharges, 13 illegal discharges, 6 sewer lines that drained into a yard or ditch, 26 SSOs, 154 septic tank inspections, and 201 private lift station inspections. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 119 provides additional information on COJ's activities in the Pottsburg Creek watershed.

TABLE 119: COJ ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Capital Improvement Projects						
COJ-240	Barnes Road (University Blvd to Parental Home) (Main Stem COJ-11)	Wet detention	97 acres	Unknown	COJ	Complete
COJ-241	Parental Home Road Phase 2 (Beach Blvd. to Ibach Rd) (Main Stem COJ-15)	Wet detention	82 acres	Unknown	COJ	Complete
COJ-242	Parental Home Road Phase 1 (Bowden Rd from Salisbury to Dean Rd) (Main Stem COJ-14)	Wet detention	28 acres	Unknown	COJ	Complete
Drainage System Rehab Projects						
COJ-243	Wren Road Drainage	Drainage improvements along Wren Road	Unknown	\$45,000	COJ	Construction
MS4 Maintenance Activities						
COJ-244	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	344 (for 2005-09)	\$69,808	COJ	Ongoing
COJ-245	Lake or Pond Problem		19 (for 2005-09)	\$104.81	COJ	Ongoing
COJ-246	Structure Blocked/Repair/General Flooding		405 (for 2005-09)	\$26,928	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-247	Illicit Water Discharge	CARE initiated	17 (for 2005-07)	\$6,443	COJ	Ongoing
COJ-248	Pollution - Water - Illegal Discharge	CARE initiated	13 (for 2000-09)	\$4,927	COJ	Ongoing
COJ-249	Sewer drains into yard/ditch	CARE initiated	6 (for 2008-09)	\$2,274	COJ	Ongoing
COJ-250	Sewer Overflow	CARE initiated	26 (for 2000-09)	\$9,854	COJ	Ongoing
COJ-251	Septic Tank Inspection	CARE initiated	154 (for 2005-07)	\$58,366	COJ	Ongoing
COJ-252	Private Lift Station Inspection	51 private lift stations in the WBID	201 (for 1997-2009)	\$76,179	COJ	Ongoing
COJ-253	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-254	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	5 stations (Atlantic Blvd near River Hill Drive, 3500 Southside Blvd, 3444 Southside Blvd, 3401 Southside Blvd, 3332 Southside Blvd)	Unknown	COJ	Planned
COJ-255	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	3 stations (Atlantic Blvd near River Hill Drive, 3840 Belfort Road, 7529 Salisbury Road)	Unknown	COJ	Planned
COJ-256	Illicit Discharge Detection and Elimination	21 open, 2 illicit	62 (for 1997-2009)	\$23,498	COJ	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
COJ-257	PIC Program	Follow up on outstanding PICs	21 (for 2010-11)	Unknown	COJ	Planned
COJ-258	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	112 (for 1995-2009)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-259	Glynlea Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	354 tanks, 354 connected	Unknown	COJ	Complete
COJ-260	Oakhaven Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	356 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-261	Murray Hill Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	1 tank, 1 connected	Unknown	COJ	Complete
COJ-262	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	1,498 tanks, 269 connected	Unknown	COJ	Ongoing
COJ-263	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-264	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

¹ COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study, or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023. For the 15 tributaries addressed in this BMAP, the failing tanks within 300 meters of surface waters will be included in the COJ plan and schedule to phase out tanks and will be identified as Tributaries BMAP-related tanks.

18.3.4 FDOT ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

18.3.4.1 Completed FDOT Projects

FDOT completed a wet detention systems project at the Southside Boulevard and Beach Boulevard interchange that treats 33 acres. This project captures and treats stormwater runoff, which reduces the amount of fecal coliform loading to the creek.

18.3.4.2 Ongoing FDOT Programs and Activities

FDOT conducts street sweeping on 12 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 6 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. A total of 2 PICs have been identified, 1 of which was determined to be illicit and removed. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund 2 monitoring stations in the Pottsburg Creek watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 120** lists FDOT's activities in the Pottsburg Creek watershed.

TABLE 120: FDOT ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-86	PIC Program	Search for illicit connections	Effort is continuous in this WBID	See Note 1	FDOT/COJ	Ongoing
FDOT-87	PIC Program	Illicit connections identified and removed if found to be true illicit	2 identified, 1 found to be true illicit and removed	See Note 1	FDOT/COJ	Ongoing
FDOT-88	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	112 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-89	Stormwater Management Systems	Southside Blvd and Beach Blvd Interchange	33 acres, wet detention systems	Unknown	FDOT	Complete
FDOT-90	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 6 miles of roadway and associated stormwater conveyance systems currently maintained in this WBID; approximately 12 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

18.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 117 through **Table 120** list the projects and programs to reduce fecal coliform loading in the Pottsburg Creek watershed. Several key efforts completed in this WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Pottsburg Creek based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Pottsburg Creek watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

18.4.1 OSTDS

Failure Area – Based on the GIS current database, there are approximately 1,585 septic tanks in the WBID. Of these, 356 OSTDS are eligible for sewer connection due to their inclusion in the Oakhaven failure area. COJ committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. The failing tanks in the Oakhaven failure area in the Pottsburg Creek watershed that are within 300 meters of a surface water will be included in the COJ phase-out plan and schedule, as described in the Main Stem BMAP, and will be identified in the plan as Tributaries BMAP-related efforts.

There are a large number of repair permits in this watershed (177 permits) and many are outside of the failure area. During the next failure area ranking, DCHD and COJ should consider looking at the portion of the WBID south of the previous Glynlea nuisance area as a potential new failure area. Surface waters in this part of the watershed would benefit from removal of the failing OSTDS.

Program Implementation – City ordinances, inspections, and program implementation, combined with DCHD permit review processes and inspections, proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure area and to prevent the creation of new OSTDS sources.

Capital Improvement Projects – COJ has completed 3 capital projects in the watershed along Barnes Road and Parental Home Road (2 phases). In addition, they have a drainage improvements project under construction on Wren Road. These projects are all located in OSTDS areas and have reduced high-water conditions that can contribute to septic tank failure from improperly treated waste.

18.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, COJ inspects 51 private lift stations in the watershed annually. There are 5 stations located on the WBID boundary: (1) Atlantic Boulevard near River Hill Drive; (2) 3500 Southside Boulevard; (3) 3444 Southside Boulevard; (4) 3401 Southside Boulevard; and (5) 3332 Southside Boulevard. COJ will verify which WBID these stations are located in and will provide an update in the first annual BMAP progress report. In addition, there are 3 stations located near surface waters: (1) Atlantic Boulevard near River Hill Drive; (2) 3840 Belfort Road; and (3) 7529 Salisbury Road. COJ will inspect these stations to ensure they are functioning properly and report the status in the first annual BMAP progress report. The continuation of the inspection program, confirmation of reporting

boundaries, and inspection of the stations near surface waters are sufficient to address private lift stations in the watershed at this time.

Sewer Infrastructure Projects – JEA conducted several projects in the watershed to address SSOs. JEA replaced the ARV on Hazel Hurst Drive, which was the location of a past SSO. There were two SSOs on Salisbury Road and JEA replaced the electric panel at the station in fiscal year 2005 and repiped the station in fiscal year 2007. JEA replaced the pipe near 8765 Baymeadows Road through CIPP to address 2 previous SSOs. There were several sewer-related problems in the area along Pottsburg Drive from West Road to El Camino. In 2005, JEA replaced the ARV in this area and repaired a segment of defective pipe. In addition, there were also sewer line problems along Holiday Road from Molokai and Montevideo. JEA pipe burst the lines in this neighborhood in 2004 and replaced a manhole in 2008.

JEA also has 5 lift stations located on the WBID boundary: (1) ABC Jax Liquors; (2) River Hill Condo; (3) Glynlea Phase 2; (4) Jenkins Brick; and (5) San Souci. JEA will verify which WBID these stations are located in and will provide an update in the first annual BMAP progress report. In addition, there are 7 stations located in close proximity to surface waters: (1) San Souci; (2) Watson Realty Corp; (3) Murray Hill Condo; (4) Glynlea; (5) South Brook Condo; (6) Pottsburg Land on Dickinson Road; and (7) ACS-7200. JEA will inspect these stations to ensure they are functioning properly and report the results in the first annual BMAP progress report.

Program Implementation – Continued inspection, repair, and maintenance activities in conjunction with the systemwide programs are sufficient to address potential sewer sources in the WBID at this time. The Root Cause Program and other SSO prevention efforts, such as FOG and CMOM, should be continued so that any additional infrastructure problems that develop will be identified and repaired. JEA will be expected to report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to ensure that the system is being monitored and maintained.

18.4.3 STORMWATER

Illicit Connection Removal – COJ has identified and removed 2 illicit connections and FDOT removed 1 illicit connection. COJ and FDOT have committed to continue the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner. COJ currently has 21 open PIC cases and they will investigate these PICs and provide the status for the first annual BMAP report.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its facilities as part of its MS4 permit. In addition, FDOT sweeps 12 miles of roadway every month, helping to reduce sediments entering the stormwater conveyance systems.

COJ Program Implementation – COJ completed 344 work orders for ditch maintenance, 19 work orders for pond problems, and 405 repairs of structures. The continuation of current programs and maintenance activities in the watershed will help reduce and eliminate potential sources of fecal coliform loading.

TABLE 121: SUMMARY OF RESTORATION ACTIVITIES FOR THE POTTSBURG CREEK WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	√	X	-	X
Capital Projects/Stormwater Water Quality BMPs	√	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	+	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	-	X	-	X
Tributary Assessment Team (TAT)	-	X	-	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 19: TROUT RIVER (WBID 2203)

19.1 WBID DESCRIPTION

Trout River WBID 2203 is located in Duval County, northwest of the Lower St. Johns River within Trout River Planning Unit, as designated by the SJRWMD (**Figure 28**). This WBID includes the upper portion of the Trout River only; WBID 2203A consists of the lower Trout River segments (refer to **Chapter 20**). The “headwaters” of Trout River are presumably comprised of stormwater runoff that appears to originate west of Diamond C Lane and from its associated branches just south of Kevin Allen Lane, near Garden Street, west of Old Kings Road, and north of V.C. Johnson Road (**Figure 29**). The river generally flows east in a single channel with the exception of numerous contributing branches that join Trout River from the south (“southwestern branch”, “south central branch”, and “southeastern branch”) and north (“northwestern branch”, “north central branch”, and “northeastern branch”). The most upstream branch, the southwestern branch, originates at a pond south of Kevin Allen Lane and merges with the main channel north of Garden Street at the southern WBID boundary. The northwestern branch begins northwest of the main channel west of Messer Road. The south central branch extends south outside of the southern WBID boundary from the main channel just east of Doe Lane and forks just north of Garden Street. The southeastern branch continues from the main channel south of Sycamore Street and divides into several branches north of Garden Street. The north central branch originates outside of the WBID boundary between Old Kings Road and Plummer Road and merges with the main channel slightly south of the Dunn Avenue and the New Kings Road intersection. The northeastern branch extends from the main channel at Bridges Road and stretches northeast to V C Johnson Road where it forms a loop and merges with the main channel a second time southwest of Creative Drive South. There are also several contributing branches that flow through wooded areas and wetlands throughout the watershed. The upstream and midstream segments of the main channel west of US Highway 1 (New Kings Road) are narrower than the downstream segment of the main channel east of US Highway 1. The waters of Trout River continue southeast and merge with the St. Johns River east of North Main Street (PBS&J, May 2009).

The spatial distribution and acreage of different land use categories in the Trout River watershed were identified using 2004 land-use coverage data from the SJRWMD (**Table 122**). The dominant land use (3,622.2 acres; 36.5% of total coverage) in the Trout River watershed is classified as upland forest and is primarily located: (1) in the western portion of the WBID west of Messer Road; (2) in the area just south of the Plummer Road and northern WBID boundary intersection; and (3) in the northeastern corner of the WBID. The next two most abundant land cover categories are: (1) wetlands (2,948.9 acres; 29.8% of total coverage), predominantly located bordering Trout River surface waters and in the central portion of the WBID; and (2) low-density residential areas (1,023.9 acres; 10.3% of total coverage) located primarily in patches throughout the eastern portion of the WBID. Wetlands and upland forests accounted for nearly 66.3% of the total land coverage of Trout River and form a boundary around the main channel and associated branches. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Trout River in these areas (PBS&J, May 2009).

There are two specialty farmland uses identified within the Trout River watershed. One area was identified as a horse farm and is located in close proximity to the southeastern branch in a small area just south of Sycamore Street. The second specialty farm was identified as a dairy farm (Oaklane Dairy LLC) and is located in close proximity to the northwestern branch at 9800

Plummer Road. More recent information provided by SJRWMD indicated that this area is no longer agricultural and is transitioning to a residential land use. In addition, the Bowie Dairy, located at 6687 Bowie Road in the most downstream portion of the WBID, has 25-30 cattle. This facility is in close proximity to the main channel, approximately 850 meters downstream of US Highway 1. There are also numerous areas within the watershed classified as cropland and pasturelands; however, the agricultural operation of these areas is currently unknown. As dairy farms and horse farms are located in close proximity to surface waters, there is a potential for these operations to contribute to the fecal contamination of Trout River (PBS&J, May 2009).

According to the 2000 Census, there are 923 households within the watershed, averaging 2.01 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 369 dogs in the watershed.

TABLE 122: LAND USES IN THE TROUT RIVER (WB ID 2203) WATERSHED

LAND USE	ACRES	% OF TOTAL
Upland Forest	3622.2	36.5
Wetlands	2948.9	29.8
Low Density Residential	1023.9	10.3
Cropland and Pastureland	937.7	9.5
Non-Forested Upland	434.9	4.4
Medium Density Residential	377.2	3.8
Commercial/ Utility/ Institutional	170.8	1.7
Specialty Farms	87.8	0.9
Water	84.9	0.9
Transportation	66.7	0.7
Disturbed Land	49.9	0.5
Feeding Operations	49.7	0.5
Recreational	41.6	0.4
Nurseries and Vineyards	11.5	0.1
Extractive	2.1	0.02
Industrial	1.3	0.0
TOTAL:	9,911.0	100

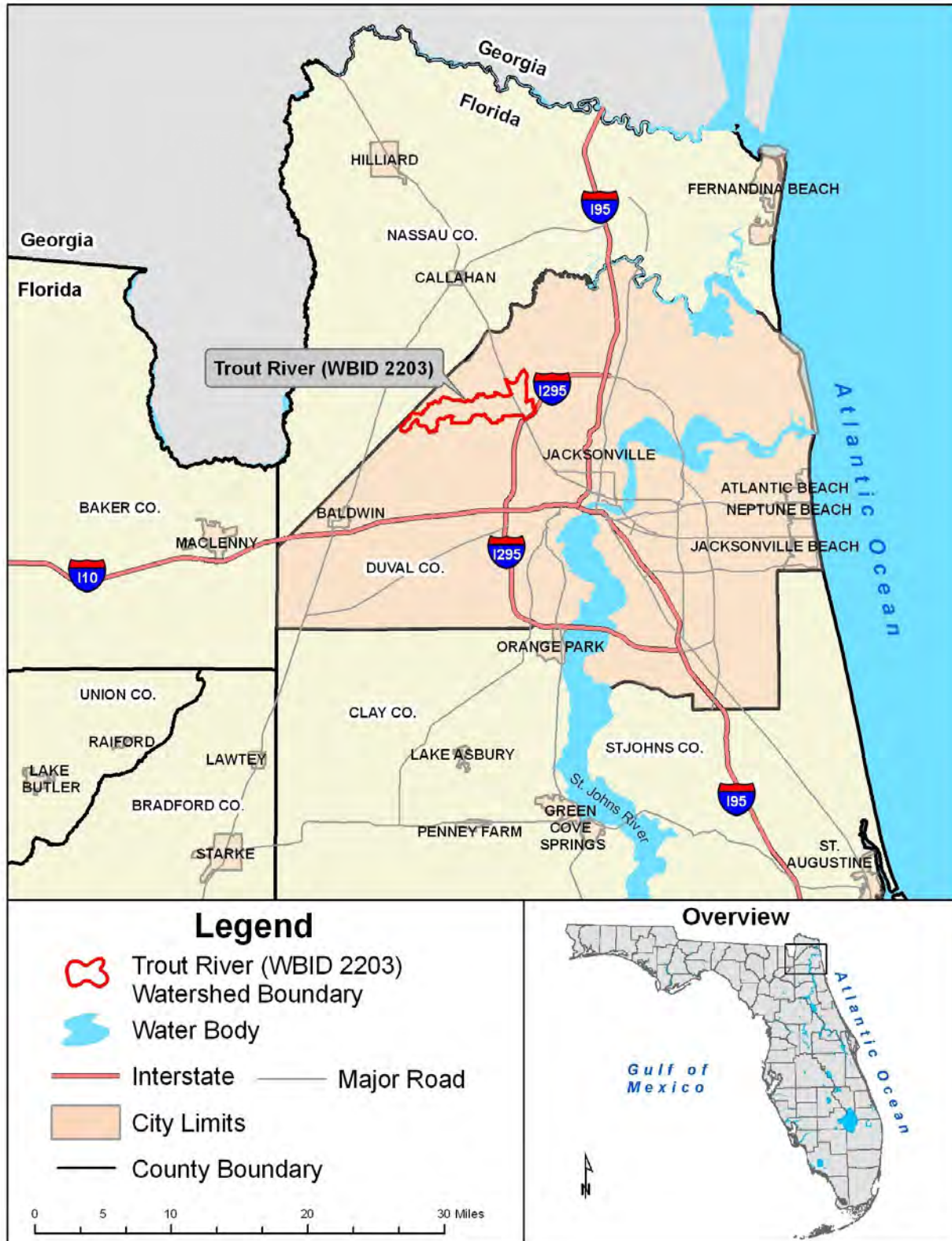


FIGURE 28: LOCATION OF THE TROUT RIVER (WBID 2203) WATERSHED

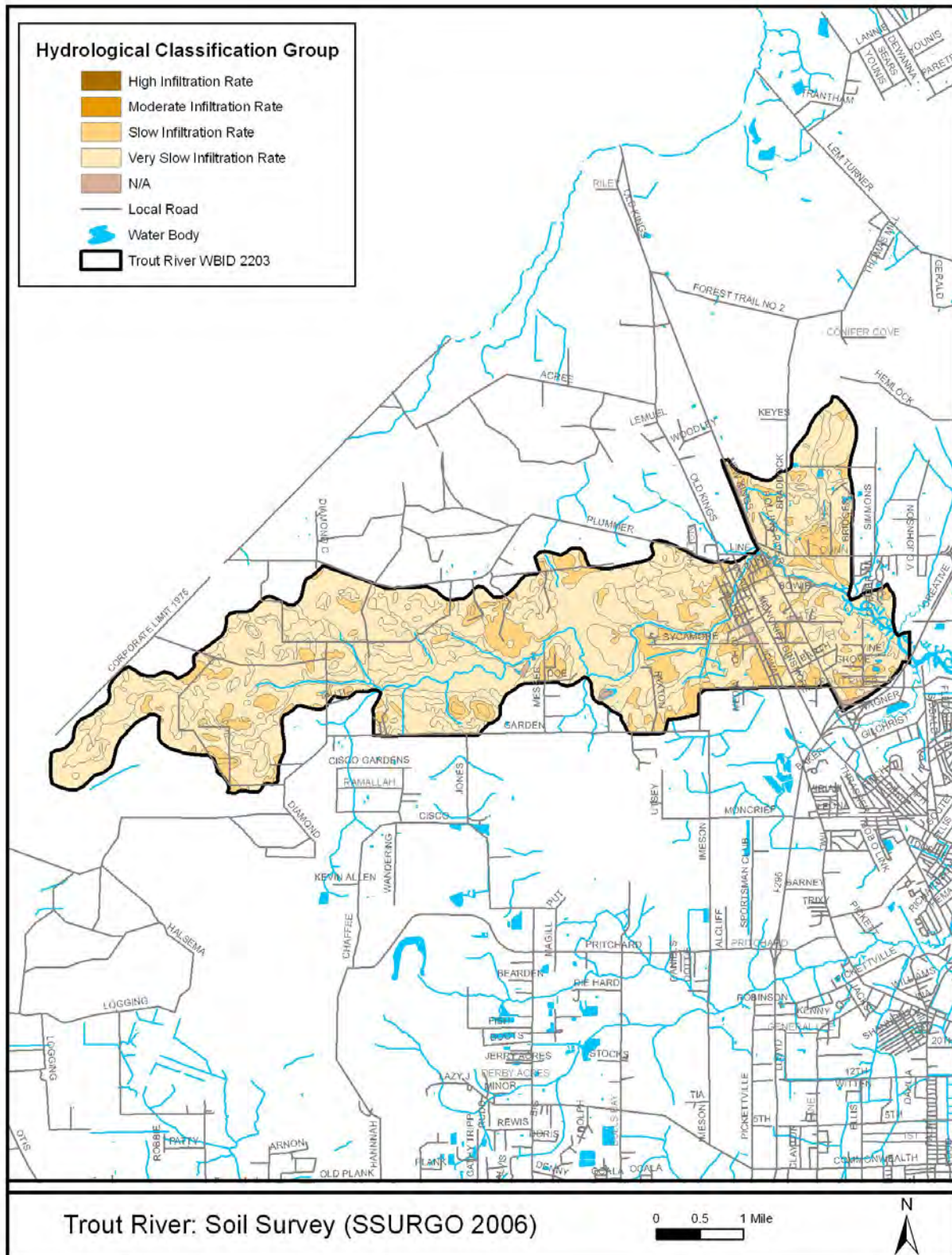


FIGURE 29: TROUT RIVER (WBID 2203) WBID LOCATOR MAP

19.2 POTENTIAL SOURCES

19.2.1 *POINT SOURCES*

Lil Champ #1215 has an industrial wastewater permit near the intersection of the southern WBID boundary and New Kings Road. The Silver Dolphin Mobile Home Park, located at 11134 Kings Road, previously discharged treated wastewater from a private WWTF into Trout River. This discharge was removed on September 25, 2006 when the mobile home park connected to JEA's centralized sewer service. The COJ/FDOT MS4 permit includes the Trout River (WBID 2203) watershed (PBS&J, May 2009).

19.2.2 *ILLICIT DISCHARGES*

COJ EQD identified 2 PICs in the Trout River watershed. One PIC was found on March 2005 north of the main channel at US Highway 1. The source of the PIC was identified as an open plastic system of sediment-laden water and the PIC was removed in March 2005. The status of the other PIC is pending investigation (PBS&J, May 2009).

19.2.3 *CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS*

The Trout River watershed is located within the JEA Buckman and District II WWTF Service Areas. There are an estimated 1,338 households (approximately 100% of households) connected to the sanitary sewer system. This WBID supports nearly 82 kilometers (51 miles) of sewer lines and 5 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is found primarily: (1) in a small area just west of the Garden Street and the Jones Road intersection in close proximity to an unnamed tributary connected to the main channel just upstream of the northwest branch; (2) adjacent to the main channel near the Sycamore Street and the Rabbit Ridge Road intersection and the southeastern branch forks; (3) in areas along the southeastern branch and associated forks from the Sycamore Street and the Civic Club Drive intersection south to the southern WBID boundary; (4) in the northeast corner of the WBID in close proximity to the main channel just east of New Kings Road; (5) along the northeastern branch south of the Dunn Avenue and the Simmons Road intersection; and (6) outside the WBID boundary along the northeastern branch between Dunn Avenue and Interstate 295. There have been no SSOs reported by JEA within the Trout River WBID boundaries (PBS&J, May 2009).

19.2.4 *OSTDS*

WSEA estimates that there are 819 OSTDS in the watershed. According to DCHD, 36 septic system repair permits were issued within this area. There were several septic system repair permits located in close proximity to surface waters: (1) along the upper Trout River (WBID 2223); (2) at the main channel near Messer Road; (3) along Bay Drain at Garden Street; (4) in areas along the main channel between the Civic Club Drive and the Sycamore Street intersection and Braddock Road; (5) on the Little Trout River at Old Kings Road; and (6) along the Gully Branch (PBS&J, May 2009).

19.2.5 *NONPOINT SOURCES*

An analysis of impervious surface indicates that the Trout River WBID contains predominantly less than 10% impervious surfaces. Areas with less than 10% impervious surface are located throughout the watershed and primarily correspond to wetland and upland forest land use classifications. Areas with 10% to 25% impervious surface occur primarily within the eastern portion of the watershed, corresponding mainly with the residential portion of the WBID. Areas

of the watershed with greater than 25% impervious surface correspond to commercial/utility and institutional land use classifications and are located in close proximity to surface waters along New Kings Road and at a utility strip that bisects the watershed at Sycamore Street (PBS&J, May 2009).

Furthermore, the potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients within the WBID are predominantly low. The lower runoff coefficients were calculated primarily for areas corresponding to wetland and upland forest land use classifications. The highest runoff coefficients correlated with transportation and commercial/utility and institutional land use classifications and are located in close proximity to surface waters mainly at US Highway 1 (PBS&J, May 2009).

The storm sewer network in the Trout River watershed includes 32 permitted stormwater treatment areas, encompassing approximately 5.82% to 26.14% of the WBID area. Stormwater infrastructure within the WBID includes 33 outfalls by receiving water (none are classified by FDEP as “major outfalls”) and 212 inlets. Inlets and outfalls are located primarily in the eastern portion of the WBID. There are few closed conveyance systems and ditches within the watershed. The most significant ditch parallels Moncrief Dinsmore Road from the southern WBID boundary north to Civic Club Drive. There are also numerous ponds located in close proximity to Trout River surface waters: (1) in close proximity to the main channel at Dunn Terrace Avenue; (2) along the main channel at Civic Club Drive; (3) in close proximity to the southeastern branch at Lancashire Drive; (4) at the upper Trout River at Garden Street; and (5) at the Gully Branch between Old Kings Road and New Kings Road. As these ponds are in close proximity to Trout River, there is a potential for their waters to merge with Trout River surface waters (PBS&J, May 2009).

Higher fecal coliform loadings were not identified in the “wet” season suggesting that the majority of bacterial loading was delivered to Trout River through nonpoint source discharges, failing wastewater conveyance systems, or septic systems independent of rainfall. Considering the possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were even higher than they appeared to be (PBS&J, May 2009).

19.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

19.3.1 *JEA ACTIVITIES IN THE TROUT RIVER (WBID 2203) WATERSHED*

19.3.1.1 **Ongoing JEA Programs and Activities**

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA has replaced or repaired components on 1 of the 5 (20%) lift stations in the WBID. During FY09, JEA inspected 26,743 LF of pipe using a closed circuit television system, pipe cleaned 5,130 LF, and cleaned 137,945 LF of HPDE pipe to prevent blockages. These activities will continue in the future to maintain the sanitary sewer system and prevent future problems. **Table 123** lists JEA's projects in the WBID.

TABLE 123: JEA ACTIVITIES IN THE TROUT RIVER (WBID 2203) WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-171	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-172	ARV Inspection and Rehab	See Appendix E	27 of 36 ARVs replaced	\$100,000*	JEA	Ongoing
JEA-173	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-174	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-175	Pump Station Class I/II Rebuilding	Repair or replace components of existing pump stations	1 project in watershed in FY09	\$35,022	JEA	Ongoing
JEA-176	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	2 stations (BIG-6671, Bigby Lane)	Unknown	JEA	Planned
JEA-177	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	1 station (Rabbit Ridge)	Unknown	JEA	Planned
JEA-178	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-179	Pipe TV Inspection	Inspect existing infrastructure through use of a closed circuit TV system	26,743 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-180	Pipe Cleaning	Clean existing pipes to avoid blockages	5,130 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-181	HDPE Pipe Cleaning - Contractor	Clean existing HDPE pipes to avoid blockages	137,945 ft of HDPE pipe cleaned in watershed	\$ 172,431	JEA	Ongoing
JEA-182	Pipe Cleaning	Clean existing pipes to avoid blockages	Not applicable	Unknown	JEA	Ongoing
JEA-183	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-184	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-185	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-186	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$200,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

19.3.2 DCHD ACTIVITIES IN THE TROUT RIVER (WBID 2203) WATERSHED

19.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

DCHD has implemented the OSTDS Program to address septic tanks as a potential source in the watershed. As part of this effort, it has issued 251 new construction permits, 36 repair permits, and 23 abandonment permits in the WBID. In addition, 27 annual operating permits have been issued for PBTS in the watershed. DCHD has conducted 290 plan reviews and site evaluations and 52 investigations in response to complaints received. DCHD will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 124** lists DCHD's projects in the Trout River watershed.

TABLE 124: DCHD ACTIVITIES IN THE TROUT RIVER (WBID 2203) WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-91	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 251 new construction permits, 36 repair permits, and 23 abandonment permits issued	\$146,165	General Revenue/DOH	Ongoing
DCHD-92	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	Approximately 27 annual operating permits issued for commercial; 2 PBTS are monitored annually	\$72,500	General Revenue/DOH	Ongoing
DCHD-93	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	General Revenue/DOH	Ongoing
DCHD-94	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 290 plan reviews and site evaluations have been performed based upon permitting history	\$72,500	General Revenue/DOH	Ongoing
DCHD-95	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	General Revenue/DOH	Ongoing
DCHD-96	Failure Area Evaluation	Work with COJ to consider if the area south of Plummer Road, north of Garden Street and Trout River Blvd, west to I-295 and east to Messer Road should be included as a failure area	Consideration for adding a failure area	Unknown	General Revenue/DOH	Planned

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-97	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	52 complaint investigations have been performed	\$17,300	General Revenue/DOH	Ongoing

19.3.3 COJ ACTIVITIES IN THE TROUT RIVER (WBID 2203) WATERSHED

19.3.3.1 Completed COJ Projects

19.3.3.2 COJ Projects in Construction or Design

COJ is planning a project in the Messer Area to provide positive drainage to eliminate flooding. The Garden Street Drainage Improvements Project is currently under construction and the Allene Road Ditch Improvement Project is in design. These projects, once completed, will provide stormwater treatment and reduce flooding, which will help with bacteria loading to the creek from stormwater runoff in these areas.

19.3.3.3 Ongoing COJ Programs and Activities

COJ has established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. In Trout River (WBID 2203), COJ has 2 routine monitoring stations that are sampled quarterly. A total of 91 samples were taken at this station between 1995 and 2009. In addition to the routine sampling, COJ EQD also participates in the TAT. EQD has collected 91 samples as part of the TAT, with an additional 2 samples taken to follow up on high fecal coliform counts in an effort to identify potential sources.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 156 work orders for ditch and creek regrading, erosion control, and cleaning; 4 work orders for lake and pond maintenance; and 117 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

As part of the PIC Program, COJ has identified 2 PICs in the watershed; 1 PIC was determined to be illicit and was removed. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

COJ PWD has also conducted inspections in the watershed, including 2 investigations into illicit water discharges, 6 illegal discharges, 2 sewer lines that drained into a yard or ditch, 5 SSOs, and 27 private lift station inspections. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database. **Table 125** provides additional information on COJ's activities in the Trout River (WBID 2203) watershed.

TABLE 125: COJ ACTIVITIES IN THE TROUT RIVER (WBID 2203) WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Capital Improvement Projects						
COJ-265	Messer Area Drainage	Provide positive drainage to eliminate flooding; completion in 2013	Unknown	\$4,750,000	COJ	Planned
Drainage System Rehab Projects						
COJ-266	Garden Street Drainage Improvements	Intersection of Garden Street and Iowa Avenue floods	Unknown	\$158,170	COJ	Construction
COJ-267	Allene Road Ditch Improvement	Ditch is eroding and flooding street	Unknown	Unknown	COJ	Design
MS4 Maintenance Activities						
COJ-268	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	156 (for 2005-09)	\$50,953	COJ	Ongoing
COJ-269	Lake or Pond Problem		4 (for 2005-09)	Unknown	COJ	Ongoing
COJ-270	Structure Blocked/Repair/General Flooding		117 (for 2005-09)	\$6,119	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-271	Illicit Water Discharge	CARE initiated	2 (for 2006)	\$758	COJ	Ongoing
COJ-272	Pollution - Water - Illegal Discharge	CARE initiated	6 (for 2003-06)	\$2,274	COJ	Ongoing
COJ-273	Sewer drains into yard/ditch	CARE initiated	2 (for 2009)	\$758	COJ	Ongoing
COJ-274	Sewer Overflow	CARE initiated	5 (for 2001-06)	\$1,895	COJ	Ongoing
COJ-275	Private Lift Station Inspection	5 private lift stations in the WBID	27 (for 1997-2009)	\$10,233	COJ	Ongoing
COJ-276	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-277	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	3 stations (Old Kings Road and Dunn Avenue, 6611 Dunn Avenue, 912 New Kings Road)	Unknown	COJ	Planned
COJ-278	Illicit Discharge Detection and Elimination	0 open, 1 illicit	2 (for 2005-09)	\$758	COJ	Ongoing
COJ-279	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	91 (for 1995-2009)	Unknown	COJ	Ongoing
COJ-280	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	2 (for 2007-09)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-281	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	837 tanks, 18 connected	Unknown	COJ	Ongoing
COJ-282	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-283	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

19.3.4 FDOT ACTIVITIES IN THE TROUT RIVER (WBID 2203) WATERSHED

19.3.4.1 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a Drainage Connection Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT Drainage Connection permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. FDOT supports the Adopt-A-Highway Program in the watershed and collects trash from 4 miles of roadway. Street sweeping also occurs on 5 miles of roadways, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 2.5 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund 2 monitoring stations in the Tour River (WBID 2203) watershed that are sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 126** lists FDOT's activities in the Trout River (WBID 2203) watershed.

TABLE 126: FDOT ACTIVITIES IN THE TROUT RIVER (WBID 2203) WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-91	PIC Program	Search for illicit connections	Effort is continuous in WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-92	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	91 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-93	Source ID Sampling	Source ID sampling conducted when high levels of fecal coliform bacteria are noted	2 (for 2007-09)	See Note 2	FDOT/COJ	Ongoing
FDOT-94	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	FDOT	Ongoing
FDOT-95	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 4 miles	Unavailable	Not applicable	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-96	Maintain FDOT Stormwater Systems	Clean catch basin/inlet and other drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 2.5 miles of roadway and associated stormwater conveyance systems currently maintained in this WBID; approximately 5 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

19.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 123 through **Table 126** list the projects and programs to reduce fecal coliform loading in the Trout River (WBID 2203) watershed. Several key efforts completed in this WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Trout River (WBID 2203) based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Trout River (WBID 2203) watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

19.4.1 OSTDS

Repair Permits – There are 36 repair permits and no failure areas within the WBID. However, during the next failure area ranking, DCHD and COJ should consider looking at the portion of the WBID south of Plummer Road, north of the intersection of Garden Street and Trout River Boulevard, west to I-295, and east to Messer Road. This area is close to the convergence of Trout River and Little Trout River and there are a significant number of repair permits. Surface waters in this part of the watershed would benefit from removal of the failing OSTDS.

Program Implementation – City ordinances, inspections, and program implementation, combined with DCHD permit review processes and inspections, proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure area and to prevent the creation of new OSTDS sources.

Capital Improvement Projects – COJ has completed 2 capital projects in the watershed along Johnson Court and in the Messer area. In addition, they have a drainage improvements project in design on Allene Road. These projects are all located in OSTDS areas and have or will reduce high-water conditions that can contribute to septic tank failure from improperly treated waste.

19.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, COJ inspects 5 private lift stations in the watershed annually. Of these stations, there are 3 located near surface waters: (1) Old Kings Road and Dunn Avenue; (2) 6611 Dunn Avenue; and (3) 912 New Kings Road. COJ will inspect these stations to ensure they are functioning properly and report the status in the first annual BMAP progress report. The continuation of the inspection program and inspection of the stations near surface waters are sufficient to address private lift stations in the watershed at this time.

Sewer Infrastructure Projects – JEA rebuilt 1 of 5 lift stations in the watershed and replaced 27 of the 36 ARVs. JEA has 2 lift stations, BIG-6671 and Bigby Lane, stations located on the WBID boundary. JEA will verify which WBID these stations are located in and will provide an update in the first annual BMAP progress report. In addition, there is 1 station located in close proximity to surface waters at Rabbit Ridge Road. JEA will inspect this station to ensure it is functioning properly and report the results in the first annual BMAP progress report. JEA will continue their maintenance efforts and its systemwide programs, and this will be sufficient to address potential sewer sources in the WBID at this time.

Program Implementation – Continued inspection, repair, and maintenance activities in conjunction with the systemwide programs are sufficient to address potential sewer sources in the WBID at this time. The Root Cause Program and other SSO prevention efforts, such as FOG and CMOM, should be continued so that any additional infrastructure problems that develop will be identified and repaired. JEA will be expected to report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to ensure that the system is being monitored and maintained.

19.4.3 STORMWATER

Illicit Connection Removal – COJ has identified and removed 1 illicit connection. COJ and FDOT have committed to continue the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its facilities as part of its MS4 permit. In addition, FDOT sweeps 5 miles of roadway monthly and supports Adopt-A-Highway along 4 miles of roadways, preventing sediments from entering the stormwater conveyance system. FDOT will continue stormwater infrastructure maintenance, as these efforts prevent potential regrowth in the MS4 conveyances.

COJ Program Implementation – COJ completed 156 work orders for ditch maintenance, 4 work orders for pond problems, and 117 repairs of structures. The continuation of current programs and maintenance activities in the watershed will help reduce and eliminate potential sources of fecal coliform loading.

19.4.4 WILDLIFE SOURCES

Most of the western portion of the watershed is rural; therefore, it is likely that wildlife is the main source of fecal coliform in that portion of the WBID. Wetlands and upland forests account for nearly 66.3% of the total land coverage and form a boundary around the main channel and associated branches. As wetlands and upland forest serve as habitat for various species of

wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Trout River in these areas (PBS&J, May 2009).

TABLE 127: SUMMARY OF RESTORATION ACTIVITIES FOR THE TROUT RIVER (WBID 2203) WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	-	-	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	-
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehab	X	X	X	√
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	√	X	-	X
Capital Projects/Stormwater Water Quality BMPs	-	X	-	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	-	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	-	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	√	X	√	X
Tributary Assessment Team (TAT)	-	X	-	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

CHAPTER 20: TROUT RIVER (WBID 2203A)

20.1 WBID DESCRIPTION

Trout River, WBID 2203A, is located in Duval County, west of the Lower St. Johns River within the Trout River Planning Unit, as designated by the SJRWMD (**Figure 30**). This WBID only includes the lower Trout River. The general locations of the various headwaters are listed from upstream to downstream and include: Ninemile Creek (WBID 2220), Key Haven Boulevard, Sibbald Road, Portsmouth Avenue, Ribault Avenue, Dunn Avenue at West Branch (WBID 2210), Dunn Avenue, north of Armsdale Road at Blockhouse Creek (WBID 2207), Dunn Avenue at Highlands Creek, Gailwood Circle North, Sisson Drive, Ribault River (WBID 2224), Heckscher Drive, and Moncrief Creek (WBID 2228) (**Figure 31**) (PBS&J, October 2009).

The river generally flows southeast in a single channel with the exception of contributing branches that join Trout River from the west ("Ninemile Creek"), the south ("southwestern branch", "south central branch", "southeastern branch", "Ribault River", and "Moncrief Creek"), and the north ("northwestern branch", "West Branch", "north central branch", "Blockhouse Creek", "Highlands Creek", "Menlo Park branch", "Sisson branch", and "Heckscher branch"). The most upstream contributing branch, Ninemile Creek, flows into Trout River just east of Interstate 295. The southwestern branch stretches south from Trout River to Arrowsmith Road where it forks west and southwest to Sibbald Road. Just downstream, the south central branch extends south from Trout River to Portsmouth Avenue. The northwestern branch appears to originate near a pond at Key Haven Boulevard and merges with the main channel south of Bessent Road. A ditch system forms segments of the southeastern branch, which continues south from the main channel before branching east close to Ribault Avenue. West Branch joins Trout River slightly south of Bessent Avenue. The north central branch appears to begin within the West Branch WBID boundary at Dunn Avenue and generally extends south before draining into Trout River at Captain Jim Drive. Blockhouse Creek merges with Trout River south of Broward Road. Highlands Creek stretches north from Trout River to just north of Leonid Road where it forks northeast and east to Dunn Avenue. The Menlo Park branch parallels Gailwood Circle North and Gailwood Circle East and extends south into wetlands at Menlo Park before merging with Trout River. The Sisson branch begins just east of Sisson Drive and flows southwest into the main channel west of the Broward Road and Clark Road intersection. The Ribault River flows into the main channel of Trout River northeast of Harrison Court. The Heckscher branch originates at a pond near Heckscher Drive and parallels Interstate 95 south of Heckscher Drive until it merges with Trout River. The most downstream branch, Moncrief Creek, empties into Trout River north of Tallulah Avenue. The waters of Trout River continue southeast to the St. Johns River approximately 2.4 kilometers (1.5 miles) east of Main Street (PBS&J, October 2009).

The spatial distribution and acreage of different land use categories in the Trout River watershed were identified using 2004 land use coverage data from the SJRWMD (**Table 128**). The dominant land use (1,698.8 acres; 22% of total coverage) in the Trout River watershed is classified as medium-density residential, and is primarily located: (1) adjacent to the main channel from Gibson Avenue east to Carbondale Drive; (2) in areas in the southeast corner of the WBID; (3) on either side of Interstate 95 on the south side of Trout River; (4) in areas south of Leonid Road from Dodd Road east to Monaco Drive; and (5) in patches throughout the watershed. The next two most abundant land cover categories, excluding water (1,601.2 acres; 20.7% of total coverage) are: (1) high-density residential (926.7 acres; 12.0% of total coverage), located primarily: (i) in the southwest corner of the WBID in the Sherwood Forest subdivision; (ii) near the northwestern branch at Woodley Creek Road; (iii) west of the north central branch at

Lydia Estates Drive; (iv) west of Interstate 95 at Island Pointe Apartments and Water's Edge Apartments; (v) southeast of Lexington Drive and Saratoga Boulevard; and (vi) in the southeast corner of the WBID west of Main Street; and (2) wetlands (884.8 acres; 11.5% of total coverage) predominantly located on the north side of Trout River: (i) in the northwestern corner of the WBID along the main channel and northwestern branch; (ii) in areas adjacent to the north central branch; (iii) in areas surrounding the Broward Road and Clark Road intersection near the Sisson branch; and (iv) in areas from the Interstate 95 and Heckscher Drive intersection east to Hayden Road including the Heckscher branch (PBS&J, October 2009).

Wetlands and upland forests accounted for nearly 20% of the total land coverage of the Trout River watershed and form a boundary around most of the northwestern branch and Heckscher branch and small segments of the main channel, north central branch, southeastern branch, and Sisson branch. As wetlands and upland forest serve as habitat for various species of wildlife and are in close proximity to surface waters, there is a potential for wildlife to contribute to the fecal pollution of Trout River in these areas (PBS&J, October 2009).

According to the 2000 Census, there are 8,348 households within the watershed, averaging 2.25 people per household. In addition, assuming that 40 percent of households have one dog (Tyler 2006), there are an estimated 3,339 dogs in the watershed (PBS&J, October 2009).

TABLE 128: LAND USES IN THE TROUT RIVER (WBID 2203A) WATERSHED

LAND USE	ACRES	% OF TOTAL
Medium Density Residential	1698.8	22.0
Water	1601.2	20.7
High Density Residential	926.7	12.0
Wetlands	884.8	11.5
Upland Forest	630.6	8.2
Low Density Residential	517.4	6.7
Commercial/ Utility/ Institutional	444.8	5.8
Recreational	384.6	5.0
Transportation	334.1	4.3
Open Land	93.3	1.2
Non-Forested Upland	92.2	1.2
Disturbed Land	49.9	0.6
Extractive	38.6	0.5
Industrial	27.0	0.4
TOTAL:	7,724.1	100

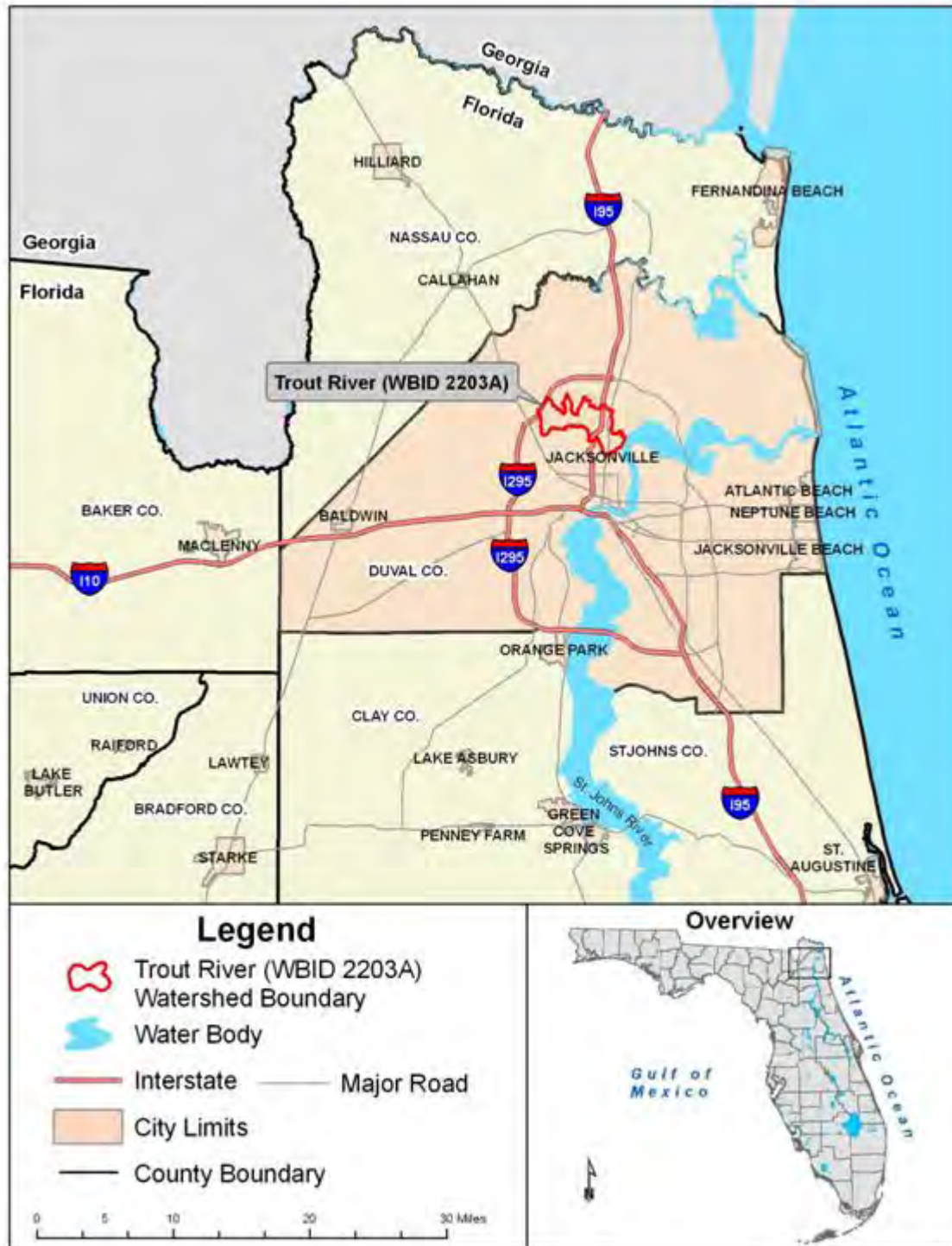


FIGURE 30: LOCATION OF THE TROUT RIVER (WBID 2203A) WATERSHED

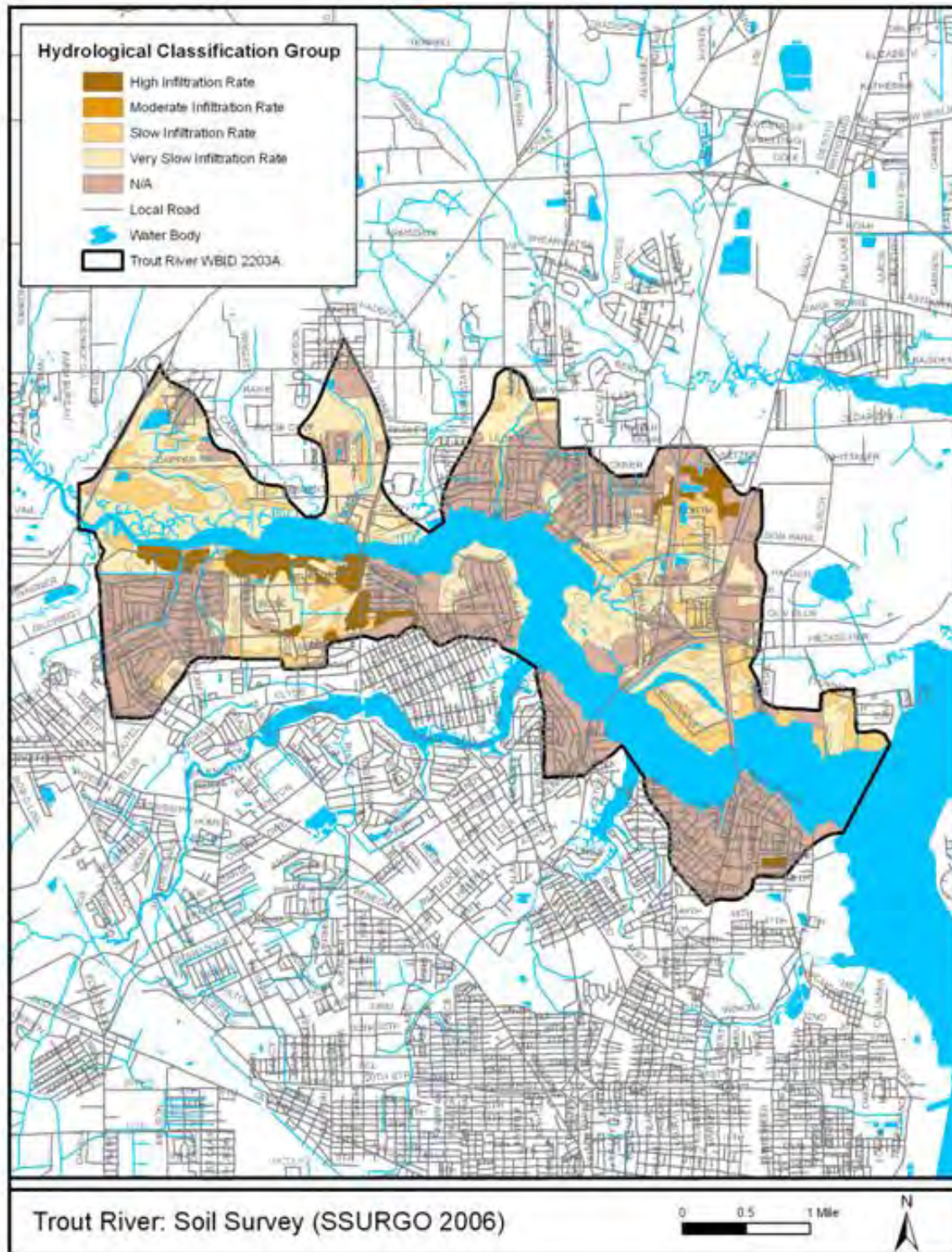


FIGURE 31: TROUT RIVER (WBID 2203A) WBID LOCATOR MAP

20.2 POTENTIAL SOURCES

20.2.1 POINT SOURCES

The Nave Fuel Depot (FL0032492) and Cemex – Main Street Cement Batch Processing (FLG110368) have industrial wastewater permits near the confluence of the Trout River and St. Johns River at C Street and at the intersection of Main Street and Heckscher Drive, respectively. In addition, The COJ/FDOT MS4 permit includes the Trout River (WBID 2203A) watershed (PBS&J, October 2009).

20.2.2 ILLICIT DISCHARGES

Ten illicit connections were identified by COJ EQD in the Trout River (WBID 2203A) watershed. Of these 3 were determined to be illicit and were removed. There are 2 PICs classified as other and 2 PICs pending investigation.

20.2.3 CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS

The Trout River (WBID 2203A) watershed is located within the District II and Buckman JEA WWTF service areas. District II and Buckman WWTF service areas are located in portions of the watershed north and south of Trout River, respectively. There are an estimated 6,072 households (approximately 73% of households) connected to the sanitary sewer system within the Trout River watershed. This WBID supports over 417 kilometers (259 miles) of sewer lines and 32 sanitary sewer lift stations, as well as associated infrastructure that comprise the central sanitary sewer system and have the potential to contribute fecal contamination to surface waters. Available GIS data indicate that sewer infrastructure is found primarily: (1) in the southwestern corner of the watershed at the southwestern and south central branches between the western WBID boundary and Waynesboro Avenue; (2) in the northwestern corner of the WBID in areas near the northwestern branch along Capper Drive and near Key Haven Boulevard; (3) near the north central branch in areas just south of Dunn Avenue and along Capper Road; (4) between the northern WBID boundary and Trout River from Dodd Road east to Monaco Drive including areas in close proximity to Highlands Creek and the Menlo Park branch; (5) near the southern WBID boundary at Lem Turner Road; (6) in close proximity to Sisson branch at Interstate 95; (7) in close proximity to the main channel, west of Broward Road near the Island Pointe Apartments; and (8) in the southeastern corner of the WBID adjacent to the main channel (PBS&J, October 2009).

There have been 21 SSOs reported by JEA within the Trout River WBID boundaries between March 2001 and December 2007 (**Table 129**). The estimated volume of spills associated with these overflows ranged from 10 to 2,500 gallons and averaged approximately 596 gallons; six SSOs were reported to have potentially impacted surface waters. Two of the SSOs that impacted surface waters (September 29, 2003 and October 14, 2003) occurred in the same location in close proximity to Highlands Creek at Villanova Road and totaled 3,000 gallons (PBS&J, October 2009).

TABLE 129: SSOs REPORTED IN THE TROUT RIVER (WBID 2203A) WATERSHED, 2001-07

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Trout River (2203A)	15-Dec-01	10	No
Trout River (2203A)	19-Dec-01*	2,500	Yes
Trout River (2203A)	24-Jan-02	20	No
Trout River (2203A)	9-Feb-02	50	No
Trout River (2203A)	31-Dec-02	300	No

WBID NAME (NUMBER)	DATE OF OVERFLOW	ESTIMATED VOLUME OF SPILL (GALLONS)	POTENTIALLY IMPACTED SURFACE WATERS
Trout River (2203A)	24-Jan-03	50	No
Trout River (2203A)	10-Apr-03*	150	Yes
Trout River (2203A)	24-May-03*	1,200	No
Trout River (2203A)	29-Sep-03*	2,000	Yes
Trout River (2203A)	14-Oct-03*	1,000	Yes
Trout River (2203A)	21-Oct-03	250	No
Trout River (2203A)	12-Nov-03	500	No
Trout River (2203A)	7-Sep-04*	450	Yes
Trout River (2203A)	19-Dec-04	100	No
Trout River (2203A)	14-Mar-05	50	No
Trout River (2203A)	20-Aug-05	10	No
Trout River (2203A)	29-Sep-05	200	No
Trout River (2203A)	9-Dec-05	75	No
Trout River (2203A)	28-Dec-05	350	No
Trout River (2203A)	7-Apr-06*	2,500	No
Trout River (2203A)	10-May-06*	750	Yes

*Reportable SSOs that spilled > 1,000 gallons of sewage and/or affected surface waters.

20.2.4 OSTDS

WSEA estimates that there are 2,964 OSTDS in the Trout River (WBID 2203A) watershed. According to DCHD, 163 septic system repair permits were issued within this area. The permits, and presumably failed septic systems, are located in close proximity to surface waters: (1) along Trout River Boulevard at the main channel and southwestern branch; (2) at Bessent Road at the northwestern branch; (3) at the north central branch at Capper Road and at Beam Street; (4) at the main channel near the Bayview Avenue and Lem Turner Road intersection; (5) at the main channel along Carbondale Road and along East Carbondale Drive; (6) at the main channel along Broward Road between Lem Turner Road and Villanova Road; (7) at Highlands Creek from Dunn Avenue south to Broward Road; (8) at Highlands Creek at Adee Road; (9) at the Menlo Park branch just south of Dunn Avenue; (10) at the downstream segment of Sisson Branch at Broward Road; and (11) at the upstream segment of Sisson Branch just west of Sisson Drive. As parcels with OSTDS repair permits are located in close proximity to surface waters, there is a potential for OSTDS to contribute to the fecal pollution in these areas of the river (PBS&J, October 2009).

In addition, one nuisance area, Lake Forest, and one septic system failure area, Riverview, are located within the WBID. The Lake Forest nuisance area covers the southern portion of the WBID from the confluence of Ribault River and Trout River southeast to the Interstate 95 southern WBID boundary intersection. The Riverview failure area is located in the southern portion of the WBID south of Bassett Road from Ribault Avenue east to the confluence of Ribault River and Trout River. According to JEA, phase 1 and phases 2A and 2B of the Lake Forest nuisance area completed transition to centralized sewer in December 2005 and November 2006, respectively; the final phase (phase 3) completed transition to centralized sewer in July 2009. As of August 2009, there is no timeline set for design or construction of the Riverview failure area. (PBS&J, October 2009).

20.2.5 NONPOINT SOURCES

An analysis of impervious surface indicates that the Trout River watershed contains predominantly 10% to 25% impervious surface. Areas with less than 10% impervious surface

primarily correspond to wetland and upland forest land use classifications. Areas with 10% to 25% impervious surface occur throughout the watershed. Areas of the WBID with greater than 25% impervious surface primarily correspond to commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) at the north central branch along Lem Turner Road; (2) near the headwaters of Highlands Creek at Dunn Avenue; (3) at the headwaters of the Menlo Park branch at Dunn Avenue; (4) at the Sisson branch at Interstate 95; and (5) near the headwaters of the Heckscher branch on either side of Main Street (PBS&J, October 2009).

Furthermore, the potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients within the WBID range from low-to-high depending on the area of the watershed. Lower runoff coefficients were calculated primarily in areas classified as wetlands, upland forests, and open land. The highest runoff coefficients correlated with high-density residential, transportation, and commercial/utility and institutional land use classifications and are located in close proximity to surface waters: (1) along the southwestern and south central branches south of Trout River Boulevard; (2) at the northwestern branch in areas near the Florida Community College of North Jacksonville; (3) at the north central branch along Lem Turner Road; (4) near the headwaters of Highlands Creek north of Dunn Avenue; (5) near the upstream segments of the Menlo Park branch at Dunn Avenue; (6) at the Sisson branch at the Clark Road and Interstate 95 intersection; and (7) at the Heckscher branch along Interstate 95. High stormwater coefficients indicate that there is a potential for stormwater to impact surface waters in these areas (PBS&J, October 2009).

The storm sewer network in the watershed includes 52 permitted stormwater treatment areas, encompassing approximately 15.99% to 24.11% of the WBID area. Stormwater infrastructure within the WBID includes 235 outfalls by receiving water (two are classified by FDEP as “major outfalls”) and 1,631 inlets. Although closed conveyances are common throughout the WBID, there are few open ditch systems present in the watershed. Ditches form segments of the: (1) southwestern branch along Arrowsmith Drive, Northfolk Boulevard, and Roanoke Boulevard; (2) south central branch beginning at Arrowsmith Drive south to the southern WBID boundary; (3) northwestern branch from Capper Road north to the northern WBID boundary; (4) southeastern branch from Trout River Boulevard south to Rose Street; and (5) the Heckscher branch. Ditches are also located: (1) from Menlo Avenue north to Dunn Avenue; (2) adjacent to Swarthmore Drive; (3) adjacent to the Sisson branch at Main Street and Interstate 95; and (4) near the Broward Road and Interstate 95 intersection in close proximity to the Heckscher branch. The ditch system that makes up part of the southwestern branch extends outside the southwestern WBID boundary, west of Roanoke Boulevard, into the Ninemile Creek WBID. All ditch systems, with the exception of that along Swarthmore Drive, appear to merge directly with the main channel or with its associated branches (PBS&J, October 2009).

There are also numerous ponds and lakes located in close proximity to Trout River surface waters: (1) at the Florida Community College North Campus near the northwestern branch; (2) at Lake Bethesda Park near the northwestern branch; (3) in several locations along Woodley Creek Road near the northwestern branch; (4) near the headwaters of the north central branch at Natalie Drive North; (5) at the upstream segment of Highlands Creek at Ray Greene Park; (6) at the Sisson branch and Interstate Center Drive intersection; and (7) at the headwaters of the Heckscher branch at Heckscher Drive. As these ponds are in close proximity to Trout River, there is a potential for their waters to merge with Trout River surface waters (PBS&J, October 2009).

Fecal coliform concentrations were not different during the “wet” and “dry” seasons suggesting that the majority of bacterial loading was delivered to Trout River through nonpoint source discharges, failing wastewater conveyance systems, or septic systems during rainfall.

Considering the possibility for dilution during the “wet” season, it is possible that loadings observed during this time of the year were even higher than they appeared to be (PBS&J, October 2009).

20.3 PROJECTS TO REDUCE FECAL COLIFORM LOADING

20.3.1 JEA ACTIVITIES IN THE TROUT RIVER (WBID 2203A) WATERSHED

20.3.1.1 Ongoing JEA Programs and Activities

JEA is currently implementing a number of countywide specific improvement programs, as follows, to address the sanitary sewer system as a source of fecal coliform contamination: (1) FOG Reduction Program; (2) SSO Root Cause Program; (3) Pop-Top Program; (4) Non-Destructive Testing and ARV Programs; (5) SCADA; (6) Third Party Education and Enforcement Program; (7) Manhole Monitoring; (8) Force Main Discharge Manholes; and (9) CMOM Program. **Appendix E** describes each of these programs.

JEA has replaced or repaired components on 1 of the 32 (3.13%) lift stations in the WBID. JEA will continue the maintenance activities in the future to maintain the sanitary sewer system and prevent future problems. **Table 130** lists JEA's activities in the watershed.

TABLE 130: JEA ACTIVITIES IN THE TROUT RIVER (WBID 2203A) WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-187	Manhole Linings Rehabbed	Repair deteriorating manhole linings	Not applicable	\$150,000*	JEA	Ongoing
JEA-188	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix E	Not applicable	\$22,000,000*	JEA	Complete
JEA-189	Inspect Force Main Discharge Manholes, Repair/Rehab as Necessary	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-190	Pump Station Class I/II Rebuilding	Repair or replace components of existing pump stations	1 project in watershed in FY09	\$35,022	JEA	Ongoing
JEA-191	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	1 station (Northwood Apartments)	Unknown	JEA	Planned
JEA-192	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	13 stations	Unknown	JEA	Planned

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
JEA-193	FOG Reduction Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-194	Implement CMOM Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-195	SSO Root Cause Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-196	Pop-Top Program	See Appendix E	Not applicable	Unknown	JEA	Ongoing
JEA-197	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix E	Not applicable	\$100,000*	JEA	Ongoing

* Costs provided are total systemwide costs for the program because WBID-specific costs are currently unavailable.

20.3.2 DCHD ACTIVITIES IN THE TROUT RIVER (WBID 2203A) WATERSHED

20.3.2.1 Ongoing DCHD Programs and Activities

Currently, DCHD is implementing a variety of countywide specific improvement programs and restoration activities to address OSTDS as sources of fecal coliform contamination. These include (1) the OSTDS Program; (2) training programs; and (3) the designation of septic tank failure and nuisance areas for transfer to central sewer. **Appendix E** describes each of these programs.

There is currently 1 designated failure area, Riverview, in the watershed. Approximately 51% of this failure area is located in the Trout River (WBID 2203A) watershed. DCHD has also implemented the OSTDS Program to address septic tanks as a potential source in the watershed. As part of this effort, it has issued 167 new construction permits, 163 repair permits, and 112 abandonment permits in the WBID. In addition, 34 annual operating permits have been issued for PBTS and aerobic treatment units in the watershed. DCHD has conducted 338 plan reviews and site evaluations. And 168 investigations in response to complaints received. DCHD will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 131** lists DCHD's projects in the Trout River (WBID 2203A) watershed.

TABLE 131: DCHD ACTIVITIES IN THE TROUT RIVER (WBID 2203A) WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-98	OSTDS Program	Implementation of programs to address septic systems as potential sources	Approximately 167 new construction permits, 163 repair permits, and 112 abandonment permits issued	\$178,300	General Revenue/ DOH	Ongoing
DCHD-99	Annual Operating Permits	Annual Operating Permits issued for PBTS, systems located within IMZ, and commercial systems	Approximately 34 annual operating permits issued for commercial properties; 11 PBTS and 7 Aerobic Treatment Units are monitored annually	\$130,000	General Revenue/ DOH	Ongoing
DCHD-100	SWIM Project	Implementation of broad-ranging septic tank ordinance	Approximately 51% of Riverview and 32% of Lake Forest Septic Tank Failure Areas exist within this WBID	\$147,050	General Revenue/ DOH	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
DCHD-101	DCHD-Sponsored Training Programs	Annual training programs held for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 - 2 trainings per year providing up to 12 contact hours	\$2,500	General Revenue/DOH	Ongoing
DCHD-102	Application/Plan Review/Site Evaluations	DCHD performs a plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of an existing system	Approximately 338 plan reviews and site evaluations have been performed based upon permitting history	\$84,500	General Revenue/DOH	Ongoing
DCHD-103	Septic Tank Failure Area Ranking	Septic Tank Failure Area scored and prioritized on an annual basis	Less than 1 year since previous update	Not applicable	General Revenue/DOH	Ongoing
DCHD-104	Complaint Investigations	DCHD performs an investigation of all complaints received, performs a site visit, and initiates enforcement action on sanitary nuisance violations	168 complaint investigations have been performed within this WBID	\$55,950	General Revenue/DOH	Ongoing
DCHD-105	Intensive Inspection Program	Intensive geospecific inspections in selected BMAP WBIDs based on repair permit applications, water quality information, and site conditions; additional WBIDs may be identified in future based on ongoing assessment efforts	103 tanks north of Lauder Avenue to Carbondale Drive, including Harriet Avenue, Sappington Avenue, and Evans Road	\$15,965	Unknown	Planned

20.3.3 COJ ACTIVITIES IN THE TROUT RIVER (WBID 2203A) WATERSHED

20.3.3.1 Completed COJ Projects

COJ has completed the Sherwood Forest Area and Riverview North flood control projects. These projects reduce flooding in these areas of the watershed to decrease fecal coliform loading to Trout River.

20.3.3.2 COJ Projects in Construction and Design

COJ also has a drainage improvement project along Soutel/Bassett is in design. This project, once completed, will reduce flooding in this area and associated stormwater bacteria loading to the river.

20.3.3.3 Ongoing COJ Programs and Activities

COJ has also established a monitoring plan to evaluate the effectiveness of the SWMP and the associated pollutant reduction from MS4 systems to waters of the state. As part of this plan,

COJ has 2 routine monitoring stations in the watershed that are sampled quarterly. A total of 95 samples were taken at this station between 1995 and 2009.

COJ PWD's Streets and Drainage Division is responsible for maintaining its stormwater conveyance systems in Jacksonville. This maintenance includes 636 work orders for ditch and creek regrading, erosion control, and cleaning; 20 work orders for lake and pond maintenance; and 569 work orders for the repair of blocked structures and measures to prevent flooding. These work orders were completed between 2005 and 2009. PWD will continue a level of effort to maintain the MS4 conveyances based on CARE requests.

In addition, COJ has implemented the PIC Program, which keeps track of reported PICs in a database for COJ inspector follow-up. A total of 10 PICs were identified, with 3 confirmed as illicit and removed, and 2 still pending investigation. As part of the PIC Program, COJ EQD provides public outreach through educational pamphlets, informational door hangers, and the storm drain–stenciling program.

COJ PWD also conducts inspections in the watershed that are initiated through the CARE database. Between 1995 and 2009, PWD conducted 14 investigations into illicit water discharges, 22 illegal discharges, 4 sewer lines that drained into a yard or ditch, 9 SSOs, and 54 lift station inspections. PWD will maintain a future level of effort for these investigations based on requests, which are logged and tracked through the CARE database.

Table 132 provides additional details on COJ's activities in the watershed.

TABLE 132: COJ ACTIVITIES IN THE TROUT RIVER (WBID 2203A) WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
Capital Improvement Projects						
COJ-284	Sherwood Forest Area	Flood control	Unknown	\$3,190,400	COJ	Complete
COJ-285	La Villa Brooklyn (Broward Road at Smith Road)	Flood control and compensatory treatment for new downtown library	Unknown	\$2,750,000	COJ	Construction
COJ-286	Riverview North	Wet detention/flood control	Unknown	\$1,646,045	COJ	Complete
Drainage System Rehab Projects						
COJ-287	Soutel/Bassett Drainage Improvements	Drain pipe beyond pond is 1' too high	Unknown	Unknown	COJ	Design
MS4 Maintenance Activities						
COJ-288	Ditch/Creek Regrade/Erosion/ Clean	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	636 (for 2005-09)	\$75,689.45	COJ	Ongoing
COJ-289	Lake or Pond Problem		20 (for 2005-09)	Unknown	COJ	Ongoing
COJ-290	Structure Blocked/Repair/General Flooding		569 (for 2005-09)	\$34,167.47	COJ	Ongoing
Inspection, Enforcement, and Sampling						
COJ-291	Illicit Water Discharge	CARE initiated	14 (for 2005-07)	\$5,306	COJ	Ongoing
COJ-292	Pollution - Water - Illegal Discharge	CARE initiated	22 (for 2001-08)	\$8,338	COJ	Ongoing
COJ-293	Sewer drains into yard/ditch	CARE initiated	4 (for 2008-09)	\$1,516	COJ	Ongoing
COJ-294	Sewer Overflow	CARE initiated	43 (for 2000-09)	\$16,297	COJ	Ongoing
COJ-295	Septic Tank Inspection	CARE initiated	2 (for 2007-08)	\$758	COJ	Ongoing
COJ-296	GIS Coverage Update	Update and verify private lift station GIS coverage	Ongoing – 2010 completion	Unknown	COJ	Planned
COJ-297	Private Lift Station Inspection	9 private lift stations in the WBID	54 (for 1997-2009)	\$20,466	COJ	Ongoing
COJ-298	Confirm Locations of Lift Stations on Boundary	Confirm locations of lift stations on boundary for first annual progress report	3 stations (4835 Soutel Drive, 1061 Lem Turner, Lem Turner and Capper)	Unknown	COJ	Planned
COJ-299	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are function properly and report status in first annual report	3 stations (8137 Main Street North, 800 Broward Road, 2149 Leonid Road)	Unknown	COJ	Planned
COJ-300	Illicit Discharge Detection and Elimination	2 open, 3 illicit, 2 other	10 (for 2002-07)	\$3,790	COJ	Ongoing
COJ-301	PIC Program	Follow up on outstanding PICs	2 (for 2010-11)	Unknown	COJ	Planned
COJ-302	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	95 (for 1995-2009)	Unknown	COJ	Ongoing
Septic Tank Phase-Out Program						
COJ-303	Lake Forest Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	389 tanks, 13 connected	Unknown	COJ	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
COJ-304	Riverview Failure Area – Septic Tank Phase-Out	Phase out of septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project) ¹	714 tanks, 0 connected	Unknown	COJ	Ongoing
COJ-305	Septic Tanks Outside Failure Area – Septic Tank Phase-Out	Phase-out program as provided by COJ ordinance	1,895 tanks, 21 connected	Unknown	COJ	Ongoing
COJ-306	Septic Tank Maintenance Public Education	Public service announcements	Ongoing	Unknown	COJ	Ongoing
Management and Reduction of Pet and Animal Waste						
COJ-307	Pet/Animal Management Public Education	Public service announcements (PSAs)	Ongoing	Unknown	COJ	Ongoing

¹ COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. COJ must submit a plan to FDEP for removing septic tanks within 6 months of completion of the septic tank study, or by June 30, 2011, whichever is earlier. At a minimum, COJ will accomplish a 50% implementation of the septic tank phase-out projects by July 31, 2015, with the phase-outs completed by December 31, 2023. For the 15 tributaries addressed in this BMAP, the failing tanks within 300 meters of surface waters will be included in the COJ plan and schedule to phase out tanks and will be identified as Tributaries BMAP-related tanks.

20.3.4 FDOT ACTIVITIES IN THE TROUT RIVER (WBID 2203A) WATERSHED

20.3.4.1 Completed FDOT Projects

FDOT completed two wet detention systems projects in the watershed: (1) I-295 from west of Duval to Biscayne Boulevard that treats 20 acres; and (2) I-95 from South of Clark Road to I-295 that treats 94 acres. These projects capture and treat stormwater runoff from these areas, which reduces the fecal coliform loading to Trout River (WBID 2203A).

20.3.4.2 Ongoing FDOT Programs and Activities

Under Subsection 334.044(15), F.S., and Rule 14-86, F.A.C., FDOT implements a Drainage Connection Program. The program does not issue water quality permits but requires the connecting entity to certify that the discharge is of acceptable water quality. Connecting entities are required to maintain the discharge of acceptable water quality for the duration of the FDOT Drainage Connection permit. If connecting entities fail to meet this requirement after sufficient warning by FDOT, they will be reported to FDEP, SJRWMD, and, if applicable, to the local municipality; these entities regulate stormwater quality through state rules, ordinances, and codes. FDOT performs periodic site inspections as part of the MS4 NPDES permit. FDOT supports the Adopt-A-Highway Program in the watershed and collects trash from 20 miles of roadway. Street sweeping also occurs on 12 miles of roadway, reducing the amount of trash and sediment entering the stormwater conveyance system. As part of the maintenance program, FDOT removes sediment, trash, and debris from the system, as needed. This maintenance occurs on 6 miles of roadway and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. FDOT participates in the PIC Program in conjunction with COJ. FDOT has instructed staff to be alert for illicit connections during routine maintenance activities, and investigates observances in the right of way. Those located outside the right of way are reported to the applicable municipality for further investigation and enforcement action. FDOT maintains a toll-free number to be used for reporting illicit connections. FDOT also helps to fund 2 monitoring stations in the Trout River (WBID 2203A) watershed that is sampled as part of the routine monitoring program. FDOT will continue these activities in the future to support the maintenance of the MS4 system. **Table 133** lists FDOT's activities in the watershed.

TABLE 133: FDOT ACTIVITIES IN THE TROUT RIVER (WBID 2203A) WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-97	PIC Program	Search for illicit connections	Effort is continuous in WBID; none identified	See Note 1	FDOT/COJ	Ongoing
FDOT-98	Routine Surface Water Sampling	NPDES permit related quarterly water quality sampling	95 (for 1995-2009)	See Note 2	FDOT/COJ	Ongoing
FDOT-99	DCP Program	Connecting entity must certify that all discharges to FDOT MS4 are treated prior to connection	Ongoing effort	See Note 3	COJ	Ongoing

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	ESTIMATED COST	FUNDING SOURCE	PROJECT STATUS
FDOT-100	Adopt-A-Highway Program	Program allows individuals or groups (after receiving FDOT training) to adopt a stretch of road and to collect trash and debris	Trash collection area is 20 miles	Unavailable	Not applicable	Ongoing
FDOT-101	I-295 from West of Duval to Biscayne Boulevard	Interstate improvement project	20 acres, wet detention systems	Unknown	FDOT	Complete
FDOT-102	I-95 Improvement from South of Clark Road to I-295	Interstate improvement project	94 acres, wet detention systems	Unknown	FDOT	Complete
FDOT-103	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mowing, roadside litter removal, respond to citizen complaints and roadway sweeping	About 6 miles of roadway and associated stormwater conveyance systems currently maintained in this WBID; approximately 12 miles of roadway swept	See Note 4	FDOT	Ongoing

¹ Countywide Contract - Average cost is \$37,605 per year contribution to COJ.

² Countywide Contract - Average cost is \$22,546 per year contribution to COJ.

³ Countywide Contract - Average cost is \$27,151 per year.

⁴ Countywide Contract - Average cost is \$2,750,735 per year.

20.4 SUMMARY OF RESTORATION ACTIVITIES AND SUFFICIENCY OF EFFORTS

Table 130 through **Table 133** list the projects and programs to reduce fecal coliform loading in the Trout River (WBID 2203A) watershed. Several key efforts completed in this WBID are summarized below, as well as activities that are expected to continue or to be implemented in future years. The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in Trout River (WBID 2203A) based on the best information available about fecal coliform sources. As water quality improves in response to these actions and the bacteria source information is refined, future BMAPs may recommend different activities or levels of effort. For this BMAP, the full implementation of the projects and programs listed in the project tables for the Trout River (WBID 2203A) watershed is sufficient to significantly reduce fecal coliform sources and make substantial progress towards meeting the TMDL.

20.4.1 OSTDS

Failure Area – Based on the GIS current database, there are approximately 2,964 septic tanks in the WBID. Of these, 1,090 OSTDS are eligible for sewer connection due to their inclusion in the Lake Forest and Riverview failure areas. COJ committed to removing septic tanks in failure areas that are within 300 meters of surface waters in the 2008 LSJR Main Stem BMAP. The failing tanks in the Lake Forest and Riverview failure areas in the Trout River (2203A) watershed that are within 300 meters of a surface water will be included in the COJ phase-out

plan and schedule, as described in the Main Stem BMAP, and will be identified in the plan as Tributaries BMAP-related efforts.

Program Implementation – City ordinances, inspections, and program implementation, combined with DCHD permit review processes and inspections, proactively address potential sources. Program implementation ensures the proper review of new OSTDS sites and ensures the maintenance of existing systems. These activities need to be continued and fully enforced to manage potential impacts from existing systems outside the failure area and to prevent the creation of new OSTDS sources.

In addition, there is a discrete portion of the WBID that has a higher probability of OSTDS-related problems based on the number of repair permits issued, water quality data, and site conditions. DCHD will intensively inspect this specific area within the WBID boundary and will report the results of the inspection in an annual BMAP progress report.

Capital Improvement Projects – COJ has completed a drainage improvement project along Lexington Drive and has a project under design for Soutel/Bassett. These projects are located in OSTDS areas and have or will reduce high-water conditions that can contribute to septic tank failure from improperly treated waste.

20.4.2 SEWER INFRASTRUCTURE

Private Infrastructure – According to the COJ database, COJ inspects 9 private lift stations in the watershed annually. Of these stations, there are 3 located near surface waters: (1) 8137 Main Street North; (2) 800 Broward Road; and (3) 2149 Leonid Road. COJ will inspect these stations to ensure they are functioning properly and report the status in the first annual BMAP progress report. In addition, there are 3 stations located on the WBID boundary: (1) 4835 Soutel Drive; (2) 1061 Lem Turner; and (3) Lem Turner and Capper. COJ will determine if these stations are located in the watershed and provide the results in the first annual BMAP report.

Sewer Infrastructure Projects – JEA has conducted several projects to rectify SSOs in the watershed. There was a 13,000 gallon SSO at 9415 Norfolk Boulevard that was due to a broken sewer force main and JEA replaced 14 feet of pipe that previously had been improperly installed. JEA has a project at 90% design to add a new station and gravity system relay at 68th Street and Kenyon to fix sewer infrastructure problems in this area. There were also 8 previous SSOs in the Highlands neighborhood from Biscayne Boulevard to Broward Road. JEA pipe burst the lines in 2004 and then cleaned the lines in 2009.

JEA also has 1 lift station, Northwood Apartments on Biscayne Boulevard, located on the WBID boundary. JEA will verify which WBID this station is located in and will provide an update in the first annual BMAP progress report. In addition, there are 13 stations located in close proximity to surface waters: (1) Roanoke Boulevard; (2) Sherwood Forest; (3) Biscayne Villa; (4) Jax Remship on Lem Turner; (5) Lem-10600; (6) Broward #5; (7) Broward #4; (8) Library off of Ray Greene Drive; (9) Highlands on Broward Road; (10) Broward #2; (11) Broward #1; (12) Interstate North on Interstate Center Drive; and (13) 68th and Kenyon. JEA will inspect these stations to ensure they are functioning properly and report the results in the first annual BMAP progress report.

Program Implementation – Continued inspection, repair, and maintenance activities in conjunction with the systemwide programs are sufficient to address potential sewer sources in the WBID at this time. The Root Cause Program and other SSO prevention efforts, such as FOG and CMOM, should be continued so that any additional infrastructure problems that

develop will be identified and repaired. JEA will be expected to report its inspection, prevention, and maintenance efforts in the WBID as part of the annual BMAP reporting process to ensure that the system is being monitored and maintained.

20.4.3 STORMWATER

Illicit Connection Removal – COJ has identified and removed 3 illicit connections. COJ and FDOT have committed to continue the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner. COJ has 2 open PIC cases that should be investigated and the results reported in the first annual BMAP progress report.

FDOT Program Implementation – In accordance with Rule 14-86, F.A.C., FDOT requires any new connections to its MS4 stormwater conveyance systems to be evaluated and permitted to prevent the introduction of new sources to its conveyances. This permit program will continue, and FDOT will continue to periodically inspect its facilities as part of its MS4 permit. In addition, FDOT sweeps 12 miles of roadway monthly and supports Adopt-A-Highway along 20 miles of roadways, preventing sediments from entering the stormwater conveyance system. FDOT will continue stormwater infrastructure maintenance, as these efforts prevent potential regrowth in the MS4 conveyances.

COJ Program Implementation – COJ completed 636 work orders for ditch maintenance, 20 work orders for pond problems, and 569 repairs of structures. The continuation of current programs and maintenance activities in the watershed will help reduce and eliminate potential sources of fecal coliform loading.

TABLE 134: SUMMARY OF RESTORATION ACTIVITIES FOR THE TROUT RIVER (WBID 2203A) WATERSHED

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
OSTDS				
Ordinances	√	X	X	X
Enforcement	√	√	X	X
Program Implementation	√	√	X	X
Permit Review (new and repair permits)	X	√	X	X
Failure Area Evaluation	√	√	X	X
Failure Area Ranking	√	√	X	X
Septic Tank Inspection	√	√	X	X
Septic Tank Phase-Out	√	√	X	X
Public Education (PSA)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System				
Sewer Line Upgrades	X	X	X	-
Manhole Inspection and Rehab	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehab	X	X	X	-
Program Implementation	X	X	X	√
Private Lift Station Inspections and Enforcement	√	X	X	X
Sanitary Sewer Overflow (SSO) Investigations	√	X	X	√
Surface Water Sampling for Conditions and Trends	X	X	X	√
Stormwater				
Flood Control Capital Projects	√	X	-	X
Capital Projects/Stormwater Water Quality BMPs	√	X	√	X
Stormwater System Ditch and Canal Maintenance	√	X	√	X
Stormwater Pond Maintenance	√	X	√	X
Stormwater Pipe Cleaning and Maintenance	√	X	√	X
Potential Illicit Connection (PIC) Identification	√	X	+	X
Illicit Connection Removal	√	X	-	X
Public Education and Outreach	√	X	+	X
Surface Water Sampling for Conditions and Trends	√	X	+	X
Program Implementation	√	X	√	X
Pet Waste Management				
Ordinances and Enforcement	√	X	X	X
Public Education and Outreach	√	X	X	X
Special Source Assessment Activities				
Intensive Water Quality Sampling To Track Sources	-	X	-	X
Tributary Assessment Team (TAT)	-	X	-	X
Microbial Source Tracking (MST)	-	X	-	X
Thermal Imagery To Identify PICs	-	X	-	X

Note: Shaded cells (marked with an X) represent activities that do not apply to the associated entity.

+ FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

APPENDICES

Appendix A: TMDL Basin Rotation Schedule

TMDLs are developed, allocated, and implemented through a watershed management approach (managing water resources within their natural boundaries) that addresses the state's 52 major hydrologic basins in five groups, on a rotating schedule. **Table A-1** shows the hydrologic basins within each of the five groups, with the FDEP District office of jurisdiction. **Table A-2** illustrates the repeating five-year basin rotation schedule.

TABLE A-1: MAJOR HYDROLOGIC BASINS BY GROUP AND FDEP DISTRICT OFFICE

FDEP DISTRICT	GROUP 1 BASINS	GROUP 2 BASINS	GROUP 3 BASINS	GROUP 4 BASINS	GROUP 5 BASINS
NW	Ochlockonee–St. Marks	Apalachicola–Chipola	Choctawhatchee–St. Andrews Bay	Pensacola Bay	Perdido Bay
NE	Suwannee	Lower St. Johns	Not applicable	Nassau–St. Marys	Upper East Coast
Central	Ocklawaha	Middle St. Johns	Upper St. Johns	Kissimmee	Indian River Lagoon
SW	Tampa Bay	Tampa Bay Tributaries	Sarasota Bay–Peace–Myakka	Withlacoochee	Spring Coast
S	Everglades West Coast	Charlotte Harbor	Caloosahatchee	Fisheating Creek	Florida Keys
SE	Lake Okeechobee	St. Lucie–Loxahatchee	Lake Worth Lagoon–Palm Beach Coast	Southeast Coast–Biscayne Bay	Everglades

Each group will undergo a cycle of five phases on a rotating schedule:

- Phase 1:** Preliminary evaluation of water quality
- Phase 2:** Strategic monitoring and assessment to verify water quality impairments
- Phase 3:** Development and adoption of TMDLs for waters verified as impaired
- Phase 4:** Development of basin management action plan (BMAP) to achieve the TMDL
- Phase 5:** Implementation of the BMAP and monitoring of results

The Lower St. Johns River is a Group 2 basin. As such, the Cycle 1 list of verified impaired waters was developed in 2004 and the Cycle 2 update was developed in 2009. Subsequent TMDL and BMAP development is occurring on a schedule driven by the 1998 303(d) list (see <http://www.dep.state.fl.us/water/tmdl/> for more information) and FDEP staff resource availability. FDEP will re-evaluate impaired waters every 5 years to determine whether improvements are being achieved and to refine loading estimates and TMDL allocations using new data. If any changes in a TMDL are required, the applicable TMDL rule may be revised. Changes to a TMDL would prompt revisions to the applicable BMAP, which will be revisited at least every 5 years and modified as necessary, regardless of whether the TMDL is modified.

Appendix B: Summary of Statutory Provisions Guiding BMAP Development and Implementation

SECTIONS 403.067(6) AND (7), FLORIDA STATUTES - *Summary of Excerpts*

ALLOCATIONS

- The TMDL shall include reasonable and equitable allocations of the TMDL between or among point and nonpoint sources that will alone, or in conjunction with other management and restoration activities, provide for the attainment of pollutant reductions established pursuant to paragraph (a) to achieve applicable water quality standards.
- The allocations may establish the maximum amount of the pollutant that may be discharged or released in combination with other discharges or releases.
- Allocations may also be made to individual basins and sources or as a whole to all basins and sources or categories of sources of inflow to the water body or water body segments.
- An initial allocation of allowable pollutant loads may be developed as part of the TMDL; in such cases detailed allocations to specific point sources and categories of nonpoint sources shall be established in the basin management action plan.
- The initial and detailed allocations shall be designed to attain pollutant reductions established pursuant to paragraph (a) and shall be based on consideration of:
 1. Existing treatment levels and management practices;
 2. Best management practices established and implemented pursuant to paragraph (7)(c);
 3. Enforceable treatment levels established pursuant to state or local law or permit;
 4. Differing impacts pollutant sources may have on water quality;
 5. The availability of treatment technologies, management practices, or other pollutant reduction measures;
 6. Environmental, economic, and technological feasibility of achieving the allocation;
 7. The cost benefit associated with achieving the allocation;
 8. Reasonable timeframes for implementation;
 9. Potential applicability of any moderating provisions such as variances, exemptions, and mixing zones; and
 10. The extent to which non-attainment of water quality standards is caused by pollution sources outside of Florida, discharges that have ceased, or alterations to water bodies prior to the date of this act.

GENERAL IMPLEMENTATION

- **DEP is the lead agency** in coordinating TMDL implementation, through existing water quality protection programs.
- **Application of a TMDL by a water management** district does not require WMD adoption of the TMDL.
- **TMDL implementation may include**, but is not limited to:
 - o Permitting and other existing regulatory programs
 - o Non-regulatory and incentive-based programs
 - o Other water quality management and restoration activities, such as Surface Water Improvement and Management (SWIM) plans or **basin management action plans**
 - o Pollutant trading or other equitable economically based agreements
 - o Public works
 - o Land acquisition

BASIN MANAGEMENT ACTION PLAN DEVELOPMENT

- DEP may develop a basin management action plan that addresses some or all of the watersheds and basins tributary to a TMDL waterbody.
- A basin management action plan **shall**:
 - o Integrate appropriate management strategies available to the state through existing water quality protection programs.
 - o Equitably allocate pollutant reductions to individual basins, all basins, each identified point source, or category of nonpoint sources, as appropriate.
 - o Identify the mechanisms by which potential future increases in pollutant loading will be addressed.
 - o Specify that for nonpoint sources for which BMPs have been adopted, the initial requirement shall be BMPs developed pursuant to paragraph (c).
 - o Establish an implementation schedule.
 - o Establish a basis for evaluating plan effectiveness.
 - o Identify feasible funding strategies.
 - o Identify milestones for implementation and water quality improvement, and an associated water quality monitoring component to evaluate reasonable progress over time.
 - o Be adopted in whole or in part by DEP Secretarial Order, subject to chapter 120.
- A basin management action plan **may**:
 - o Give load reduction credits to dischargers that have implemented load reduction strategies (including BMPs) prior to the development of the BMAP. (*Note: this assumes the related reductions were not factored into the applicable TMDL.*)
 - o Include regional treatment systems or other public works as management strategies.
 - o Provide for phased implementation to promote timely, cost-effective actions.
- An assessment of progress in achieving milestones shall be conducted every 5 years and the basin management action plan revised, as appropriate, in cooperation with basin stakeholders, and adopted by secretarial order.
- DEP shall assure that key stakeholders are invited to participate in the basin management action plan development process, holding at least one noticed public meeting in the basin to receive comments, and otherwise encouraging public participation to the greatest practicable extent.
- A basin management action plan shall not supplant or alter any water quality assessment, TMDL calculation, or initial allocation.

BASIN MANAGEMENT ACTION PLAN IMPLEMENTATION

- NPDES Permits
 - o Management strategies related to a discharger subject to NPDES permitting shall be included in subsequent applicable NPDES permits or permit modifications when the permit expires (is renewed), the discharge is modified (revised), or the permit is reopened pursuant to an adopted BMAP.
 - o Absent a detailed allocation, TMDLs shall be implemented through NPDES permit conditions that include a compliance schedule. The permit shall allow for issuance of an order adopting the BMAP within five years. (**Note:** *Intended to apply to individual wastewater permits – not MS4s*)
 - o Once the BMAP is adopted, the permit shall be reopened, as necessary, and permit conditions consistent with the BMAP shall be established.
 - o Upon request by a NPDES permittee, DEP may establish individual allocations prior to the adoption of a BMAP, as part of a permit issuance, renewal, or modification (revision).
 - o To the maximum extent practicable, MS4s shall implement a TMDL or BMAP through the use of BMPs or other management measures.
 - o A BMAP does not take the place of NPDES permits or permit requirements.
 - o Management strategies to be implemented by a DEP permittee shall be completed

according to the BMAP schedule, which may extend beyond the 5-year term of an NPDES permit.

- o Management strategies are not subject to challenge under chapter 120 when they are incorporated in identical form into a NPDES permit or permit modification (revision).
- Management strategies assigned to nonagricultural, non-NPDES permittees (state, regional, or local) shall be implemented as part of the applicable permitting programs.
- Nonpoint source dischargers (e.g., agriculture) included in a BMAP shall demonstrate compliance with the applicable TMDLs by either implementing appropriate BMPs established under paragraph 7(c), or conducting water quality monitoring prescribed by **DEP or a WMD**. (*Note: this is not applicable to MS4s, as they are considered point sources under the federal Clean Water Act and TMDL Program.*)
 - o Failure to implement BMPs or prescribed water quality monitoring may be subject to **DEP or WMD** enforcement action.
- Responsible parties who are implementing applicable BMAP strategies shall not be required to implement additional pollutant load reduction strategies, and shall be deemed in compliance with this section. However, this does not limit DEP's authority to amend a BMAP.

BEST MANAGEMENT PRACTICES

- DEP, in cooperation with WMDs and other interested parties, may develop interim measures, BMPs, or other measures for non-agricultural nonpoint sources to achieve their load reduction allocations.
 - o These measures may be adopted by **DEP or WMD** rule. If adopted, they shall be implemented by those responsible for non-agricultural nonpoint source pollution.
- DACS may develop and adopt by rule interim measure, BMPs, or other measures necessary for agricultural pollutant sources to achieve their load reduction allocations.
 - o These measures may be implemented by those responsible for agricultural pollutant sources. **DEP, the WMDs, and DACS** shall assist with implementation.
 - o In developing and adopting these measures, DACS shall consult with DEP, DOH, the WMDs, representatives of affected farming groups, and environmental group representatives.
 - o The rules shall provide for a notice of intent to implement the practices and a system to ensure implementation, including recordkeeping.
- Verification of Effectiveness and Presumption of Compliance -
 - o DEP shall, at representative sites, verify the effectiveness of BMPs and other measures adopted by rule in achieving load reduction allocations.
 - o DEP shall use best professional judgment in making the initial verification of effectiveness, and shall notify **DACS and the appropriate WMD** of the initial verification prior to the adoption of a rule proposed pursuant to this paragraph.
 - o Implementation of rule-adopted BMPs or other measures initially verified by DEP to be effective, or verified to be effective by monitoring at representative sites, provides a presumption of compliance with state water quality standards for those pollutants addressed by the practices.
- Reevaluation –
 - o Where water quality problems are demonstrated despite implementation, operation, and maintenance of rule-adopted BMPs and other measures, **DEP, a WMD, or DACS**, in consultation with DEP, shall reevaluate the measures. If the practices require modification, the revised rule shall specify a reasonable time period for implementation.

Appendix C: Stakeholder Involvement in BMAP Development

LOWER ST. JOHNS RIVER TRIBUTARIES BASIN WORKING GROUP

The LSJR Tributaries Basin Working Group (BWG) is made up of responsible stakeholders in the tributaries. The BWG began meeting in December 2009 for this BMAP and has advised FDEP on issues related to the BMAP process. The BWG played a critical role in the development of the BMAP to implement the tributaries TMDLs.

The BWG's mission statement is as follows: *"The mission of the Lower St. Johns River Tributaries Basin Working Group is to encourage participation of all stakeholders in working to restore impaired waterbodies through recommendations for an equitable and cost-effective Basin Management Action Plan to achieve Total Maximum Daily Load reduction goals in the tributaries of the Lower St. Johns River."*

During BMAP development, the BWG met in Jacksonville on the following dates:

- December 11, 2009;
- [date]; and
- [date].

In addition to the input from the BWG, the stakeholders involved in the technical meetings provided valuable information during the BMAP process. The technical meetings began in September 2009 to organize and review the technical information that is the basis of the BMAP. The technical stakeholders also identified management actions to improve water quality in the tributaries. The technical meetings were held regularly throughout the BMAP development process.

The Tributaries Assessment Team (TAT) was formed in 2005 to investigate potential sources of fecal coliform in the LSJR tributaries. The TAT membership comprises several agencies and organizations, including FDEP, COJ EQD, COJ PWD, DCHD, and JEA. The TAT has collected much of the water quality data in the tributaries. The interagency, coordinated effort of the TAT has identified and eliminated fecal coliform sources in the tributaries, helping to achieve water quality improvements.

Members of the TAT from FDEP, COJ EQD, and JEA, participated in an intensive assessment effort between September 2008 and July 2009 to gather additional information about 11 tributaries to aid in source identification. That TAT conducted a "Walk the WBID" effort, which was a detailed field assessment of the 11 tributaries. During this effort, the TAT identified key monitoring locations in 10 of the tributaries and spent 8 months intensively monitoring these WBIDs; the monitoring included microbial source tracking (MST) sampling and sediment analysis. In addition, 4 of the WBIDs received thermal imaging to identify potential fecal coliform sources to the creeks. Of the BMAP WBIDs, Craig Creek, McCoy Creek, and Williamson Creek were assessed using all or part of these tools.

PROCESS FOR PLAN RECOMMENDATION DEVELOPMENT

BASIN WORKING GROUP MEETING PROCESS

The BWG was asked to endorse the BMAP, since the members been actively involved in the BMAP process. The BWG's endorsement of the BMAP was used to move forward with the BMAP adoption process. FDEP will also ask for letters of commitment or resolutions of support

for the BMAP from the entities. These letters and resolutions will provide an additional level of support for the BMAP efforts as staff and board members change over time. The process to submit letters and resolutions of support will occur during and after BMAP adoption. The written statements of commitment will be added to the BMAP as they are received.

CONSENSUS

The technical stakeholder meetings were operated on an informal basis where the purpose of the discussions was to provide technical input. As such, there was no formal voting or measures of consensus during these meetings. The BWG, however, made specific recommendations to FDEP on BMAP issues and used a voting procedure to make these recommendations. Votes were held only in circumstances when a quorum of at least 75% of the voting members (or their designated alternates) was present at a publicly noticed meeting. Consensus was defined as a vote where more than 50% of the BWG members could support the motion.

PUBLIC PARTICIPATION IN BASIN WORKING GROUP MEETINGS

All BWG and technical meetings were open to the public and noticed in the *Florida Administrative Weekly* (FAW). BWG meetings were also noticed in the *Florida Times-Union*. Public comment was invited during the BWG meetings and the technical meetings were open to anyone interested in participating in the technical discussions. In addition, public meetings were held on the verified lists, the adoption of the TMDLs, and the BMAP document.

PUBLIC MEETING

In addition to meetings on the proposed verified list of impaired waters and the TMDLs, a meeting public meeting on the BMAP was held on [date].

PLAN RECOMMENDATION APPROVAL AND ADOPTION

The Basin Working Group approved the final recommended BMAP at its [date] meeting. The final BMAP is to be adopted by FDEP Secretarial Order.

Appendix D: Summary of EPA-Recommended Elements of a Comprehensive Watershed Plan

The following is an excerpt on the nine elements of a watershed plan from the EPA's *Draft Handbook for Developing Watershed Plans to Restore and Protect Our Waters*. Additional information regarding these elements can be found in the full version of the handbook located online at: http://www.epa.gov/owow/nps/watershed_handbook/.

NINE MINIMUM ELEMENTS TO BE INCLUDED IN A WATERSHED PLAN FOR IMPAIRED WATERS FUNDED USING INCREMENTAL SECTION 319 FUNDS

Although many different components may be included in a watershed plan, EPA has identified a minimum of nine elements that are critical for achieving improvements in water quality. EPA requires that these nine elements be addressed for watershed plans funded using incremental Section 319 funds and strongly recommends that they be included in all other watershed plans that are intended to remediate water quality impairments.

The nine elements are provided below, listed in the order in which they appear in the guidelines. Although they are listed as *a* through *i*, they do not necessarily take place sequentially. For example, element *d* asks for a description of the technical and financial assistance that will be needed to implement the watershed plan, but this can be done only after you have addressed elements *e* and *i*.

Explanations are provided with each element to show you what to include in your watershed plan.

NINE ELEMENTS

a. Identification of causes of impairment and pollutant sources or groups of similar sources that need to be controlled to achieve needed load reductions, and any other goals identified in the watershed plan. Sources that need to be controlled should be identified at the significant subcategory level along with estimates of the extent to which they are present in the watershed (e.g., *X* number of dairy cattle feedlots needing upgrading, including a rough estimate of the number of cattle per facility; *Y* acres of row crops needing improved nutrient management or sediment control; or *Z* linear miles of eroded streambank needing remediation).

What does this mean?

Your watershed plan should include a map of the watershed that locates the major sources and causes of impairment. Based on these impairments, you will set goals that will include (at a minimum) meeting the appropriate water quality standards for pollutants that threaten or impair the physical, chemical, or biological integrity of the watershed covered in the plan.

b. An estimate of the load reductions expected from management measures.

What does this mean?

You will first quantify the pollutant loads for the watershed. Based on these pollutant loads, you'll determine the reductions needed to meet the water quality standards.

You will then identify various management measures (see element c below) that will help to reduce the pollutant loads and estimate the load reductions expected as a result of these management measures to be implemented, recognizing the difficulty in precisely predicting the performance of management measures over time.

Estimates should be provided at the same level as that required in the scale and scope component in paragraph a (e.g., the total load reduction expected for dairy cattle feedlots, row crops, or eroded streambanks). For waters for which EPA has approved or established TMDLs, the plan should identify and incorporate the TMDLs.

Applicable loads for downstream waters should be included so that water delivered to a downstream or adjacent segment does not exceed the water quality standards for the pollutant of concern at the water segment boundary. The estimate should account for reductions in pollutant loads from point and nonpoint sources identified in the TMDL as necessary to attain the applicable water quality standards.

c. A description of the management measures that will need to be implemented to achieve load reductions in paragraph 2, and a description of the critical areas in which those measures will be needed to implement this plan.

What does this mean?

The plan should describe the management measures that need to be implemented to achieve the load reductions estimated under element b, as well as to achieve any additional pollution prevention goals called out in the watershed plan. It should also identify the critical areas in which those measures will be needed to implement the plan. This can be done by using a map or a description.

d. Estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement this plan.

What does this mean?

You should estimate the financial and technical assistance needed to implement the entire plan. This includes implementation and long-term operation and maintenance of management measures, information and education (I/E) activities, monitoring, and evaluation activities. You should also document which relevant authorities might play a role in implementing the plan. Plan sponsors should consider the use of federal, state, local, and private funds or resources that might be available to assist in implementing the plan. Shortfalls between needs and available resources should be identified and addressed in the plan.

e. An information and education (I/E) component used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the nonpoint source management measures that will be implemented.

What does this mean?

The plan should include an I/E component that identifies the education and outreach activities or actions that will be used to implement the plan. These I/E activities may support the adoption and long-term operation and maintenance of management practices and support stakeholder involvement efforts.

f. Schedule for implementing the management measures identified in this plan that is reasonably expeditious.

What does this mean?

You need to include a schedule for implementing the management measures outlined in your watershed plan. The schedule should reflect the milestones you develop in g.

g. A description of interim measurable milestones for determining whether management measures or other control actions are being implemented.

What does this mean?

You'll develop interim, measurable milestones to measure progress in implementing the management measures for your watershed plan. These milestones will measure the implementation of the management measures, such as whether they are being implemented on schedule, whereas element h (see below) will measure the effectiveness of the management measures, for example, by documenting improvements in water quality.

h. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards.

What does this mean?

Using the milestones you developed above, you'll develop a set of criteria (or indicators) with interim target values to be used to determine whether progress is being made toward reducing pollutant loads. These interim targets can be direct measurements (e.g., fecal coliform concentrations) or indirect indicators of load reduction (e.g., number of beach closings). You must also indicate how you'll determine whether the watershed plan needs to be revised if interim targets are not met and what process will be used to revise the existing management approach. Where a nonpoint source TMDL has been established, interim targets are also needed to determine whether the TMDL needs to be revised.

i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item h immediately above.

What does this mean?

The watershed plan must include a monitoring component to determine whether progress is being made toward attainment or maintenance of the applicable water quality standards. The monitoring program must be fully integrated with the established schedule and interim milestone criteria identified above. The monitoring component should be designed to determine whether loading reductions are being achieved over time and substantial progress in meeting water quality standards is being made. Watershed-scale monitoring can be used to measure the effects of multiple programs, projects, and trends over time. In stream monitoring does not have to be conducted for individual BMPs unless that type of monitoring is particularly relevant to the project.

Appendix E: Programs To Achieve the TMDL

PROGRAMS TO ADDRESS THE SANITARY SEWER SYSTEM AS A SOURCE OF FECAL COLIFORM CONTAMINATION

Beginning in the late 1990s, the regional utility provider, JEA, undertook a comprehensive program of pipeline rehabilitation focusing on larger line throughout the service area. To date the utility has spent more than \$500 million in pipeline rehabilitation alone. Since the large-scale replacements of existing systems have large capital costs, it is necessary to routinely conduct investigations, including, but not limited to, infiltration and inflow studies to evaluate the integrity of the infrastructure and use this type of assessment to locate severe problem areas with a high probability of impacts related to the utility.

Examples of investigations and maintenance procedures include regularly (1) using remote camera equipment to inspect the lines; (2) cleaning lines; (3) inspecting manholes; and (4) testing pumps at lift stations to ensure proper function. Local utilities should also use “mean time to failure” estimates to replace pumps at lift stations prior to failing, as well as warning systems for utility failures to help minimize impacts when failures occur. JEA has implemented these systems. In addition to performing remedial maintenance on an as-needed basis, JEA has routinely implemented a variety of corrective actions performed on a prioritized schedule. These include, but are not limited to, the following:

- *Pipe bursting (to replace existing failing infrastructure);*
- *Slip lining (to replace existing failing infrastructure when capacity is not an issue);*
- *Open cut (removal and replacement of failing infrastructure);*
- *Manhole liners (modify polymer to rehabilitate failing manholes);*
- *Fiberglass-line manholes (to rehabilitate existing failing manholes);*
- *Replace manholes;*
- *Line wet wells (corrosion prevention and control); and*
- *Replace force mains (replace failing infrastructure).*

Spills of untreated sewage from the regional sewer system in Duval County are immediately addressed and investigated thoroughly. When an SSO occurs, the cause is usually listed as a recent, immediately traceable condition, such as a pipe blockage or pump failure. However, merely addressing the immediate cause without understanding the underlying cause of the overflow may not protect against future SSOs.

In every case of an untreated wastewater discharge, JEA conducts a two-part investigation into the cause of the spill. The first is to address the immediate cause, and the second is conducted to address any underlying causes. Historically, pipe breaks, cave-ins, and grease have been the major causes of spill events. Significant investments in pipe replacement, focused on areas with the highest occurrence of events, have significantly reduced the number of events related to breaks and cave-ins. The introduction of an effective Fats, Oils and Grease (FOG) Program has reduced the number of spills associated with grease stoppages. Continual focus on actions

to reduce the causes of the events is the primary assignment of the Wastewater Preventive Maintenance team at JEA.

SPECIFIC CITYWIDE IMPROVEMENT PROGRAMS BY JEA

FATS, OILS, AND GREASE REDUCTION PROGRAM

Fats, oils and grease (FOG) generated during food preparation build up in sanitary sewer lines. Without proper maintenance, these lines clog, eventually leading to the occurrence of SSOs. JEA has an EPA award-winning FOG Program that regulates commercial grease dumped into the sewer system. Grease is a major cause of SSOs for utilities, and JEA's Industrial Pretreatment Group is nationally recognized for its preventive program. To help reduce these events, JEA requires that all food service establishments (FSEs) ("FOG generators") connected to JEA sewer participate in the FOG Program:

<http://www.jea.com/about/pub/downloads/fog/FOGTrainingSlideShow.pdf>.

To help FOG generators meet the program requirements, JEA has developed the Preferred Hauler Program. The preferred haulers are vendors, approved by JEA, that pump, haul, and properly dispose of FOG materials for food service establishments. To meet JEA's expectations, these haulers must demonstrate, both initially and continually, that they are able to meet the following criteria (abbreviated version obtained from:

<http://www.jea.com/about/pub/downloads/fog/FOGProgramPreferredHaulerRequestforParticipation.pdf>):

1. *Satisfactorily pump out grease traps/interceptors;*
2. *Attend waste hauler education meeting;*
3. *Accept limited regulatory responsibility for the generator.*
4. *Submit manifest document for the disposal of all trap contents generated in JEA's service area on a quarterly basis.*

JEA monitors compliance monthly. Food service establishments that miss their required interceptor pump out are identified and brought into the enforcement process. Escalating enforcement measures consist of an initial notice of violation, followed by a cease and desist order, and finally the emergency suspension of service for food service establishments that fail to comply with previous actions.

The following chart shows the effect of JEA's FOG program in reducing SSOs caused by commercial grease.

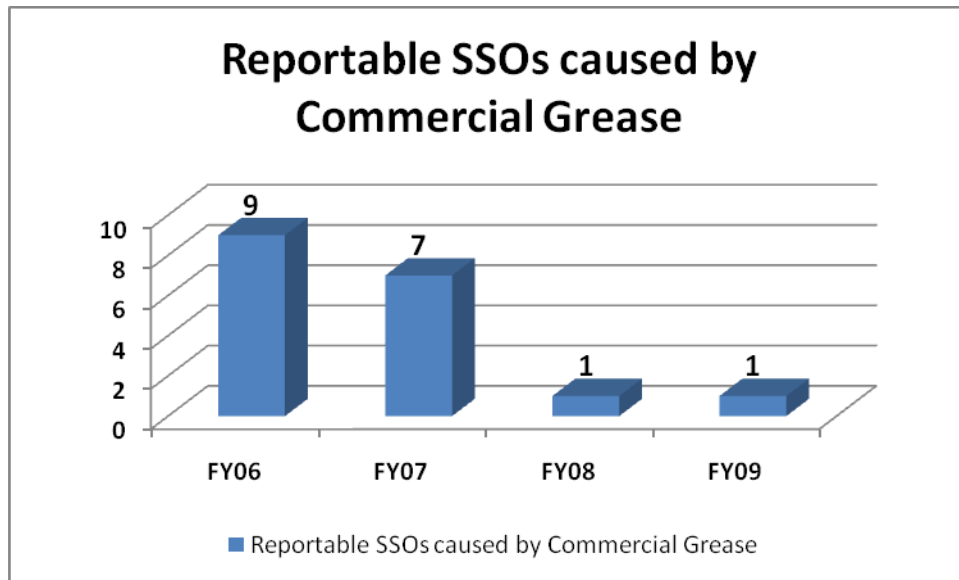


FIGURE E-1: REPORTABLE SSOs CAUSED BY COMMERCIAL GREASE

SSO ROOT CAUSE PROGRAM

The SSO Root Cause Program began in January 2007 and is run by a group of first responders, who meet every two weeks to determine the root cause of each SSO so that an effective solution can be implemented. The Root Cause Committee identifies the root cause and determines short- and long-term corrective action to prevent reoccurrence. It also identifies any improvements that can be made to reporting procedures. As indicated in the following table, the Root Cause Program has revealed that in many cases, the identified preliminary cause is not the true root cause of the overflow.

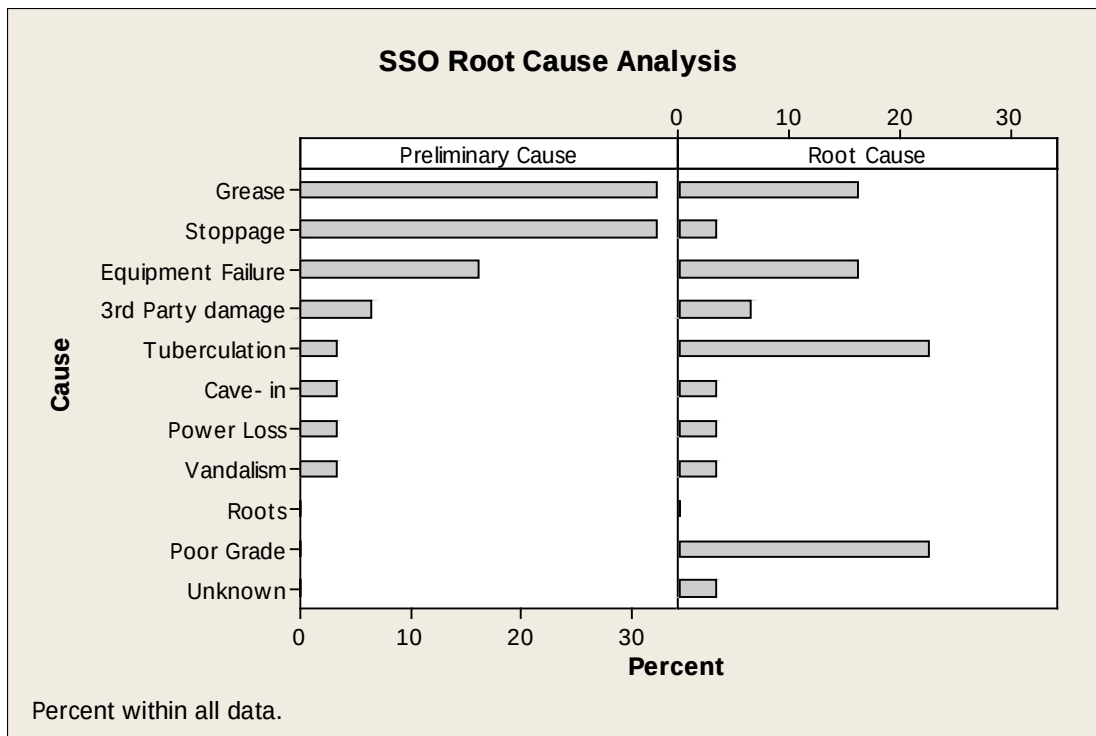


FIGURE E-2: SSO ROOT CAUSE ANALYSIS

This program is ongoing, and some benefits have already become apparent:

- *Prior to the implementation of the Root Cause Program, blockages in gravity lines would typically be dealt with by simply resolving the obvious immediate cause: the blockage, which often was caused by grease. Under the Root Cause Program, a significantly more detailed analysis is performed, which has shown that poor grade (sags or bellies) in existing pipes are often the primary reason for the accumulation of grease that caused the blockage. Under previous procedures, the blockage would be cleared and the line placed back into service. Under the program, the blockage is cleared, the line is cleaned, and a closed-circuit television camera is run through the impacted line. The video will reveal the existence of poor grade, if present. When poor grade is identified under the Root Cause Program, the affected line segment is either replaced or added to a scheduled cleaning list to be cleaned quarterly, semi-annually, or annually.*
- *The Root Cause Program has identified tuberculated iron pipe as a significant concern. Tuberculated pipe refers to the buildup of iron deposits and other materials in the interior periphery of a pipe, resulting in a reduced carrying capacity in the line and greater potential for blockage. The discovery of a pattern of tuberculated iron pipe by the Root Cause Program has resulted in a program to deal with tuberculated pipe through replacement or Cured in Place Pipe (CIPP) lining. For FY10, \$800,000 has been budgeted to continue to address tuberculated pipe.*
- *When the preliminary cause of grease is confirmed as the root cause, JEA personnel will survey the system upstream of a grease blockage to identify a potential source such as a restaurant. JEA Industrial Pretreatment (IP) personnel will visit and evaluate any potential sources to verify compliance with JEA's IP Program and undertake enforcement as necessary to reduce or eliminate the source of grease to the system.*
- *The root cause program identified a variance related to lines constructed of High Density Polyethylene (HDPE). HDPE pipe represents 10% of all gravity lines but accounts for 28% of overflows. To address this issue, JEA has implemented a dedicated program to clean HDPE pipe to reduce overflows in these lines, primarily resulting from poor grade. JEA has budgeted \$600,000 in FY09 to have a contractor perform targeted cleanings of HDPE pipes in areas with higher percentages of overflows. In addition, JEA, with FDEP approval, has initiated an in-kind project under which a new vacuum (Vac.) truck will be procured at a cost of over \$300,000. The Vac. truck will be dedicated to the upgraded cleaning program allowing JEA to significantly increase the footage of pipe cleaned by JEA crews each year.*

In general, the Root Cause Program has allowed JEA to better prioritize limited repair and replacement resources to optimize JEA's limited financial resources.

POP-TOP PROGRAM

JEA implemented the Pop-Top Program in early 2007 to open and inspect all accessible manholes in the service territory (approximately 54,000 manholes), with the objective of preventing future SSOs. Since April 2007, JEA crews have inspected more than 27,000 manholes to detect potential problems in the collection system. Generally, the problems of

greatest concern are manifested through surcharged conditions (backups of flow to varying degrees) that typically result from a restriction in flow downstream of the surcharged manhole. In some cases, the discovery of a surcharged condition has resulted in an immediate response to prevent a potential SSO. In many more cases, the pop-top inspections have identified conditions that, if unresolved, could result in an SSO sometime in the future. These lines are placed on a cleaning schedule to avoid the possibility of an eventual SSO. **Figure E-2** shows the problems identified in manholes (M/H) and main lines (M/L) to date as the result of the pop-top inspections, including 140 instances of surcharged lines.

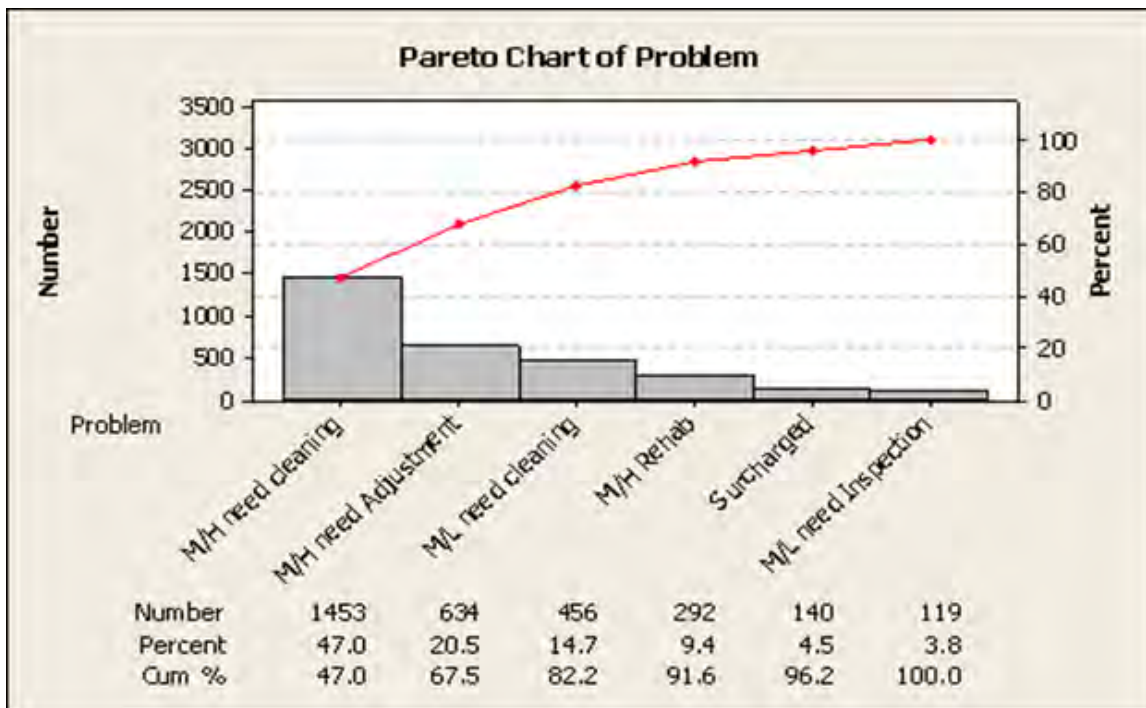


FIGURE E-3: PROBLEMS IDENTIFIED THROUGH THE POP-TOP PROGRAM

NON-INTRUSIVE PIPE TESTING AND AIR RELEASE VALVE PROGRAMS

The Pipe Integrity Testing and Air Release Valve (ARV) Programs are both incorporated under this larger entity, focusing on known critical force mains, iron pipes, and air valves that are located near waterbodies.

- *Pipe integrity testing, initiated in 2006, utilizes sonar to test the wall thickness of sanitary sewer iron or ductile iron pipes while maintaining the integrity of the structures. Sewer gases are corrosive and may over time reduce the wall thickness of sewer lines to unacceptable levels, in some cases causing pipe ruptures. The testing program allows JEA to assess the condition of the pipe and replace pipe with unacceptable pipe wall thickness before it fails. By the end of 2009, 174 sites had been tested.*
- *The purpose of an ARV is to reduce static head pressure in force main systems caused by air in the pipe. If the valves are not working properly, air cannot escape and can prevent the associated pumps from pumping, causing overflows at lift stations. Periodic inspection is required to ensure the valves are working properly. Over time, sewer gases deteriorate the ARV and the associated galvanized piping attached to the force main that support the valve.*

These failures often result in overflows, since they are attached to pressure systems. Under this program, ARVs are inspected and replaced as necessary. All metal ARVs are now replaced with plastic corrosion-resistant valves that are easily cleaned and reused. Also, all galvanized support piping is replaced with stainless steel pipe to eliminate pipe failures. JEA standards have been modified to reflect the improved materials for construction above. To date, almost 400 ARVs have been replaced. The inspection and replacement program is prioritized based on proximity to tributaries, with valves within 200 feet of tributaries given highest priority.

SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

The SCADA Program was implemented at JEA lift stations. Alarms sound if the sewer in a wet well rises above a specific level, and triggers an alert to the JEA lift station Operations and Maintenance Group. They respond immediately to avoid an SSO. Currently, 1,230 lift stations have been retrofitted with SCADA telemetry systems at a cost of more than \$22 million. With SCADA, JEA can respond to a comprehensive list of alarms, including high wet-well levels, power outages, and pump failures. During a typical week, there are between 40 and 50 wet-well high alarms received from the 1,230 stations on SCADA.

The implementation of SCADA monitoring at JEA's lift stations has resulted in a significant decrease in lift station-related SSOs, as shown in **Figure E-4**.

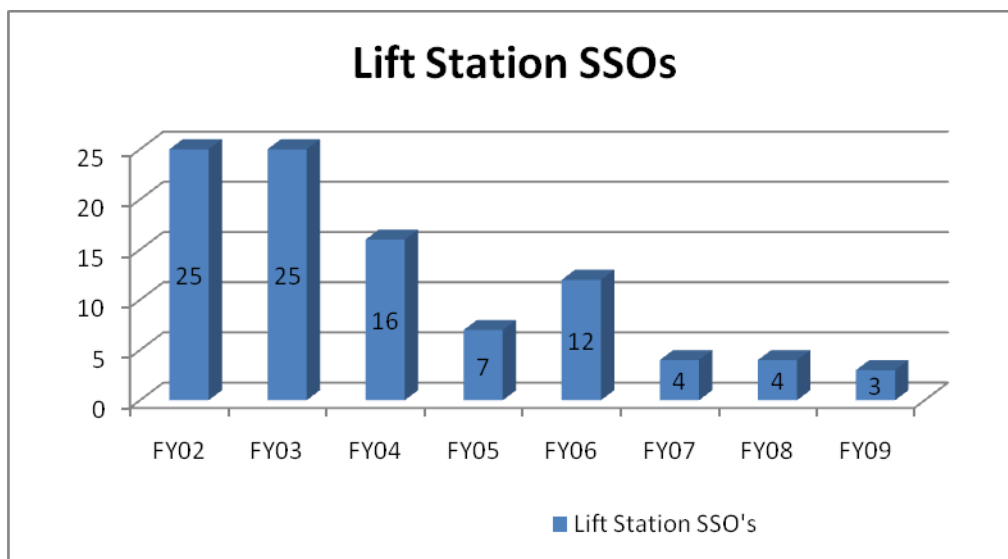


FIGURE E-4: LIFT STATION SSOs, FY02–FY09

THIRD PARTY EDUCATION AND ENFORCEMENT PROGRAM

In 2003, JEA implemented a program to address SSOs caused by third-party contractors. The program involves an increased emphasis on both education and enforcement of the contractors who routinely perform excavations in the vicinity of JEA infrastructure. The program has been successful in dramatically reducing the SSOs caused by third-party hits on JEA sewage lines, as shown in **Figure E-5**.

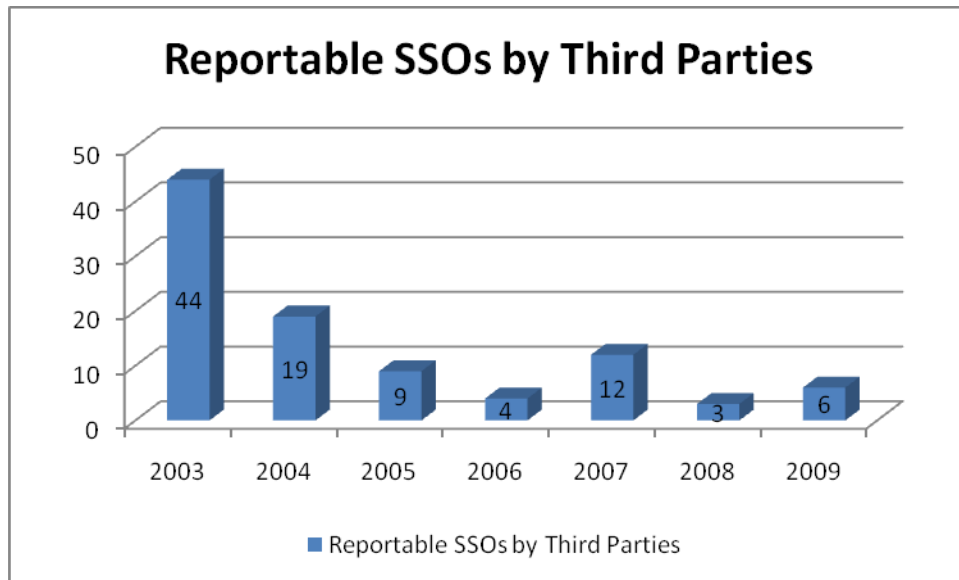


FIGURE E-5: REPORTABLE SSOs BY THIRD PARTIES, 2003–09

MANHOLE MONITORING

The Manhole Monitoring Program, which was initiated in 2007, involves the placement of fluid level measurement devices under manhole covers. The devices transmit alarms when the water level within the manhole is elevated, denoting a surcharged condition. Upon receiving an alarm, JEA personnel are dispatched to the site to address the situation and take action as necessary. JEA has avoided 36 SSOs as the result of the 20 monitors currently deployed by the end of calendar year 2009. The monitors have also allowed JEA to more effectively utilize its resources, as personnel are no longer required to make frequent inspections of potential problem sites to assess constantly changing conditions.

FORCE MAIN DISCHARGE MANHOLES

This program was implemented at manholes into which force mains discharge. The structure of these manholes is subjected to increased deterioration due to a higher concentration of corrosive sewer gases associated with the pressurized discharges of sewage. Under this program, all force main discharge manholes were inspected in 2007. Those found in need of repair have been rehabilitated.

TRIBUTARY POLLUTION ASSESSMENT MANUAL

JEA contracted with a consultant, PBS&J, to develop a methodology for conducting tributary pollution assessments for sources of fecal coliform contamination in the listed tributaries. This methodology will be field-verified by conducting sanitary surveys of selected tributary waterbody segments, and revised based on lessons learned from this process. The final product of this endeavor was a *Tributary Pollution Assessment Manual* that can be used as a blueprint for conducting sanitary surveys.

CAPACITY, MANAGEMENT, OPERATIONS, AND MAINTENANCE (CMOM) PROGRAM

JEA's Water and Wastewater Systems Group is spearheading a voluntary EPA program aimed at reducing SSOs and preserving wastewater infrastructure. Considering that SSOs can lead to disease, water quality violations, the contamination of drinking water supplies, and beach closures, the importance of a well-maintained wastewater collection system cannot be overstated.

CMOM is a standardized system of continuous improvement to track numerous elements that contribute to a successful wastewater collection system. JEA has tracked similar information for years, but formalized and consolidated it in January 2008. In JEA's CMOM program, there are 152 elements tracked in the following three areas:

1. **Management** – Includes areas such as complaint management tracking, sewer system design and construction standards, and public notification.
2. **Operations** – Examples include pump station operations, pretreatment monitoring, and grease trap monitoring.
3. **Maintenance** – Collection system maintenance includes pump station inspections and sewer line cleaning.

Documentation, measurement, and reporting in this standardized fashion will lead to more informed decisions based on hard data, allowing JEA to identify and address system priorities, detect trends, and proactively address problems both internally and cooperatively with local partners.

COJ LOCAL POLLUTION CONTROL PROGRAM

COJ's local pollution control program has helped to address fecal coliform problems in the tributaries of the St. Johns River through several innovative programs. COJ began a regionalization program for small WWTFs (package plants) in 1989 that has resulted in phasing out over 400 plants. Currently, there are approximately 20 package plants in the city.

Before the regionalization effort began in 1989, COJ had hundreds of small private sanitary lift stations serving the area. Recognizing that the number of sanitary lift stations would significantly increase because of phasing out package plants and the need for reducing the potential sewage overflow, the local pollution control program has implemented a sanitary lift station inspection program requiring all lift stations constructed after August 1991, to have operator attendance. The COJ Environmental Protection Board (EPB) Rule 3 established the basic requirements for lift station design, construction, and operation by adopting Rule 62-604, F.A.C. The rule also requires that all lift station must have monthly operator visits, a logbook, and an emergency contact number posted at the site.

Today there are more than 900 privately owned lift stations, and EQD's goal is to inspect all private lift stations at least annually. Citizens' reports of sewage overflow or self-reports by lift station owners are entered and tracked in COJ's CARE system. All overflow events from a lift station are investigated and enforced using EPB guidelines. COJ's proactive efforts to reduce SSOs are well documented.

EQD has recently recognized and begun addressing the problem of old above-ground sand filter onsite sewage treatment systems. These systems previously were not under the jurisdiction of existing regulatory programs because of their hybrid design. The sand filters recently examined are nonfunctional due to a lack of maintenance. In addition, bypass pipes (around the sand filter) have been installed in some of the systems, causing inadequately treated sewage to be discharged to the MS4. EQD has embarked on a program to identify, map, and sample these systems to bring them into compliance through enforcement and connection to the municipal sanitary sewer system, or to use other means if connection is not possible.

NAVAL STATION MAYPORT ACTIVITIES

COLLECTION SYSTEM SPILL PREVENTION PROGRAM

Phase I videoing and cleaning was completed in two (2) stages: (1) piers T-D-E-F were cleaned and videoed in March-May 2008; and (2) piers A-B-C in June-July 2008. E-F pier collection lines had heavy buildup of scale and were descaled, completed on May 5, 2009 at cost of \$16,096.46. A 40' section of 12" pipe was replaced on Echo pier as it was pitted badly after descaling and had a metal object protruding into line between F3 and F4 manholes at a total cost of \$23,536.94. Upon descaling the rest of that section, a hole was discovered closer to manhole F4 and a blockage approximately 61' from manhole F4. This remaining section is a candidate for relining however a cost estimate has not been received to date.

C pier had descaling done between manholes A-9 and A-8 and A-8A. Relining was done between manholes A-1 to A-2, A-2 to A-3, and A-5 to A-6. Total cost to date on descaling and relining at C pier is \$112,574.38. Additional relining will be required on approximately 150' of 18" DI piping between A8, A-8A, & A-9 at proposed cost of \$59,750.78.

The Phase II area collection system was cleaned and videoed in July 2009. There were several issues noted. Pipe sags were noted at manhole E-1 to unknown manhole, obstruction between manholes E-1 and E-1A, and no manhole between manholes E-2 to E-3 where change of direction was noted. A broken pipe at Building 1430 was noted and repaired at a cost of \$11,985.53. E24 to Building 234 is candidate for descaling. Pipe sags, offset, and eroded section noted between manholes E-3 and E-4; pipe hole and sag between manhole E-3 and Building 12. Considerable scale was noted between Building 50A and Building 12/E3-E4. Manholes were observed to be holding water at Building 154 and between E-3/E-4. There were 2 pipe sags, a pipe hole, and deposits between manholes E-5 and E-3. There were also 2 sags between manhole E-5 and Building 1849. A pipe sag, deposits, offset, and infiltration were found between manholes E-6 and E-5. There was an offset between manholes E-7 and E-6; scaling between E-7 and E-8; pipe sag and broken pipe between manholes E-10 and E-9; and hammer tap, joint offsets, and pipe sag between manholes E-10 and E-11. Pipe sags, joint offset, and joint infiltration were found between manholes E-7 and E-12; abandoned line between manholes E-12 and E-12A; joint infiltrations and gasket exposure between manholes E-12 and E-13; joint offset between manholes E-13 and E-14; abandoned between manholes E-14A and E-14B, moderate joint offset between manholes E-20 and E-21A; severe offsets and mineral deposits between manholes E-22 and E-21; abandoned between manholes E-22 and E-22B; mineral deposits and moderate to severe joint offsets between manholes E-23 and Building 25; moderate to severe joint offsets between manholes E-20 and E-20A; pipe broken at several locations between manholes E-20A and E-17; abandoned between E-17 and E-18; abandoned and discontinued between manholes E-18 and Bldg 2051; moderate offsets, between manholes E-20B and E-20A; holding water at 80' between manhole E-20B and Building 190 and needs descaling; Building 161 to main cleanout had places that were very corroded; Buildings 161D, E, B, and F appear to be abandoned and dead ends; Building 161 to Building 161-E; abandoned; Pump Station 1354 to Pump Station 1354A should be descaled, pipe broken between PS 1354B and PS 1354A, holding water and in need of descaling between Pump Station 1354B and Pump Station 1354A; holding water and in need of descaling between Pump Station 1354A and PS 1354B; pipe sag and deposits between Pump Station 1354B and Pump Station 1354C; joint mineral deposits between Pump Station 1354D and Pump Station 1354E; and pipe sags between Pump Station 1354D and Pump Station 1354LS.

To date, other than the broken pipe repair at Building 1430, no repairs have been made on Phase II but work is scheduled to begin by 3rd or 4th quarter of this Fiscal Year 2010. Phase III cleaning and videoing is scheduled to begin 3rd or 4th quarter of Fiscal Year 2010 with an estimated cost of approximately \$80,000. The information above covers areas of Naval Station Mayport that do not lie within the drainage basin for Sherman Creek. Phases IV and V will cover areas that drain to Sherman Creek.

REPAIR HOUSING LATERALS

This project reported that 192 lateral sewer connections out of 364 housing units were repaired with cured-in-place pipe (CIPP). The remaining lateral sewer lines in the enlisted housing area (west of Lake Wonderwood) are vitrified clay pipe. Laterals to 157 housing units in this area were repaired with CIPP; 107 housing units were not and remain vitrified clay pipe.

In the officer housing area (east of Lake Wonderwood) there are 100 housing units; of these, 35 were repaired with CIPP as part of this project. Reportedly the laterals in the other officer units were replaced with PVC pipe during the 1999-2000 timeframe. This work was contracted by the Housing Department at that time rather than the Public Works Department. Records of that project have not been located; therefore it wasn't included on the Naval Station Mayport project table. However, those lateral lines in officer housing on the ocean were cleaned and videoed the following year and it was noted that they were all PVC.

PROGRAMS TO ADDRESS OSTDS AS SOURCES OF FECAL COLIFORM CONTAMINATION

DCHD OSTDS PROGRAM

The objective of the OSTDS Program is to provide safe and sanitary treatment and disposal of domestic and commercial sewage waste in the areas not served by public sewerage systems. Generally, OSTDS present no public health problems when they are properly designed, installed, and maintained on sites having satisfactory soil and drainage features. However, where an installation site is unsuitable, and where no modification of the property is possible or practical, the use of an OSTDS may contaminate ground or surface waters. The primary goals of DCHD are to protect public health by eliminating the potential for the spread of infectious disease caused by improperly built or maintained OSTDS, and to protect ground and surface water from OSTDS discharge.

DCHD is responsible for all operational aspects of the OSTDS Program, as described in Rule 64E-6, F.A.C. To accomplish its program goals and objective, DCHD utilizes the expertise of one field supervisor, eight field inspectors, and three administrative support staff. In addition, the DCHD office has a field inspector to perform complaint investigations and an enforcement officer to address legal cases.

During the permitting process, the OSTDS staff provides many services including, but not limited to, the following:

- *Application/plan review;*
- *Site evaluation;*
- *System construction permitting; and*
- *Installation inspection.*

DCHD must review all applications for construction permits relating to the installation, modification, replacement, or repair of OSTDS and determine within the time limitations prescribed by the Florida Administrative Procedures Act, Section 120.60, F.S., whether to issue or deny a permit. The goal for the average number of days to issue a new construction permit is eight days and two days for a repair permit.

The review process involves a determination as to whether the site location and installation will comply with standards set forth in Chapter 381, F.S. and Rule 64E-6, F.A.C. DCHD also inspects and evaluates all new installations, repairs, abandonments, or modifications of OSTDS; inspections are made to ensure adequate tank construction and capacity, fill material if needed, drainfield size, elevation, cover, dosing system construction, distance from surface water and potable wells, and other regulatory requirements. DCHD also inspects existing OSTDS for compliance when there is a change of use or occupancy. When COJ's Building and Zoning Department receives an application for a building permit, when a zoning change is requested or when COJ receives an application for occupational license, the applicant will be referred to the DCHD office for OSTDS review.

When a building served by an OSTDS is located in an area zoned or used for industrial/manufacturing purposes, or where a business generates commercial sewerage waste, DCHD issues an annual operating permit and requires at least one compliance inspection per

year. The updated listings of these properties are identified by DCHD staff, who cross-reference JEA and COJ data.

In addition to the actual permitting process for OSTDS systems, DCHD also regulates the OSTDS maintenance industries. Service permits are issued to the following facilities annually, and DCHD performs one to two compliance inspections each year, as follows, depending on the type of facility:

- *Septic disposal services;*
- *Lime stabilization facilities;*
- *Land application facilities;*
- *Portable or temporary toilet services; and*
- *Septic tank manufacturers.*

When an inspection determines that a DCHD-issued OSTDS permit is out of compliance, the inspector notifies the appropriate parties in writing. Proper documentation, in the following sequence, is required for any type of inspection:

- Step i. Written notice (i.e. inspection report);
- Step ii. Official notice;
- Step iii. Legal notice or corrective notice; and
- Step iv. Case referred to State Attorney's Office.

It should be noted that a complaint investigation begins at Step ii, with the issue of the official notice. By law, two versions of the notice are required prior to enforcement. Depending on the severity of the case, the timeline between steps of this sequence may vary. For example, for more serious occurrences, the timeframe between Step i and Step iii can be under 24 hours.

Approximately 90% of cases in Duval County are corrected after Steps i and ii. For those cases that require enforcement, DCHD has its own Enforcement Officer to take cases to court. FDEP law enforcement becomes involved in cases of willful pollution. The DCHD computer database includes a record of all complaints and investigations. This database is updated daily and may include approximately 16 to 20 complaints per week.

FLORIDA ONSITE WASTEWATER ASSOCIATION (FOWA) PROPOSED LEGISLATION

FOWA proposed legislation for a state statute requiring that OSTDS be inspected every five years. Although the goal was to have the bill voted on during the 2007 legislative session, the bill failed in committee and was not brought to the full legislature. According to Mike McNarny, FOWA (personal communication, June 5, 2007), it is currently the organization's goal to educate legislators in the upcoming year with the objective of resubmitting the bill during the 2008 legislative session.

At this point, the focus has temporarily shifted to legislation on the local level. FOWA proposed a similar bill before the Jacksonville City Council. Mr. McNarny stated it will be the goal of FOWA to educate officials on the local level in order to increase support for the ordinance.

DCHD-SPONSORED TRAINING PROGRAMS

On April 25, 2006, First Coast District Florida Environmental Health Association (FEHA) hosted its first advanced OSTDS training opportunity, *Perspectives on the use of OSTDS in Florida*. The course was approved for 6 hours of continuing education for registered septic tank contractors and certified environmental health professionals. Approximately 70 people were in attendance. Speakers included representatives from associations such as FDOH, EPA, St. Johns Riverkeeper, WSEA, FOWA, and DCHD. Those in attendance included personnel from JEA and FDEP, as well as certified plumbers, septic tank contractors, and environmental health professionals from 7 county health units.

DCHD and FDOH hosted another training program, entitled *Onsite Management: Alternative for a Better Community*, on November 16, 2006, in Jacksonville. The course was originally presented at the 2006 FEHA Annual Education Meeting in Sarasota, Florida. This training provided 6 contact hours for all septic tank contractors and certified environmental health professionals. It was an introduction to Onsite Wastewater Management and EPA's Voluntary Management Guidelines. In addition, the speakers provided consideration for existing and future development and the opportunity for discussion of local issues that affect our community.

DCHD intends to continue other such efforts in the future; however, the themes may change. One idea is to include a DCHD public outreach endeavor as a part of the COJ's annual environmental workshop.

DCHD INTENSIVE INSPECTION PROGRAM

In the Fishing Creek, Moncrief Creek, Blockhouse Creek, Hopkins Creek, Wills Branch, Greenfield Creek, and Trout River (2203A) watersheds, a discrete portion of each WBID was identified as having a higher probability of OSTDS-related problems. This determination was made based on the number of repair permit applications, water quality information, and the site conditions of these areas. DCHD is proposing to add an intensive inspection program to focus on these areas to proactively prevent issues from septic tanks in these watersheds.

As part of this first five-year BMAP cycle, DCHD will seek to secure funding for the new program and will begin inspections as funding is available. DCHD will provide the findings from the inspections and any corrective actions taken in the annual BMAP progress reports. Assessment efforts that are also occurring in these WBIDs may identify additional areas where intensive inspections would be beneficial. DCHD will also look to secure funding to include other areas in the inspection program, as necessary.

COJ SEPTIC TANK PHASE-OUT PROGRAM

The purpose of the Septic Tank Phase-Out Program is to improve the quality of surface waters and ground waters by connecting properties located in the septic tank failure areas to JEA public sewer service. In May 2000, COJ enacted Ordinance Code 2000-119-E, which amended Chapter 751 Ordinance, to establish sources of funding for constructing public sewer service lines, adopt the FDOH priority list for septic tank failure areas, and provide an enforcement mechanism for EQD.

Based on an analysis completed by WSEA, there are a total of 64,837 OSTDS within the City with 23,944 systems contained within the 39 failure areas identified to date. The number of septic tanks connected to JEA in future years depends on the construction of sewer collection systems in each failure area and DCHD enforcement actions for septic tanks located outside identified failure areas.

DCHD/COJ SEPTIC TANK FAILURE AREA RANKING

The TAT is the sampling subcommittee for the LSJR tributaries. The DCHD and EQD mutually agreed that it would be beneficial for the TAT to make a recommendation for revisions to the procedure used to determine the “sanitary conditions” portion of the DCHD/COJ Septic Tank Failure Area ranking.

The state has adopted WBIDs as the hydrologic unit for determining whether waterbodies are in compliance with designated uses as adopted in state rule. WBIDs are also the hydrologic unit within the tributaries BMAP that management efforts are directed towards to bring various waterbodies into compliance that may be verified as impaired for fecal coliform bacteria. The TAT has adopted a protocol for ranking the various WBIDs for degree of severity. Using the ranking procedure, WBIDs that rank highest (worst water quality for fecal coliform bacteria) are prioritized for BMAP development and investigative studies to complete the required technical reports and BMAPs.

The TAT fecal coliform ranking for impaired WBIDs is as follows:

1. *For a selected WBID, all fecal coliform data from the most recent five-year period are retrieved from FL STORET.*
2. *This procedure is repeated for all WBIDs to be ranked.*
3. *Once fecal coliform data for the WBIDs of interest are assembled, each WBID is scored using the following protocol: determine the percent of samples that exceed 800 cfu/100mL, then determine the percent of samples that exceed 5,000 cfu/100mL, and lastly the percent of samples that exceed 10,000 cfu/100mL.*
4. *The above calculations are completed for each WBID.*
5. *All of the WBIDs are then ranked for each percent exceedance category. The WBID with the highest percent exceeding 800 cfu/100mL ranks as number one, then the WBIDS are ranked for percent exceedance of 5,000, and finally percent exceedance of 10,000 are ranked. In this manner, a WBID that ranked with the highest percent exceedances for 800, 5,000, and 10,000 cfu/100mL would score a 1st, 1st, and 1st ranking. The WBID would then have a combined ranking score of 3, and would be the worst WBID in the group in terms of fecal coliform violations.*
6. *After a combined score is determined for each of the WBIDs, all WBIDs are ranked based on the combined rank score.*
7. *The ranking by the combined rank score becomes the final fecal coliform rank for that WBID, as determined by the TAT protocol.*

On June 17, , the TAT met to discuss an appropriate method to calculate the sanitary condition index score, which is based on the fecal coliform determination that is used for ranking the DCHD septic tank failure areas. Three options were considered, as follows:

1. *Continue to use a ranking based on fecal coliform geometric mean for the most recent five-year period for a selected group of surface water monitoring sites near the septic tank area of interest.*
2. *Use a percent violation of the 400 or 800 cfu/100mL fecal coliform standards for the same set of data as used in the first option.*

3. *Adopt the TAT fecal coliform WBID ranking protocol and apply it individually to the different WBIDs in each septic tank failure area.*

Option 3 was selected in large part for the consistency it introduces in the methodology used throughout the tributaries regarding prioritization.

WSEA provided COJ with a comprehensive list of the WBIDs for each of the existing and proposed septic tank failure areas and the percent of each WBID that was within the boundaries for a given failure area. COJ and FDEP used the TAT protocol to rank the list of WBIDs provided by WSEA. For each failure area, the WBID rank score was then multiplied by the percent that WBID constituted in the failure area. Sanitary condition points (1 to 10) were then assigned based on total WBID scores for each of the failure areas. The lower the total WBID score for a failure area, the worse the fecal coliform conditions resulting in a high sanitary conditions point value.

CITY OF JACKSONVILLE ORDINANCE CHAPTER 751 SEPTIC TANK SUPERFUND

Sec. 751.101. Declaration of legislative intent and public policy.

The Council finds and declares that the publicly owned water and sewer system must be expanded into those neighborhoods and subdivisions where septic tank systems have failed so as to create a sanitary nuisance or other conditions affecting the environment and the health, safety and general welfare of the inhabitants of the City. It is further declared that in an area having failing septic tank systems, but which has not been declared a sanitary nuisance by the Director of the Environmental and Compliance Department after consulting with the Director of Duval County Health Department, water and/or sewer service will not be provided unless at least 60% of the property owners signify their desire for the system by signing a letter of intent to make payment of the sewer tap charge, the water pollution control charge, water meter tap fee and water capital recovery fee, if applicable. It is further declared that the costs of constructing sewer collection lines and water distribution lines to septic tank system failure areas, which are declared to be sanitary nuisances are to be borne by all taxpayers since the problems are City-wide. It is further declared that any existing Water and Sewer Enterprise Fund, managed and controlled by JEA, which is being financed by current City utility customers should not be used to rectify septic tank system failure area problems without reimbursement. (Ord. 87-485-660, § 1; Ord. 91-992-399, § 1; Ord. 93-138-148, § 56; Ord. 2000-119-E, § 1; Ord. 2008-513-E, § 1)

Sec. 751.102. Definitions.

When used in this chapter, unless the context otherwise clearly indicates a different meaning, the following terms shall have the meaning contained below:

(a) *Available as applied to a publicly owned or investor-owned sewerage system* means that the publicly owned or investor-owned sewerage system is capable of being connected to the plumbing of an establishment or residence, is not under a Department of Environmental Protection moratorium, and has adequate permitted capacity to accept the sewage to be generated by the establishment or residence; and

(1) For a residential subdivision lot, a single-family residence, or an establishment, any of which has an estimated sewage flow of 1,000 gallons per day or less, a gravity sewer line to maintain gravity flow from the property's drain to the sewer line, or a low pressure or vacuum sewage collection line in those areas approved for low pressure or vacuum sewage collection, exists in a public easement or right-of-way that abuts the property line of the lot, residence, or establishment.

(2) For an establishment with an estimated sewage flow exceeding 1,000 gallons per day, a sewer line, force main, or lift station exists in a public easement or right-of-way that abuts the property of the establishment or is within 50 feet of the property line of the establishment as accessed via existing rights-of-way or easements.

(3) For proposed residential subdivisions with more than 50 lots, for proposed commercial subdivisions with more than five lots, and for areas zoned or used for an industrial or manufacturing purpose or its equivalent, a sewerage system exists within one-fourth mile of the development as measured and accessed via existing easements or rights-of-way.

(4) For repairs or modifications within areas zoned or used for an industrial or manufacturing purpose or its equivalent, a sewerage system exists within 500 feet of an establishment's or residence's sewer stub-out as measured and accessed via existing rights-of-way or easements.

(b) *Criteria factors* means a prescribed listing of criteria to be applied to the Failed Area List to determine priority of providing service pursuant to Section 751.107.

(c) *Director* means the person directing the water and sewer distribution and collection systems for JEA, or his deputy, division chief, agent or representative, unless a specific reference is made to a named City department.

(d) *EPB* means the Environmental Protection Board.

(e) *Failed Area List* means the most current list of septic tank system failure areas pursuant to Section 751.106.

(f) *Sanitary nuisance* shall have the meaning given in Section 386.01, F.S., and as further defined and interpreted in the criteria factors specified herein.

(g) *Septic tank system* has the same meaning as provided in Section 64E-6, Florida Administrative Code.

(h) *Septic tank system failure areas* means a subdivision or platted subdivision with five or more failing septic tank systems, and which meets a minimum score of 70 percent of the criteria factors, from evaluation of those criteria factors specified herein, by the Director of the Environmental and Compliance Department after consulting with the Director of the Duval County Health Department or designee.

(i) *Sewage lines* means any of the publicly owned regional sewerage system and connections, fittings, collection and pumps including force mains and gravity flow lines.

(j) *STS Fund* means the Septic Tank Superfund.

(k) *Water lines* means any part of the publicly owned water system together with all connections, fittings, valves and pipes.

(Ord. 87-485-660, § 1; Ord. 91-992-399, § 1; Ord. 93-138-148, § 57; Ord. 94-903-552, § 61; Ord. 97-229-E, § 28; Ord. 2000-119-E, § 1; Ord. 2008-513-E, § 1)

Sec. 751.103. Septic Tank Superfund (STS), establishment of.

There is hereby established a *Septic Tank Superfund* (known as the *STS Fund*) of monies collected and received from various sources, as specified in Section 751.104, to be used to provide water and/or sewer service to septic tank system failure areas, that have been declared sanitary nuisances as provided herein and are noted on a Failed Area List.

(Ord. 87-485-660, § 1; Ord. 91-992-399, § 1; Ord. 2000-119-E, § 1)

Sec. 751.104. Sources of funding.

The STS Fund may acquire monies from the Environmental Protection Fund, federal or State grant funds, monies that may be appropriated from revenue bonds and any other monies appropriated by Council.

(Ord. 87-485-660, § 1)

Sec. 751.105. Administration of STS Fund.

The Director of Finance is authorized and directed to make disbursements from this fund upon the written recommendation of the Director of the Environmental and Compliance Department after consulting with the Director of the Duval County Health Department for the sole purpose of providing water or sewer service to areas on the Failed Area List which are presently served or will be served by the city in priority as determined in accordance with the criteria factors.

(Ord. 87-485-660, § 1; Ord. 91-992-399, § 1; Ord. 93-138-148, § 58; Ord. 2000-119-E, § 1; Ord. 2008-513-E, § 1)

Sec. 751.106. Failed Area List.

The Director of the Environmental and Compliance Department shall be responsible for assembling and maintaining a prioritized listing of Septic Tank System Failure Areas (Failed Area List) based upon the criteria factors specified herein, after consulting with the Director of the Duval County Health Department. The Failed Area List shall be submitted to City Council for its review as part of the annual budget process. The Failed Area List shall be updated at least annually. The list shall be promulgated and shall be made available to the public in the Office of the Director of the Environmental and Compliance Department. Any area on the list which has been designated a sanitary nuisance by the Director of the Environmental and Compliance Department after consulting with the Director of the Duval County Health Department shall be identified as such on the list.

(Ord. 87-485-660, § 1; Ord. 93-138-148, § 59; Ord. 2000-119-E, § 1; Ord. 2008-513-E, § 1)

Sec. 751.107. Criteria factors.

Priority of providing sewage lines or water lines to a Septic Tank System Failure Area shall be determined by the Director of the Environmental and Compliance Department in consultation with the Director of the Duval County Health Department, or designee, in accordance with criteria factors developed by the Director of the Environmental and Compliance Department after consulting with the Director Duval County Health Department, or designee, and the Director of the Public Works Department. The criteria factors developed shall include:

1. The number of septic tank system repair permits issued in the area.
2. Average lot size in the area.
3. Soil potential in the area.
4. Seasonal highwater table in the area.
5. Threat to potable water in the area.
6. Sanitary conditions in the area.
7. Proximity of the area to any surface water body.
8. Potential for flooding in the area.

If a Septic Tank System Failure Area has been declared a sanitary nuisance by the Director of the Environmental and Compliance Department after consulting with the Director of the Duval County Health Department, that area automatically shall be given the highest priority for the provision of service. If two or more areas are so declared sanitary nuisances, then the developed criteria factors shall be applied to determine the priority amongst them.

(Ord. 87-485-660, § 1; Ord. 93-138-148, § 60; Ord. 2000-119-E, § 1; Ord. 2008-513-E, § 1)

Sec. 751.108. Provision of sewage service to Septic Tank System Failure Areas.

(a) When the Director of the Environmental and Compliance Department, in consultation with the Director of the Duval County Health Department have ranked the Septic Tank System Failure Areas in accordance with Section 751.107 and sufficient STS Funds are available, the Director shall contact the property owners in the Septic Tank System Failure Area having the highest priority. When at least 60 percent of the property owners in the Septic Tank System

Failure Area have agreed to have service provided to their area and each of those property owners has signed a letter of intent to make payment of the sewer tap charge, water pollution control charge, water meter tap fee and capital recovery fee, the Director shall prepare and implement a plan for providing sewage lines to the Septic Tank System Failure Area in accordance with Chapter 122, Part 6.

(b) If, however, a Septic Tank System Failure Area has been declared a sanitary nuisance by the Director of the Environmental and Compliance Department after consultation with the Director of the Duval County Health Department, the Director shall prepare and implement a plan for providing sewage lines without first having to contact the owners in the Septic Tank System Failure Area.

(c) For a failure area where the threat is to drinking water supplies (wells), when notified by the Director of the Environmental and Compliance Department after consultation with the Director of the Duval County Health Department, the Director or designee shall prepare and implement a plan for providing water lines only to the failure area where installation of water lines would be more cost effective than installation of sewage lines to failure area.

(Ord. 87-485-660, § 1; Ord. 91-992-399, § 1; Ord. 93-138-148, § 61; Ord. 2000-119-E, § 1; Ord. 2008-513-E, § 1)

Sec. 751.109. Variances.

Variances to the procedure for the provision of service to a Septic Tank System Failure Area established by this Chapter may be granted as provided in Section 360.111.

(Ord. 87-485-660, § 1; Ord. 2000-119-E, § 1; Ord. 2000-119-E, § 1)

Sec. 751.110. Appeals.

Appeals shall be heard as prescribed in Part 4, Chapter 360.

(Ord. 87-485-660, § 1)

Sec. 751.111. Reimbursement of Water and Sewer Enterprise Fund.

When the STS Fund is created and sufficient funds are available, the first use of the monies available shall be for reimbursement of the Water and Sewer Enterprise Fund, managed and controlled by JEA for the costs of providing water and sewer service.

(Ord. 87-485-660, § 1; Ord. 94-903-552, § 62; Ord. 2000-119-E, § 1)

Sec. 751.112. Mandatory and deferred connections.

(a) The owner of a septic tank system shall connect to a publicly owned or investor-owned sewerage system within 365 days after written notification by the owner of the publicly owned or investor-owned sewerage system that the system is available for connection. In the alternative, said owner may defer such connection as provided in subsection (b) of this Section. The publicly owned or investor-owned sewerage system must notify the owner of the septic tank of the availability of the central sewerage system. No less than one year prior to the date the sewerage system will become available, the publicly owned or investor-owned sewerage system shall notify the affected owner of the septic tank of the anticipated availability of the sewerage system and shall also notify the owner that the owner may be required to connect to the sewerage system within one year of the actual availability. The owner shall have the option of prepaying the amortized value of required connection charges in equal monthly installments over a period of time determined by JEA, based upon sewerage system costs. Nothing in this Section shall operate to impair contracts or other binding obligations relating to payment schedules in existence as of May 31, 2000.

(b) If the owner has a properly functioning septic tank system and wishes to defer connection to the available publicly owned or investor owned sewerage system in subsection (a), of this Section, such connection may be deferred until such time as the title to the owner's property is

sold, conveyed or otherwise transferred. In consideration for such deferral, the owner shall execute an agreement with the City, under which the owner agrees to have a covenant placed upon the deed to owner's property that restricts the sale, conveyance or other transfer of title to the property until such time as connection to the available publicly owned or investor owned sewerage system is made. Said agreement shall also provide that the deferral relates only to connection under this ordinance and that it in no way binds the State of Florida from enforcing mandatory connections to available systems pursuant to Florida law, including Section 381.00655, F.S. Said contract shall be filed in the Official Records of Duval County as notice of such connection requirement. The Director of Public Works is hereby authorized to sign such agreements for the City; provided however that such agreement shall bear attestation from the Corporation Secretary, review and approval from the Director of Administration and Finance and form approval by the Office of General Counsel.

(c) If the owner's septic tank system has failed and the Duval County Health Department will not issue a permit for repair, the owner shall connect to the available publicly owned or investor owned sewerage system within 90 days after notification, by the Duval County Health Department, that the permit will not be issued.

(Ord. 2000-119-E, § 1)

Sec. 751.113. Penalty.

Any person who violates any provision of this Chapter or shall be assessed a civil penalty not to exceed \$500 per violation. Each day a violation continues shall constitute a separate violation.

(Ord. 2000-119-E, § 1)

Sec. 751.114. Enforcement.

This Chapter shall be enforced by the Environmental and Compliance Department and Environmental Protection Board pursuant to the provisions of Chapter 360, Part 4 and rules promulgated pursuant thereto.

(Ord. 2000-119-E, § 1; Ord. 2008-513-E, § 1)

Sec. 751.115. Assessment and recovery of civil penalties.

Civil penalties provided for in Section 751.113 may be assessed by the administrative process in Chapter 360, Part 4 and rules promulgated pursuant thereto or, in the alternative, by judicial process in a civil action filed in the name of the City in a court of competent jurisdiction. A civil penalty assessed and owed under this Chapter shall be paid to the Tax Collector for deposit in the Septic Tank Superfund established by Section 751.103. An administratively assessed civil penalty under this Section and Chapter 360, Part 4, may be recovered in a civil action in the name of the City. The City shall be entitled to reasonable attorney's fees and costs, including appellate fees and costs in actions where the City is successful in recovering civil penalties.

(Ord. 2000-119-E, § 1)

Sec. 751.116. Other relief.

In addition to any penalties assessed and collected under this Chapter, the City, through the Office of General Counsel, may seek injunctive or other appropriate relief in a court of competent jurisdiction to enforce this Chapter or administrative orders issued pursuant to this Chapter and Chapter 360, Part 4.

(Ord. 2000-119-E, § 1)

Sec. 751.117. Interpretation.

Whenever the titles "Director of Environmental and Compliance," "Director of Duval County Health Department," "Director" as the person directing the water and sewer distribution systems

for JEA, or "Director of Public Works" are used in this chapter, those titles include the deputies, division chiefs, agents, representatives or designees of each respective director.
(Ord. 2000-119-E, § 1; Ord. 2008-513-E, § 1)

PROGRAMS TO ADDRESS STORMWATER AS SOURCES OF FECAL COLIFORM CONTAMINATION

SPECIFIC EFFORTS BY CITY OF JACKSONVILLE

MS4 CAPITAL AND DRAINAGE SYSTEM REPAIR (DSR) PROJECTS

Between 1997 and 2008, COJ completed numerous MS4 capital improvements at a cost of over \$182 million. COJ's current 5-year Capital Improvement Plan (CIP) lists 19 MS4 projects with a total estimated cost of over \$95 million, with an additional \$167 million in proposed funding beyond FY2012/2013.

In addition to constructing new drainage CIP projects, between 1997 and 2008, COJ has completed over 60 DSR projects at a total cost of over \$5 million. It is anticipated that continuing investments will average \$500,000 annually for DSR projects.

As demonstrated above the COJ has, is, and will, within approved annual budget limits, construct stormwater collection and treatment facilities.

MS4 MAINTENANCE ACTIVITIES

COJ maintains its MS4 via response to requests received through the Citizen Action Response Effort (CARE) system, as well as through an allocation of approximately \$6 million annually for street sweeping, structure and closed conveyance cleaning, and spot repair/replacement projects.

The Department of Public Works' Right-of-Way and Grounds Division responds to an average of 10,000 CARE requests per year. A work order management system to track labor equipment and material costs for each CARE-related work order was implemented in 2007. To date, the work order management system database contains over 9,000 CARE drainage work orders at an average total cost of \$550 per work order. This translates into an annual cost of approximately \$5.5 million.

In summary, COJ invests approximately \$11.5 million annually to maintain its stormwater drainage system. Based on the historical number of CARE-related cases, it is projected that the average annual maintenance costs will remain at the historic levels summarized above. The type and volume of CARE-related maintenance activities and their locations assist DPW in defining future capital improvement and DSR projects.

INSPECTION, SAMPLING, AND ENFORCEMENT ACTIVITIES

Between January 1, 2000, and September 1, 2009, COJ EQD completed 2,510 CARE-initiated inspections citywide. The City anticipates conducting an annual average of 350 CARE-initiated inspections, described in the *Inspection, Sampling, and Enforcement Activities Report*, for the foreseeable future.

EQD maintains 100 ambient tributary water quality trends and conditions sampling sites citywide. EQD has established a goal of conducting quarterly sampling for these sites.

There are over 920 private lift stations within the City of Jacksonville that were permitted after 1992 which require operator attendance. The Water Quality Branch of the Environmental Quality Division in the Environmental and Compliance Department conducts

annual routine inspections of each private lift station. Enforcement actions are taken as required to ensure compliance following annual inspections or CARE initiated inspections.

SSO inspections are initiated via a CARE request or referral by FDEP or JEA. Where the SSO inspection determines the source is from an NPDES-permitted facility, inspection findings are forwarded to FDEP for enforcement. Enforcement actions related to SSOs found to originate from a private lift station or non-NPDES permitted WWTF within the City are addressed by the City.

City of Jacksonville completed investigations and enforcement within the following WBIDs:

- *Blockhouse Creek (WBID 2207), Williamson Creek (WBID 2316), and Fishing Creek (WBID 2324) for inadequate erosion and sediment control measures which resulted in water quality violations and the assessment of enforcement penalties.*
- *Fishing Creek (WBID 2324), Moncrief Creek (WBID 2228), and Pottsburg Creek (WBID 2265B) for septic tank phase-out projects. The process developed during the Pernecia Septic Tank Phase Out is the basis for the process we are still using to work with septic tank owners in failing septic tank areas after sewerage becomes available to help ensure that the septic tanks are phased out. Most enforcement actions are resolved by EQD without referral to the Office of General Counsel.*
- *Craig Creek (WBID 2297) and Pottsburg Creek (WBID 2265B) for failing sewage collection system that allowed sewage to enter the MS4. In each instance through enforcement action the discharge was stopped, necessary repairs were made and civil penalties were assessed for water quality violations.*

STORMWATER MANAGEMENT PLAN

Beginning in 2006, the City contracted with a consultant to update the City of Jacksonville's Stormwater Management Plan (SWMP). Under this contract the consultant completed the following:

- *Updated the City's stormwater models;*
- *Developed master plan level designs for regional and neighborhood BMPs to reduce flow and improve water quality; and*
- *Assisted in development of a Stormwater Utility fee structure and operating budget.*

To date, COJ has invested \$1.5 million in the SWMP. The current CIP includes \$2 million to update the MSMP during the 2012/2013 fiscal year. Although planned, the proposed SWMP update requires budget approval.

MS4 NPDES PROGRAM

In 1991, the City took the first steps toward implementing an ongoing NPDES program. In 1997, the City, along with its co-permittee FDOT District 2, was issued a permit. Between 1996 and 2008 the City has invested approximately \$10,900,000 in its NPDES program. Key elements of the work completed during this period include the following:

- *Complete inventory and mapping of all COJ and FDOT MS4 infrastructure.*

- *Between 1998 and 2007 a citywide Illicit Discharge Detection and Elimination field inspection program was conducted.*
- *Implementation of a High Priority Industry Inspection Program.*
- *Implementation of an ongoing water quality sampling and monitoring program.*
- *Development of field inspection tools and protocols to support ongoing illicit discharge and detection by COJ staff.*

During the next 5 years (2009–13) the City will invest an additional \$2.7 million in its NPDES program. During this period the City plans to develop and implement tools and practices to enhance current private lift station, septic tank, and high priority industry inspections and enforcement procedures. In addition, the City will integrate existing systems and data to more effectively address NPDES permit administration as well as comply with LSJR Main Stem and Tributaries BMAP reporting requirements.

OUTREACH AND EDUCATION

COJ is actively engaged in many public awareness activities, including the following:

- *Public service announcements on septic tank maintenance and pet waste management;*
- *Educational materials and newsletters to provide a better understanding of ordinances; and*
- *Presentations to groups such as homeowner's associations and Citizen Policy Advisory Committees (CPACs) on the impact of fecal coliform generated by pet waste entering and affecting our waterways.*

PET WASTE MANAGEMENT

In 2004, Sec.462.301 Jacksonville Ordinance Code (JOC) and 2007, Sec. 28.716 JOC, COJ enacted ordinances for the removal and proper disposal of solid waste from pets and animals on private and public properties. Enforcement provisions include monetary penalties up to \$250 per violation and imprisonment.

TRIBUTARY THERMAL IMAGING

In 2005, COJ funded \$8,000 to conduct a trial thermal imaging project. The trial project covered three tributary segments: Hogan Creek, Fishing Creek, and Little Pottsburg Creek. Follow-up ground truthing revealed much information on the potential hot spots identified via thermal imagery. However, water quality information was not collected to substantiate the hot spots as positive fecal coliform sources.

Leveraging the lessons learned during the 2005 study, in conjunction with FDEP, another study was conducted. Using \$50,000 in special funding from the Legislature, the study involved the thermal imaging of four creeks routinely contaminated with fecal coliform. This study included preflight and postflight sampling for fecal coliform bacteria by the EQD/FDEP contractor and MST analysis by the University of South Florida. Field verifications and ground truthing will be completed on four WBIDs. The WBIDs included in this study are McCoy Creek, Miramar Creek, Craig Creek, and Big Fishweir Creek.

WALK THE WBIDS

In September and October 2008, COJ, FDEP, DCHD, FDOT, PBS&J, USF, and JEA staff walked 11 WBIDs. The WBIDs walked include Miller Creek, Miramar Creek, Big Fishweir Creek, Hogan Creek, Craig Creek, Red Bay Branch, Long Branch, McCoy Creek, Christopher Branch, Williamson Creek, and Leeds Pond. The purpose of the Walk the WBIDs exercise was to identify potential fecal coliform sources. During the walk numerous potential illicit connections and other potential fecal coliform sources were identified. The City is continuing to investigate the potential sources identified in the Walk The WBID summary provided by PBS&J during the November 12, 2009 Lower St. Johns River Tributary Meeting.

COJ POTENTIAL ILLICIT CONNECTION PROGRAM

The keys to COJ's PIC Program are education and the elimination of illicit discharges. In June 2007, the consulting firm of England-Thims & Miller (ETM), under contract with COJ PWD, began to develop an inventory of PICs while mapping the MS4 system in Duval County. ETM has examined the permits, beginning in 1997, for the cities of Jacksonville, Atlantic Beach, and Neptune Beach, and FDOT. The entire MS4 system was inventoried; however, with constant growth comes constant change. New technologies are being used to make inventory maintenance less time consuming and more economical.

On October 1, 2007, the PIC Program was shifted from PWD to COJ EQD. EQD is currently following up on and resolving the PICs found by ETM during its inventory. EQD is using several handheld Trimble units and a dedicated computer to track progress. ETM created the computer programming, set up the system, and trained EQD staff on its operation.

EQD has the authority to conduct detailed investigations and take enforcement action, if necessary, to resolve the PIC. There are daily reports of new PICs from COJ's CARE system, which is a database that allows anyone to report a PIC or any other problem to COJ. The reports coming in from the CARE system vary greatly, and the PIC staff looks into each one of them.

A typical PIC investigation includes talking to the property owner to gather as much information as possible about the pipe and to formulate a plan and timetable for its removal. If the property owners are cooperative, EQD works in conjunction with them to remove the pipe. If the property owners are not cooperative, EQD is prepared to bring about compliance through the enforcement process. Many of the reported PICs involve swimming pools or washing machines and are fairly easy to resolve. A small percentage involves an illegal discharge of wastewater, usually from a failing septic system. EQD works with the State Health Department to resolve these issues.

EQD also conducts over 200 industrial inspections a year of high-priority sites. One full-time inspector visits these industries and checks the facilities for areas that might be prone to illegal runoff. After a comprehensive site visit, the inspector will share his findings with facility personnel.

Educational outreach is an essential part of the PIC Program. EQD distributes pamphlets, door hangers, and other educational materials in a variety of ways, including to an individual during an inspection, at homeowner's association meetings, during Earth Day events, and anywhere else where there is an opportunity to get the message across. EQD also works in conjunction

with SJRWMD's WAV Program. Information about the program can be found online at www.sjrwmd.com/education/wav/index.html.

FDOT DRAINAGE CONNECTION PROGRAM

14-86.001 Purpose. The purpose of this rule chapter is to regulate and prescribe conditions for the transfer of stormwater to the Department of Transportation's right of way as a result of manmade changes to adjacent property(ies), through a permitting process designed to ensure the safety and integrity of the Department of Transportation's facilities and to prevent an unreasonable burden on lower properties. This rule chapter does not regulate dewatering activities.

Specific Authority 334.044(2), (15) FS. Law Implemented 334.044(15) FS. History - New 11-12-86, Amended 1-20-09.

14-86.002 Definitions. As used in this rule chapter the following terms shall have the following meanings:

- (1) "Adjacent Property" means any real property or easement with a shared boundary to the Department's right of way.
- (2) "Applicant" means the owner of adjacent property or the owner's authorized representative.
- (3) "Applicable Water Quality Standards" means rules and regulations of state or federal governmental entity(ies) pertaining to stormwater discharges from the Department's facilities to which the drainage connection is made.
- (4) "Approved Stormwater Management Plan" or "Master Drainage Plan" means a plan adopted or approved by a city, county, water management district, or other agency with specific drainage or stormwater management authority provided that:
 - (a) Such plan is actively being implemented;
 - (b) Any required construction is substantially complete;
 - (c) Downstream mitigation measures have been provided for in the plan; and
 - (d) The use of any Department facilities either existing or planned, which are part of such plan, have been approved by the Department.
- (5) "Closed Basin" means a basin without any positive outlet, for the design storms applicable to this rule.
- (6) "Critical Duration" means the length of time of a specific storm frequency which creates the largest volume or highest rate of net stormwater runoff (post-improvement runoff less pre-improvement runoff) for typical durations up through and including the 10-day duration for closed basins and up through the 3-day duration for basins with positive outlets. The critical duration for a given storm frequency is determined by calculating the peak rate and volume of stormwater runoff for various storm durations and then comparing the pre-improvement and post-improvement conditions for each of the storm durations. The duration resulting in the highest peak rate or largest net total stormwater volume is the "critical duration" storm (volume is not applicable for basins with positive outlets).
- (7) "Department" means the Florida Department of Transportation.
- (8) "Discharge" means the event or result of stormwater draining or otherwise transferring from one property to another or into surface waters.
- (9) "Drainage Connection" means any structure, pipe, culvert, device, paved or unpaved area, swale, ditch, canal, or other appurtenance or feature, whether naturally occurring or created, which is used or functions as a link to convey stormwater.
- (10) "Facility" or "Facilities" means anything built, installed, or maintained by the Department within the Department's right of way.
- (11) "Impervious Area" means surfaces which do not allow, or minimally allow, the penetration of water. Examples of impervious areas are building roofs, all concrete and asphalt pavements,

compacted traffic-bearing areas such as limerock roadways, lakes, wet ponds, pond liners, and other standing water areas, including some retention/detention areas.

(12) "Improvement" means any man-made change(s) to adjacent property.

(13) "Licensed Professional" means an individual licensed by a Florida professional licensing board, authorized by law to design and certify the stormwater management system under review.

(14) "Man-made Change" means any intentional physical change to or upon adjacent property resultant from an intentional physical change, which establishes or alters the rate, volume, or quality of stormwater.

(15) "Permit" or "Drainage Connection Permit" means an authorization to establish or alter a drainage connection to the Department's right of way issued pursuant to this rule chapter.

(16) "Permittee" means the individual or entity to which a Drainage Connection Permit is issued.

(17) "Positive Outlet" means a point of stormwater runoff into surface waters which under normal conditions would drain by gravity through surface waters ultimately to the Gulf of Mexico, or the Atlantic Ocean, or into sinks, closed lakes, or recharge wells provided the receiving waterbody has been identified by the appropriate Water Management District as functioning as if it recovered from runoff by means other than transpiration, evaporation, percolation, or infiltration.

(18) "Post-improvement" means the condition of property after improvement.

(19) "Pre-improvement" means the condition of property:

(a) Before November 12, 1986; or

(b) On or after November 12, 1986, with connections which have been permitted under this rule chapter or permitted by another governmental entity based on stormwater management requirements equal to or more stringent than those in this rule chapter.

(20) "Right of Way" means land in which the Department owns the fee or less than the fee, or for which the Department has an easement, devoted to or required for use as a transportation or stormwater management facility.

(21) "Stormwater" or "Stormwater Runoff" means the flow of water which results from and occurs immediately following a rainfall event.

(22) "Stormwater Management System" means a system which is designed and constructed or implemented to control stormwater, incorporating methods to collect, convey, store, infiltrate, treat, use, or reuse stormwater to prevent or reduce flooding, overdrainage, pollution, and otherwise affect the quantity or quality of stormwater in the system.

(23) "Surface Water" means water upon the surface of the earth whether contained in bounds created naturally or artificially or diffused. Water from natural springs shall be classified as surface water when it exits onto the earth's surface.

(24) "Watershed" means the region draining or contributing water to a common outlet, such as a stream, lake, or other receiving area.

Specific Authority 334.044(2), (15) FS. Law Implemented 334.044(15) FS. History - New 11-12-86, Amended 1-20-09.

14-86.003 Permit, Assurance Requirements, and Exceptions.

(1) Permit.

(a) No permits are required for properties without improvements on or after November 12, 1986.

(b) All improvements on or after November 12, 1986, require a Drainage Connection Permit, Form 850-040-06 (10/08), whether or not the work is done in conjunction with a driveway connection, and whether or not the improvement retains stormwater runoff on the adjacent property up to and including the 100 year event of critical duration.

(2) Assurance Requirements.

(a) The applicant for a drainage connection permit shall provide reasonable assurances that:

1. The peak discharge rates and total volumes of stormwater discharging from the adjacent property to the Department's right of way are those provided for in an approved stormwater management plan or master drainage plan; otherwise the post-improvement stormwater runoff discharging from the adjacent property to the Department's right of way shall not exceed the more stringent of the following:

a. The peak discharge rates and total volumes allowed by applicable local regulation; or
b. The improvement shall not increase stormwater discharge rate above the pre-improvement discharge rate, and in watersheds which do not have a positive outlet, the post-improvement total volume of stormwater runoff shall not be increased beyond the pre-improvement volume considering worst case storms for up to the frequencies and durations contained in paragraph 14-86.003(2)(c), F.A.C.

2. Any discharge pipe establishing or constituting a drainage connection to the Department's right of way is limited in size based on the pre-improvement discharge rate, downstream conveyance limitations, downstream tailwater influences, and design capacity restrictions imposed by other governmental entities.

3. If the improvement changes the inflow pattern of stormwater or method of drainage connection to the Department's right of way, post-improvement discharge will not exceed the pre-improvement discharge to the Department's right of way, any new drainage connection will not threaten the safety or integrity of the Department's right of way, and will not increase maintenance costs to the Department. At a minimum pavement hydraulics, ditch hydraulics, storm drain hydraulics, cross drain hydraulics, and stormwater management facilities shall be analyzed. The analysis must follow the methodology used in the design of the Department's facilities receiving the discharge and meet the criteria in chapters 2, 3, 4, and 6 of the Department's *Drainage Manual*, Topic Number 625-040-002-c, May 2008, incorporated herein by reference. The *Drainage Manual* is available from the Department at: <http://www.dot.state.fl.us/rddesign/dr/Manualsandhandbooks.shtm>.

4. The quality of water conveyed by the connection meets all applicable water quality standards, and such assurance shall be certified in writing. In the event the discharge is identified causing or contributing to a violation of applicable water quality standards, the permittee will be required to incorporate such abatement as necessary to bring the permittee's discharge into compliance with applicable standards.

(b) If the requirements set forth in paragraph 14-86.003(2)(a), F.A.C., cannot be fully complied with, the applicant may submit alternative drainage connection designs. The analysis supporting the proposed alternative connection must follow the methodology used in the design of the Department's facilities receiving the proposed alternative drainage connection and meet the criteria in chapters 2, 3, 4, and 6 of the Department's *Drainage Manual*. Deviation from a standard in the *Drainage Manual* must be approved by the District Drainage Engineer. Acceptance of any alternative design must serve the purpose of this rule chapter and shall be based upon consideration of the following:

1. The type of stormwater management practice proposed;
2. The efficacy and costs of alternative controls;
3. The impact upon the operation and maintenance of the Department's facilities; and
4. The public interest served by the drainage connection.

(c) In providing reasonable assurances, the applicant shall:

1. Use a methodology which is compatible with the methodology employed in the design of the Department's facilities receiving the stormwater;
2. Determine the peak discharge rates considering various rainfall event frequencies up to and including a 100 year event of critical duration of up to three days; and
3. In watersheds without a positive outlet, determine the stormwater runoff total volumes considering various rainfall amounts up to a 100 year rainfall frequency of critical durations of up to ten days. The pond retention volume must recover at a rate such that one-half of the volume

is available in seven days with the total volume available in 30 days, with a sufficient amount recovered within the time necessary to satisfy applicable water treatment requirements.

(3) Exceptions. The following exceptions do not require a Drainage Connection Permit:

(a) Improvements to adjacent properties not draining to the Department's right of way in the pre-improvement and post-improvement condition.

(b) Single-family residential improvements which are not part of a larger common plan of improvement or larger common plan of sale.

(c) Agricultural and silvicultural improvements that:

1. Are subject to regulation by the Department of Environmental Protection or regional Water Management Districts;

2. Are exempt under the provisions of Section 373.406, F.S.; or

3. Are implementing applicable best management practices adopted by the Florida Department of Agriculture and Consumer Services in Rule Chapter 5M, F.A.C., or Rule Chapter 5I-6, F.A.C.

(d) Any other improvement, provided that all of the following apply:

1. The total impervious area, after improvement, is less than 5,000 square feet of cumulative impervious area and is less than 40% of that portion of the property that naturally drained to the Department's right of way;

2. The improvement does not create or alter a drainage connection;

3. The improvement does not change flow patterns of stormwater to the Department's right of way, and does not increase the surface area draining to the Department's right of way;

4. The property is located in a watershed which has a positive outlet; and

5. The site or improvement is not part of a larger common plan of improvement or larger common plan of sale.

(4) An exception provided in subsection 14-86.003(3), F.A.C., shall not apply if any drainage connection from the adjacent property threatens the safety and integrity of the Department's facilities or creates an unreasonable burden on lower properties, including violations of applicable water quality standards.

Specific Authority 334.044(2), (15) FS. Law Implemented 334.044(15) FS. History - New 11-12-86, Amended 1-20-09.

14-86.004 Permit Application Procedure.

(1) An applicant shall submit a Drainage Connection Permit, Form 850-040-06 (10/08), incorporated herein by reference. This form may be obtained from any of the Department's local area Maintenance Offices, District Offices, or on the internet at the Department's website: <http://www.dot.state.fl.us/onestoppermitting/>.

(2) The applicant shall submit four completed Drainage Connection Permits packages. Each completed Drainage Connection Permit package shall include all applicable attachments. All applicable plans and supporting documentation shall be submitted on no larger than 11" X 17" multipurpose paper and included in PDF format on a compact disk.

(3) The Drainage Connection Permit shall be accompanied by:

(a) A location map, included in the construction plans, sufficient to show the location of the improvement and any drainage connection to the Department's right of way, and shall include the state highway number, county, city, and section, range, and township.

(b) A grading plan drawn to scale showing pre-improvement and post-improvement site conditions including all pervious and impervious surfaces, land contours, spot elevations, and all drainage facilities of the Department and of the adjacent property. The bench mark datum for the plans (whether NGVD 29 or NAVD 88) shall be noted on the plans. Contour information shall extend 50 feet beyond the property boundaries or be sufficient to clearly define the portion of the watershed which drains through the property to the Department's right of way.

(c) Photographs which accurately depict pre-improvement and present conditions.

(d) Soil borings and water table data and, where percolation or infiltration is utilized in the design, appropriate percolation test methodology and results.

(e) Computations as required by subsection 14-86.003(2), F.A.C.

(f) The Drainage Connection Certification, Part 2 of the permit must be certified by a Licensed Professional that the complete set of plans and computations comply with either paragraph 14-86.003(2)(a) or 14-86.003(2)(b), F.A.C.

(4) Improvements which otherwise meet the criteria of subparagraphs 14-86.003(3)(d)1. and 14-86.003(3)(d)4., F.A.C., but which create or alter a drainage connection to the Department's right of way, will not require submittal of the information required by paragraphs 14-86.004(3)(d) through (f), F.A.C., but will otherwise require the submittal of all other required information.

(5) The Department recognizes that regulatory and permitting programs exist or may be developed in the future by local units of government, and state or federal agencies which may overlap with some or all of the requirements of this rule chapter. In order to avoid duplication the Department will:

(a) In lieu of the requirements in Rule 14-86.003 and subsection 14-86.004(3), F.A.C., accept a permit that accomplishes the purposes of this rule chapter so long as the permit is issued by a governmental entity with specific stormwater management authority and is based on requirements equal to or more stringent than those in Rule 14-86.003, F.A.C.; or

(b) Accept any form, plans, specifications, drawings, calculations, or other data developed to support an application for a permit required by a governmental entity, pursuant to any rule which establishes requirements equal to or more stringent than Rule 14-86.003, F.A.C.

(6) The Drainage Connection Permit serves as the application. Once approved by the Department, the form and supporting documents become the Drainage Connection Permit.

Specific Authority 334.044(2), (15) FS. Law Implemented 334.044(15) FS. History - New 11-12-86, Amended 1-20-09.

14-86.005 General Conditions for a Drainage Permit.

(1) A Drainage Connection Permit does not exempt the permittee from meeting all other applicable regulations and ordinances governing stormwater management.

(2) All work done in conjunction with the drainage connection permit shall meet and adhere to all general and specific conditions and requirements contained on the Permit.

(3) Within 15 working days after completion of the work authorized by an approved Drainage Connection Permit, the permittee shall notify the Department in writing of the completion; and for all design work that originally required certification by a Licensed Professional, this notification shall contain the As Built Certification, Part 8 of the Permit. The certification shall state that work has been completed in substantial compliance with the Drainage Connection Permit.

(4) The permittee or property owner, will be required to reimburse the Department for any fines, penalties and costs, e.g., abatement costs, mitigation costs, remediation costs, etc. incurred by the Department in the event the permittee's discharge fails to meet the applicable water quality standards or minimum design and performance standards contrary to the permittee's assurances provided in subsection 14-86.003(2), F.A.C.

Specific Authority 334.044(2), (15) FS. Law Implemented 334.044(15) FS. History - New 11-12-86, Amended 1-20-09.

14-86.006 Permit Suspension or Revocation. A permit will be suspended or revoked if:

(1) The permitted drainage connection is not constructed, operated, or maintained in accordance with the permit;

(2) Emergency conditions or hazards exist;

(3) False or misleading information is submitted to the Department in the Drainage Connection Permit package;

(4) Another governmental entity revokes or suspends a permit which was the basis upon which a Department Drainage Connection Permit was obtained;

(5) The As-built Certificate required for the Drainage Connection Permit is not submitted in accordance with subsection 14-86.005(3), F.A.C.

(6) Any discharge above the permitted design discharge.

Specific Authority 334.044(2), (15) FS. Law Implemented 334.044(15) FS. History - New 11-12-86, Amended 1-20-09.

14-86.007 Forms.

Specific Authority 334.044(2) FS. Law Implemented 120.53(1)(b), 120.60, 334.03(17), (22), 334.035, 334.044(1), (12), (13), (27), 335.04(2), 335.10(2), 339.155(2)(a), (f) FS. History - New 11-12-86, Repealed 1-20-09.

ATLANTIC BEACH STORMWATER MANAGEMENT PROGRAM

The objective of the Atlantic Beach Stormwater Management Program is to ensure quality runoff, and to identify areas that may experience property damage due to the intrusion of stormwater. Another concern is any area where the accumulation of stormwater may create a hazard to vehicular and/or pedestrian traffic. Many of these problems are easily solved by readjustment of the existing grade. However, the majority are taken care of or eliminated through the City's rigorous preventative maintenance program.

The City of Atlantic Beach implements this program by using a dedicated crew and budget. Private stormwater facilities are the responsibility of the owner, however the City inspects them. The City adopted a stormwater utility ordinance that sets the rate schedules, billing, and payment methods. These funds are used to maintain the Stormwater Management Program, personnel, and the equipment for this endeavor.

Improvement of the Stormwater Management Program continues to be realized through physical changes in the grades/flow lines; the installation of needed piping and culverts; the creation of retention ponds; and a rigorous program of cleaning and maintaining the existing system of drainage ditches, piped systems, catch basins, manholes, and control structures. Further improvements continue to be made within the Stormwater Management Program yearly as budgets permit.

DESCRIPTION OF PROGRAM EFFORTS

1. Structural Controls – The City of Atlantic Beach maintains three city-owned stormwater wet detention treatment ponds with associated control structures. In addition, the Stormwater Division maintains three FDOT ponds under annual maintenance contract. Maintenance of the structures occurs as required by the NPDES permit.
2. Roadway Maintenance – Litter control is done manually. The frequency is daily in all areas, or as needed in the rest of the City. Catch basins are inspected weekly, and cleaned as needed. Ditches are checked, monitored, and cleaned once a week as required by the city's NPDES permit, to assure good flow conditions. All drainage facilities are inspected after each major storm event and in response to citizens' complaints. Citizen complaints are typically responded to within 24 hours of their receipt. Roadway maintenance is performed routinely and as needed by the Streets & Maintenance Division. Streets are swept every other month, as required by the NPDES permit.
3. Municipal Waste Facilities – All household waste is collected weekly by a contractor, and is deposited in a City of Jacksonville landfill. Commercial dumpster waste is collected as required (minimum twice weekly). Yard waste is collected once per week by a contractor, and is taken to a mulching facility owned by the City of Jacksonville.

4. Pesticide, Herbicide, and Fertilizer Application – Presently, herbicide application is done by a licensed contractor. Fertilizer application is per bag instructions, and bulk distribution is not used, as required by the NPDES permit. Application on and treatment of city properties is accomplished by contracting with licensed firms (e.g., R&D Landscaping, Inc., Bluewater Environmental of Florida, Inc., etc.)
5. High Risk Industrial Facilities – Currently there are no known facilities of this type in the City of Atlantic Beach. However, if there was, the City of Jacksonville Fire and Rescue Department would monitor and inspect as required by the NPDES Permit.
6. Construction – The City of Atlantic Beach Public Works Department visits all jobsites as a matter of routine to check for erosion and sediment control as required by the NPDES Permit. The City Building Inspector also pays heed to construction practices as they relate to stormwater management. The City Building Official reviews all proposed construction plans. Plans proposing a change in site grading or adding impervious area are also reviewed by the Public Works Director and Public Works Department. The City's Building Official, Code Enforcement Officer, and the Public Works Department, per the NPDES permit, perform inspections of in progress construction.
7. Development Planning Procedures – The City of Atlantic Beach has updated the Stormwater Master Plan and the City Land Development Code (City Code Chapter 24). These documents serve as the guides for all stormwater procedures.
8. Flood Control – Flood control is accomplished through the cleaning and maintenance of the existing network of ditches, drainage canals, catch basins and pipes, as required by the NPDES Permit.
9. Illicit Discharges and Connections, Inspections, and Investigations/Enforcement – Current facilities consist of only catch basins and ditches, and are checked on a regular basis for illicit connections as required by the NPDES permit. An educational program has been instituted to inform residents not to use these facilities for the disposal of trash, yard waste, dog droppings, or other substances. This program is implemented through the use of door hangers and a monthly newsletter. The City of Atlantic Beach has not experienced problems involving illicit discharges. The Public Works Department searches for problems during its routine ditch maintenance, and the aquatic weed control contractor looks also, per the NPDES permit. For public reports of illicit discharges, the appropriate personnel are notified and the information is included in the annual NPDES report.
10. Spill Response – The City of Atlantic Beach has limited supplies for in-house spill response capability, keeping spills contained until the Jacksonville Fire and Rescue Department takes control.
11. Oil and Household Hazardous Waste – Several auto parts stores collect used oil. Also, Ace hardware in Neptune Beach is the designated recycling facility for household compact fluorescent light bulbs. We strongly encourage the residents of Atlantic Beach to dispose of their household materials at the facility in Jacksonville. The City also holds an annual hazardous waste collection event in conjunction with COJ's Solid Waste Division, typically in the spring at the City Hall parking lot.
12. Sanitary Sewage Seepage – Some infiltration and exfiltration is expected but major problem areas are identified and addressed, as discussed in the Stormwater Master Plan. The City has completed major sanitary sewer-pipelining projects in the Core City (2003), Royal Palms (2008), and Sea Spray (2009) neighborhoods.
13. Educational Activities – The City of Atlantic Beach's monthly newsletter is used to educate residents of the importance of the Stormwater Management Program, and also refer to FDEP's Section 319 Grant Education Program required by the NPDES permit. In addition, educational events have been conducted by the SJRWMD Watershed Action Volunteers at most of the public schools located in Atlantic Beach, along with education

booths at city festivals and events. A pamphlet is being created to stress the importance to the citizens.

14. Monitoring Activities – The Public Works Department currently maintains a log of all of its activities, including erosion and sediment control inspections and stormwater structure inspections and maintenance.

STORMWATER UTILITY

The Stormwater Utility was established with the creation of a monthly fee for the purpose of funding improvements needed to reduce the impact of severe weather by providing effective treatment and removal of the City's stormwater. In addition to capital projects, this program now funds the maintenance of the stormwater system within the City of Atlantic Beach. The costs associated with that function were previously paid for from the Streets Division and now those costs are shared. The stormwater drainage system consists of over six miles of ditches, eleven miles of storm drains, and four hundred eighty-five catch basins.

Stormwater Maintenance Overview

The purpose of the division is to develop stormwater management programs, and to document channel debris removal procedures. This is in response to regulatory mandates, such as the NPDES stormwater requirements, or in reaction to major flood events. In addition, the City raises public awareness for proper drainage and watershed management. This division consists of the teamwork of two operators under the supervision of the Streets and Maintenance Division Director. The information below shows a maintenance schedule for work done throughout the City. The schedule may change from time-to-time due to unforeseen weather conditions and unscheduled projects that require immediate attention.

Drainage Maintenance Program

The Stormwater Division performs maintenance and debris removal for storm ditches, waterway embankments and storm drains. The major growing season is late March through late October. All areas for stormwater during that time are inspected on a weekly basis. Some areas are given more frequent attention as needed. All waterways and storm ponds are policed weekly for large debris, plants and material (building supplies, shopping carts, and refuge).

Storm drains are inspected and maintained on a daily basis when permitted. Specific attention is given during and following storm conditions. Ditch cleaning and clearing is an area that requires more than the City is equipped or capable to meet its full demand. Citizen reports on clogged or malfunctioning stormwater drainage systems are responded to on the day received.

Stormwater Maintenance Facilities (Detention Ponds)

City-owned and maintained ponds are inspected by the Public Works Director (Professional Engineer) at least annually and recertified to the St. Johns River Water Management District biannually. The Public Works Department also inspects all privately-owned and maintained ponds within the City limits on an annual basis as authorized by City Code, Section 24-66, paragraph (f), which states:

Subsequent to approval of the property owner's final grading, including on-site and/or flood plain storage and stormwater treatment, the improvement shall be maintained by the property owner. Failure to maintain the improvements will require restoration upon notification by the Public Works Director, within a stipulated time frame. If restoration is not timely completed, the City shall have the right to complete the restoration, and the City's actual cost incurred, together

with a charge of 100% of said costs to cover the City's administrative expenses, shall be charged to the owner.

Aquatic Management Program

Aquatic weed control for Atlantic Beach is contracted out. This includes quarterly inspections and treatments, as necessary, for control and prevention of noxious aquatic weeds. The contract also includes debris removal from ditches and ponds and grass cutting.

Inspection and Maintenance

The type and frequency of required inspection and maintenance of stormwater facilities should be tailored for every system. Examples of inspection and maintenance procedures that may be required for stormwater facilities are listed below:

- *Removal of sediment, debris and other obstructions.*
- *Clearing of safety grates and grills.*
- *Control of brush and weeds by cutting and application of herbicides.*
- *Restoration of eroded areas and sloughed banks and slopes.*
- *Repair of armoring, such as cracked concrete lining or deteriorating riprap.*
- *Repair or replacement of fences, rails and other safety features.*
- *Repair of transition sections.*
- *Revegetation by means such as seeding, sodding, fertilization and mulching.*
- *Inspection and repair of sluice gates and other control devices.*
- *Control of algae, mosquitoes and other nuisances.*
- *Periodic investigation of earthen dams and berms for erosion, slumping, excessive seepage, woody growth and rodent damage.*
- *Examination of pond's spillways for stability and integrity.*
- *Periodic removal of sediment and debris from sedimentation basins and baffle boxes.*
- *Provision for and servicing of waste receptacles in ponds.*
- *Cleaning of sediment, debris and obstructions from inlets and catch basins.*

All stormwater facilities will be inspected quarterly to ensure that they are functioning properly. Examination and cleaning and repair of flow-regulating devices installed in catch basins, inlets, or other control works will be inspected following major storms. Systems that incorporate infiltration are most critical since poor maintenance practices can soon render them inefficient. Inspection of pipes, covered trenches and wells will be accomplished with closed-circuit television. Still photographs will be obtained either by taking a picture of the monitor or by mounting a still camera alongside the television camera and triggering it electronically.

The Streets and Maintenance Division Director will keep records of all maintenance operations to help plan future work and identify facilities requiring attention. The Director shall analyze reports and prepare a summary of specific problem areas on a semi-annual basis.

NAVAL STATION MAYPORT ILLICIT DISCHARGE DETECTION AND ELIMINATION

Naval Station Mayport is divided into approximately 45 drainage basins, the majority of which drain to the Naval Station Mayport Turning Basin and the St. Johns River. There is one large drainage basin that drains to Sherman Creek. The Naval Station Mayport Water Program Manager walks the entirety of each of these drainage basins (with the exception of wetland areas) once every three years to investigate the status of the stormwater system and to observe for indications of illicit connections or discharges. All outfalls, drains, catch basins, culverts, retention ponds, and other components of the stormwater conveyance system are observed. In

addition, storage areas, industrial sites, administrative buildings, construction projects, wastewater utilities, etc. are also examined to check for any condition that would lead to discharge of contaminants to the stormwater system.

Examples of actual findings and follow-up actions include:

- *Unidentified pipes discharging to stormwater system - review design drawings or die test to confirm they carry stormwater.*
- *Illicit dump sites - determine responsible party and require them to remove or task base contractor.*
- *Refuse dumpsters without drain hole plugs - require refuse contractor to install drain plugs.*
- *Erosion/sediment problems in drainage system - task Grounds Maintenance contractor to correct.*
- *Erosion control BMPs not maintained at construction sites - require builder to restore BMPs.*
- *Cigarette litter- require offending organization to clean up.*
- *Leaking equipment - require owner to repair/replace also clean up soil if contaminated.*
- *Abandoned fertilizer bags (spillage)- have owner remove bags, shovel spillage and dispose.*
- *Trash and debris issues - when from a particular source, require that organization to clean up more often.*
- *Retention ponds overgrown with vegetation - task Grounds Maintenance contractor to remove vegetation and restore to design cover. Modify contract for continued maintenance.*
- *Abandoned materials in storage - require owner to recycle or dispose of materials.*

To date there have not been any hard-piped illicit discharge sources or leaky sewer lines identified as a result of this ongoing project.

Appendix F: Walk the WBID Guidelines

Walk the WBIDs is a field reconnaissance effort to gain a better understanding of a watershed, including the hydrology of the creek and its branches, where infrastructure (sewer and stormwater) is located, and what potential sources are contributing fecal coliform to the waterbody. This activity is a useful tool for impaired WBIDs in which the source(s) of the fecal coliform loading are not readily apparent. The following provides guidelines, based on past efforts, for organizing and conducting a Walk the WBID exercise to gain additional information for the tributaries in this BMAP.

INITIAL STEPS

Before going into the field, the lead entity should hold a data review meeting with other entities. Each entity provides available information about the WBID to better acquaint themselves with the conditions in the watershed. This information includes GIS data, infrastructure maps, and the WBID-specific technical report (available from FDEP). After this review, the lead entity conducts a preliminary reconnaissance of the WBID to identify areas of focus and to determine appropriate routes for the Walk the WBID effort.

Once the lead entity has gained a better understanding of the WBID, the Walk the WBID field team should be organized. The members of this team are determined based on the conditions in the watershed and the likely sources identified in the data review meeting. For instance, if failing OSTDS are common in the WBID (based on the number of repaired permits issued), it would be beneficial to include DCHD on the team, since it can access private property to inspect a septic tank. Depending on the potential sources, not all entities need to participate in the field exercise and should only attend the follow-up meeting. However, the lead entity should ensure that it has the emergency call-in numbers and appropriate contact information for other entities in case an incident is observed while in the field that should be reported.

The team should meet briefly before the exercise to review any pertinent information that the lead entity has gathered and to choose a date and time for the Walk the WBID. Based on past efforts, a maximum of two WBIDs can be walked in one day.

WALK THE WBID FIELD RECONNAISSANCE

The Walk the WBID team should have large-format WBID maps while conducting the field investigations, including WBID boundary, roads, stormwater infrastructure, sewer infrastructure, potential septic tank locations, National Hydrography Dataset (NHD), and jurisdictional boundaries when appropriate. A GPS unit, camera, and notepad are essential for obtaining the coordinate of a potential source, capturing an image of the potential source, and correlating the coordinates with the photo for later follow-up. Sampling equipment should also be included to provide additional water quality information about potential sources identified in the field.

The team should try to explore the entire waterbody while in the field, referring to the maps to follow the creek above and below ground, where the creek branches or is piped underground. The team should look in the banks for exposed pipes and along the vicinity of the creek for potential sources. Canals/ditches that intersect the waterbody should also be walked to ensure that the waterbody and its associated branches are all included within the WBID boundary.

The team should also investigate any potential sources. This can include identifying sewer infrastructure (manholes and pump stations) and inspecting for signs of recent overflows, MS4 conveyances that need cleaning, failing septic tanks, evidence of wildlife, heavy tree cover or

vegetated ditches, evidence of homeless populations, and pet and livestock sources. Care should be taken to ensure that only appropriate entity representatives access private property, unless the property owner has offered access to the entire team.

Any potential sources identified while in the field should be properly reported. The lead entity will keep a record of major findings during the Walk the WBID effort, including observations about the waterbody, potential sources, followed-up items and the responsible entity, as well as any areas that should be added to the monitoring plan.

FOLLOW-UP ACTIVITIES

After the Walk the WBID field visit, the lead entity will provide a write-up to FDEP summarizing the findings, which should include the following components:

1. *Identification of the WBID walked;*
2. *Results of any preliminary investigation or issues identified;*
3. *List of entities and personnel participating in the field efforts or other operations;*
4. *Sources and potential sources observed;*
5. *Immediate follow-up actions taken;*
6. *Follow-up actions still needed;*
7. *Sources eliminated or investigated;*
8. *Monitoring sites identified or proposed; and*
9. *Any other pertinent information.*

This information will be used in the BMAP annual progress report. In addition, the lead entity should hold a meeting with the data review team to determine the status of issues identified in the field that other entities were responsible for addressing. The resolutions for these follow-up activities will be included in the Walk the WBID write-up.

The Walk the WBID team should also review the monitoring plan for the tributary and determine if adjustments need to be made to the sampling locations based on the field observations. Updated station locations and monitoring responsibilities will also be reported to FDEP.

Appendix G: Glossary of Terms

303(d) List: The list of Florida's waterbodies that do not meet or are not expected to meet applicable water quality standards with technology-based controls alone.

305(b) Report: Section 305(b) of the federal Clean Water Act requires states to report biennially to the EPA on the quality of the waters in the state.

Allocation Technical Advisory Committee (ATAC): The Watershed Restoration Act of 1999 required FDEP to form a Technical Advisory Committee to address issues relating to the allocation of load reductions among point source and nonpoint source contributors. The ATAC was therefore formed in order to develop recommendations for a report to the legislature on the process for allocating TMDLs.

Background: The condition of waters in the absence of human-induced alterations.

Baffle box: An underground stormwater management device that uses barriers (or baffles) to slow the flow of untreated stormwater, allowing particulates to settle out in the box before the stormwater is released into the environment.

Baseline period: A period of time used as a basis for later comparison.

Baseline loading: The quantity of pollutants in a waterbody, used as a basis for later comparison.

Basin Management Action Plan (BMAP): The document that describes how a specific TMDL will be implemented; the plan describes the specific load and wasteload allocations as well as the stakeholder efforts that will be undertaken to achieve an adopted TMDL.

Basin Status Report: For the LSJR Basin, this document was published in June 2002 by FDEP. The report documents the water quality issues, list of water segments under consideration for a TMDL and data needs in the basin.

Best Available Technology (BAT) Economically Achievable: As defined by 40 CFR, §125.3, outlines technology-based treatment requirements in permits.

Best Management Practices (BMPs): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

City of Jacksonville (COJ): An incorporated city in northeast Florida, some of which lies in the St. Johns River Basin.

Coliforms: Bacteria that live in the intestines (including the colon) of humans and other animals, used as a measure of the presence of feces in water or soil.

Clean Water Act (CWA): The Clean Water Act is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants to waters of the United States.

Continuous deflective separation (CDS) Unit: A patented stormwater management device that uses the available energy of the storm flow to create a vortex to cause a separation of

solids from fluids. Pollutants are captured inside the separation chamber, while the water passes out through the separation screen.

Designated use: Uses specified in water quality standards for each waterbody or segment (such as drinking water, swimmable, fishable).

Detention Pond: A stormwater system that delays the downstream progress of stormwater runoff in a controlled manner, typically by using temporary storage areas and a metered outlet device.

Domestic Wastewater: Wastewater derived principally from dwellings, business buildings, institutions and the like; sanitary wastewater; sewage.

Dry Season: The dry part of the year when rainfall is low; in the LSJR Basin the dry season is defined as November through May.

Effluent: Wastewater that flows into a receiving stream by way of a domestic or industrial discharge point.

Environmental Protection Agency (EPA): The agency was created in December 1970 to address the nation's urgent environmental problems and to protect the public health. The majority of FDEP's regulatory programs has counterparts at the EPA or is delegated from the EPA.

Event mean concentration: The flow-weighted mean concentration of an urban runoff pollutant measured during a storm event.

Exfiltration: Loss of water from a drainage system as the result of percolation or absorption into the surrounding soil.

External loading: Pollutants originating from outside a waterbody that contribute to the pollutant load of the waterbody.

Flocculent: A liquid that contains loosely aggregated, suspended particles.

Florida Department of Environmental Protection (FDEP): FDEP is Florida's principal environmental and natural resources agency. The Florida Department of Natural Resources and the Florida Department of Environmental Regulation were merged together to create FDEP effective July 1, 1993.

Ground Water or Groundwater: Water below the land surface in the zone of saturation where water is at or above atmospheric pressure.

Impairment: The condition of a waterbody that does not achieve water quality standards (designated use) due to pollutants or an unknown cause.

Jacksonville Electric Authority (JEA): A large electric and water utility that operates in Duval and St. Johns Counties.

Load Allocations (LA): The portions of a receiving water's loading capacity that are allocated to one of its existing or future nonpoint sources of pollution.

Load Capacity: The greatest amount of loading that a waterbody can receive without violating water quality standards.

Loading: The total quantity of pollutants in stormwater runoff that contributes to the water quality impairment.

Lower Basin: When used in northeast Florida, commonly refers to the LSJR Basin.

Margin of safety (MOS): An explicit or implicit assumption used in the calculation of a TMDL, which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. An explicit MOS is typically a percentage of the assimilative capacity or some other specific amount of pollutant loading (e.g., the loading from an out-of-state source). Most FDEP-adopted TMDLs include an implicit MOS based on the fact that the predictive model runs incorporate a variety of conservative assumptions (they examine worst-case ambient flow conditions, worst-case temperature, and assume that all permitted point sources discharge at their maximum permissible amount).

National Pollutant Discharge Elimination System (NPDES): The permitting process by which technology based and water quality–based controls are implemented.

Nonpoint Source (NPS): Diffuse runoff without a single point of origin that flows over the surface of the ground by stormwater and is then introduced to surface or ground water. NPS includes atmospheric deposition and runoff or leaching from agricultural lands, urban areas, unvegetated lands, OSTDS, and construction sites.

Nonpoint Source Pollution: Nonpoint source pollution is created by the flushing of pollutants from the landscape by rainfall and the resulting stormwater runoff, or by the leaching of pollutants through the soils into the ground water.

Organic Matter: Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

Outfall: The place where a sewer, drain, or stream discharges.

Particulate: A minute separate particle, as of a granular substance or powder.

Pollutant Load Reduction Goals (PLRGs): PLRGs are defined as the estimated numeric reductions in pollutant loadings needed to preserve or restore designated uses of receiving waterbodies and maintain water quality consistent with applicable state water quality standards. PLRGs are developed by the water management districts.

Point Source: An identifiable and confined discharge point for one or more water pollutants, such as a pipe, channel, vessel, or ditch.

Pollutant: Generally any substance, such as a chemical or waste product, introduced into the environment that adversely affects the usefulness of a resource.

Pollution: An undesirable change in the physical, chemical, or biological characteristics of air, water, soil, or food that can adversely affect the health, survival, or activities of humans or other living organisms.

Removal efficiency: A description of how much of a given substance (metals, sediment, etc.) has been extracted from another substance.

Retention Pond: A stormwater management structure whose primary purpose is to permanently store a given volume of stormwater runoff, releasing it by infiltration and /or evaporation.

Reuse: The deliberate application of reclaimed water for a beneficial purpose. Criteria used to classify projects as “reuse” or “effluent disposal” are contained in Subsection 62-610.810, F.A.C.

Runoff curve: A calculated number representing the percentage of rainfall that becomes runoff for a given area.

Quality Assurance (QA): An integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, product, or service meets defined standards of quality.

Quality Control (QC): The overall system of technical activities that measures the attributes and performance of a process, product, or service against defined standards to verify that they meet the established data quality objectives.

Septic Tank: A watertight receptacle constructed to promote the separation of solid and liquid components of wastewater, to provide the limited digestion of organic matter, to store solids, and to allow clarified liquid to discharge for further treatment and disposal in a soil absorption system.

STORET: The EPA's STORage and RETrieval database, used nationally for water quality data storage.

Stormwater: Water that results from a rainfall event.

Stormwater runoff: The portion of rainfall that hits the ground and is not evaporated, percolated, or transpired into vegetation, but rather flows over the ground surface seeking a receiving water body.

Submersed: Growing or remaining under water.

Surface Water: Water on the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs is classified as surface water when it exits the spring onto the earth's surface.

Surface Water Improvement and Management (SWIM) Waterbody: A waterbody designated by statute or by a water management district for priority management to restore and maintain water quality, habitat, and other natural features of the waterbody. The LSJR Basin has this special designation.

Total Maximum Daily Load (TMDL): The sum of the individual wasteload allocations for point sources and the load allocations for nonpoint sources and natural background. Prior to determining individual wasteload allocations and load allocations, the maximum amount of a pollutant that a waterbody or waterbody segment can assimilate from all sources while still

maintaining its designated use must first be calculated. TMDLs are based on the relationship between pollutants and instream water quality conditions.

Wasteload Allocations (WLAs): Pollutant loads allotted to existing and future point sources, such as discharges from industry and sewage facilities.

Wastewater: The combination of liquid and pollutants from residences, commercial buildings, industrial plants, and institutions, together with any ground water, surface runoff, or leachate that may be present.

Waterbody Identification (WBID) Numbers: WBIDs are numbers assigned to hydrologically based drainage areas in a river basin.

Water column: The water within a waterbody between the surface and sediments.

Water Quality Index: Determines the quality of Florida's streams, blackwaters, and springs. Categories include water clarity, dissolved oxygen, oxygen-demanding substances, nutrients, bacteria, and macroinvertebrate diversity.

Water Quality Standards (WQSs): (1) Standards that comprise the designated most beneficial uses (classification of water), the numeric and narrative criteria applied to the specific water use or classification, the Florida Anti-degradation Policy, and the moderating provisions contained in Rules 62-302 and 62-4, F.A.C. (2) State-adopted and EPA-approved ambient standards for waterbodies. The standards prescribe the use of the waterbody (such as drinking, fishing and swimming, and shellfish harvesting) and establish the water quality criteria that must be met to protect designated uses.

Watershed: Topographic area that contributes or may contribute runoff to specific surface waters or an area of recharge.

Watershed management approach: The process of addressing water quality concerns within their natural boundaries, rather than political or regulatory boundaries. The process draws together all the participants and stakeholders in each basin to decide what problems affect the water quality in the basin, which are most important, and how they will be addressed.

Wet Season: The rainy part of the year; in the LSJR Basin the wet season is defined as June through October.

Appendix H: Bibliography of Key References and Websites

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STORMWATER AND WATER QUALITY PROTECTION WEBSITES:

TABLE H-1: STORMWATER AND WATER QUALITY PROTECTION WEBSITES

ENTITY/PROGRAM	URL
Local and Regional Sites	
SJRWMD WAV Program	http://www.sjrwmd.com/education/wav/index.html
JEA	http://www.jea.com/
JEA FOG Program Workshop	http://www.jea.com/about/pub/downloads/fog/FOGTrainingSlideShow.pdf
COJ	http://www.coj.net/Departments/Environmental+and+Compliance/Environmental+Quality/Water+Quality.htm
Atlantic Beach	http://www.ci.atlantic-beach.fl.us/
Stormwater Utility	http://www.ci.atlantic-beach.fl.us/index.aspx?NID=82
FOG Program	http://www.ci.atlantic-beach.fl.us/index.aspx?nid=314
LSJR Technical Advisory Committee	http://www.lsjr.org/
State Sites	
General Portal for Florida	http://www.myflorida.com
FDEP	http://www.dep.state.fl.us/
Watershed Management	http://www.dep.state.fl.us/water/watersheds/index.htm
TMDL Program	http://www.dep.state.fl.us/water/tmdl/index.htm
BMPs, public information	http://www.dep.state.fl.us/water/nonpoint/pubs.htm
NPDES Stormwater Program	http://www.dep.state.fl.us/water/stormwater/npdes/index.htm
Nonpoint source funding assistance	http://www.dep.state.fl.us/water/nonpoint/319h.htm
Surface Water Quality Standards	http://www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf
LSJR Basin Water Quality Assessment Report	http://www.dep.state.fl.us/water/basin411/sj_lower/assessment.htm
FDOH	http://www.doh.state.fl.us
Standards for OSTDS	http://www.doh.state.fl.us/environment/ostds/pdfiles/forms/64e620070924.pdf
National Sites	
Center for Watershed Protection	http://www.cwp.org/
EPA Office of Water	http://www.epa.gov/water
EPA Region 4 (southeast United States)	http://www.epa.gov/region4
EPA SSO Fact Sheet	http://www.epa.gov/npdes/ssso/control/