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 Tributaries Basin

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

AADF	Annual Average Daily Flow
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
CCTV	Closed Circuit Television
CDBG	Community Development Block Grant
CFU	Colony-Forming Units
CIP	Capital Improvement Plan
CIPP	Cured In Place Pipe
CMOM	Capacity, Management, Operations, and Maintenance
CMP	Corrugated Metal Pipe
COJ	City of Jacksonville
DCHD	Duval County Health Department
DCP	Drainage Connection Permit [Program]
DI	Ductile Iron
DO	Dissolved oxygen
EPA	U.S. Environmental Protection Agency
EPB	Environmental Protection Board
EQD	Environmental Quality Division
ERCP	Elliptical Reinforced Concrete Pipe
ETM	England-Thims and Miller
F.A.C.	Florida Administrative Code
FAW	Florida Administrative Weekly
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
FSE	Food Service Establishment
FWRA	Florida Watershed Restoration Act
FY	Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
HDPE	High Density Polyethylene
I/E	Information and Education
IMZ	Industrial/Manufacturing Zone
I&I	Inflow and Infiltration
IP	Industrial Pretreatment
IWR	Impaired Surface Waters Rule
LF	Linear Feet
LSJR	Lower St. Johns River

MEP	Maximum Extent Practicable
MES	Mitered End Section
MF	Membrane Filter
MGD	Million Gallons Per Day
mg/L	Milligrams per Liter
M/H	Manhole
mL	Milliliter
M/L	Main Line
MPN	Most Probable Number
MS4	Municipal Separate Storm Sewer System
MSGP	Multi-Sector General Stormwater Permit
MST	Microbial Source Tracking
N/A	Not Applicable
NAVD	North American Vertical Datum
NGVD	National Geodetic Vertical Datum
NHD	National Hydrography Dataset
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NS	Naval Station
NTU	Nephelometric Turbidity Unit
OSTDS	Onsite Sewage Treatment and Disposal System
PBTS	Performance-Based Treatment and Disposal System
PIC	Potential Illicit Connection
ppt	Parts Per Thousand
PS	Pump Station
PSA	Public Service Announcement
PVC	Polyvinyl Chloride
PWD	Public Works Department
QA/QC	Quality Assurance/Quality Control
RCP	Reinforced Concrete Pipe
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
SWPPP	Stormwater Pollution Prevention Plan
TAT	Tributary Assessment Team
TMDL	Total Maximum Daily Load
Umho/cm	Microumhos per Centimeter
USF	University of South Florida
UV	Ultraviolet
WAV	Watershed Action Volunteer
WBID	Waterbody Identification
WMD	Water Management District
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, including the 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 coliforms) 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*
- *Moncrief Creek*
- *Wills Branch*

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

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

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

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

LOWER ST. JOHNS RIVER TRIBUTARIES BASIN MANAGEMENT ACTION PLAN

This BMAP is the second BMAP for the LSJR tributaries that are impaired for fecal coliforms. The BMAP addresses 15 of the 75 tributaries that were identified as some of the worst-case waterbody identification (WBID) segments, 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 the full implementation of the 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 (COJ)*
- *City of Jacksonville Beach*
- *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 under Paragraph 403.067(7)(a)1, Florida Statutes (F.S.). The adaptive management approach for TMDL implementation described in the BMAP will address fecal coliform bacteria reductions, and the iterative evaluation process will continue until the TMDL is attained. The phased BMAP approach allows for the implementation of projects designed to achieve reductions, while simultaneously implementing source assessment, carrying out 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 be to 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 in 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 the 5th-year analysis, additional efforts may be required. Achieving 50% of the required reductions will be an important milestone for measuring the success of the 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 coliforms can be highly variable and easily transported, making it difficult, in many cases, to identify the source of the bacteria. Additionally, almost no data are available that show the efficiency of stormwater best management practices (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 will reduce or eliminate sources of fecal coliform loading. This sufficiency of effort evaluation is not an assessment of each entity’s individual activities; rather, it focuses on 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 on 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, 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 E of the supporting document);*
- *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 coliforms);*
- *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*
- *Improved 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 more than $92 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 coliforms 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 count 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 coliforms.

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*
- *The determination of effective projects through the stakeholder decision-making and priority-setting processes.*

Commitment to BMAP Implementation

BWG members will endorse the BMAP on behalf of the entities they represent and are committed to ensuring that the plan is implemented to reduce fecal coliforms in the LSJR tributaries. In addition to this endorsement, the entities will also be encouraged to 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 show support for the BMAP and the efforts it describes.

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 means 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

* Class I and II waters include the uses of the classifications listed below them.
** Surface water classification for waters in the LSJR Basin.

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 (*no current Class V designations*)

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 coliforms, 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 verifies 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 Basin Management Action Plan (BMAP) are all Class III waters. TMDLs have been established for these waters, identifying the amount of fecal coliforms 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 B of the supporting document) 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	ACTIVITY
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 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 C of the supporting document 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 coliforms 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 (the current sampling plan includes 10 WBIDs). When a sample is above a fecal coliform colony count of 5,000 per 100 milliliters (counts/100mL), 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, helping to improve water quality in those waterbodies.

In July 2006, FDEP initiated BMAP technical meetings involving key stakeholders to prepare information for the first LSJR tributaries fecal coliform BMAP (adopted December 2009). The stakeholders in the first BMAP include COJ, DCHD, the Florida Department of Transportation (FDOT), and JEA. The technical meetings for the second LSJR tributaries fecal coliform BMAP began in September 2009. The stakeholders in the second BMAP include those from the first BMAP as well as City of Atlantic Beach, City of Jacksonville Beach, City of Neptune Beach, and Naval Station (NS) Mayport. 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 the additional entities that have responsibilities as part of this BMAP, and their meetings on this second LSJR 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 E of the supporting document 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 LSJR tributaries fecal coliform TMDLs. 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 coliforms 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 coliforms 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 (DO). 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 addressed in this BMAP.

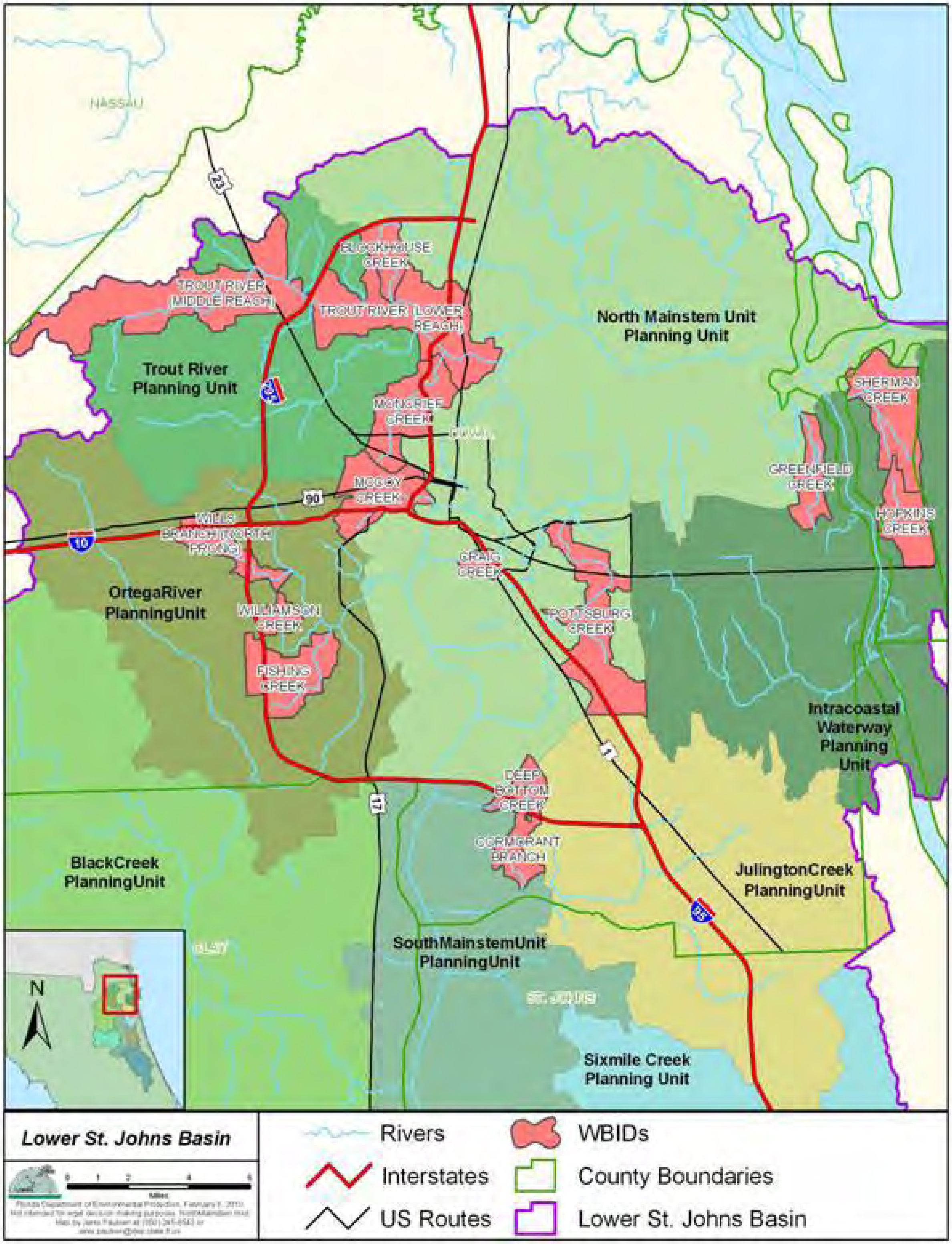

FIGURE 1: LSJR TRIBUTARIES INCLUDED IN THE BMAP

Though considerable effort was taken to understand the dynamics of the waterbodies that require TMDLs, 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.

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 other 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, a milestone has been established 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 LSJR 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 counts/100mL. 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 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 NS Mayport. The available data are analyzed in the reports to identify the most probable sources of fecal coliforms, 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 coliforms and guide follow-up reconnaissance and investigation toward corrective actions. This approach uses statistical and GIS data analyses to focus watershed management efforts, classify priorities, and support decisions and activities related to fecal coliform reduction. 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 are 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 coliforms and the associated impact on the waterbody. Due to the inherent variability of fecal coliforms and the diffuse nature of nonpoint sources, modeling was not considered viable, and the weight-of-evidence approach was used 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 coliforms 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 the activities they had implemented since 1996 (the start of the TMDL verified period) to reduce or remove bacteria sources and additional efforts that are currently under way or planned in the next 5 years. The City of Atlantic Beach, COJ, City of Jacksonville Beach, City of Neptune Beach, DCHD, 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 evaluate the cumulative effects of projects and activities that address or eliminate fecal coliform loading. This sufficiency of effort evaluation was not an assessment of each entity’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*
- *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 I of the supporting document), 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 in each watershed with recent sewer line upgrades (cured in place pipe [CIPP], 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 entering 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 from becoming 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 coliforms). 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 coliforms and other pollutants to 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 (PSAs), 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 carried out between September 2008 and July 2009 to gain a better understanding of the WBIDs and potential sources. These assessments were implemented in 3 watersheds 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 for TMDL adoption require the establishment of 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 that each source designation may continue to contribute (discharge allocation), or the colonies per day or the percent of its loading that 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:*
    - **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.
    - **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 analysis, technical and environmental feasibility, implementation time frames, and others (see Appendix C of the supporting document).

Due to the nature of the fecal coliform impairments, 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 results are not available that quantify 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 coliforms 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, upper Trout River, and lower Trout River 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 were adopted in July 2010. **Table 3** lists the TMDLs adopted by rule for the 15 tributaries that are the focus of this BMAP.

Table 3: TMDLs for the LSJR Tributaries

N/A = Not applicable

WBID Number	WBID Name	Waterbody Type	Wasteload Allocation for Wastewater	Wasteload Allocation for NPDES Stormwater (%)	Load Allocation (%)
2297	Craig Creek	Stream	N/A	87%	87%
2257	McCoy Creek	Stream	N/A	84%	84%
2316	Williamson Creek	Stream	N/A	83%	83%
2324	Fishing Creek	Stream	Must meet permit limits	69%	69%
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	N/A	67%	67%
2381	Cormorant Branch	Stream	N/A	73%	73%
2282	Wills Branch	Stream	N/A	80%	80%
2227	Sherman Creek	Stream	N/A	71%	71%
2240	Greenfield Creek	Stream	N/A	70%	70%
2265B	Pottsburg Creek	Stream	N/A	50%	50%
2203	Trout River	Stream	N/A	66%	66%
2203A	Trout River	Stream	N/A	60%	60%

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 MS4 loads from other nonpoint sources (given the nature of stormwater transport).*

- *Bacteria loads from specific sources are generally not quantified because they are highly variable and not well understood. Thus 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 whether 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 coliforms 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, reducing 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 coliforms 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 coliforms.*
- *The penetration of ultraviolet (UV) light into waters and sediments may aid fecal coliform die-off and prevent 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 the 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 tributaries 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 the 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 will provide 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 bacterial 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 coliforms) by soil type, under the range of conditions that represent typical OSTDS sites near impaired surface waters. It 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 coliforms 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 used to aid in source identification. This information will include determining the locations of private wastewater systems and infrastructure, collecting information on jurisdictional or systemwide programs and activities on a WBID scale for future reporting and assessment, and systematically updating all GIS 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 coliforms 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**). They include residential (high, medium, and low density), commercial/utility/ institutional, transportation, recreational, industrial, communication, and extractive. Since the 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

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

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%
Upper Trout River	16.9%*
Lower Trout River	56.7%

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, reducing 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 Atlantic Beach, City of Jacksonville Beach, City of Neptune Beach, and NS Mayport have ordinances for pet waste management that address sources of fecal coliforms. In addition, COJ, Atlantic Beach, and Jacksonville Beach have 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 the 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

The fecal coliform concentration in Craig Creek ranged from 20 to 96,000 counts/100mL and averaged 6,757 counts/100mL during the verified period. The data from sampling station 21FLJXWQSS63 (from January 29, 2001, to November 29, 2007) were used to obtain long-term annual and seasonal fecal coliform averages and percent exceedances. No long-term temporal trends were observed. Episodic peak fecal coliform concentrations occurred throughout the period of observation, and the average concentration in the creek neither increased nor decreased over the period of observation (**Table 5**).

Seasonally, it is not uncommon to observe a peak in fecal coliform concentrations and exceedance rates during the third quarter (summer, July–September), when conditions are rainy and warm, and lower concentrations and exceedance rates in the first and fourth quarters (winter, January–March; and fall, October–December), when conditions are drier and colder. While the highest percent exceedance, mean concentration, and median concentration did occur during the third quarter, fecal coliform concentrations and exceedance rates were very high during each quarter (FDEP, July 2010a).

TABLE 5: SUMMARY OF CRAIG CREEK FECAL COLIFORM DATA BY YEAR FOR THE VERIFIED PERIOD (JANUARY 1, 2001–JUNE 30, 2008)

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

YEAR	N[1]	MINIMUM[2]	MAXIMUM[2]	MEDIAN[2]	MEAN[2]	NUMBER OF EXCEEDANCES[3]	% EXCEEDANCES
2001	4	100	6,000	4,000	3,525	3	75%
2002	11	452	17,200	1,410	4,545	11	100%
2003	4	20	11,000	1,645	3,578	3	75%
2004	4	360	96,000	47,600	47,890	3	75%
2005	4	1,700	3,300	2,650	2,575	4	100%
2006	4	130	11,000	2,150	3,858	3	75%
2007	4	340	21,000	5,525	8,098	3	75%

2.1.2 MCCOY CREEK

Table 6 summarizes the fecal coliform data results in McCoy Creek, by year, for the verified period. Exceedances occurred in all months in which samples were collected, with exceedance rates higher than or equal to 50%, except in December (33.3%) and April (40%). When the data were aggregated by season, the summer season demonstrated the highest percentage of exceedances (93%). The yearly data showed that exceedance rates decreased 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)

\- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

Year[1]	N[2]	Minimum[3]	Maximum[3]	Median[3]	Mean[3]	Number of Exceedances[4]	% 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%

2.1.3 Williamson Creek

Table 7 summarizes the fecal coliform data results for Williamson Creek, by year, for the verified period. There was a 75.56% overall exceedance rate for fecal coliforms. Exceedances occurred in all seasons; however, the highest number occurred in the fall (October–December) and the lowest in the spring (April–June). The highest percentage of exceedances occurred during February, July, October, November, and December (all 100% exceedances) (FDEP, July 2005a). When looking at the data by year, fecal coliform concentrations appeared to decrease over time.

Table 7: Summary of Williamson Creek Fecal Coliform Data by Year for the Verified Period (January 1, 1996–June 30, 2003)

\- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

Year[1]	N[2]	Minimum[3]	Maximum[3]	Median[3]	Mean[3]	Number of Exceedances[4]	% 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	-	-	-	-	-	-	-

2.1.4 Fishing Creek

Table 8 through **Table 11** summarize the fecal coliform data results for Fishing Creek, by year, for the verified period for each of 4 stations. The fecal coliform concentration ranged from 20 to 50,000 counts/100mL and averaged 2,272 counts/100mL during the Cycle 2 verified period. To obtain long-term annual and seasonal fecal coliform averages and percent exceedances, long-term data from Stations 21FLJXWQOR8 and 21FLJXWQOR4 (from February 15, 2000, to December 20, 2007) were analyzed. Station 21FLJXWQOR8 is located in the north fork of Fishing Creek, upstream of the confluence of the north and south forks and the Fishing Creek main stem. Station 21FLJXWQOR4 is located downstream of the confluence of the north and south forks, in the main stem of Fishing Creek. No significant long-term temporal trends were observed. The highest fecal coliform concentrations at these stations occurred more recently in the period of observation; continued data collection is needed to confirm whether periodic extreme fecal coliform concentrations are becoming more common in the creek. The lowest percent exceedances occurred over the summer months at both stations (FDEP, July 2010b).

Long-term data from Stations 21FLJXWQOR9 and 21FLJXWQOR110 (from April 22, 2003, to July 23, 2007) in the creek's south fork were also analyzed for annual and seasonal trends. Like the north fork and mainstem stations discussed above, no long-term temporal trends were observed. High fecal coliform concentrations occurred at both stations throughout the period of observation, and the average concentration in the creek was observed to neither increase nor decrease over the period of observation. A relationship between upstream south fork Station 21FLJXWQOR9 and downstream south fork Station 21FLJXWQOR110 was not readily apparent, nor was a relationship between either station and the downstream, main stem station 21FLJXWQOR4 observed.

Seasonally, a peak in fecal coliform concentration and exceedance rate was observed in downstream south fork Station 21FLJXWQOR110 during the warm and rainy third-quarter summer months; however, fecal coliform concentration and exceedance rates were also high over the first-quarter winter months. At upstream south fork station 21FLJXWQOR9, fecal coliform concentrations and exceedance rates were generally higher in the second quarter than at other times of the year (FDEP, July 2010b).

Table 8: Summary of Fishing Creek Fecal Coliform Data by Year for Station 21FLJXWQOR4 During the Verified Period (January 1, 2001–June 30, 2008)

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

Year	N[1]	Minimum[2]	Maximum[2]	Median[2]	Mean[2]	Number of Exceedances[3]	% Exceedances
2001	4	53	2,000	586	806	2	50%
2002	4	24	1,800	157	535	1	25%
2003	4	30	2,800	315	865	2	50%
2004	3	100	970	800	623	2	67%
2005	4	620	7,000	1,800	2,805	4	100%
2006	5	320	7,600	4,900	3,904	4	80%
2007	4	500	2,400	1,613	1,531	4	100%

Table 9: Summary of Fishing Creek Fecal Coliform Data by Year for Station 21FLJXWQOR8 During the Verified Period (January 1, 2001–June 30, 2008)

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

Year	N[1]	Minimum[2]	Maximum[2]	Median[2]	Mean[2]	Number of Exceedances[3]	% Exceedances
2001	4	200	818	600	555	3	75%
2002	4	150	3,400	464	1,120	2	50%
2003	4	40	180	90	100	0	0%

Year	N[1]	Minimum[2]	Maximum[2]	Median[2]	Mean[2]	Number of Exceedances[3]	% Exceedances
2004	3	20	1,270	220	503	1	33%
2005	5	340	17,000	1,100	4,046	4	80%
2006	5	270	14,750	500	3,898	3	60%
2007	4	150	1,150	550	600	2	50%

Table 10: Summary of Fishing Creek Fecal Coliform Data by Year for Station 21FLJXWQOR9 During the Verified Period (January 1, 2001–June 30, 2008)

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

Year	N[1]	Minimum[2]	Maximum[2]	Median[2]	Mean[2]	Number of Exceedances[3]	% Exceedances
2003	7	20	20,000	270	3,350	3	43%
2004	3	70	1,300	170	513	1	33%
2005	4	300	800	600	575	3	75%
2006	6	200	3,080	608	929	4	67%
2007	3	100	3,000	220	1,107	1	33%

Table 11: Summary of Fishing Creek Fecal Coliform Data by Year for Station 21FLJXWQOR110 for the Verified Period (January 1, 2001–June 30, 2008)

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

Year	N[1]	Minimum[2]	Maximum[2]	Median[2]	Mean[2]	Number of Exceedances[3]	% Exceedances
2003	7	20	2,800	600	1,046	5	71%
2004	2	700	11,000	5,850	5,850	2	100%
2005	4	300	2,400	1,232.5	1,291	3	75%
2006	5	600	14,000	3,365	6,153	5	100%
2007	3	300	1,100	925	775	2	67%

2.1.5 Deep Bottom Creek

Table 12 summarizes the results for Deep Bottom Creek, by year, during the verified period. There was a 92.31% overall exceedance rate for fecal coliform. Exceedances occurred in all months in which samples were collected, with exceedance rates greater than or equal to 66.67%, except for February, June, and December (all had no samples). The winter and fall seasons demonstrated the highest percentages of exceedances (both 100%). The yearly data showed that exceedances appeared to be decreasing, with 100% exceedances from 1996 through 2001 and 50% exceedances in 2003 (FDEP, June 2009b).

Table 12: Summary of Deep Bottom Creek Fecal Coliform Data by Year for the Verified Period (January 1, 1996–June 30, 2003)

- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

Year[1]	N[2]	Minimum[3]	Maximum[3]	Median[3]	Mean[3]	Number of Exceedances[4]	% Exceedances
1996	1	8,000	8,000	8,000	8,000	1	100%

YEAR[1]	N[2]	MINIMUM[3]	MAXIMUM[3]	MEDIAN[3]	MEAN[3]	NUMBER OF EXCEEDANCES[4]	% EXCEEDANCES
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%

2.1.6 *Moncrief Creek*

Table 13 summarizes the results for Moncrief Creek, by year, for the verified period. There was a 74.1% overall exceedance rate for fecal coliform. Exceedances occurred in all seasons; however, the highest number occurred in the summer months (July–September), and the lowest in the winter (January–March). Additionally, the highest percentage of exceedances occurred during August and the lowest in February (FDEP, July 2005b).

Table 13: Summary of Moncrief Creek Fecal Coliform Data by Year for the Verified Period (January 1, 1996–June 30, 2003)

- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

YEAR[1]	N[2]	MINIMUM[3]	MAXIMUM[3]	MEDIAN[3]	MEAN[3]	NUMBER OF EXCEEDANCES[4]	% 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	-	-	-	-	-	-	-

2.1.7 *Blockhouse Creek*

Table 14 summarizes the fecal coliform results for Blockhouse Creek, by year, during the verified period. There was a 76.19% overall exceedance rate. Exceedances occurred in all months in which samples were collected, with exceedance rates greater than or equal to 50%, except in February (no samples), November (no samples), and December (0% exceedance rate). When the data are aggregated by season, the winter and spring seasons (100.00% and 83.33%, respectively) had the highest percentages of exceedances (FDEP, June 2009c).

TABLE 14: SUMMARY OF BLOCKHOUSE CREEK FECAL COLIFORM DATA BY YEAR FOR

- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

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%

2.1.8 HOPKINS CREEK

The fecal coliform concentration in Hopkins Creek ranged from 10 to 9,000 counts/100mL and averaged 1,563 counts/100mL during the period of observation. High fecal coliform concentrations in 2007 were correlated with 3-day precipitation (e.g., when 3-day precipitation was 1.42 inches, the fecal coliform concentration was 8,500 counts/100mL at Station 21FLJXWQIWWH on September 20, 2007). The data from Station 21FLJXWQIWWH during the Cycle 2 verified period were used to obtain long-term annual and seasonal fecal coliform averages and percent exceedances. No long-term temporal trends were observed. Episodic peak fecal coliform concentrations occurred throughout the period of observation, and the average concentration in the creek neither increased nor decreased over the period of observation (**Table 15**). The mean fecal coliform concentrations were slightly lower in the first and fourth quarters than in the second and third (FDEP, July 2010c).

TABLE 15: SUMMARY OF HOPKINS CREEK FECAL COLIFORM DATA BY YEAR FOR THE VERIFIED PERIOD (JANUARY 1, 2001–JUNE 30, 2008)

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

YEAR	N[1]	MINIMUM[2]	MAXIMUM[2]	MEDIAN[2]	MEAN[2]	NUMBER OF EXCEEDANCES[3]	% EXCEEDANCES
2001	4	220	9,000	500	2,555	2	50%
2002	4	10	368	277	233	0	0%
2003	4	20	800	480	445	2	50%
2004	3	960	7,000	2,000	3,320	3	100%
2005	4	140	1,300	665	693	2	50%
2006	4	40	500	297	284	2	50%
2007	6	20	8,500	90	1,472	1	17%

2.1.9 CORMORANT BRANCH

The fecal coliform concentration ranged from 20 to 10,200 counts/100mL and averaged 1,269 counts/100mL during the Cycle 2 verified period. High fecal coliform concentrations in 2007 were not correlated with rainfall. The data from Station 21FLJXWQJC15 (from January 2001–November 2007) were used to obtain long-term annual and seasonal fecal coliform averages and percent exceedances. No long-term temporal trends were observed (**Table 16**). Episodic peak fecal coliform concentrations occurred throughout the period of observation, and the average concentration in the creek neither increased nor decreased. The highest percent exceedance, mean concentration, and median concentration occurred during the third quarter (summer, July–September), with lower, but still elevated, fecal coliform concentrations and exceedance rates during the rest of the year. During the period of observation, peak seasonal rainfall coincided with peak season fecal coliform percent exceedance, and minimum seasonal rainfall coincided with minimum seasonal percent exceedance. However, fecal coliform concentrations were high during all quarters (FDEP, July 2010d).

Table 16: Summary of Cormorant Branch Fecal Coliform Data by Year for the Verified Period (January 1, 2001–June 30, 2008)

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

Year	N[1]	Minimum[2]	Maximum[2]	Median[2]	Mean[2]	Number of Exceedances[3]	% Exceedances
2001	4	100	3,100	1,750	1,675	2	50%
2002	4	20	204	90	101	0	0%
2003	4	120	220	160	165	0	0%
2004	3	450	1,020	900	790	3	100%
2005	4	170	2,200	870	1,028	2	50%
2006	4	60	1,700	184	532	1	25%
2007	6	40	3,000	950	1,240	5	83%

2.1.10 Wills Branch

Table 17 summarizes the fecal coliform results for Wills Branch, by year, during the verified period. Fecal coliform exceedances occurred in all seasons; however, a lower number occurred in the summer (July–September), and the lowest occurred in the spring (April–June). Additionally, most of the exceedances occurred during February and November, the lowest number in March. It appeared that the number of exceedances by year was decreasing, with 100% in 1996 and only 7% in 2002 (FDEP, July 2005c).

Table 17: Summary of Wills Branch Fecal Coliform Data by Year for the Verified Period (January 1, 1996–June 30, 2003)

[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

Year[1]	N[2]	Minimum[3]	Maximum[3]	Median[3]	Mean[3]	Number of Exceedances[4]	% 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%

2.1.11 Sherman Creek

Table 18 summarizes the fecal coliform results for Sherman Creek, by year, during the verified period. There was a 41.6% overall exceedance rate. Exceedances occurred in all months, except March and July, with 100% exceedances in August. When aggregating data by season, the lowest percentage of exceedances occurred in the winter and fall, and the highest occurred in summer. There was at least a 33.33% exceedance rate across each season. By year, there appeared to be a general downward trend in exceedances from 1996 to 2002, except for 2000. However, there was only 1 sample from 1996; all other years had at least 9 samples (FDEP, July 2009).

Table 18: Summary of Sherman Creek Fecal Coliform Data by Year for the Verified Period (January 1, 1996–June 30, 2003)

\- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL

Year[1]	N[2]	Minimum[3]	Maximum[3]	Median[3]	Mean[3]	Number of Exceedances[4]	% 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	-	-	-	-	-	-	-

2.1.12 Greenfield Creek

The fecal coliform concentration in Greenfield Creek ranged from 14 to 10,500 counts/100mL and averaged 1,237counts/100mL during the period of observation. High fecal coliform concentrations in 2007 were correlated with 3-day precipitation (e.g., when 3-day precipitation was 2.66 inches, fecal coliform concentration was 10,500 counts/100mL at Station 21FLA 20030809 on October 3, 2007). The data from Station 21FLJXWQGC1 were used to obtain long-term annual and seasonal fecal coliform averages and percent exceedances. No long-term temporal trends were observed (**Table 19**). Episodic peak fecal coliform concentrations occurred throughout the period of observation, and the average concentration in the creek neither increased nor decreased (FDEP, July 2010e).

Table 19: Summary of Greenfield Creek Fecal Coliform Data by Year for the Verified Period (January 1, 2001–June 30, 2008)

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

Year	N[1]	Minimum[2]	Maximum[2]	Median[2]	Mean[2]	Number of Exceedances[3]	% Exceedances
2001	4	40	600	285	303	1	25%
2002	4	120	1,800	286	623	1	25%
2003	4	50	4,000	380	1,203	2	50%
2004	2	100	2,500	1,300	1,300	1	50%

Year	N[1]	Minimum[2]	Maximum[2]	Median[2]	Mean[2]	Number of Exceedances[3]	% Exceedances
2005	4	20	700	220	290	1	25%
2006	4	80	510	280	288	2	50%
2007	6	18	4,900	390	1,361	3	50%

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 verified impairment was based on the observation that 27 out of 98 fecal coliform samples for the creek collected during the verified period (January 1, 2001–June 30, 2008) exceeded the fecal water quality criterion. **Table 20** summarizes the fecal coliform results by year from January 1, 1996, through June 30, 2008 (FDEP, September 2009). Overall, the number of exceedances decreased by year, with 100% in 1996 and only 18% in 2007.

Table 20: Summary of Pottsburg Creek Fecal Coliform Data By Year for the Verified Period (January 1, 1996–June 30, 2008)

- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

Year[1]	N[2]	Minimum[3]	Maximum[3]	Median[3]	Mean[3]	Number of Exceedances[4]	% 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%

2.1.14 Upper Trout River

Table 21 summarizes the fecal coliform results for the upper Trout River, by year, during the verified period. There was a 55.8% overall exceedance rate and a 52.9% exceedance rate for the verified period. There were data from all months except February. Several months (July, November, and December) had a 100% exceedance rate, but July and November only had 1 observation; March, April, and May had the lowest exceedance rate, all at 33.3%. Fall had the highest exceedance rate among seasons (85.7%); spring had the lowest (37.5%). When considering the data by year, there were 100% exceedances in 1996 and 1998, with the lowest number occurring in 2003 (33.33%) (FDEP, June 2009d).

TABLE 21: SUMMARY OF UPPER TROUT RIVER FECAL COLIFORM DATA BY YEAR FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

YEAR[1]	N[2]	MINIMUM[3]	MAXIMUM[3]	MEDIAN[3]	NUMBER OF EXCEEDANCES[4]	% 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%

2.1.15 LOWER TROUT RIVER

Table 22 summarizes the fecal coliform results for the lower Trout River, by year, during the verified period. There was a 32.07% overall exceedance rate and a 25.6% exceedance rate for the verified period. Data existed 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 were 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 22: SUMMARY OF LOWER TROUT RIVER FECAL COLIFORM DATA BY YEAR FOR THE VERIFIED PERIOD (JANUARY 1, 1996–JUNE 30, 2003)

- = Empty cell/no data
[1]Table represents years for which data exist.
[2]Number of samples
[3]Coliform counts are #/100mL.
[4]Exceedances represent values above 400 counts/100mL.

YEAR[1]	N[2]	MINIMUM[3]	MAXIMUM[3]	MEDIAN[3]	NUMBER OF EXCEEDANCES[4]	% 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

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 LSJR tributaries. Additional details on these sources, specific for each tributary, are 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 watersheds have had SSOs with the potential to impact surface waters, including Craig Creek, McCoy Creek, Williamson Creek, Fishing Creek, Deep Bottom Creek, Moncrief Creek, Cormorant Branch, Wills Branch, Sherman Creek, Greenfield Creek, Pottsburg Creek, and lower Trout River.

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 coliforms from septic tanks through shallow ground water into the creeks.

The majority of households in the Pottsburg Creek watershed 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 the Craig Creek, McCoy Creek, Williamson Creek, Fishing Creek, Deep Bottom Creek, Moncrief Creek, Cormorant Branch, Pottsburg Creek, and lower Trout River watersheds. DCHD has issued repair permits for septic tanks in all 15 WBIDs. The locations of the repair permits closely correspond with the failure areas in the Craig Creek, Deep Bottom Creek, Cormorant Branch, Pottsburg Creek, and lower Trout River watersheds.

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 the sediments. 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 potentially be an issue in areas such as Greenfield Creek, Pottsburg Creek, and Craig Creek, where the majority of the watershed (more than 50%) is served by stormwater treatment areas.

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, upper Trout River, and lower Trout River. 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.

3.1.4 WILDLIFE

In some segments of the impaired tributaries, wildlife can be a significant source of fecal coliforms, especially in watersheds with significant acreages of wetlands, upland forest, or wooded corridors. While wildlife is a contributing source of fecal coliform loading to the tributaries, this is considered a background concentration and uncontrollable source in the BMAP. Stakeholders are not asked to remove or discourage wildlife near the creeks. However, the stakeholders are asked to record instances or indicators of wildlife when sampling to help correlate potential sources with the fecal coliform concentrations.

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;*
- *Attainment of the 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 effects, 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*
  - Collect project implementation information from the stakeholders and MS4 permit reporting and compare with the BMAP schedule. **Table 23** provides a sample annual reporting form on BMAP project implementation (to be completed by the entities).
  - Discuss the data collection process, including any concerns and possible improvements to the process.
  - Review the monitoring plan implementation, as detailed in **Section 4.2**.
- *Sharing New Information*
  - Report on results from water quality monitoring and trend information.
  - Provide updates on new projects and programs in the basin that will help reduce fecal coliform loading.
  - Identify and review new scientific developments in addressing fecal coliform contamination and incorporate any new information into annual progress reports.
  - Review effectiveness of existing fecal coliform assessment techniques and discuss new sampling technologies that will improve source identification.
- *Coordinating TMDL-Related Issues*
  - Provide updates from FDEP on the basin cycle and activities related to any impairments, TMDLs, and BMAP.
  - Obtain reports from other basins where tools or other information may be applicable to the TMDLs for the LSJR tributaries.

Covering all of these topics is not required for the annual meetings of the BWG, but this list provides 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 23: 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

BMAP Project #	Affected Area (WBID)	Brief Description	Projected Start/ End	Project/ Activity Status	Project Monitoring Results	Comments
Shade if also an MS4 activity						

New Management Strategies

BMAP Project #	Affected Area (WBID)	Brief Description	Projected Start/ End	Project/ Activity Status	Project Monitoring Results	Comments
Shade if also an MS4 activity						

Directions for BMAP Annual Reporting Format:

COLUMN 1—BMAP Projects table: 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.

COLUMN 1—New Management Strategies table: The table includes new projects/activities that are not included in the BMAP. Create a project number for new management strategies by using the prefix, and 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.

COLUMN 2—List the affected area (WBID).

COLUMN 3—Include a brief description of the management action being reported (e.g., street sweeping to remove gross debris on all streets with "L curbs"—5 miles swept each month).

COLUMN 4—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).

COLUMN 5—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.

COLUMN 6—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. These results should include the monitoring entity, dates of data collection, where the data are stored, summary of the results, field conditions, and conclusions about the project effectiveness.

COLUMN 7—Include comments on any implementation obstacles, including weather conditions, 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 coliforms.*

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 24** 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 listed in **Table 24** are important because factors other than water quality could affect the observed bacterial colony counts.

Table 24: Water Quality Indicators and Field Parameters

Water Quality Indicators	Field Parameters
Fecal coliforms (colony-forming units per 100 milliliters [CFU/100mL])	Air Temperature (°C)
Conductivity (micromhos per centimeter [umho/cm])	Cloud Cover
DO (milligrams per liter [mg/L])	Rainfall
DO Saturation (%)	Tide Stage
pH	Canopy Cover
Salinity (parts per thousand [ppt])	Water Flow Condition
Temperature (°C)	Wind
Turbidity (Nephelometric Turbidity Units [NTUs])	

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 following entities are responsible for monitoring:

- *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 the BMAP. These are the worst case WBIDs, and initial monitoring efforts will focus on source assessment and fecal coliform trends in these WBIDs. Water quality trends 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. Additional sampling will be done as needed to follow up on high fecal coliform counts, following 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 LSJR 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**

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

TABLE 25: MONITORING STATIONS IN CRAIG CREEK

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

4.2.3.2 **McCoy Creek Monitoring Network**

JEA will be responsible for monitoring in McCoy Creek. **Table 26** lists the stations that will be sampled.

TABLE 26: MONITORING STATIONS IN MCCOY CREEK

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

4.2.3.3 Williamson Creek Monitoring Network

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

Table 27: Monitoring Stations in Williamson Creek

Monitoring Station	Station Type	Frequency	Location	Responsible Entity
21FLA 20030618	Trend	Quarterly	Jammes Road at Williamson Creek	JEA
21FLJXWQCR84	Trend	Quarterly	Hyde Park Road	JEA
21FLA 20030884	Source assessment	Monthly	Williamson Creek at Wilson Boulevard	JEA
TAT Station WC3	Source assessment	Monthly	South of Wilson Boulevard and east of Lane Avenue	JEA

4.2.3.4 Fishing Creek Monitoring Network

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

Table 28: Monitoring Stations in Fishing Creek

Monitoring Station	Station Type	Frequency	Location	Responsible Entity
21FLJXWQOR4	Trend	Quarterly	Timuquana Road and Fishing Creek	COJ
21FLA 20030617	Trend	Quarterly	Fishing Creek at Ortega River Confluence	COJ
New station	Source assessment	Monthly	Fishing Creek and West 118th Street, east of Jammes Road and west of Blanding	COJ
21FLA 20030604	Source assessment	Monthly	Fishing Creek at Jammes Road	COJ

4.2.3.5 Deep Bottom Creek Monitoring Network

COJ will be responsible for monitoring in Deep Bottom Creek. **Table 29** lists the stations that will be sampled.

Table 29: Monitoring Stations in Deep Bottom Creek

Monitoring Station	Station Type	Frequency	Location	Responsible Entity
21FLJXWQSS18	Trend	Quarterly	Scott Mill Road	COJ
New station	Source assessment	Monthly	At ditch downstream of Crown Point Road and Old St. Augustine Road	COJ
New station	Source assessment	Monthly	Northern branch at Hartley Road, west of Cypresswood Drive	COJ

4.2.3.6 Moncrief Creek Monitoring Network

FDEP will be responsible for monitoring in Moncrief Creek. **Table 30** lists the stations that will be sampled.

Table 30: Monitoring Stations in Moncrief Creek

Monitoring Station	Station Type	Frequency	Location	Responsible Entity
21FLJXWQTR316	Trend	Quarterly	33rd Street	FDEP
21FLA 20030726	Trend	Quarterly	Moncrief Creek at Moncrief Road	FDEP
New station	Source assessment	Monthly	Southwestern branch at West 18th Street	FDEP
New station	Source assessment	Monthly	Northeastern branch at West 63rd Street	FDEP

4.2.3.7 Hopkins Creek Monitoring Network

COJ, Atlantic Beach, Jacksonville Beach, and Neptune Beach will be responsible for monitoring in Hopkins Creek. **Table 31** lists the stations that will be sampled.

Table 31: 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	Southeastern branch at 20th Avenue North (Seagate Avenue)	Jacksonville Beach
New station	Source assessment	Monthly	Southwestern branch at Tallwood Road	Jacksonville Beach

4.2.3.8 Sherman Creek Monitoring Network

COJ, NS Mayport, and Atlantic Beach will be responsible for monitoring in Sherman Creek. **Table 32** lists the stations that will be sampled.

Table 32: 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 State Road A1A Bridge	COJ
New station	Source assessment	Monthly	South side of Patrol Road and west of Maine Street	NS Mayport
New station	Source assessment	Monthly	Ditch at southeastern branch on 20th 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 at Fleet Landing Boulevard	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. Water quality data will be collected in a manner consistent with FDEP's SOPs for quality assurance/quality control (QA/QC). The most current version of these procedures can be downloaded from http://www.dep.state.fl.us/labs/library/lab_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 used 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, carrying out 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 of septic tanks in the Jacksonville area to assess fecal coliforms and nutrient loadings, and associated surface and ground water quality impacts from septic tanks. The 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 2008–09, an effort 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 waterbody impairment. Of the WBIDs that received these additional assessments, this BMAP discusses Craig Creek, McCoy Creek, and Williamson Creek.

Monthly MST sampling began as a part of the Walk the WBIDs in December 2008 and ended in July 2009. Additional samples were taken as needed to help identify sources of fecal contamination beginning in September 2008. This sampling program used fecal coliform samples and MST testing to guide corrective actions, including a quantitative human assay as well as animal assays, to help determine if the bacteria sources are human or animal. The program was designed with 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 activities to implement 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 confirmed to be sources of fecal coliforms.

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 help in determining water quality impairments and aid in 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 sewering 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 stakeholders' voluntary modification of their internal databases and/or business processes, facilitating a restoration perspective and enabling more effective planning and management actions. Most importantly, these modifications also increase the ease and effectiveness of interagency coordination and response, which are critical elements 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 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 nonspatial 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 WBID and other key datasets. The expansion and spatial verification of the Duval County private lift station database is an example of one key dataset that will enable COJ to better conduct their inspection program. This consolidation will provide valuable information from the multiple divisions in one location.

In addition, COJ is modifying the information included in the Citizen Action Response Effort (CARE) database; these modifications will aid in reporting activities on a WBID basis, 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 help to reduce 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 assessment will be carried out. During the 5^{th} 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/100mL.

A minimum of 50% improvement as a milestone measure acknowledges the variability of fecal coliforms and the time necessary for restoration activities to result in water quality improvement. If this 50% reduction is not achieved by the time of the 5^{th}-year analysis, additional efforts may be required. These efforts may include Walk the WBID–type assessments to identify and remove sources and/or additional projects and programs to reduce and prevent fecal coliform contamination 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 33,** efforts implemented since the TMDL verified period have led to improved water quality in most of the WBIDs.

Major components of this BMAP to achieve the milestones are the maintenance, inspection, enforcement, and public outreach programs conducted by the City of Atlantic Beach, COJ, City of Jacksonville Beach, City of Neptune Beach, DCHD, FDOT, JEA, and NS Mayport. Many of these programs were initiated during the Cycle 1 verified period (1996–2003) and are now ongoing. However, many of them have been enhanced since their initiation or targeted toward specific problems that were recently identified; therefore, their effectiveness should increase. Information gathered through the tributaries assessment activities, Walk the WBID exercise, source assessment sampling, intensive monitoring, MST, and thermal imaging has 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 will 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. Neptune Beach has 3 capital projects planned for completion in 2010. Additionally, Atlantic Beach has 3 projects in construction, all scheduled for completion by 2014.

COJ has also committed to removing septic tanks in failure areas that are within 300 meters of surface water, as part of its responsibilities in the 2008 LSJR Main Stem BMAP. As a more specific commitment for reducing coliform sources to the 15 tributaries in this BMAP, COJ will prioritize the 2,338 septic tanks in failure areas in these WBIDs (all may not be within 300 meters of surface waters) 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 finish implementing 50% 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, reducing the amount of fecal coliforms entering the tributaries.

Table 33: Percent Fecal Coliform Reduction since the TMDL Verified Period

Note: The geometric mean was not used because the minimum of 10 samples within a 30-day period required under the Florida Administrative Code to calculate a geometric mean is not available.
[1] Coliform counts are #/100mL.
[2] The data periods for the TMDLs range from 1991 to 2008. Each TMDL uses a different period and, in some cases, there is an overlap between the TMDL data range and the 2004 through 2008 data used as a comparison.

WBID Number	WBID Name	TMDL Median[1]	Median (2004–08)[2]	% Reduction
2297	Craig Creek	3,000	2,034	32%
2257	McCoy Creek	2,510	935	63%
2316	Williamson Creek	2,400	780	68%
2324	Fishing Creek	1,300	800	38%
2361	Deep Bottom Creek	2,200	1,768	20%
2228	Moncrief Creek	2,600	620	76%
2207	Blockhouse Creek	2,200	980	62%
2266	Hopkins Creek	1,200	847	29%
2381	Cormorant Branch	1,500	800	47%
2282	Wills Branch	4,000	570	86%
2227	Sherman Creek	1,400	267	81%
2240	Greenfield Creek	1,354	400	70%
2265B	Pottsburg Creek	800	240	70%
2203	Upper Trout River	1,184	364	69%
2203A	Lower Trout River	1,000	110	89%

4.6 Adaptive Management Measures

Adaptive management involves setting up a mechanism for adjusting 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 the 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 C of the supporting document*)*. 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 May 14, 2010 meeting on behalf of the entities they represent, as these members have 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 continued support for the BMAP and the activities included in the BMAP. 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.

City of Atlantic Beach Letter of Commitment

2010

Lower St. Johns River Tributaries Basin Management Action Plan II

Statement of Commitment to Support Plan Implementation

The Lower St. Johns River Tributaries Basin Management Action Plan (BMAP) II was endorsed on May 13, 2010, by authorized representatives of the agencies and organizations listed as members of the Lower St. Johns River Tributaries Basin Working Group (BWG).

The signatories of the BMAP agree that, as applicable, their organizations will:

- *Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and achieve total maximum daily load (TMDL)-related pollutant load reductions and water quality improvements.*
- *Support the necessary approvals and funding needed to implement the consensus management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.*
- *Pursuant to the process agreed upon by the BWG, track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.*
- *Identify and advise the Florida Department of Environmental Protection (FDEP) and BWG of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.*
- *As appropriate, assist with water quality monitoring according to the BMAP monitoring strategy approved by the BWG.*
- *Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.*

Organization: City of Atlantic Beach, Florida

Authorized Name/Title (print): Mike Borno, Mayor of Atlantic Beach, Florida

City of Jacksonville Letter of Commitment

July 8, 2010

Mr. Greg Strong
Director
Florida Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7577

Dear Mr. Strong:

Re: Lower St Johns River Tributaries Basin Management Action Plan (BMAP) II

The City of Jacksonville (City) is pleased to submit this letter of support for the Lower St. Johns River Tributatiaries BMAP II. The BMAP was endorsed as a consensus document on May 13, 2010 by authorized representatives of the agencies and organizations listed as members of the Lower St Johns River Tributaries Basin Working Group (BWG).

As a member of the BWG the City will support the implementation of the BMAP II as follows:

- *Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and achieve TMDL-related pollutant load reductions and water quality improvements.*
- *Support the necessary approvals and funding needed to implement the consensus management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.*
- *Pursuant to the process agreed upon by the BWG, track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.*
- *Identify and advise DEP and the BWG of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.*
- *As appropriate, assist with water quality monitoring according to the BMAP monitoring strategy approved by the BWG.*
- *Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.*

The City appreciates the opportunity to support this collaborative effort and to reiterate our commitment toward working collaboratively on restorting the health of the St. Johns River and its Tributaries.

Thank you for your assistance in this matter.

Sincerely,
Kerri Stewart
Chief Administrative Officer

CC: John Abendroth, DEP Environmental Administrator

City of Jacksonville Beach Letter of Commitment

May 21, 2010

Greg Strong Director
Florida Department of Environmental Protection
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7577

Dear Mr. Strong:

Re: Lower St. Johns River Tributaries Basin Management Action Plan 2

The City of Jacksonville Beach (City) supports the Lower St. Johns River Tributaries Basin Management Action Plan 2 (BMAP 2). The BMAP 2 was endorsed as a consensus document on May 13, 2010 by authorized representatives of the agencies and organizations listed as members of the Lower St. Johns River Tributaries Basin Working Group for BMAP 2 (BWG).

As a member of the BWG, the City will support the implementation of the BMAP 2 as follows:

- *Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and work towards achieving total maximum daily load (TMDL)-related pollutant load reductions and water quality improvements.*
- *Support the necessary approvals needed to implement the consensus management actions identified in the BMAP, and assist implementation of those actions as required approvals are secured and funding becomes available.*
- *Pursuant to the process agreed upon by the BWG, track the implementation of management actions for which they are responsible to assure that the BMAP 2 is carried out.*
- *Identify and advise the Florida Department of Environmental Protection (FDEP) and the BWG of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.*
- *As appropriate, assist with water quality monitoring according to the BMAP 2 monitoring strategy approved by the BWG.*
- *Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.*

Sincerely,
George D. Forbes
City Manager

CC: John Abendroth, Environmental Administrator, Florida Department of Environmental Protection

City of Neptune Beach Letter of Commitment

2010

Lower St. Johns River Tributaries Basin Management Action Plan II

Statement of Commitment to Support Plan Implementation

The Lower St. Johns River Tributaries Basin Management Action Plan (BMAP) II was endorsed on July 12, 2010, by authorized representatives of the agencies and organizations listed as members of the Lower St. Johns River Tributaries Basin Working Group (BWG).

The signatories of the BMAP agree that, as applicable, their organizations will:

- *Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and achieve total maximum daily load (TMDL)-related pollutant load reductions and water quality improvements.*
- *Support the necessary approvals and funding needed to implement the consensus management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.*
- *Pursuant to the process agreed upon by the BWG, track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.*
- *Identify and advise the Florida Department of Environmental Protection (FDEP) and BWG of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.*
- *As appropriate, assist with water quality monitoring according to the BMAP monitoring strategy approved by the BWG.*
- *Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.*

Organization: City of Neptune Beach

Authorized Name/Title (print): James R. Jarboe, City Manager

Date: July 14, 2010

DUVAL COUNTY HEALTH DEPARTMENT LETTER OF COMMITMENT

2010

Lower St. Johns River Tributaries Basin Management Action Plan II

Statement of Commitment to Support Plan Implementation

The Lower St. Johns River Tributaries Basin Management Action Plan (BMAP) II Was endorsed on May 13, 2010, by authorized representatives of the agencies And organizations listed as members of the Lower St. Johns River Tributaries Basin Working Group (BWG).

The signatories of the BMAP agree that, as applicable, their organizations will:

- *Support the use of an equitable and cost-effective coordinated comprehensive watershield management approach to address and achieve total maximum daily load (TMDL)-related pollutant load reductions and water quality improvements.*
- *Support the necessary approvals and funding needed to implement the consensus management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.*
- *Pursuant to the process agreed upon by the BWG, track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.*
- *Identify and advise the Florida Department of Environmental Protection (FDEP) and BWG of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.*
- *As appropriate, assist with water quality monitoring according to the BMAP monitoring strategy approved by the BWG.*
- *Continue to communicate and coordinate actions and funding across community organization, agencies, and programs with regard to BMAP implementation.*

Organization: Duval County Health Department

Authorized Name/Title (print): D. Gale Tucker-Disney, Environmental Administrator

JEA Letter of Commitment

June 28, 2010

Lower St. Johns River Tributaries Basin Management Action Plan II

The Lower St. Johns River Tributaries Basin Management Action Plan (BMAP) II was endorsed as a concensus document on May 13, 2010, by authorized representatives of the agencies and organizations listed as members of the Lower St. Johns River Tributaries Basin Working Group (BWG).

As a member of the BWG, JEA will support the BMAP implementation as follows:

- *Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and achieve TMDL-related pollutant load reductions and water quality improvements.*
- *Support the necessary approvals and funding needed to implement the consensus management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.*
- *Pursuant to the process agreed upon by the BWG, track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.*
- *Identify and advise DEP and the BWG of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.*
- *As appropriate, assist with water quality monitoring according to the BMAP monitoring strategy approved by the BWG.*
- *Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.*

JEA welcomes the opportunity to support the collaborative effort of the BWG members to restore the health of the St. Johns River and it Tributaries.

Sincerely,

Athena T. Mann

Vice president, Environmental Services

JEA

NAVAL STATION MAYPORT LETTER OF COMMITMENT

Mr. Greg Strong, Director
Florida Department of Environmental Protection
Northeast District
7825 Baymeadows Way, Suite B-200
Jacksonville, FL 32256-7577

Dear Mr. Strong:

Subject: Lower St. Johns River Tributaries Basin Management Action Plan II

The Lower St. Johns River Tributaries Basin Management Action Plan (BMAP) II was endorsed on May 13th, 2010, by authorized representatives of the member agencies and organizations of the Lower St. Johns River Tributaries Basin Working Group (BWG). Naval Station (NS) Mayport is a member of the BWG and participated in the BMAP II process.

As a member of the BWG, NS Mayport will support the implementation of BMAP II as follows:

a. *Support the use of an equitable and cost-effective coordinated comprehensive watershed management approach to address and achieve total maximum daily load (TMDL)-related pollutant load reductions and water quality improvements.*

b. *Support the necessary approvals and funding needed to implement the consensus management actions identified in the BMAP, and assist implementation of those actions as required approvals and funding are secured.*

c. *Pursuant to the process agreed upon by the BWG, track the implementation of management actions for which they are responsible to assure that the BMAP is carried out.*

d. *Identify and advise the Florida Department of Environmental Protection (FDEP) and BWG of any issues or concerns that could be obstacles to carrying out management actions identified in the BMAP, including technical, funding, and legal obstacles.*

e. *As appropriate, assist with water quality monitoring according to the BMAP monitoring strategy approved by the BWG.*

f. *Continue to communicate and coordinate actions and funding across community organizations, agencies, and programs with regard to BMAP implementation.*

If you have any questions on this matter, please contact NAVSTA Mayport Environmental Director, Ms Cheryl Mitchell, at 904-270-6070, E-mail cheryl.mitchell@navy.mil.

Sincerely,
A.L. Bowman, Captain, U.S. Navy, Commanding Officer

Copy to: FDEP Environmental Administrator, Mr. John Abendroth

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 presumably comprise 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, except for 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 not known 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 entire south fork comprises 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 the SJRWMD (**Table 34**). The dominant land use (238.6 acres; 37.3% of total coverage) in the WBID 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 2 locations in the northeastern corner of the WBID along Interstate 95, (3) in an area along Stonemont Street, and (4) near the downstream segment of the main channel between Green Bay Lane and West Cove Lane.

The next 2 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).

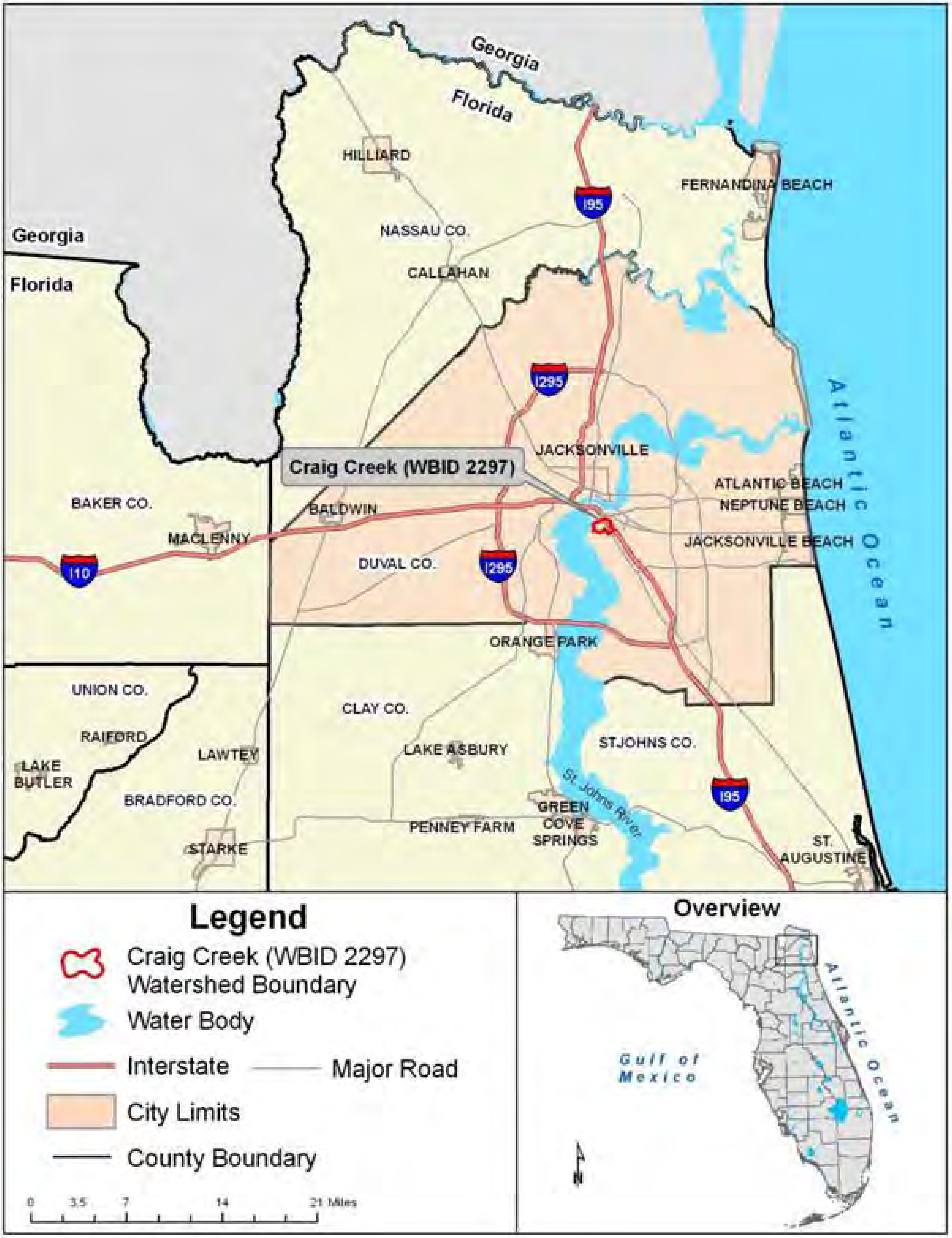

FIGURE 2: LOCATION OF THE CRAIG CREEK WATERSHED IN THE LSJR TRIBUTARIES BASIN

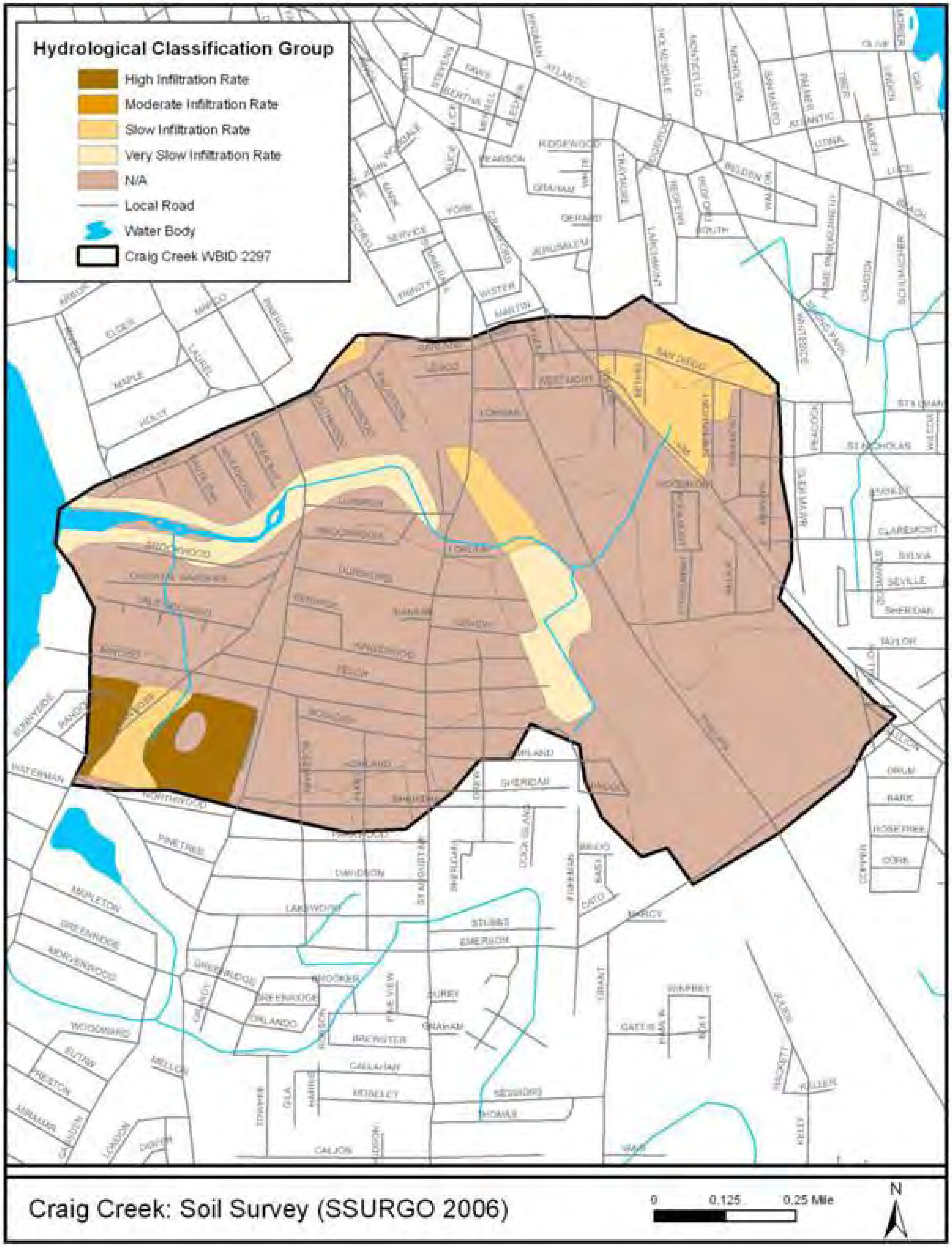

FIGURE 3: CRAIG CREEK WBID LOCATOR MAP

TABLE 34: LAND USES IN THE CRAIG CREEK WATERSHED IN 2004

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%**

Although wetlands account 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 surface waters (typically between about 1,000 and 50,000 CFU/100mL) as well as sediments (more than 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 near surface waters, wildlife could potentially 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 2 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 1 dog (Tyler 2006), there are about 614 dogs in the watershed.

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 I of the supporting document). As part of this effort, COJ has confirmed approximately 1,100 PICs in 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. Currently, 2 PICs are pending investigation.

6.2.3 CENTRALIZED SEWAGE INFRASTRUCTURE AND OVERFLOWS

The Craig Creek watershed is located in the Buckman JEA WWTF service area. About 1,075 households (approximately 70% of households) are connected to the sanitary sewer system in the watershed. This watershed supports over 99 kilometers (62 miles) of sewer lines, 2 sanitary sewer lift stations (including 1 private), and 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 near surface waters throughout the watershed, except for 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, although it remains near 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 2 sanitary sewer lift stations in the watershed are both located along the southern WBID boundary and are relatively distant from any contributing surface waters. The overall proximity of sanitary sewer infrastructure to Craig Creek increases the possibility of potential spills and/or unidentified sewer infrastructure leaks impacting surface waters (PBS&J, December 2009).

JEA reported a total of 6 SSOs within the Craig Creek WBID boundaries between March 2001 and July 2008 (**Table 35**); these events mainly occurred in the midstream and upstream portions of the watershed. The estimated volume of spills associated with the 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, 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 35: SSOs Reported in the Craig Creek Watershed, March 2001-July 2008

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

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

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 use 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 2 locations north of the main channel between Southwood Lane and Fieldston Lane, and (4) at 1 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 in the 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 near 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 analysis of the potential stormwater runoff demonstrates that stormwater runoff coefficients in 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 near 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 stormwater could potentially 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 in the WBID includes 24 outfalls by receiving water (1 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. Ditches form segments of (1) the main channel from Hendricks Avenue east to the railroad tracks, (2) the southern branch from the confluence with Craig Creek south to Vale Orchard Lane, and (3) the 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 close to Craig Creek surface waters (1) near the south fork just east of Felch Avenue, (2) near the main channel slightly south of the intersection of St. Augustine Road and St. Augustine Road East, 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 close to Craig Creek, their waters could potentially 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 are unknown. The St. Augustine Road project (September 5, 2000–January 2001) used the 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 (LF) 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 (greater than 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. JEA estimated that the manhole repairs were completed by 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 investigated 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 comprised high density polyethylene (HDPE) pipe (as of 2003), except along Thornwood Lane, where portions of pipe remained vitrified clay and cast iron. CIPP rehabilitation 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 asked to investigate 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 that the manhole was operating properly upon inspection but that the manhole location made further inspection by closed-circuit television (CCTV) 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) Supervisory Control and Data Acquisition (SCADA) Program; (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 I of the supporting document 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 installing a new inner lining in the pipe using CIPP. A total of 24.88% of the sewer lines in the watershed have been pipe burst, and 1.43% have had CIPP. During fiscal year (FY) 2009, JEA replaced or repaired components on 1 of the 2 (50%) lift stations in the WBID. Also during FY09, using a CCTV system, JEA inspected 3,147 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 36** provides additional information on JEA's activities in the Craig Creek watershed.

Table 36: JEA Activities in the Craig Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-1	Pipe Bursting–Increase Carrying Capacity	Replace 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	Rehabilitate failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 4,690	$626,970	JEA	Ongoing
JEA-3	Manhole Linings Rehabilitated	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 I of supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-5	Inspect Force Main Discharge Manholes, Repair/ Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Completed
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 CCTV system	3,147 feet in FY09	Unknown	JEA	Ongoing
JEA-9	Pipe Cleaning–JEA	Clean existing pipes to avoid blockages	5,114 feet in FY09	Unknown	JEA	Ongoing
JEA-10	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-11	Implement CMOM Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-12	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-13	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-14	Non-Destructive Testing Program/Pipe Integrity Testing	See Appendix I of the supporting document	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	Completed
JEA-16	Walk the WBID–Elevated Levels at TCC1	Investigated and found no sanitary sewer in area	Not applicable	Unknown	JEA	Completed
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

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 asked 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 I of the supporting document 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, 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 37** lists DCHD's projects in the Craig Creek watershed.

Table 37: 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	Implement programs to address septic systems as potential sources	Approximately 14 new construction permits, 14 repair permits, and 5 abandonment permits issued	$14,425	Florida Department of Health (FDOH)/ LSJR Surface Water Improvement and Management (SWIM) Grant	Ongoing
DCHD-2	Annual Operating Permits	Issue annual operating permits for PBTS, systems located in industrial/manufacturing zones (IMZs), 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	Implement broad-ranging septic tank ordinance	Approximately 9.4% of Emerson failure area and 19.6% of Freeman/Inwood failure area located in this WBID	$83,600	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-4	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-5	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 28 plan reviews and site evaluations performed based on permitting history	$7,000	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-6	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-7	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	22 complaint investigations 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 U.S. Highway 1 that treats stormwater from an area of 167 acres. The project provides stormwater treatment, helping 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 that will improve the curbing along Vale Orchard Lane, where previous street repairs have settled and damaged 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 (MEP). The monitoring plan is a requirement of Part V.B. of the COJ/FDOT NPDES MS4 permit and is supported by Title 40 of the Code of Federal Regulations, Part 122.26(d)(2)(iii). It is the responsibility of the MS4 copermittees (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. Between 2005 and 2009, completed maintenance 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 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 help the individual remedy 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, COJ PWD's activities between 1995 and 2009 have included investigating 1 illicit water discharge, 8 illegal discharges, 2 sewer lines that drained into a yard or ditch, and 8 SSOs, as well as inspecting 1 private lift station. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 38** provides additional details on COJ's activities in the Craig Creek watershed.

Table 38: COJ Activities in the Craig Creek Watershed

[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.

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-1	St Augustine Road. (Emerson to U.S. Highway 1) (Main Stem COJ-7)	Construct regional pond	167 acres	Unknown	COJ	Completed
COJ-2	Vale Orchard Lane Street Improvements	Address area where previous street repair has settled and damaged side curbing	Unknown	Unknown	COJ	Construction
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	5 (for 2005–09)	Unknown	COJ	Ongoing
COJ-5	Structure Blocked/Repair/General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	138 (for 2005–09)	$7,429	COJ	Ongoing
COJ-6	Illicit Water Discharge	CARE initiated inspection	1 (for 2006)	$379	COJ	Ongoing
COJ-7	Pollution–Water–Illegal Discharge	CARE initiated inspection	8 (for 1999–2008)	$3,032	COJ	Ongoing
COJ-8	Sewer Drains into Yard/Ditch	CARE initiated inspection	2 (for 2008)	$758	COJ	Ongoing
COJ-9	Sewer Overflow	CARE initiated inspection	8 (for 2000–09)	$3,032	COJ	Ongoing
COJ-10	Private Lift Station Inspection	Inspect 1 private lift station in 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 2 open PICs in watershed	2 (for 2010–2011)	Unknown	COJ	Planned
COJ-14	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	55 (for 1995–2009)	Unknown	COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-15	TAT Sampling	Conducted by EQD to assess bacteria levels in creek and help identify potential fecal bacteria sources	19 (for 2008–09)	Unknown	COJ	Ongoing
COJ-16	Freeman Road/Inwood Failure Area–Septic Tank Phase-Out	Phase out 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 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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-20	Pet/Animal Management Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing

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 they 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 roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It participates in the PIC Program in conjunction with COJ. A total of 26 PICs have been identified in FDOT conveyances, with 5 truly illicit connections 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. It 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 39** lists FDOT's activities in the watershed.

Table 39: FDOT Activities in the Craig Creek Watershed

[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.

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	Identify and remove illicit connections if found to be truly illicit	26 identified and investigated; 5 found to be truly illicit and removed	See Note 1	FDOT/ COJ	Ongoing
FDOT-3	Routine Surface Water Sampling	Carry out 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 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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 8 miles of roadways and associated stormwater conveyance systems currently maintained in this WBID; approximately 16 miles of roadways swept	See Note 4	FDOT	Ongoing

6.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 36 through **Table 39** list the projects and programs to reduce fecal coliform loading in the Craig Creek watershed, by entity. 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 (**Table 40**). 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 current GIS database there are approximately 133 septic tanks in the WBID. Of these, 115 OSTDS are eligible for sewer connection because they are located 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 the failure area are not an immediate threat to surface water.

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

Project Implementation—During FY09, JEA pipe burst 24.9% and installed CIPP on 1.43% of the sewer lines in the WBID, and upgraded 50% of the lift stations. These repairs and upgrades constitute a large percentage of the sewer infrastructure in the WBID, indicating that the previous system was due for substantial maintenance and that these activities have likely addressed some leakage and potential SSO problems. There is 1 lift station, S5 Gen on Basil Road, on the WBID boundary, and 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 the manhole to prevent further problems and report its 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—COJ has removed 2 illicit connections and FDOT has removed 5 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 continuing 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 action 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 roadways and associated stormwater conveyances, and sweeps 16 miles of roadways monthly. FDOT will continue stormwater infrastructure maintenance.

COJ Program Implementation—COJ has completed 5 work orders to repair stormwater pond problems, 75 for ditch or creek maintenance, and 138 for structure maintenance. It 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 Interstate 95 corridor and in the downstream segments near the confluence with the main channel. There is a multi-agency investigative effort underway to identify and address any fecal coliform sources in the area. The results of this effort will be provided in the first annual BMAP progress report.

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 individuals 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 in the annual reports on how to address the situation until it is resolved.

Table 40: Summary of Restoration Activities for the Craig Creek Watershed

\- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehabilitation	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

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
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

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 presumably comprise 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, except for 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; 1 branch continues north to just east of the terminus of McDuff Avenue North, and the other extends 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 the 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 WZAZ radio station property (which appeared to be abandoned during the Walk the WBID effort) to just south of Strickland Street. The waters of McCoy Creek continue east to Riverside Avenue, where the creek 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 41). The dominant land use (906.2 acres; 26.5% of total coverage) in the 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 2 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 near 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 close to surface waters and form a boundary along segments of the main channel, north fork, and north fork's northern branch. As wetlands serve as habitat for various species of wildlife and are near surface waters, wildlife could potentially 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 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 during the LSJR Tributary Assessment Project (2008–09). During the Walk the WBID 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 in the watershed, averaging 1.85 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 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 41: Land Uses in the McCoy Creek Watershed in 2004

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%
Nonforested 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 IN THE LSJR TRIBUTARIES BASIN

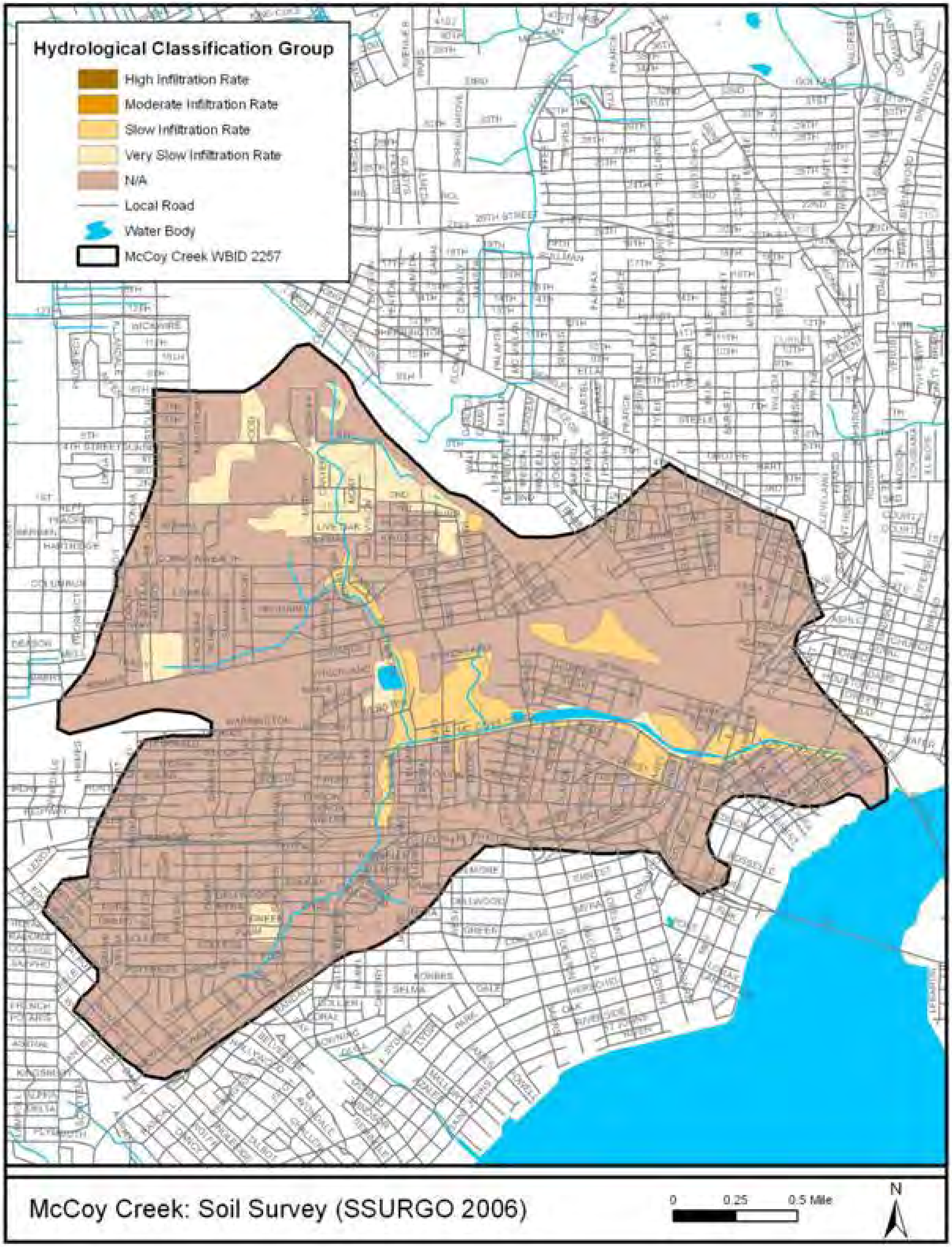

FIGURE 5: MCCOY CREEK WBID LOCATOR MAP

7.2 Potential Sources

7.2.1 Point Sources

COJ 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 McDuff Avenue North, respectively. In addition, the Conrad Yelvington Distributors Inc. and Load King Manufacturing have industrial multisector 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 in the McCoy Creek watershed between 2001 and 2007. None of these was determined to be illicit; however, 14 PICs are pending investigation in the watershed.

7.2.3 Centralized Sewage Infrastructure and Overflows

The McCoy Creek watershed is located in the JEA Buckman WWTF service area. About 7,300 households (approximately 100% of households) are connected to the sanitary sewer system in the watershed. This watershed supports over 558 kilometers (347 miles) of sewer lines and 10 sanitary sewer lift stations, as well as associated infrastructure, which 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 near 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. Force mains 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 located close 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 in the watershed are relatively distant from any contributing surface waters. The overall proximity of sanitary sewer infrastructure to McCoy Creek increases the possibility that potential spills and/or unidentified sewer infrastructure leaks could potentially impact surface waters (PBS&J, January 2010a).

JEA reported a total of 27 SSOs within the McCoy Creek WBID boundaries between March 2001 and July 2008 (**Table 42**). The estimated volume of spills associated with these overflows ranged from less than 1 to 80,000 gallons and averaged approximately 4,098 gallons; 11 of these SSOs were reported to have potentially impacted surface waters. In addition to the reported SSOs, during the Walk the WBID effort on September 30, 2008, and again on July 17, 2009, an unsealed manhole with signs of a recent sewer overflow (i.e., debris 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 a 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 was notified that illegal dumping may have occurred (PBS&J, January 2010a).

Table 42: SSOs reported in the McCoy Creek Watershed, March 2001–July 2008

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

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

7.2.4 OSTDS

WSEA estimates that there are approximately 316 OSTDS in the watershed. Households that potentially use 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 in 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 after centralized sewer was installed in over 90% of the failure area. Four of the OSTDS repair permits in 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 nonforested 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 near 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 headwaters 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 in 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 close to surface waters in the same locations as the areas with more than 25% impervious surface. 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 stormwater could potentially 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 in the WBID includes 86 outfalls by receiving water (5 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. 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, respectively, that form the Gilmore branch (PBS&J, January 2010a).

There are also several ponds located near 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 in 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 close to McCoy Creek, their waters could potentially merge with McCoy Creek surface waters. Field investigations during the Walk the WBID 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 have an 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 LF of sanitary sewer pipe. The James-Nelson pipe bursting improvement project rehabilitated approximately 44,094 LF of existing sewer lines in the area via the pipe bursting method. The Margaret-Osceola project included the rehabilitation of nearly 5,145 LF of sanitary sewer lines using the pipe bursting method. Pipe bursting improvement projects were carried out in McDuff and Riverside 5B. The Robinson pipe bursting project rehabilitated 30,000 LF of existing sewer lines in the Robinson area. The Cherokee Street CIPP project included the rehabilitation of approximately 1,068 LF of 36-inch sewer pipe and approximately 315 LF of 8-inch sewer lines. The Southwest Jacksonville CIPP project rehabilitated approximately 28,600 LF of deteriorated 8- 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 for McDuff and 5th Street–Interstate 10 to Edgewood. The project includes the reconstruction of a 3-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 fecal coliform levels (5,600 CFU/100mL) observed during the Walk the WBID effort (September 30, 2008). JEA also provided a lid for an uncovered manhole identified just south of the railroad tracks at Division Street. JEA investigated 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 it 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 I of the supporting document 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 rehabilitation 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% rehabilitated with CIPP, and 0.10% repaired through open cut. In FY09, JEA 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 pipe using a CCTV system, 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 43** provides additional information on JEA's activities in the McCoy Creek watershed.

Table 43: JEA Activities in the McCoy Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-18	Pipe Bursting–Increase Carrying Capacity	Replace 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	Rehabilitate 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	Replace failing/leaking infrastructure	Total footage of open cut replacement in watershed since 2001: 1,872	$421,936	JEA	Ongoing
JEA-21	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-22	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	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 I of the supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-24	Inspect Force Main Discharge Manholes, Repair/Rehabilitate as Necessary	See Appendix I of the supporting document	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 functioning 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-28	Pipe TV Inspection	Inspect existing infrastructure using CCTV system	10,986 feet of pipe in FY09	Unknown	JEA	Ongoing
JEA-29	HDPE Pipe Cleaning–Contractor	Clean existing HDPE pipes to avoid blockages	36,394 feet of HDPE pipe 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-32	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-33	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-34	Non-Destructive Testing Program/Pipe Integrity Testing	See Appendix I of the supporting document	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	Repair manhole	Look at SCADA and pump times of stations upstream of manhole to determine cause of overflows	Unknown	JEA	Planned

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 I of the supporting document 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 44** lists DCHD's projects in the McCoy Creek watershed.

Table 44: 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	Implement 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	Issue annual operating permits for PBTS, systems located in IMZs, 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	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-11	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 28 plan reviews and site evaluations performed based on permitting history	$7,000	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-12	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-13	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	165 complaint investigations 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, which treat 680 acres; (3) McCoy Creek Pond F, which treats 11 acres; and (4) McCoy Creek Pond D, which 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 anomalies identified through thermal imagery. COJ investigated these anomalies and determined that none were a source of fecal coliforms.

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 collected 13 samples in 2009. EQD 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. Between 2005 and 2009, completed maintenance included 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. 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 an illicit connection. 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.

In the McCoy Creek watershed, COJ PWD's activities have included investigating 19 illicit water discharges, 14 illegal discharges, 5 sewer lines that drained into a yard or ditch, and 59 SSOs, as well as inspecting 9 private lift stations. PWD will maintain a future level of effort 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 45** provides additional information on COJ's activities in the McCoy Creek watershed.

Table 45: COJ Activities in the McCoy Creek Watershed

[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.

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Estimated Completion	Project Status
COJ-21	Lenox Avenue (Highway to McDuff) (Main Stem COJ-32)	Construct wet detention pond	108 acres	Unknown	COJ	Completed	Completed
COJ-22	McCoy Creek (Main Stem COJ-3)	Construct Ponds A and B	680 acres	Unknown	COJ	Completed	Completed
COJ-23	McCoy Creek (Main Stem COJ-4)	Construct Pond F	11 acres	Unknown	COJ	Completed	Completed
COJ-24	McCoy Creek (Main Stem COJ-22)	Construct Pond D	27 acres	Unknown	COJ	Completed	Completed
COJ-25	McCoy Creek–Air Liquid Site	Retrofit pond and drainage	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	Construct wet detention pond	278 acres	$2,701,500	COJ	Unknown	Construction
COJ-28	McCoy Creek	Construct Broward/Smith Pond	14 acres	$97,000	COJ	2010	Construction
COJ-29	Ontario Street Drainage Improvements	Implement drainage improvements to address flooding at 795 Ontario	Unknown	Unknown	COJ	Unknown	Construction
COJ-30	Spruce/Price Drainage Improvements	Implement drainage improvements to address flooding at intersection during heavy rains	Unknown	Unknown	COJ	Unknown	Design
COJ-31	Correct Drainage at Westbrook Circle West	Implement drainage improvements to address flooding at 1025 Westbrook	Unknown	Unknown	COJ	Unknown	Design
COJ-32	Correct Road Flooding at Labelle Street	Implement drainage improvements to address inadequate underdrain system that allows flooding	Unknown	Unknown	COJ	Unknown	Construction
COJ-33	Winter Street	Implement drainage improvements to address ponding water	Unknown	Unknown	COJ	Completed	Completed
COJ-34	Barber Street and Broadway Avenue	Implement drainage improvements to address flooding at intersection	Unknown	Unknown	COJ	Completed	Completed
COJ-35	Dignan Street/Day Avenue	Reconstruct ditches and culverts to provide positive drainage	Unknown	$63,408	COJ	Completed	Completed

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Estimated Completion	Project Status
COJ-36	Acorn Street S/W and Drainage	Replace sidewalks, install new curbing, and construct new drainage infrastructure on Acorn between McQuade Street and Windle Street	Unknown	$100,507	COJ	Completed	Completed
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	30 (for 2005–09)	$2,799	COJ	Ongoing	Ongoing
COJ-39	Structure Blocked/Repair/ General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	858 (for 2005–09)	$58,355	COJ	Ongoing	Ongoing
COJ-40	Illicit Water Discharge	CARE initiated inspection	19 (for 2005–07)	$7,201	COJ	Ongoing	Ongoing
COJ-41	Pollution–Water– Illegal Discharge	CARE initiated inspection	14 (for 2000–07)	$5,306	COJ	Ongoing	Ongoing
COJ-42	Sewer Drains into Yard/Ditch	CARE initiated inspection	5 (for 2005–09)	$1,895	COJ	Ongoing	Ongoing
COJ-43	Sewer Overflow	CARE initiated inspection	59 (for 1999–2009)	$22,361	COJ	Ongoing	Ongoing
COJ-44	Private Lift Station Inspection	Inspect 3 private lift stations in WBID	9 (for 2005–08)	$3,411	COJ	Ongoing	Ongoing
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 /4121 Dylan Street)	Unknown	COJ	2011	Planned
COJ-47	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are functioning properly and report status in first annual report	2 stations (CSX Warehouse 334, 1315 Canal Street)	Unknown	COJ	2011	Planned

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Estimated Completion	Project Status
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 14 open PICs in watershed	14 (for 2010–2011)	Unknown	COJ	2011	Planned
COJ-50	Routine Surface Water Sampling	Carry out 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 creek and help identify potential fecal bacteria sources	13 (for 2009)	Unknown	COJ	Ongoing	Ongoing
COJ-52	Source Identification Sampling	Conduct source identification sampling 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 thermal imagery, followed up on anomalies in WBID; none were fecal coliform source	2009	Unknown	COJ	Completed	Completed
COJ-54	Murray Hill A Failure Area–Septic Tank Phase-Out	Phase out 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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing	Ongoing
COJ-57	Pet/Animal Management Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing	Ongoing

7.3.4 FDOT Activities in the McCoy Creek Watershed

7.3.4.1 FDOT Projects under Construction

FDOT is constructing a wet detention pond located at the intersection of Interstates 10 and 95 that will capture and treat stormwater from 119 acres, helping to 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 they 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 roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It 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 46** lists FDOT's activities in the watershed.

Table 46: FDOT Activities in the McCoy Creek Watershed

[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.

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	Identify and remove illicit connections if found to be truly illicit	34 identified, 32 found to be truly illicit and removed; 2 pending further investigation	See Note 1	FDOT/ COJ	Ongoing
FDOT-9	Follow Up on Outstanding PICs	Follow up on 2 open PICs in watershed	2 PICs (for 2010–11)	See Note 1	FDOT/ COJ	Planned
FDOT-10	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	108 (for 1995–2009)	See Note 1	FDOT/ COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
FDOT-11	TAT Sampling	Conducted by EQD to assess bacteria levels in creek and help identify potential fecal bacteria sources	13 (for 2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-12	Source Identification Sampling	Conduct source identification sampling 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	Construct wet detention pond at intersection of Interstates 10 and 95	119 acres, wet pond	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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 2 miles of roadways and associated stormwater conveyance systems currently being maintained in this WBID; portion of this area is under construction and there are no routine maintenance activities	See Note 4	FDOT	Ongoing

7.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 43 through **Table 46** show the projects and programs to reduce fecal coliform loading in the McCoy Creek watershed, by entity. 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 (**Table 47**). 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 in the WBID. Fifty-eight OSTDS are eligible for sewer connection because they are located 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 WBID 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 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, COJ inspects 3 private lift stations in the watershed annually. In accordance with its private lift station inspection program, COJ is committed to ensuring that privately owned infrastructure in its jurisdiction is monitored and properly maintained by the owners. There is 1 private lift station on the WBID boundary located at 20016 Druid/4121 Dylan. COJ will report whether 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, it upgraded 1 of the 10 lift stations in FY09 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 LF of pipe have been cleaned in 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 the 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 at (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 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 of these outstanding PICs in the first annual BMAP progress report. COJ and FDOT have committed to continuing 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. The permit program will continue, and FDOT will periodically inspect its facilities as part of its MS4 permit to prevent unpermitted connections. FDOT will continue stormwater infrastructure maintenance.

Capital Improvement Projects—FDOT has constructed a stormwater improvement project at the intersection of Interstates 10 and 95 that treats 119 acres of roadways and urban runoff through a wet pond. COJ has also completed 4 wet pond projects, with 3 additional projects planned, and a multiple drainage system rehabilitation project, all of which 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 WBID field investigations, a homeless person 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 for the BMAP annual reports on how to address the homeless population until the issue is resolved.

TABLE 47: SUMMARY OF RESTORATION ACTIVITIES FOR THE MCCOY CREEK WATERSHED

- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 presumably comprise 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, except for contributing branches and forks that join it from the south ("southwest fork," "southeast fork," "southern branch") and north ("north fork"). Williamson 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 WBID 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 the Cedar River just north of Ormsby Circle. The 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 48**). The dominant land use (631.5 acres; 68.0% of total coverage) is classified as medium-density residential and is found throughout the WBID. The next 2 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) near 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 2 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 close to surface waters, wildlife could potentially contribute to the fecal pollution in these areas. Signs of wildlife were observed in medium-density residential areas during the LSJR Tributary Assessment Project (2008–09). 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 WBID 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 in the watershed, averaging 2.83 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 892 dogs in the watershed.

Table 48: Land Uses in the Williamson Creek Watershed in 2004

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%
Nonforested Upland	13.9	1.5%
Disturbed Land	7.2	0.8%
TOTAL:	**928.7**	**100%**

FIGURE 6: LOCATION OF THE WILLIAMSON CREEK WATERSHED IN THE LSJR TRIBUTARIES BASIN

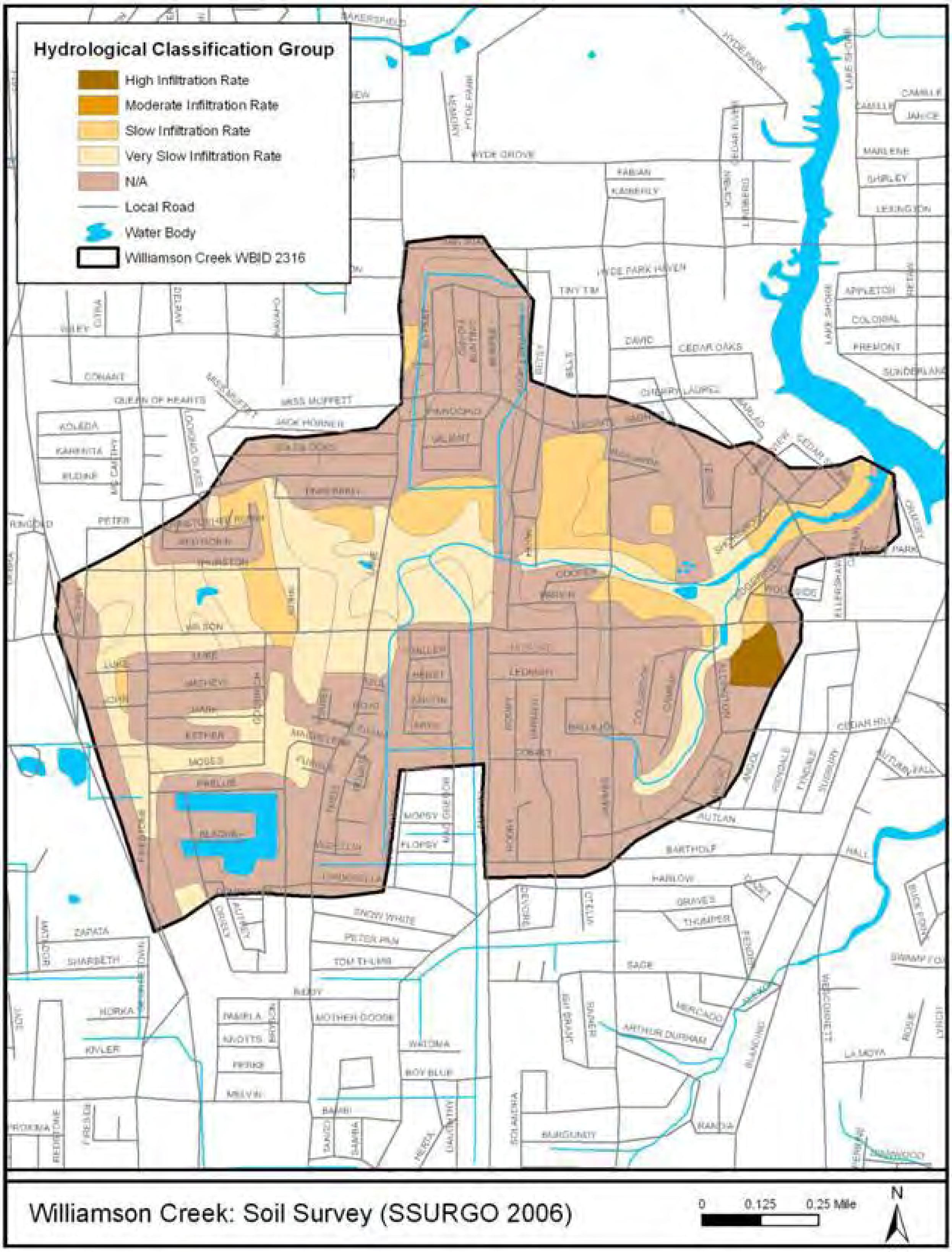

FIGURE 7: WILLIAMSON CREEK WBID LOCATOR MAP

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 in the Williamson Creek watershed, and 1 PIC was determined to be illicit and was removed. There are 5 PICs still pending investigation.

8.2.3 *Centralized Sewage Infrastructure and Overflows*

The Williamson Creek watershed is located in the JEA Southwest WWTF service area. About 1,888 households (approximately 85% of households) are connected to the sanitary sewer system in 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 near 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. There are 2 JEA lift stations close to the main channel's surface waters (1) just downstream of the confluence of the north and south forks at Hugh Court, and (2) farther downstream at Aldington Drive. The remaining private lift stations in the Williamson Creek watershed are relatively distant from any contributing surface waters. The overall closeness of sanitary sewer infrastructure to Williamson Creek increases the possibility that potential spills and/or unidentified sewer infrastructure leaks could potentially impact surface waters (PBS&J, January 2010b).

JEA reported a total of 9 SSOs within the Williamson Creek WBID boundaries between March 2001 and July 2008 (**Table 49**); 1 area with 4 repetitive SSO events (2001–05) 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 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 occurred just upstream near Aldington Road; this spill was due to a grease blockage. The estimated volume of spills associated with the overflows throughout the Williamson Creek watershed 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 49: SSOs reported in the Williamson Creek Watershed, March 2001–July 2008
*Reportable SSOs that spilled more than 1,000 gallons of sewage and/or affected surface waters.

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

8.2.4 OSTDS

WSEA estimates that there are 264 OSTDS in the Williamson Creek watershed. The majority of households that use 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 in this area. The permits and presumably failed septic systems are located primarily in the far eastern corner of the WBID boundary close to the main channel. As parcels that possibly use OSTDS are located near Williamson Creek surface waters, OSTDS could potentially contribute to the fecal pollution in these areas of the creek (PBS&J, January 2010b).

No failing systems were identified in the Williamson Creek watershed during the course of the LSJR Tributary Assessment Project (2008–09); however, homes on San Juan Avenue, Lane Avenue South, Wilson Boulevard, Oriely Drive, Jammes Road, Aldington Drive, and Aldington Road located close to the surface waters of Williamson Creek were identified as potentially using OSTDS. According to JEA, these homes are not billed for sewer, indicating that they may use OSTDS. Over the duration of the project sampling period, monitoring sites near these properties periodically showed elevated levels of fecal coliform (more than 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 nonforested 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 near 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 close to the main channel just north of Wilson Boulevard (PBS&J, January 2010b).

Furthermore, stormwater runoff coefficients in 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 close to surface waters in the same locations as the areas with impervious surface greater than 25%. 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 stormwater could potentially 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 in the WBID includes 74 outfalls by receiving waters (none are classified by FDEP as a major outfall) and 419 inlets. Although closed conveyances are common throughout the WBID, there are fewer open ditch systems present. 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 approximately here), and (4) parallel to Jammes Road in the southeastern portion of the WBID (PBS&J, January 2010b).

There are also several ponds located close 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 have an outfall into the main channel. Field investigations during the Walk the WBID effort on October 1, 2008, verified that the stormwater pond located at Oriely Drive is piped to Lane Avenue, where there is an outfall 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 coliform (810 CFU/100mL), suggesting that the pond and associated conveyance system contribute 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 WBID 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 did not differ between the wet and dry seasons in this WBID, suggesting a constant source of fecal coliform bacteria to the 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, 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 LF of sanitary sewer lines. The Southwest Jacksonville improvement project rehabilitated approximately 28,600 LF of deteriorated 8- to 18-inch gravity sewer lines via the CIPP method. The Tinkerbell Lane project pipe bursted 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 manhole SSO in July 2008 (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 I of the supporting document 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 been rehabilitated using CIPP. In addition, JEA conducts activities to help prevent future infrastructure problems. During FY09, it inspected 2,382 LF of pipe using a CCTV 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 50** provides additional information on JEA's activities in the Williamson Creek watershed.

Table 50: JEA Activities in the Williamson Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-37	Pipe Bursting–Increase Carrying Capacity	Replace 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	Rehabilitate failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 9,168	$495,491	JEA	Ongoing
JEA-39	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-40	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	3 of 6 ARVs replaced	$100,000*	JEA	Ongoing
JEA-41	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix I of the supporting document	Not applicable	$22,000,000*	JEA	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-42	Inspect Force Main Discharge Manholes, Repair/ Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-43	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-44	Pipe TV Inspection	Inspect existing infrastructure through use of CCTV 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 feet of HDPE pipe 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-48	Manhole Monitoring	See Appendix I of the supporting document	1 monitor	Unknown	JEA	Ongoing
JEA-49	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-50	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-51	Non-Destructive Testing Program/Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing
JEA-52	Walk the WBID–Manhole SSO at Wilson Boulevard	Repaired manhole riser section; CIPP along Wilson Boulevard.; dye testing showed no problems	Not applicable	Unknown	JEA	Completed
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	Completed
JEA-54	Walk the WBID–Investigations on Blanco Court	Investigate residential area on Blanco Court that has shallow lines and manhole problems	Complete inspection and report in first annual BMAP report	Unknown	JEA	Planned

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 (see Appendix I of the supporting document). 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. 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 51** shows the DCHD project table for Williamson Creek.

Table 51: 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	Implement 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	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	Approximately 2 annual operating permits issued for commercial properties	$5,000	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-16	SWIM Project	Implement broad-ranging septic tank ordinance	Approximately 25.6% of Cedar Creek failure area is located in WBID	$73,800	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-17	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-18	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 20 plan reviews and site evaluations performed based on permitting history	$5,000	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-19	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-20	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	4 complaint investigations 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. Between 2005 and 2009, completed maintenance included 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. 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.

In the Williamson Creek watershed, between 1995 and 2009 COJ PWD's activities included investigating 4 illicit water discharges, 2 illegal discharges, 3 sewer lines that drained into a yard or ditch, and 11 SSOs, as well as inspecting 5 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 52** provides additional details on COJ's activities in the watershed.

TABLE 52: COJ ACTIVITIES IN THE WILLIAMSON CREEK WATERSHED

[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.

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	1 (for 2005–09)	$281.35	COJ	Ongoing
COJ-60	Structure Blocked/Repair/General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	128 (for 2005–09)	$21,013	COJ	Ongoing
COJ-61	Illicit Water Discharge	CARE initiated inspection	4 (for 2006–07)	$1,516	COJ	Ongoing
COJ-62	Pollution–Water–Illegal Discharge	CARE initiated inspection	2 (for 2002)	$758	COJ	Ongoing
COJ-63	Sewer Drains into Yard/Ditch	CARE initiated inspection	3 (for 2008–09)	$1,137	COJ	Ongoing
COJ-64	Sewer Overflow	CARE initiated inspection	11 (for 2000–09)	$4,169	COJ	Ongoing
COJ-65	Private Lift Station Inspection	Inspect 2 private lift stations in 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 Avenue)	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 5 open PICs in watershed	5 (for 2010–11)	Unknown	COJ	Planned
COJ-70	Routine Surface Water Sampling	Carry out 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 creek and help identify potential fecal bacteria sources	19 (for 2008–09)	Unknown	COJ	Ongoing
COJ-72	Walk the WBIDS	Participated in Walk the WBID reconnaissance efforts and TAT sampling	2008–09	Unknown	COJ	Completed

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-73	Cedar Creek Failure Area– Septic Tank Phase-Out	Phase out 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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-76	Pet/Animal Management Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing

8.3.4 FDOT Activities in the Williamson Creek Watershed

8.3.4.1 Completed FDOT Projects

FDOT has completed 2 wet pond projects in the watershed: (1) Lane Avenue, which treats 7 acres, and (2) Wilson Avenue, which treats 72 acres. These projects collect and treat stormwater, helping to reduce the amount of fecal coliforms that reaches the creek through runoff. In addition, during the Walk the WBID 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, helping to 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 they 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 roadways. Street sweeping also occurs on 1.5 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 on 1.5 miles of roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It 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 53** lists FDOT's activities in the watershed.

Table 53: FDOT Activities in the Williamson Creek Watershed

[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.

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
FDOT-18	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	51 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
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	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and 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	Completed
FDOT-22	Stormwater Management Systems	Wilson Ave.	72 acres, wet ponds	Unknown	FDOT	Completed
FDOT-23	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 1.5 miles of roadways and associated stormwater conveyance systems currently maintained in this WBID; approximately 1.5 miles of roadways swept	See Note 4	FDOT	Ongoing
FDOT-24	Maintain FDOT Stormwater Systems	Maintain pond at 3613 Lane Avenue	Trash found in pond during Walk the WBID was subsequently removed	See Note 4	FDOT	Completed

8.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 50 through **Table 53** list the projects and programs to reduce fecal coliform loading in the Williamson Creek watershed, by entity. 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 (**Table 54**). 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 in the Cedar Creek failure area and are eligible to receive sewer connection. In the 2008 LSJR Main Stem BMAP, COJ committed to removing septic tanks in failure areas that are within 300 meters of surface waters. In the Williamson Creek watershed, the failing tanks in the Williamson Creek failure area 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 WBID 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 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 prevent the creation of new OSTDS sources.

8.4.2 Sewer Infrastructure

Private Infrastructure—According to the COJ database, COJ inspects 2 private lift stations annually. In accordance with its private lift station inspection program, COJ is committed to ensuring that privately owned infrastructure in its jurisdiction is monitored and properly maintained by the owners. In addition, COJ will confirm whether 1 private lift station on the WBID boundary is located 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 conduced pipe bursting and CIPP projects in the watershed to prevent problems with the sewer infrastructure. Through a contract, more than 84,000 LF of HDPE pipe have 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. The continuation of JEA's maintenance efforts and its systemwide programs, along with the follow-up on the LSJR Tributary Assessment (described 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, 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 roadways monthly and supports Adopt-A-Highway along 2 miles of roadway, preventing sediments from entering the stormwater conveyance system. The trash removal efforts are expected to continue if the Adopt-A-Highway volunteers continue to be active in the WBID. FDOT will continue stormwater infrastructure maintenance. During the Walk the WBID, 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 maintaining 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 WBID effort in October 2008, and a pair of ducks was observed at Wilson Boulevard during the March 2009 sampling event. In addition, dogs found in this area could be a potential source of fecal coliforms to the creek (PBS&J, January 2010b). COJ should consider targeting its pet waste management educational activities in the area. Evidence of a homeless camp was also observed on the north side of Wilson Boulevard; this could be a significant source of human fecal contamination to Williamson Creek. COJ should be aware of this potential source and prepare recommendations in the BMAP annual reports on how to address the homeless population until the issue is resolved.

TABLE 54: SUMMARY OF RESTORATION ACTIVITIES FOR THE WILLIAMSON CREEK WATERSHED

\- = Empty cell/no data

Notes: A checkmark (√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 SJRWMD (**Figure 8**). The "headwaters" of Fishing Creek presumably comprise 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, except for a primary divergence at Talton Lane into a "south fork" and a "north fork," and 4 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, and 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. Multiple contributing branches ("north fork northern branch," "north fork central branch," and "north fork southern branch") 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. Numerous sub-branches contribute to the north fork's northern branch. The 2 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 55**). The dominant land use (942.1 acres; 25.8% of total coverage) in the watershed is classified as medium-density residential. The next 2 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), found primarily in the south central portion of the WBID. There are also high-density residential areas located near 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 the watershed 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 close to surface waters, wildlife could potentially contribute to the fecal pollution of Fishing Creek in these areas (PBS&J, February 2009a).

A specialty farm, Windemere Equestrian Center, is situated 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, stormwater runoff from horse pastures could potentially contribute to 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 in the watershed, averaging 2.4 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 2,295 dogs in the watershed.

TABLE 55: LAND USES IN THE FISHING CREEK WATERSHED IN 2004

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%
Nonforested 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%**

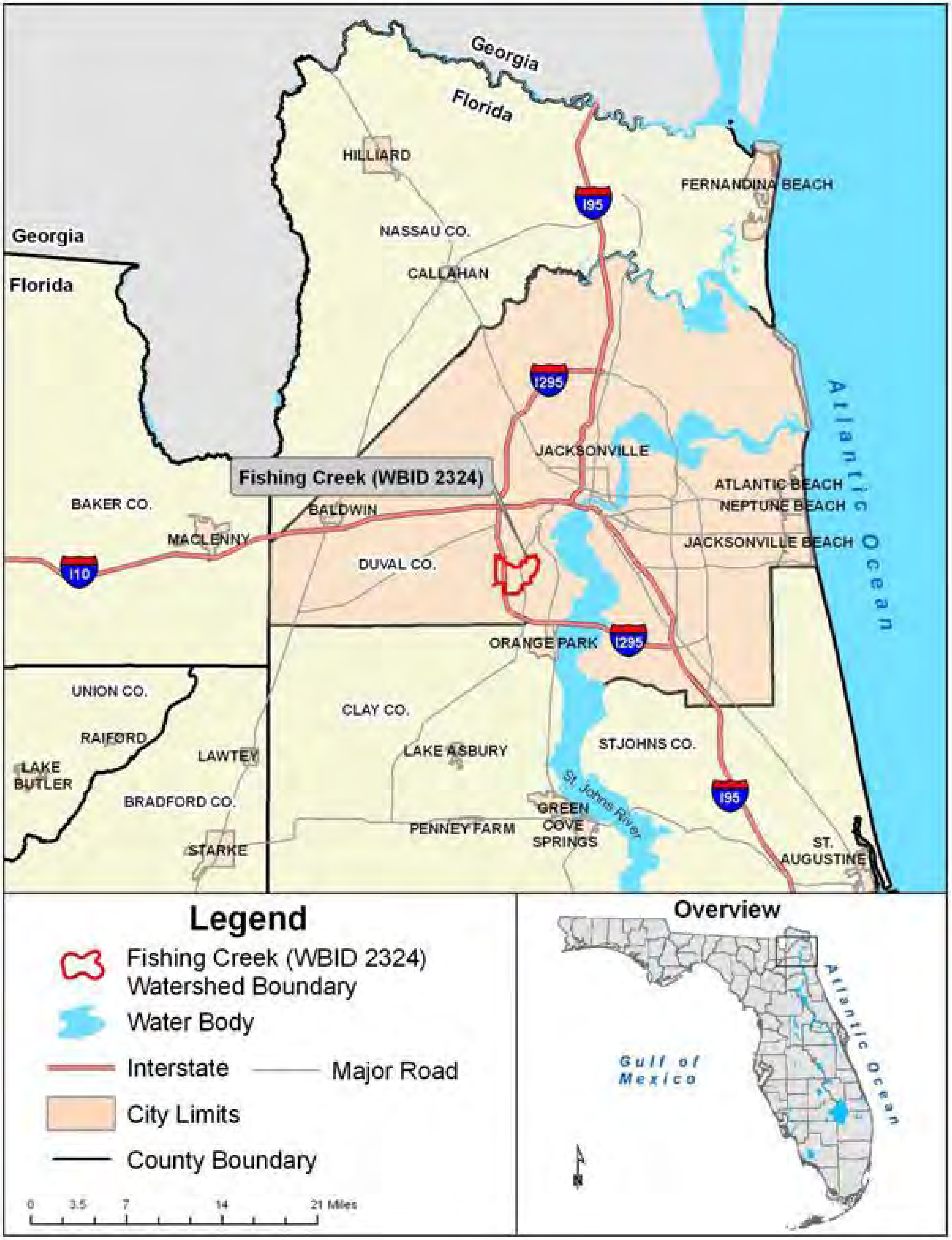

FIGURE 8: LOCATION OF THE FISHING CREEK WATERSHED IN THE LSJR TRIBUTARIES BASIN

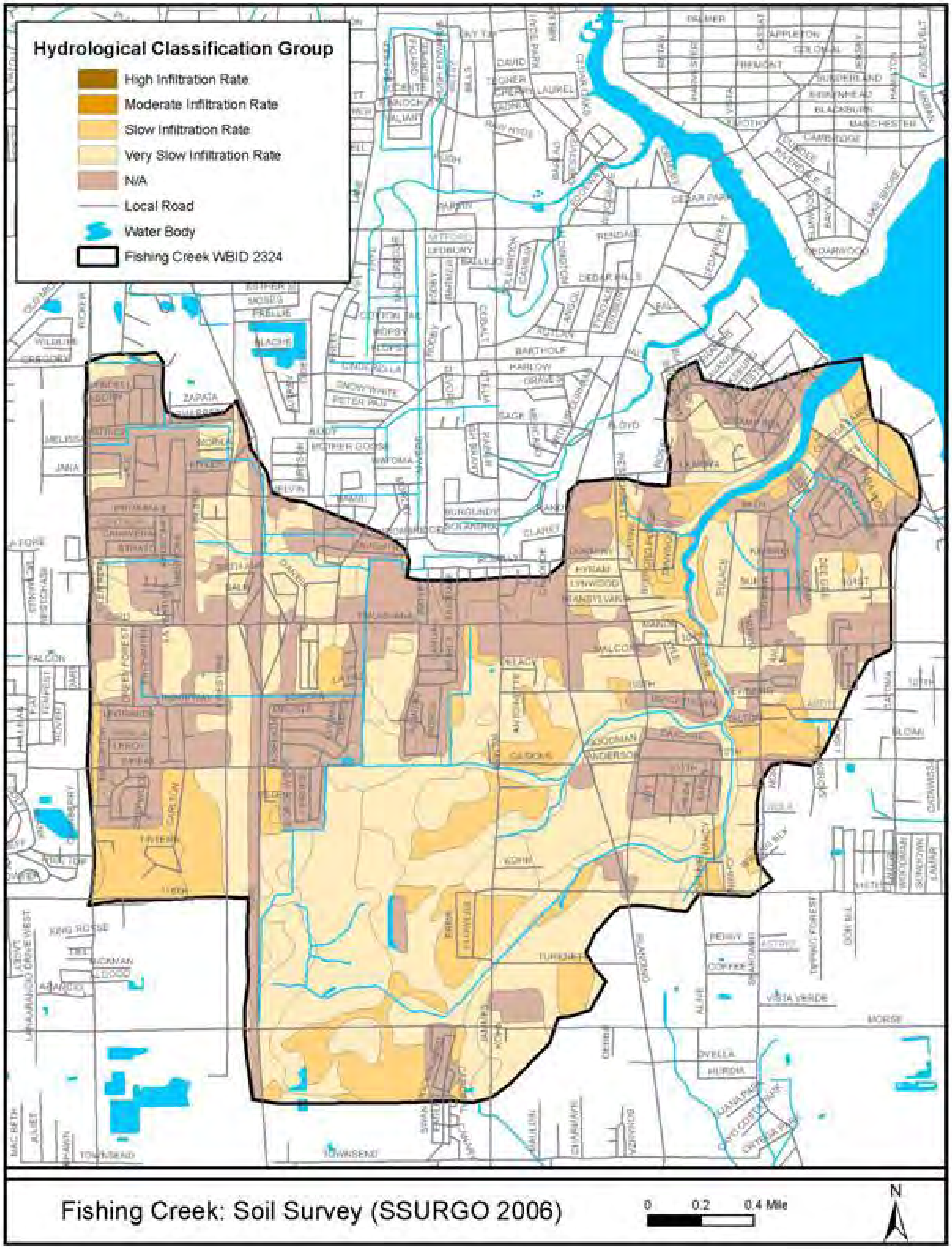

FIGURE 9: FISHING CREEK WBID LOCATOR MAP

9.2 Potential Sources

9.2.1 Point Sources

The Jacksonville Heights WWTF has a domestic wastewater permit at 2 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 the watershed.

9.2.3 Centralized Sewer Infrastructure and Overflows

The Fishing Creek watershed is located in the Southwest WWTF Service Area. About 3,995 households (approximately 70% of households) are connected to the sanitary sewer system in the watershed. This WBID supports nearly 355 kilometers (221 miles) of sewer lines and 28 sanitary sewer lift stations, as well as associated infrastructure, which 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.

JEA has reported 21 SSOs within the Fishing Creek WBID boundaries (see **Table 56**). 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 56: SSOs Reported in the Fishing Creek Watershed, 2001–07

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

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

WBID Name (Number)	Date of Overflow	Estimated Volume of Spill (Gallons)	Potentially Impacted Surface Waters
Fishing Creek (2324)	17-Jul-05*	500	Yes
Fishing Creek (2324)	2-Aug-05*	1,000	Yes
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 found throughout the watershed. Portions of the watershed with an impervious surface area greater than 25% correspond to commercial/utility and institutional land use classifications located along Timuquana Road and Blanding Boulevard. Areas with greater than 25% impervious surface are located near 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 found 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 in 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, the watershed contains fewer ditch systems. There are also a few ponds. The ponds close 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 near Fishing Creek, their waters could potentially merge with the surface waters of the creek (PBS&J, February 2009a).

Fecal coliform concentrations did not differ significantly between the wet and dry 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 I of the supporting document describes each of these programs.

JEA's maintenance activities in the watershed have resulted in pipe bursting of 0.59% of the sewer lines, CIPP rehabilitation of 0.04%, and open cut of 0.02%. In addition, JEA rebuilt 1 of the 28 (3.57%) of the lift stations in the WBID in FY09. Also during FY09, JEA inspected 2,191 LF of pipe using a CCTV 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 57** provides additional information on JEA's activities in the Fishing Creek watershed.

Table 57: JEA Activities in the Fishing Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-55	Pipe Bursting–Increase Carrying Capacity	Replace 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	Rehabilitate failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 437	$1,731,285	JEA	Ongoing
JEA-57	Open Cut–Removal and Replacement	Replace failing/leaking infrastructure	Total footage of open cut replacement in watershed since 2001: 200	$50,000	JEA	Ongoing
JEA-58	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-59	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	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 I of the supporting document	Not applicable	$22,000,000*	JEA	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-61	Inspect Force Main Discharge Manholes, Repair/Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
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 functioning 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-66	Pipe TV Inspection	Inspect existing infrastructure through use of CCTV system	2,191 feet of pipe 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-69	Manhole Monitoring	See Appendix I of the supporting document	2 monitors	Unknown	JEA	Ongoing
JEA-70	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-71	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-72	Non-Destructive Testing Program/Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing

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 I of te supporting document 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. DCHD has also performed 155 plan reviews and 104 complaint investigations. It will continue these efforts in the future to reduce and prevent issues related to OSTDS. **Table 58** lists DCHD's projects in the watershed.

Table 58: 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	Implement 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	Implement broad-ranging septic tank ordinance	100% of Pernecia failure area is located in this WBID	Unknown	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-23	Annual Operating Permits	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	25 annual operating permits issued for commercial properties; 1 PBTS is monitored annually	$65,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-24	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-25	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 155 plan reviews and site evaluations performed based on permitting history	$38,750	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-26	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-27	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	104 complaint investigations performed	$34,600	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-28	Intensive Inspection Program	Carry out 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 94th Street, south to 103rd Street; 73 tanks west of Ortega Farms Boulevard to Benlocke Road to 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, which treats 17 acres, and the Wesconnett Boulevard Wet Detention Project, which 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 cross drain to improve drainage is under construction. These projects capture and treat stormwater, helping to 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. Between 2005 and 2009, completed maintenance included 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. 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.

In the Fishing Creek watershed, between 1995 and 2009 PWD's activities included investigating 12 illicit water discharges, 15 illegal discharges, 12 sewer lines that drained into a yard or ditch, and 37 SSOs, as well as inspecting 1 private lift station. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 59** provides additional details on COJ's activities in the Fishing Creek watershed.

Table 59: COJ Activities in the Fishing Creek Watershed

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-77	La Moya Roadway Project (Main Stem COJ-42)	Construct wet detention pond	17 acres	Unknown	COJ	Completed
COJ-78	Wesconnett Blvd. (Blanding to Blanding) (Main Stem COJ-33)	Construct wet detention pond	396 acres	Unknown	COJ	Completed
COJ-79	Replace Cross Drain at Perrine Drive	Replace cross drain–too small to handle drainage area	Unknown	Unknown	COJ	Construction
COJ-80	Redstone Drive Drainage	Install cross drain and improve ditches	Unknown	$150,000	COJ	Completed
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	24 (for 2005–09)	Unknown	COJ	Ongoing
COJ-83	Structure Blocked/Repair/ General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	369 (for 2005–09)	$51,649	COJ	Ongoing
COJ-84	Illicit Water Discharge	CARE initiated inspection	12 (for 2005–07)	$4,548	COJ	Ongoing
COJ-85	Pollution–Water–Illegal Discharge	CARE initiated inspection	15 (for 2002–08)	$5,685	COJ	Ongoing
COJ-86	Sewer Drains into Yard/Ditch	CARE initiated inspection	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 (103rd Street and Bricker Road)	Unknown	COJ	Planned
COJ-90	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are functioning properly and report status in first annual report	1 station (5951 Wilmar Road)	Unknown	COJ	Planned

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-91	Private Lift Station Inspection	Inspect 13 private lift stations in 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 30 open PICs in watershed	30 (for 2010–11)	Unknown	COJ	Planned
COJ-95	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	161 (for 1995–2009)	Unknown	COJ	Ongoing
COJ-96	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	5 (for 2007–09)	Unknown	COJ	Ongoing
COJ-97	Pernecia Failure Area– Septic Tank Phase-Out	Phase out septic tanks in failure areas	186 tanks, 186 connected	Unknown	COJ	Completed
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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-100	Pet/Animal Management Public Education	Develop 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. The 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 they 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 roadways. Street sweeping also occurs monthly on 14 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 7 miles of roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It 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 60** lists FDOT's activities in the watershed.

Table 60: FDOT Activities in the Fishing Creek Watershed

[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.

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	Identify illicit connections and remove if found to be truly illicit	4 identified; 1 found to be truly illicit and removed; 3 pending investigation	See Note 1	FDOT/ COJ	Ongoing
FDOT-27	PIC Program	Follow up on outstanding PICs	3 (for 2010–11)	See Note 1	FDOT/ COJ	Planned

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
FDOT-28	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	161 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-29	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	5 (for 2007–09)	See Note 2	FDOT/ COJ	Ongoing
FDOT-30	Stormwater Management Systems	Construct Interstate 295 retention/detention systems	72 acres	Not applicable	FDOT	Completed
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	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and 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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 7 miles of roadways and associated stormwater conveyance systems currently maintained; approximately 14 miles of roadways swept	See Note 4	FDOT	Ongoing

9.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 57 through **Table 60** list the projects and programs to reduce fecal coliform loading in the Fishing Creek watershed, by entity. 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 (**Table 61**). 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. All of the 186 tanks located in the Pernecia failure area have been phased out. In addition, 170 tanks outside the failure area were removed. The watershed still includes 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, discrete portions of the WBID 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 these are designated in the future for inclusion in the program, they 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 has completed 2 flood control projects at Perrine Drive and Redstone Drive, which are both located in OSTDS areas. In addition, COJ has 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 of private lift stations since 1997 and will continue to inspect these stations annually. There is 1 station, 103rd Street and Bricker Road, located on the WBID boundary. COJ will determine whether this station is located in the Fishing Creek WBID and provide the result in the first annual BMAP report. In addition, 1 station, 5951 Wilmar Road, is located close to surface waters. COJ will inspect the station to ensure it is functioning properly and carry out any necessary enforcement. This inspection will be discussed in the first annual report.

Sewer Infrastructure Projects—JEA has conducted pipe bursting, CIPP rehabilitation, and open cut projects to repair the sewer mains in the WBID. JEA also upgraded 1 lift station in FY09 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, a neighborhood in the watershed had 4 previous SSOs. To address this issue, JEA constructed weirs to reroute flow, the line on Firestone was cleaned and inspected using CCTV, 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, 4 stations located close to surface waters 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 of these PICs will be discussed in the first annual report. COJ and FDOT have committed to continuing 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 to prevent unpermitted connections. FDOT will continue stormwater infrastructure maintenance. Additionally, 14 miles of roads are swept monthly, and trash is collected along 2 miles of roadways 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 61: SUMMARY OF RESTORATION ACTIVITIES FOR THE FISHING CREEK WATERSHED

\- = Empty cell/no data

Notes: A checkmark (√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 presumably comprise 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, except for 3 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 62**). The dominant land use (415.5 acres; 34% of total coverage) in the watershed is classified as medium-density residential and is predominantly located east of Interstate 295 in the central portion of the WBID. The next 2 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 account for approximately 7.2% of the total land coverage of the Deep Bottom Creek watershed and form a boundary around the main channel in areas west of San Jose Boulevard. Upland forests are also located close 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 located near surface waters, wildlife could potentially 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 in the watershed, though 2 horses were 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 2 apartment complexes, were identified in the watershed close to surface waters just east of the San Jose Boulevard and Interstate 295 intersection. In addition, several PICs and trash were observed near 1 of these apartment complexes (Woods of Mandarin). An additional apartment complex is situated in the northern portion of the watershed at Arrowhead Drive (PBS&J, February 2009b).

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

TABLE 62: LAND USES IN THE DEEP BOTTOM CREEK WATERSHED IN 2004

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%
Nonforested Upland	12.7	1.0%
TOTAL:	**1,222.4**	**100%**

FIGURE 10: LOCATION OF THE DEEP BOTTOM CREEK WATERSHED IN THE LSJR TRIBUTARIES BASIN

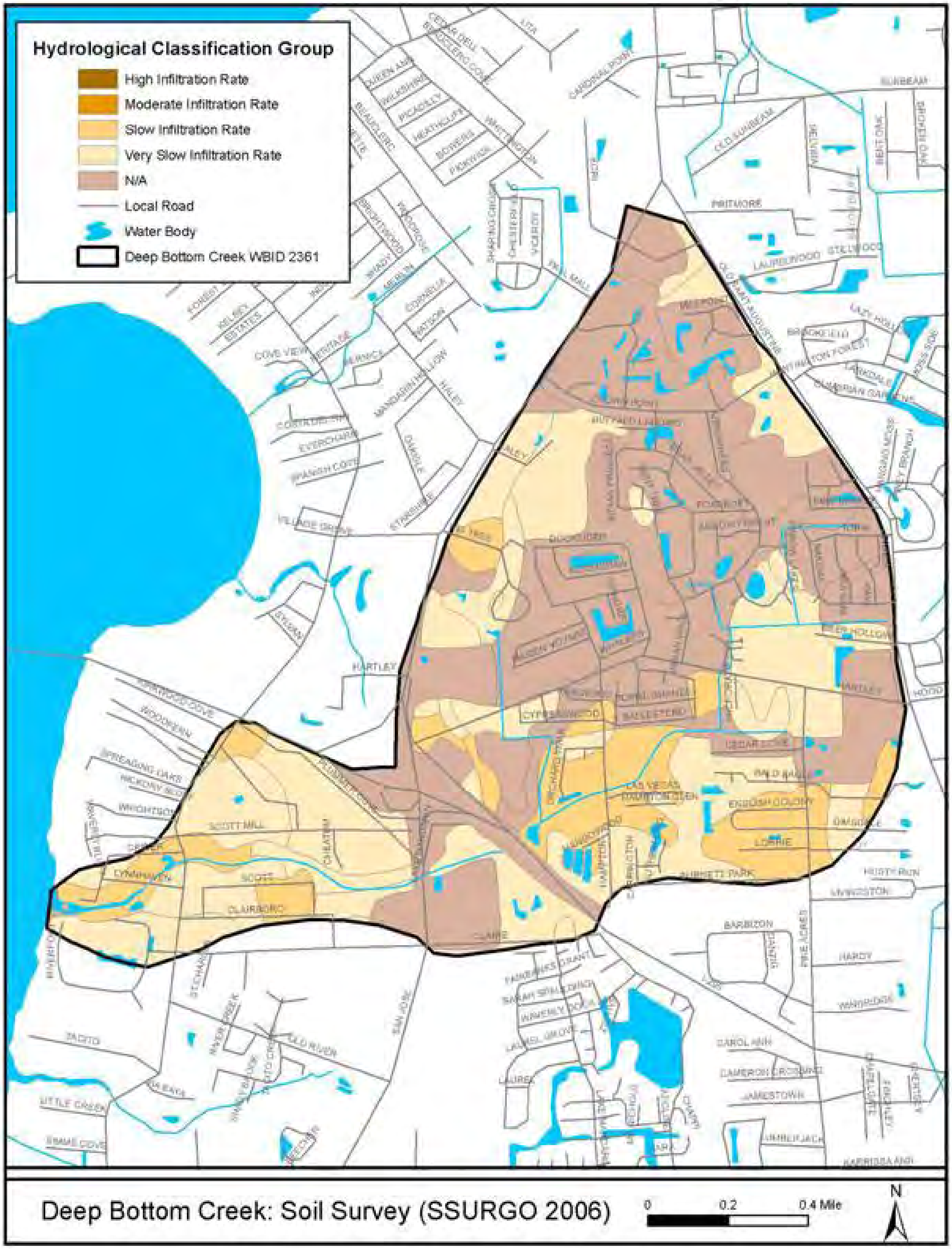

FIGURE 11: DEEP BOTTOM CREEK WBID LOCATOR MAP

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 in 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 in the Mandarin WWTF Service Area. About 1,867 households (approximately 66% of households) are connected to the sanitary sewer system in the WBID. This watershed supports approximately 51 kilometers (32 miles) of sewer lines and 8 sanitary sewer lift stations, as well as associated infrastructure, which 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 portions of the watershed east of San Jose Boulevard and close to surface waters. Furthermore, sewer mains parallel a large portion of Deep Bottom Creek surface waters and span the width of the creek, either above or below surface waters, in numerous areas east of San Jose Boulevard, thus increasing the likelihood that unidentified sewer infrastructure leaks (e.g., from underground sewer mains) may impact surface waters in this part of the watershed (PBS&J, February 2009b).

JEA has reported 8 SSOs within the Deep Bottom Creek WBID boundaries (**Table 63**). 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 63: SSOs Reported in the Deep Bottom Creek Watershed, 2001–07

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

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

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 in this area. The permits, and presumably failed septic systems, were primarily located west of San Jose Boulevard in the Scott Mill Hill nuisance area. A 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 near Deep Bottom Creek surface waters, suggesting that septic systems could potentially affect the water quality of the 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 areas with predominantly 10% to 25% impervious surface are found 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 areas with more than 25% impervious surface 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, including areas close 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 found in areas along San Jose Boulevard and Interstate 295. As the main channel of Deep Bottom Creek flows through the high runoff coefficient areas at San Jose Boulevard and Interstate 295, and the northern branch is located near areas with high runoff coefficients along San Jose Boulevard, stormwater runoff could potentially 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 includes 100 outfalls by receiving water (none are classified by FDEP as a major outfall) and 413 inlets. Closed conveyances are common and are found 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. There are also numerous ponds, mostly north of Hartley Road. Those close 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 near Deep Bottom Creek, their waters could potentially impact the creek's surface waters (PBS&J, 2009b).

Fecal coliform concentrations did not differ 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 I of the supporting document 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 its maintenance activities for the sanitary sewer system to prevent future problems. **Table 64** provides additional information on JEA's activities in the Deep Bottom Creek watershed.

Table 64: JEA Activities in the Deep Bottom Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-73	Pipe Bursting–Increase Carrying Capacity	Replace failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 379	$50,441	JEA	Ongoing
JEA-74	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-75	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	2 of 6 ARVs replaced	$100,000*	JEA	Ongoing
JEA-76	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are functioning properly and report status in first annual report	1 station (Burger King on San Jose Boulevard)	Unknown	JEA	Planned
JEA-77	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix I of the supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-78	Inspect Force Main Discharge Manholes, Repair/Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-79	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-80	Implement CMOM Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-81	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-82	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-83	Non-Destructive Testing Program/Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing

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 I of the supporting document 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. The transition to sewer has started in this area, 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 65** list DCHD's projects in the Deep Bottom Creek watershed.

Table 65: 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	Implement 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	Implement broad-ranging septic tank ordinance	Approximately 40% of Scott Mill Hill Septic Tank Failure Area located in this WBID	Unknown	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-31	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-32	Application/Plan Review/Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 35 plan reviews and site evaluations performed based on permitting history	$8,750	FDOH/ LSJR SWIM Grant	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
DCHD-33	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-34	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	10 complaint investigations 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 cross drain in the area. In addition, the Crown Point and Moorings Landing Drainage Project is under construction. These projects will improve drainage and reduce flooding, decreasing 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. Between 2005 and 2009, completed maintenance included 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. 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 the Deep Bottom Creek watershed, 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's activities between 1995 and 2009 included investigating 4 illicit water discharges, 6 illegal discharges, 1 sewer line that drained into a yard or ditch, and 8 SSOs, as well as inspecting 14 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 66** provides additional detail on COJ's activities in the Deep Bottom Creek watershed.

Table 66: COJ Activities in the Deep Bottom Creek Watershed

[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.

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
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	Improve intersection–failing cross drain causing road to wash out	Unknown	$100,000	COJ	Completed
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	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)	$1,329	COJ	Ongoing
COJ-105	Structure Blocked/Repair/General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	211 (for 2005–09)	$14,873	COJ	Ongoing
COJ-106	Illicit Water Discharge	CARE initiated inspection	4 (for 2006–07)	$1,516	COJ	Ongoing
COJ-107	Pollution–Water–Illegal Discharge	CARE initiated inspection	6 (for 1999–2007)	$2,274	COJ	Ongoing
COJ-108	Sewer Drains into Yard/Ditch	CARE initiated inspection	1 (for 2009)	$379	COJ	Ongoing
COJ-109	Sewer Overflow	CARE initiated inspection	8 (for 2000–07)	$3,032	COJ	Ongoing
COJ-110	Private Lift Station Inspection	Inspect 4 private lift stations in 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 Boulevard, 11100 San Jose Boulevard)	Unknown	COJ	Planned
COJ-113	Illicit Discharge Detection and Elimination	5 open, 6 illicit	32 (for 1999–2003)	$12,128	COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-114	Follow Up on Outstanding PICs	Follow up on 5 open PICs in watershed	5 (for 2010–2011)	Unknown	COJ	Planned
COJ-115	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	50 (for 1995–2009)	Unknown	COJ	Ongoing
COJ-116	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	10 (for 2007–09)	Unknown	COJ	Ongoing
COJ-117	Scott Mill Failure Area–Septic Tank Phase-Out	Phase out 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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-120	Pet/Animal Management Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing

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. The 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 they 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. It also supports the Adopt-A-Highway program in the watershed, in which trash is collected from 2 miles of roadways. Street sweeping occurs monthly on 2.5 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 on 2.5 miles of roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It 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 67** lists FDOT's activities in the watershed.

Table 67: FDOT Activities in the Deep Bottom Creek Watershed

[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.

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	Carry out NPDES permit-related quarterly water quality sampling	50 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-36	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	10 (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-37	Stormwater Management Systems	Implement stormwater improvements as part of San Jose Boulevard widening	105 acres	Not applicable	FDOT	Completed
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
FDOT-39	Adopt-A-Highway Program	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and 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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 2.5 miles of roadways and associated stormwater conveyance systems currently being maintained; approximately 2.5 miles of roadways swept	See Note 4	FDOT	Ongoing

10.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 64 through **Table 67** list the projects and programs to reduce fecal coliform loading in the Deep Bottom Creek watershed, by entity. 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 (**Table 68**). The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in the 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 in the Scott Mill failure area. COJ and WSEA have begun sewering efforts, with 95 tanks connected in the failure area and 34 tanks connected outside the failure area. The majority of repair permits are located in the failure area. In the 2008 LSJR Main Stem BMAP, COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters. 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, 4 private lift stations in the watershed are inspected annually. COJ will continue to inspect these annually to ensure they are operating properly and should take enforcement action when necessary. Two private lift stations, 1210 San Jose Boulevard and 11100 San Jose Boulevard, are located on the WBID boundary. COJ will determine whether 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 close to surface waters. JEA will inspect this station to ensure it is functioning properly and will report on its 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 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, 5 PIC cases are still open, and these will be investigated and their status updated in the first annual BMAP progress report. COJ and FDOT have committed to continuing the 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 to prevent unpermitted connections. The FDOT Adopt-A-Highway Program removes trash from 2 miles of roadways, and street sweeping is performed monthly on 2.5 miles of roadways. FDOT will continue stormwater infrastructure maintenance. 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. It has also completed 1 drainage system rehabilitation project in the watershed, with another under construction. The continuation of maintenance activities is sufficient to address stormwater in the watershed at this time.

TABLE 68: SUMMARY OF RESTORATION ACTIVITIES FOR THE DEEP BOTTOM CREEK WATERSHED

\- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in these activities is provided by funding in the NPDES MS4 agreements with COJ.

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 Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 presumably comprise 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, except for 7 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 69**). 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 account 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 close to surface waters, wildlife could potentially 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 in the watershed, averaging 2.38 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 3,508 dogs in the watershed.

TABLE 69: LAND USES IN THE MONCRIEF CREEK WATERSHED IN 2004

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%
Nonforested Upland	55.0	1.5%
Open Land	13.8	0.4%
Disturbed Land	5.5	0.1%
TOTAL:	**3,787.2**	**100%**

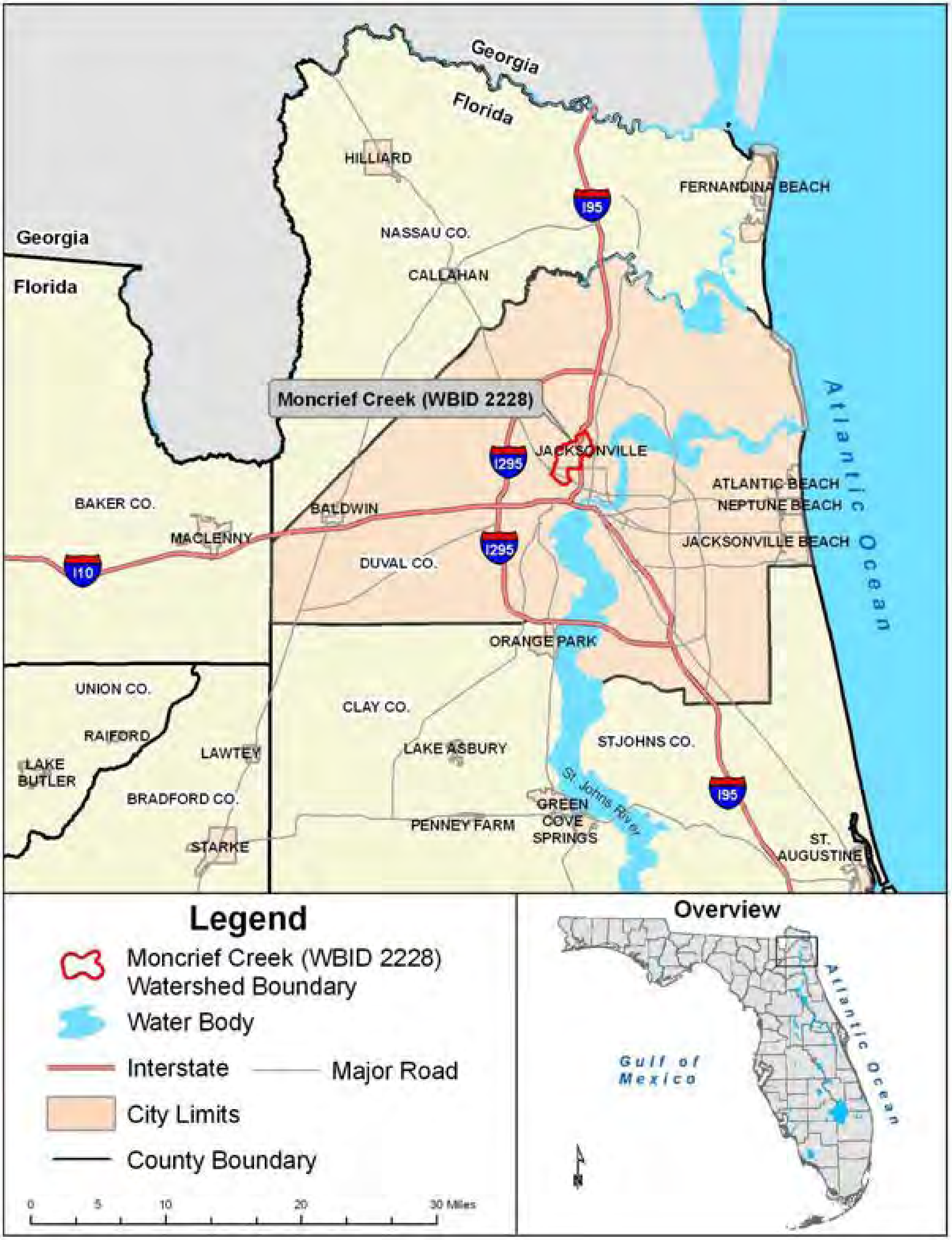

FIGURE 12: LOCATION OF THE MONCRIEF CREEK WATERSHED IN THE LSJR TRIBUTARIES BASIN

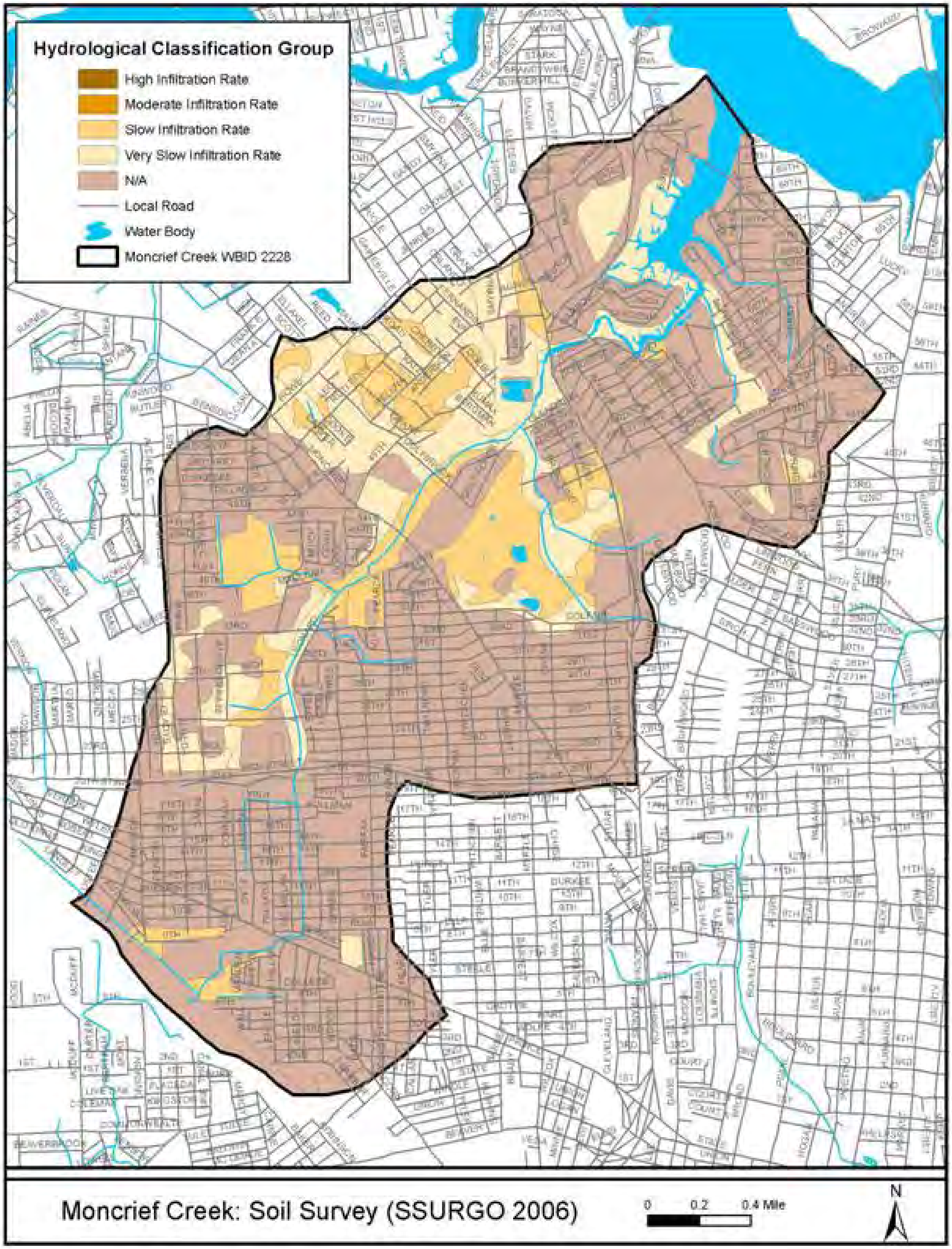

FIGURE 13: MONCRIEF CREEK WBID LOCATOR MAP

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, 2 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 currently pending investigation in the WBID.

11.2.3 Centralized Sewer Infrastructure and Overflows

The Moncrief Creek watershed is located in the Buckman WWTF Service Area. About 7,902 households (approximately 90% of households) are connected to the sanitary sewer system in the WBID. This watershed supports nearly 513 kilometers (319 miles) of sewer lines and 10 sanitary sewer lift stations, as well as associated infrastructure, which 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. JEA has reported 17 SSOs within the Moncrief Creek WBID boundaries (**Table 70**). 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 70: SSOs Reported in the Moncrief Creek Watershed, 2001–07

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

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

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 in 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 close 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 impervious surface area greater than 25% correspond to transportation and commercial/utility and institutional land use classifications and are located near 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 almost the entire WBID has primarily a moderate-to-high potential for stormwater runoff. 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 in 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, there are few ditch systems. The watershed also contains numerous ponds. Those close to Moncrief Creek surface waters are mainly 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 near Moncrief Creek, their waters could potentially merge with the surface waters of Moncrief Creek (PBS&J, February 2009c).

Fecal coliform concentrations did not differ 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 I of the supporting document 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 rehabilitation 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 CCTV 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 71** contains additional information on JEA's activities in the watershed.

Table 71: JEA Activities in the Moncrief Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-84	Pipe Bursting–Increase Carrying Capacity	Replace failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 137,181	$12,349,037	JEA	Ongoing
JEA-85	CIPP–Install New Inner Lining	Rehabilitate failing/leaking infrastructure	Total footage of CIPP in watershed since 2001: 3,446	$874,211	JEA	Ongoing
JEA-86	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-87	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	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 functioning properly and report status in first annual report	5 stations (McMillan, Spring Grove Avenue, Public Housing on Golfair Boulevard, Norwood, Lorrain)	Unknown	JEA	Planned
JEA-90	Pump Station SCADA Upgrades	Retrofitting completed in 2004; all stations constructed since have SCADA installed; see Appendix I of the supporting document	Not applicable	$22,000,000*	JEA	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-91	Inspect Force Main Discharge Manholes, Repair/Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-92	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-93	HDPE Pipe Cleaning–Contractor	Clean existing HDPE pipes to avoid blockages	54,478 feet of HDPE pipe cleaned in watershed	$68,098	JEA	Ongoing
JEA-94	Pipe TV Inspection	Inspect existing infrastructure through use of CCTV 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-97	Manhole Monitoring	See Appendix I of the supporting document	1 monitor	Unknown	JEA	Ongoing
JEA-98	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-99	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-100	Non-Destructive Testing Program/Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing

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 I of the supporting document describes each of these programs.

As of July 28, 2008, DCHD updated the listing of failure and nuisance areas. 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, which was located in the watershed, 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. 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 72** lists DCHD's projects in the Moncrief Creek watershed.

Table 72: 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	Implement 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	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	9 annual operating permits issued for commercial properties	$22,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-37	SWIM Project	Implement broad-ranging septic tank ordinance	Approximately 77.28% of Royal Terrace and 62.97% of Christobel failure areas, as well as 22% of former Lake Forest nuisance area, are located in this WBID	$40,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-38	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-39	Application/Plan Review/Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 133 plan reviews and site evaluations performed based on permitting history	$33,250	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-40	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-41	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	152 complaint investigations performed	$50,600	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-42	Intensive Inspection Program	Carry out 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 Interstate 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, which 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 former Lake Forest nuisance area, which has since been removed from the ranking list due to the sewering efforts.

11.3.3.2 COJ Projects in Design or Construction

COJ 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 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. Between 2005 and 2009, completed maintenance included 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. 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.

In the Moncrief Creek watershed, between 1995 and 2009 COJ PWD's activities included investigating 13 illicit water discharges, 9 illegal discharges, 1 sewer line that drained into a yard or ditch, 60 SSOs, and 126 septic tanks, as well as inspecting 23 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 73** provides additional detail on COJ's activities in the watershed.

TABLE 73: COJ ACTIVITIES IN THE MONCRIEF CREEK WATERSHED

[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.

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
COJ-121	Moncrief Creek (Main Stem COJ-27)	Construct wet detention pond at 30th Street West and Leonard Circle West	619 acres	Unknown	COJ	Completed
COJ-122	Royal Terrace Phases A, B, C, D, E, 1, 2, 3, 4 (Main Stem COJ-18)	Construct wet detention pond at 45th Street West and Avenue B	332 acres	Unknown	COJ	Completed
COJ-123	49th and Pearl	Implement drainage improvements–ponding water floods yard	Unknown	Unknown	COJ	Construction
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	26 (for 2005–09)	Unknown	COJ	Ongoing
COJ-126	Structure Blocked/Repair/ General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	655 (for 2005–09)	$24,365.67	COJ	Ongoing
COJ-127	Illicit Water Discharge	CARE initiated inspection	13 (for 2005–08)	$4,927	COJ	Ongoing
COJ-128	Pollution–Water–Illegal Discharge	CARE initiated inspection	9 (for 2001–09)	$3,411	COJ	Ongoing
COJ-129	Sewer Drains into Yard/Ditch	CARE initiated inspection	1 (for 2009)	$379	COJ	Ongoing
COJ-130	Sewer Overflow	CARE initiated inspection	60 (for 2000–09)	$22,740	COJ	Ongoing
COJ-131	Septic Tank Inspection	CARE initiated inspection	126 (for 2006–08)	$47,754	COJ	Ongoing
COJ-132	Private Lift Station Inspection	Inspect 5 private lift stations in 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 functioning properly and report status in first annual report	2 stations (4811 Payne Stuart Drive, Stuart and Golfair)	Unknown	COJ	Planned

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
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 open PICs in watershed	10 (for 2010–11)	Unknown	COJ	Planned
COJ-137	Routine Surface Water Sampling	Carry out 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 creek and help identify potential fecal bacteria sources	18 (for 2008–09)	Unknown	COJ	Ongoing
COJ-139	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	6 (for 2007–09)	Unknown	COJ	Ongoing
COJ-140	Lake Forest Failure Area–Septic Tank Phase-Out	Phase out septic tanks in failure areas	136 tanks, 136 connected	Unknown	COJ	Completed
COJ-141	Cristobel Failure Area–Septic Tank Phase-Out	Phase out 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 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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-145	Pet/Animal Management Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing

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 they 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 of highways. 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 roadways and associated stormwater conveyance systems.

FDOT also works with COJ on several efforts related to the MS4 permit. 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; 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. It 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 74** lists FDOT's activities in the watershed.

Table 74: FDOT Activities in the Moncrief Creek Watershed

[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.

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	Identify and remove illicit connections if found to be truly illicit	2 identified; 1 found to be truly illicit and removed; 1 pending further investigation	See Note 1	FDOT/ COJ	Ongoing
FDOT-43	PIC Program	Follow up on outstanding PICs	1 (for 2010–11)	See Note 1	FDOT/ COJ	Planned
FDOT-44	Routine Surface Water Sampling	Carry out 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 creek and help identify potential fecal bacteria sources	18 (for 2008–09)	See Note 2	FDOT/ COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
FDOT-46	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	6 (for 2007–09)	See Note 2	FDOT/ COJ	Ongoing
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	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and 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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 4 miles of roadways and associated stormwater conveyance systems currently being maintained; approximately 8 miles of roadways swept	See Note 4	FDOT	Ongoing

11.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 71 through **Table 74** list the projects and programs to reduce fecal coliform loading in the Moncrief Creek watershed, by entity. 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 (**Table 75**). 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 within the WBID boundaries. Of these, 240 are eligible for connection to sewer because they are located in a failure area. In the 2008 LSJR Main Stem BMAP, COJ has committed to removing septic tanks in failure areas that are within 300 meters of surface waters. 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, 2 discrete portions of the WBID 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 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 these are designated in the future for inclusion in the program, they 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. Two private lift stations, 4811 Payne Stuart Drive and Stuart and Golfair, are located close 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 in the watershed and replaced 7 ARVs. In 2010, JEA is also planning to install a manhole monitor at the lift station located at 1646 West 45th Street. There is 1 lift station, Lake Forest Elementary on Edgewood Avenue West, situated on the WBID boundary. JEA will confirm whether this station is located in the Moncrief Creek watershed. In addition, 5 lift stations close to surface waters should be inspected to ensure they are functioning properly: 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. COJ and FDOT have committed to continuing the PIC Program, including 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 roadways, and street sweeping is performed monthly on 8 miles of roadways. FDOT will continue stormwater infrastructure maintenance. 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 rehabilitation 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. These significant efforts in the watershed are expected to result in water quality improvements in the creek.

Table 75: Summary of Restoration Activities for the Moncrief Creek Watershed

- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 presumably comprise 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 joining Blockhouse Creek from all directions. The largest branches appear to include 3 from the east ("northeastern branch," "eastern branch," and "southeastern branch") and 3 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, terminating just north of Armsdale Road. Farther 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 farthest downstream contributor, the southeastern branch, extends from outside the WBID boundaries, just east of Pine Estates Road South, and continues southwest to Blockhouse Creek. Just south of Broward Road, the waters of Blockhouse Creek flow into the Trout River, which merges with the St. Johns River east of U.S. 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 76**). The dominant land use (344.2 acres; 21.4% of total coverage) in the watershed is classified as upland forest and is predominantly located north of Dunn Avenue. The next 2 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 close to surface waters, wildlife could potentially 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 in the watershed near surface waters at 2 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 in the watershed, averaging 2.15 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 462 dogs in the watershed.

Table 76: Land Uses in the Blockhouse Creek Watershed in 2004

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%
Nonforested 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 IN THE LSJR TRIBUTARIES BASIN

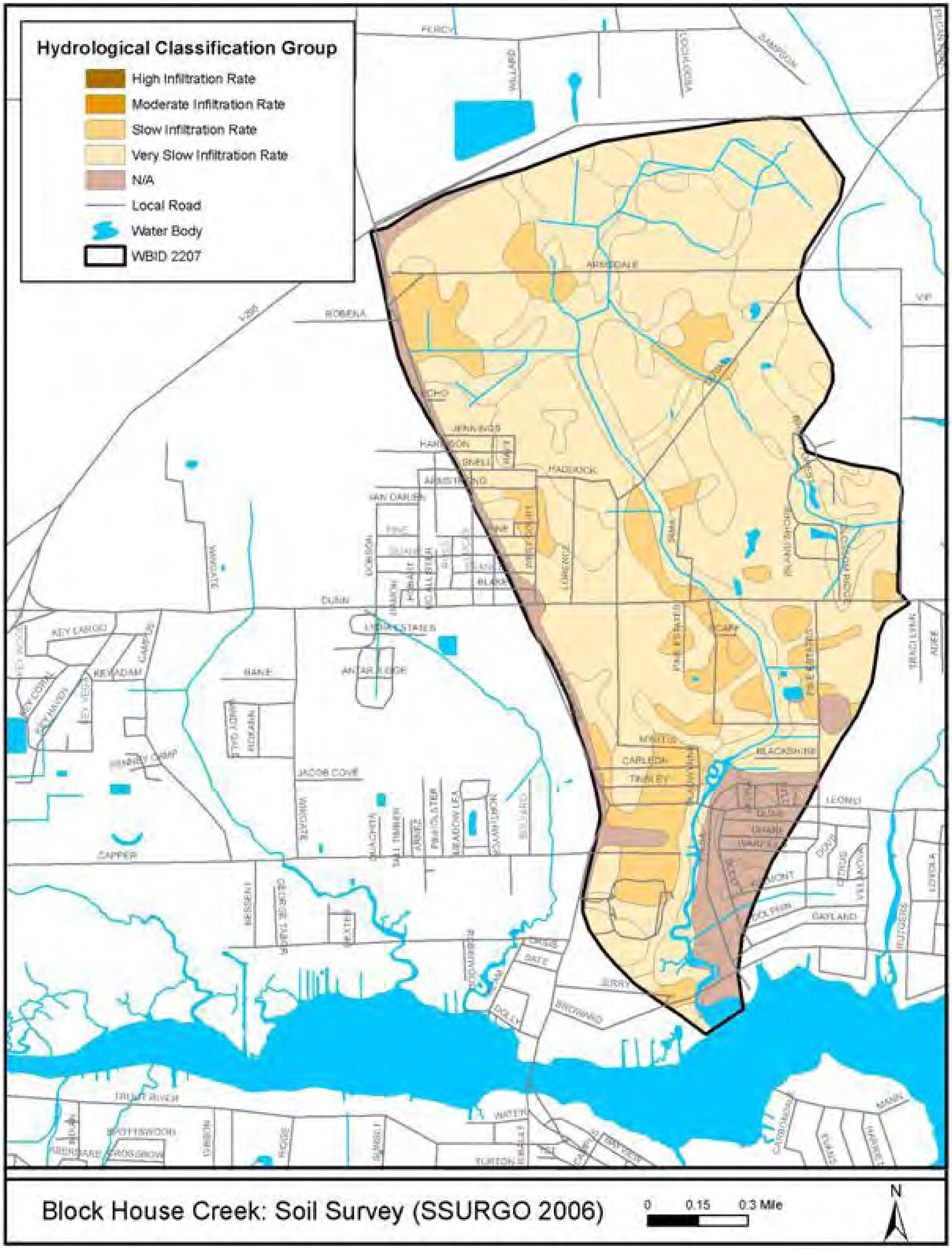

FIGURE 15: BLOCKHOUSE CREEK WBID LOCATOR MAP

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 in the JEA District II WWTF Service Area. About 1,026 households (approximately 89% of households) are connected to the sanitary sewer system in the watershed. This WBID supports 24.4 kilometers (15.2 miles) of sewer lines and 13 sanitary sewer lift stations, as well as associated infrastructure, which 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) close 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) near 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 the width of the creek either above or below surface waters at Dunn Avenue, Leonid Road, and the southwestern branch, thus increasing the likelihood that unidentified sewer infrastructure leaks will impact surface waters at these locations. JEA has not reported any SSOs 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 in this area. Septic system repair permits were located at parcels close 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 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 areas with greater than 25% impervious surface that generally correspond to industrial and commercial/utility and institutional land use classifications; these are 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, including areas near 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, stormwater runoff could potentially 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 in the WBID includes 68 outfalls by receiving water (none are classified by 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 in the watershed (PBS&J, October 2008).

According to COJ EQD, a small farm (Forshee Farms) with fewer 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 in the Victoria Preserve Development on Alexandria Drive that is still being constructed (according to COJ EQD, the construction of a few houses has been completed, while the majority of the remaining property has been cleared and is 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 did not differ during the wet and dry seasons, 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 I of the supporting document describes each of these programs.

In the Blockhouse Creek watershed, JEA has pipe burst 13.33% of the sewer lines. In addition, it replaced 4 of the 11 ARVs in the watershed. During FY09, JEA inspected 300 LF of pipe using a CCTV 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 77** contains additional information on JEA's activities in the watershed.

Table 77: JEA Activities in the Blockhouse Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-101	Pipe Bursting–Increase Carrying Capacity	Replace failing/leaking infrastructure	Total footage of pipe burst in watershed since 2001: 10,695	$792,195	JEA	Ongoing
JEA-102	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-103	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	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 functioning 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 I of the supporting document	Not applicable	$22,000,00*	JEA	Completed
JEA-106	Inspect Force Main Discharge Manholes, Repair/Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-107	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-108	Pipe TV Inspection	Inspect existing infrastructure through use of CCTV 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-111	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-112	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-113	Non-Destructive Testing Program/Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing

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 I of the supporting document 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. 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 78** lists DCHD's projects in the Blockhouse Creek watershed.

Table 78: 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	Implement 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	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	12 annual operating permits issued for commercial facilities	$30,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-45	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-46	Application/Plan Review/Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 72 plan reviews and site evaluations performed based on permitting history	$18,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-47	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-48	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	30 complaint investigations performed	$9,950	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-49	Intensive Inspection Program	Carry out 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 creek (MST hits in 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, the repair of a failed cross drain 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. Between 2005 and 2009, completed maintenance included 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. 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 an illicit connection and removed. The other 4 PICs were determined not to be illicit.

In the Blockhouse Creek watershed, between 1995 and 2009 COJ PWD's activities included investigating 5 illicit water discharges, 2 illegal discharges, 3 sewer lines that drained into a yard or ditch, and 7 SSOs, as well as inspecting 23 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 79** provides additional details on COJ's activities in the Blockhouse Creek watershed.

Table 79: COJ Activities in the Blockhouse Creek Watershed

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-146	Jennings Road/Lem Turner Road	Repair failed cross drain	Unknown	$23,000	COJ	Completed
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	2 (for 2005–09)	Unknown	COJ	Ongoing
COJ-149	Structure Blocked/Repair/General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	67 (for 2005–09)	$3,262.64	COJ	Ongoing
COJ-150	Illicit Water Discharge	CARE initiated inspection	5 (for 2005–07)	$1,895	COJ	Ongoing
COJ-151	Pollution–Water–Illegal Discharge	CARE initiated inspection	2 (for 2003–05)	$758	COJ	Ongoing
COJ-152	Sewer Drains into Yard/Ditch	CARE initiated inspection	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	Inspect 23 private lift stations in 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 functioning 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	Carry out NPDES permit-related quarterly water quality sampling	48 (for 1995–2009)	Unknown	COJ	Ongoing
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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-162	Pet/Animal Management Public Education	Develop 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 they 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 participates in the Adopt-A-Highway Program in the watershed, and trash is collected from 2.2 miles of highways. 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 on 3.75 miles of roadways 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. It 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. It 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 80** lists FDOT's activities in the watershed.

Table 80: FDOT Activities in the Blockhouse Creek Watershed

[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.

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	Carry out NPDES permit-related quarterly water quality sampling	48 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-53	Adopt-A-Highway Program	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and 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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 3.75 miles of roadways and associated stormwater conveyance systems currently being maintained; approximately 7.5 miles of roadways swept	See Note 4	FDOT	Ongoing

12.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 77 through **Table 80** list the projects and programs to reduce fecal coliform loading in the Blockhouse Creek watershed, by entity. 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 (**Table 81**). 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. 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. However, a discrete portion of the WBID 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 these are designated in the future for inclusion in the program, they 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 has performed 80 annual lift station inspections and will continue inspections annually. There is 1 private lift station, 2100 Dunn Avenue, situated on the WBID boundary. COJ will determine whether this station is located in the Blockhouse Creek watershed and report on the findings in the first annual BMAP report. In addition, a station at 2631 Dunn Avenue is located close 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 that occurred at 2751 Leonid Road. Of the 13 JEA lift stations in the watershed, 2 are located close to surface waters: 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 continuing 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 to prevent unpermitted connections. In addition, the FDOT Adopt-A-Highway Program removes trash from 2.2 miles of roadways, and street sweeping is performed monthly on 7.5 miles of roadways. FDOT will continue stormwater infrastructure maintenance. 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 81: SUMMARY OF RESTORATION ACTIVITIES FOR THE BLOCKHOUSE CREEK WATERSHED

\- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 presumably comprise 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 joining from all directions. The largest branches appear to be 2 from the north ("northeastern branch" and "northwestern branch") and 2 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 2 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 12th 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, the upstream segment of the southwestern branch, and the main channel west of Penman Road. A network of branches located at the downstream extent of the main channel also flows 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 82**). The dominant land use (1,027.1 acres; 43.3% of total coverage) in the watershed, adjacent to the 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 northwestern corner of the WBID, north of Atlantic Boulevard; (3) along 3rd Street; and (4) in patches throughout the WBID. The next 2 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%) in the Hopkins Creek WBID, they form a boundary around surface waters. As wetlands serve as habitat for various species of wildlife and are close to surface waters, wildlife could potentially 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 in the watershed, averaging 1.96 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler, 2006), there are about 2,482 dogs in the watershed.

TABLE 82: LAND USES IN THE HOPKINS CREEK WATERSHED IN 2004

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%
Nonforested Upland	0.1	0.004%
TOTAL:	**2,372.5**	**100%**

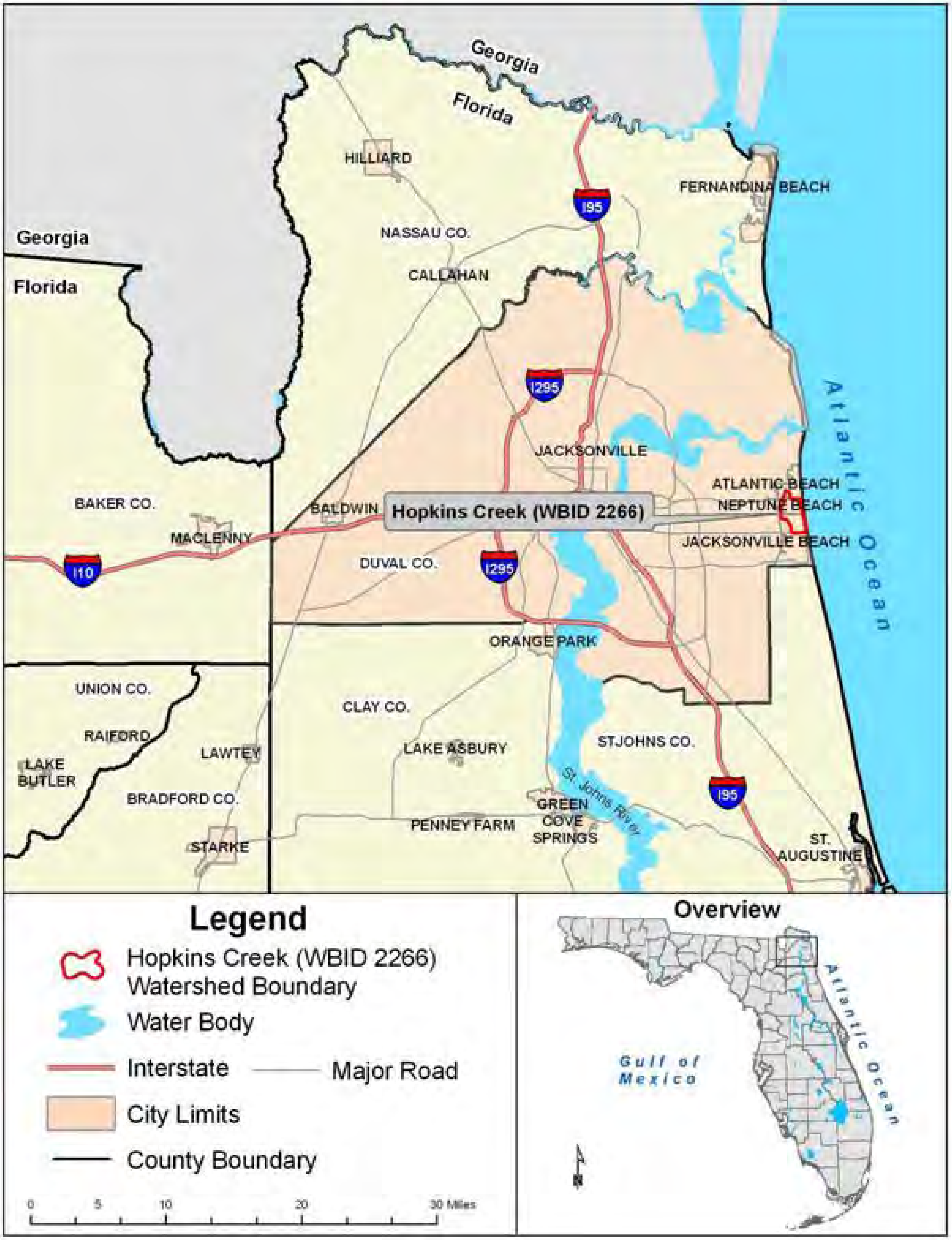

FIGURE 16: LOCATION OF THE HOPKINS CREEK WATERSHED IN THE LSJR TRIBUTARIES BASIN

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 boundaries of the Hopkins Creek watershed. The area around the WWTF drains and discharges into the marsh west of the facility, and therefore is located downstream of the ambient sampling location for Hopkins Creek. This facility is permitted to discharge 1.50 MGD annual average daily flow (AADF) of treated wastewater to the St. Johns River at Sherman Point, located outside the WBID boundaries near Helen Floyd Cooper Park. The WWTF outfall is a joint piped system shared by the cities of Neptune Beach, Atlantic Beach, and Jacksonville Beach. COJ, Neptune Beach, 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. The City of Neptune Beach has trained staff in illicit discharge detection, and they routinely inspect the city's stormwater system. No illicit connections or discharges have been found.

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. Neptune Beach has 13 lift stations in the Hopkins Creek watershed, of which 9 are close to surface waters. There are also 5 private lift stations within the City of Neptune Beach limits, of which 2 are near surface waters. The City of Atlantic Beach has 3 lift stations in the watershed, and available GIS data indicate that sewer infrastructure is close to surface waters north of Atlantic Boulevard (PBS&J, October 2008). Jacksonville Beach also has 8 lift stations.

13.2.4 OSTDS

According to DCHD, 7 septic system repair permits were issued in 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 near the downstream surface waters of Hopkins Creek. The proximity of these parcels to surface waters suggests that septic systems could potentially affect the water quality of Hopkins Creek in this area. There are no DCHD-designated septic system failure areas close to the watershed boundary (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 throughout the watershed. Areas with less than 10% impervious surface correlate with land use classifications of wetlands and upland forests. Land areas with greater than 25% impervious surface are located near 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 also demonstrated that the majority of the WBID contains a moderate-to-high potential for stormwater runoff, including areas near 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.

The Hopkins Creek watershed also contains numerous ditch systems and ponds. A pond is located adjacent to the southeastern branch at San Pablo Park. There are also 3 ponds adjacent to the northeastern branch just north of Beachcomber Drive, north of Oak Street, and at Jarboe Park. A ditch extends east from the northeastern branch at East Neptune Grove Drive and terminates outside the WBID boundary at 1st Street. There are 2 more ponds 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 did not differ during the wet and dry seasons, 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 I of the supporting document 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. 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 83** lists DCHD's projects in the Hopkins Creek watershed.

TABLE 83: 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	Implement 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	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	1 annual operating permit issued for commercial property	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-52	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-53	Application/Plan Review/Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 18 plan reviews and site evaluations performed based on permitting history	$4,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-54	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-55	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	1 complaint investigation performed	>$500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-56	Intensive Inspection Program	Carry out 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 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. Between 2005 and 2009, completed maintenance included 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. 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 illicit.

In the Hopkins Creek watershed, between 1995 and 2009 COJ PWD's activities included investigating 1 illicit water discharge, 1 illegal discharge, 2 sewer lines that drain into a yard or ditch, and 7 SSOs, as well as inspecting 20 private lift station inspections. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 84** provides additional details on COJ's activities in the Hopkins Creek watershed.

TABLE 84: COJ ACTIVITIES IN THE HOPKINS CREEK WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	17 (for 2005–09)	$217.41	COJ	Ongoing
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	Inspect 4 private lift stations in 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 15th Street)	Unknown	COJ	Planned
COJ-172	Illicit Discharge Detection and Elimination	0 open, 0 illicit	12 (for 1999)	$4,548	COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-173	Routine Surface Water Sampling	Carry out NPDES-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. The project is a wet pond that treats 14 acres, helping 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 they 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. It participates in the Adopt-A-Highway Program in the watershed, and trash is collected from 8 miles. 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 on 8 miles of roadways and associated stormwater conveyance systems in the watershed.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It 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 85** lists FDOT activities in the watershed.

Table 85: FDOT Activities in the Hopkins Creek Watershed

[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.

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	Identify and remove illicit connections if found to be truly illicit	10 identified, 1 found to be truly illicit and removed	See Note 1	FDOT/ COJ	Ongoing
FDOT-57	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	52 (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-58	Stormwater Management Systems	Construct Mayport flyover	14 acres, wet ponds	Not applicable	FDOT	Completed
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
FDOT-60	Adopt-A-Highway Program	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and 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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 8 miles of roadways and associated stormwater conveyance systems currently being maintained; approximately 16 miles of roadways swept	See Note 4	FDOT	Ongoing

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. It has phased out 9 septic tanks through a resolution that required connection to sewer by a certain date. The city has completed sewer line upgrades along Mayport Road, in the Royal Palms subdivision, near Aquatic Drive, and along Donner Road. These projects comprise a total of 34,392 LF of sewer main that were replaced, repaired through CIPP, or lined. In addition, rehabilitation projects have been completed on 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 inspected using CCTV in 2 areas and an inflow and infiltration (I&I) 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, a 1.7-acre wet detention pond that treats 54 acres, captures and treats stormwater runoff, helping to reduce fecal coliform loading to the creek. In addition, 2 drainage projects were completed, along Ardella Road and in the Royal Palms subdivision, both of which help to 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. Appendix I of the supporting document provides details on these programs. **Table 86** outlines the City of Atlantic Beach efforts in the Hopkins Creek watershed.

Table 86: 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	Ongoing	Unknown	Paid by property owner	Completed
AB-2	Septic Tank Phase-Out	Septic-to-Sewer Resolution by City Commission requires 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	Community Development Block Grant (CDBG)/ Homeowners	Completed
AB-3	Sewer Line Upgrades	Repair sewer and manholes close to Lift Station E, near 799 Mayport Road	700 LF of sewer main, 3 manholes	$49,170	Atlantic Beach	Completed
AB-4	Sewer Line Upgrades	Replace sewer force main at Mayport Road and Forrestal	100 LF of force main	$10,000	Atlantic Beach	Completed
AB-5	Sewer Line Upgrades	Rehabilitate sanitary sewer in entire Royal Palms subdivision using CIPP	30,042 LF of sewer main	$747,143	Atlantic Beach	Completed
AB-6	Sewer Line Upgrades	Replace sewer main crossing drainage ditch near Lift Station F–behind 720 Aquatic Drive	1,000 LF	$10,715	Atlantic Beach	Completed
AB-7	Sewer Line Upgrades	Line sewer in easement from Donner Road to Stanley Road, Donner subdivision; includes 12 manholes lined	1,275 LF	$91,370	Atlantic Beach	Completed
AB-8	Sewer Line Upgrades	Replace force main from Lift Station C to WWTF–Donner Road	1,275 LF	$94,257	Atlantic Beach	Completed
AB-9	Manhole Inspections and Rehabilitation	Rehabilitate/install Spectrashield coating of all manholes in Royal Palms subdivision	85 manholes	$81,653	Atlantic Beach	Completed
AB-10	Manhole Inspections and Rehabilitation	Conduct engineering analysis of failing manholes–Donner subdivision	20 manholes	$2,500	Atlantic Beach	Completed
AB-11	Manhole Inspections and Rehabilitation	Rehabilitate and replace manholes–Ardella Road area	5 manholes	$36,135	Atlantic Beach	Completed
AB-12	Manhole Inspections and Rehabilitation	Rehabilitate and replace manholes–Donner Subdivision	11 manholes	$58,205	CDBG	Completed
AB-13	Manhole Inspections and Rehabilitation	Line manholes in easement from Donner to Stanley	12 manholes	Unknown	Atlantic Beach	Completed
AB-14	Manhole Inspections and Rehabilitation	Replace effluent outfall manhole at Mayport and Donner Road	1 manhole on 21-inch effluent outfall	$12,800	Atlantic Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-15	Pump Station Inspections and Maintenance	Inspect and maintain daily Monday-Friday; all monitored by SCADA system with automatic callout 24 hours/day, 7 days/week, with 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	Improve valves at Lift Stations C, E, F (65 Donner Road, 799 Mayport Road, 858 Cavalla Road)	3 lift stations	$40,000	Atlantic Beach	Completed
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	Completed
AB-18	Pump Station Inspections and Maintenance	Install SCADA system for all lift stations. Those in Hopkins Creek watershed are Lift Stations C, E, and F (65 Donner Road, 799 Mayport Road, 858 Cavalla Road)	3 lift stations	$19,500	Atlantic Beach	Completed
AB-19	SSO Investigations–Preventive	Clean and inspect, using CCTV, 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	Completed
AB-20	SSO Investigations–Preventive	Conduct I&I analysis of entire collection system, prepare GIS system, obtain global positioning system (GPS) locations of all manholes, analyze lift station needs, make Capital Improvement Plan (CIP) recommendations	Not applicable	$60,000	Atlantic Beach	Completed
AB-21	SSO Investigations–Preventive	Clean and inspect, using CCTV, sewer mains crossing Mayport Road	5,000 LF	$6,700	Atlantic Beach	Completed
AB-22	SSO Investigations–Preventive	Sewer Master Plan Update–Analyze entire sewer system for prioritizing capital improvement program, including review of I&I analysis	1 update and review	$58,100	Atlantic Beach	Completed
AB-23	SSO Investigations–Preventive	Implement FOG Program to monitor grease trap maintenance at restaurants	25 food service establishments	Unknown	Atlantic Beach	Ongoing
AB-24	1999 Stormwater Improvements Project	Implement flood control capital projects and stormwater water quality BMPs on Donner Road and Aquatic Gardens	663.5 LF of reinforced concrete pipe (RCP) in various sizes; 4 inlets; 1 mitered end section	$414,711	Atlantic Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-25	Jordan Street Paving and Drainage	Implement 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	Completed
AB-26	Hopkins Creek Regional Stormwater Facility	Implement stormwater water quality BMPs and flood control project located just north of Atlantic Boulevard, off Aquatic Drive	1.7-acre wet detention pond with 54-acre drainage basin; 1,314 LF of pipe; 7 RCP mitered end section (MES); 6 manholes; 6 inlets; 150 LF box culvert; 1 endwall	$2,058,694	Atlantic Beach/ Legislative Appropriation	Completed
AB-27	Hopkins Creek Regional Stormwater Facility	Carry out water sampling–Section 319 grant requires 1 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-28	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-29	Stormwater System Ditch and Canal Inspections	Visually inspect weekly, take corrective action taken as needed; mow, use weedeater, and pick up litter weekly during growing season, as needed in colder months	1,120,415 LF	Unknown	Atlantic Beach	Ongoing
AB-30	Stormwater System Ditch and Canal Maintenance	Routinely clean and maintain ditch as required by MS4 permit	715,700.75 LF	Unknown	Atlantic Beach	Ongoing
AB-31	Stormwater Treatment Ponds Inspections	Routinely inspect pond as required by MS4 permit	148 ponds	Unknown	Atlantic Beach	Ongoing
AB-32	Stormwater Treatment Ponds Cleaning and Maintenance	Carry out routine pond maintenance as required by MS4 permit	99 ponds	Unknown	Atlantic Beach	Ongoing
AB-33	Stormwater Treatment Ponds, Ditch and Canal Aquatic Weed Control	Weed control by Bluewater Environmental	Not applicable	Annual budget–$21,000	Atlantic Beach	Ongoing
AB-34	Stormwater Control Structure Inspections	Conduct routine control structure inspections as required by MS4 permit	117 structures	Unknown	Atlantic Beach	Ongoing
AB-35	Stormwater Control Structure Cleaning and Maintenance	Do only when inspection shows additional effort required; carry out routine cleaning and maintenance as required by MS4 permit	76 structures	Unknown	Atlantic Beach	Ongoing
AB-36	Stormwater Pump Station Inspections	Routinely inspect Town Center pump station as required by MS4 permit	83 stations	Unknown	Atlantic Beach	Ongoing
AB-37	Stormwater Pump Station Maintenance	Routinely maintain Town Center pump station as required by MS4 permit	71 pump stations	Unknown	Atlantic Beach	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-38	Stormwater Inlets/Catch Basins/Grates Inspections	Routinely inspect inlets and catch basins as required by MS4 permit	278 inlets/catch basins/grates	Unknown	Atlantic Beach	Ongoing
AB-39	Stormwater Inlets/Catch Basins/Grates Maintenance	Maintain as required by MS4 permit	257 inlets/catch basins/grates	Unknown	Atlantic Beach	Ongoing
AB-40	Stormwater Pipe Inspection and Maintenance	Schedule stormwater pipe cleaning routinely, and in response to complaints; required by MS4 permit	2,440.75 LF	Unknown	Atlantic Beach	Ongoing
AB-41	Stormwater Pipe Maintenance (Repair/Replacement)	Repair or replace stormwater pipe	77.5 LF	Unknown	Atlantic Beach	Ongoing
AB-42	Total Miles of Right-of-Way Maintenance	Maintain right-of-way	13.08 miles	Unknown	Atlantic Beach	Ongoing
AB-43	Litter Collection	Collect litter	44,257.5 pounds/year	Unknown	Atlantic Beach	Ongoing
AB-44	Ardella Road Drainage Project	Implement drainage improvements; located between Mayport Road and Richardson Lane; pipe bursting because existing pipe crossed two parcels of private property where no drainage easement existed	290 LF HDPE pipe bursting; 1 inlet; 1 box and grate	$36,332	Atlantic Beach	Completed
AB-45	Royal Palms Drainage Rehabilitation Project	Implement flood control capital project; Royal Palms is 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-46	Royal Palms Drainage System Point Repairs	Implement 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	Completed
AB-47	Pet Feces Control	Install, maintain, and stock Dogi-Pot stations throughout city	More than 30 installed to date	$5,000	Atlantic Beach	Ongoing
AB-48	Pet Feces Control	City Code 12.(b).14 requires removal and proper disposal of pet waste	As needed	Unknown	Atlantic Beach	Ongoing
AB-49	Street Sweeping	Sweep streets throughout city	Bimonthly sweeping	$18,000	Atlantic Beach	Ongoing
AB-50	Identification and Removal of Illicit Connections	Conduct field inspections to identify and remove illicit connections	As needed	Unknown	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. It has phased out 85 septic tanks and connected those homes to the sewer system. Jacksonville Beach has cleaned 13,000 LF of pipe, rehabilitated 36 manholes, and rehabilitated 8 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 coliforms. It has also completed 28 flood control projects.

13.3.5.2 Ongoing Jacksonville Beach Programs and Activities

Jacksonville Beach has several ongoing programs, including (1) sewer system and manhole inspections, (2) sewer pump station inspections and maintenance, (3) restaurant grease trap inspections, (4) stormwater system ditch and canal maintenance, (5) stormwater pond inspections, (6) stormwater pump station inspections, (7) identification and removal of illicit connections, (8) a pet waste ordinance; (9) street sweeping, and (10) stormwater public education efforts. **Table 87** lists Jacksonville Beach's efforts in the Hopkins Creek watershed.

Table 87: Jacksonville Beach Activities in the Hopkins Creek Watershed

*Note: these activities are subject to budgetary constraints and priorities.

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JB-1	Septic Tank Phase Out	Phase out Section "A"–16th Street North to 20th Street North to 8th Avenue North to 12th Avenue North	Phase out 85 septic tanks, 5,229 LF of 8 inch PVC sewer pipe, lift station and 673 LF of 4 inch force main	$337,730	Jacksonville Beach	Completed
JB-2	Sewer System Inspection	Clean existing sanitary sewer system	Cleaned approximately 13,000 LF of existing sanitary sewer system	$26,000	Jacksonville Beach	Completed
JB-3	Sewer Manhole Inspections and Rehabilitation	Rehabilitate existing sewer manholes	Coated interior of 36 manholes in Hopkins Creek area	$55,757	Jacksonville Beach	Completed
JB-4	Sewer Pump Station Wetwells Inspections and Rehabilitation	Rehabilitate interior surface of existing sewer lift station wetwells with coating system	Coated interior of existing LS 5, 12, 24, 26 and 27 wetwells	$34,707	Jacksonville Beach	Completed
JB-5	Sewer Pump Station Inspections and Maintenance	Improve sewer lift station No. 10	Installed new fiberglass wetwell and submersible pumps, controls, odor control equipment, 1 new fiberglass manhole and related piping and equipment	$736,481	Jacksonville Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JB-6	SSO Investigations	Improve Arden Way sewer system	Installed 7 new sewer manholes, 1,500 LF of gravity sewer main, abandoned and grout filled approximately 800 LF of gravity sewer main and constructed 1,000 LF of new 6-inch force main; eliminated SSO at 1827 Arden Way (3 occurrences)	$342,000	Jacksonville Beach	Completed
JB-7	SSO Investigations	Investigate 1 occurrence at 2000 3rd Street North	Minor impact, wet conditions; manhole wet around frame and cover	$1,000	Jacksonville Beach	Completed
JB-8	SSO Investigations	Investigate 2 occurrences at 300 Palm Tree Road	Minor impact, dry conditions; contractor contained second spill on site	$5,000	Jacksonville Beach	Completed
JB-9	Sewer Pump Station Inspections and Maintenance	Inspect lift stations Nos. 2, 7, 8, 9, 18, 19, and 23	Coated wetwell	$47,230	Jacksonville Beach	Completed
JB-10	Sewer Pump Station Inspections and Maintenance	Inspect lift station No. 37 (Jarrett Point Unit II)	New wetwell	$183,541	Jacksonville Beach	Completed
JB-11	Sewer System Replacement	Improve sewer system from Barbara Lane to 14th Avenue North and 8th Street to 13th Street North	Constructed 6,200 LF of 8-inch sanitary sewer main, 16 sewer manholes, 124 sewer services, 13,800 square yards of asphalt pavement	$1,065,000	Jacksonville Beach	Completed
JB-12	Sewer System Replacement	Improve sewer system from Patricia Lane to 18th Avenue North and 4th Street to 7th Street North	Constructed 1,200 LF of 10-inch sanitary sewer main, 5,000 LF of 8-inch 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	Completed
JB-13	Sewer System Replacement	Improve sewer system from Barbara Lane to 12th Avenue North and Patricia Lane to 7th Street North	Constructed 2,000 LF of 8-inch sanitary sewer main, 5 sewer manholes, 40 sewer services, 4,500 square yards asphalt pavement	$386,000	Jacksonville Beach	Completed
JB-14	Sewer System Replacement	Improve sewer system from 2nd Street North to 3rd Street North and from easement to 6th Avenue North; 3rd Street North from easement to 7th Avenue North	Constructed 500 LF of 8-inch sanitary sewer main, 2 sewer manholes, 10 sewer services, 1,100 square yards asphalt pavement	$88,000	Jacksonville Beach	Completed
JB-15	Flood Control Capital Project	Improve stormwater system at 18th Street North, Tall Pine Park, perforated stormwater pipe	Installed 35 drainage structures, 5,543 feet of drainage pipes	$667,472	Jacksonville Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JB-16	Flood Control Capital Project	Improve stormwater system at 1st Street North and 18th Avenue North; stormwater piping	Remove/replace existing stormwater drainage system piping, 338 feet of drainage piping, 6 drainage structures	$128,817	Jacksonville Beach	Completed
JB-17	Flood Control Capital Project	Improve stormwater system at North 2nd Street between 6th Avenue North to 13th Avenue North	Installed new stormwater pump station, force main, drainage piping system and drainage inlets	$3,500,00	Jacksonville Beach/ EPA Grant	Completed
JB-18	Flood Control Capital Project	Improve stormwater system at 11th Avenue North–new stormwater pump station, new drainage system piping, new drainage structures	Installed new stormwater pump station, 2,000 feet of drainage pipe, 18 drainage structures	$450,000	Jacksonville Beach	Completed
JB-19	Flood Control Capital Project	Improve stormwater system at 11th Street North; swale grading, impervious parking	Reconstructed existing roadways with swale grading along edge of roadways and impervious block parking at Gonzales Park area	$670,000	Jacksonville Beach	Completed
JB-20	Flood Control Capital Project	Improve retention pond and infrastructure at Jacksonville Beach Golf Course; pond construction associated with construction of the 2nd Street North stormwater improvement project	Constructed another stormwater retention pond and enlargement of 2 existing retention ponds; treats Beach Boulevard to 13th Avenue from 1st Street to 3rd Street	$645,754	Jacksonville Beach/ SJRWMD Grant	Completed
JB-21	Flood Control Capital Project	Improve paving, drainage, water and sewer in downtown development area	Reconstructed existing water, drainage system, sewer and paving of downtown area consisting of 15 city blocks east of 3rd Street, between Beach Blvd and 5th Avenue North; installed new stormwater pump station, 4,761 feet of drainage pipe, 80 drainage structures, 6,545 feet of 30-inch stormwater force main piping between pump station to golf course retention ponds	$6,831,192	Jacksonville Beach	Completed
JB-22	Flood Control Capital Project	Implement project at 19th Street North at 2nd Avenue North	200 LF of 18-inch PVC pipe, 2 concrete endwalls, asphalt pavement rehab	$25,000	Jacksonville Beach	Completed
JB-23	Flood Control Capital Project	Implement project at 19th Street North between 2nd Avenue North and 5th Avenue North	30 LF of 15-inch PVC, 1 inlet, asphalt pavement rehab	$7,000	Jacksonville Beach	Completed
JB-24	Flood Control Capital Project	Implement project at easement west of Penman Road from 6th Avenue North to 16th Street North	640 LF of 15-inch PVC, connected to existing structures, asphalt pavement	$45,000	Jacksonville Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JB-25	Flood Control Capital Project	Implement project at 17th Street North from 9th Avenue North to existing ditch	420 LF of 6-inch PVC perforated underdrain; connect to existing structure	$10,000	Jacksonville Beach	Completed
JB-26	Flood Control Capital Project	Implement project at 11th Avenue North from 16th Street North to Penman Road	165 LF of 12-inch PVC; connections to existing structures	$14,000	Jacksonville Beach	Completed
JB-27	Flood Control Capital Project	Implement project at 16th Street North from 11th to 12th Avenue North	140 LF of 10-inch PVC, 1 inlet	$10,000	Jacksonville Beach	Completed
JB-28	Flood Control Capital Project	Implement project at 11th Avenue North from 17th to 18th Street North	210 LF of 24-inch RCP, 1 inlet	$15,000	Jacksonville Beach	Completed
JB-29	Flood Control Capital Project	Implement project at 21st Street from 9th Avenue to 12th Avenue North	515 LF of 15-inch PVC, 3 inlets, asphalt pavement rehab	$35,000	Jacksonville Beach	Completed
JB-30	Flood Control Capital Project	Implement project at 12th Avenue North at 20th Street North	100 LF of 24-inch PVC; asphalt pavement rehab	$10,000	Jacksonville Beach	Completed
JB-31	Flood Control Capital Project	Implement project at Tanglewood Road from Pinewood Lane to Sable Palm Lane	165 LF of 24-inch PVC, 2 inlets	$18,000	Jacksonville Beach	Completed
JB-32	Flood Control Capital Project	Implement project at Tanglewood Road at Sable Palm Lane	75 LF of 18-inch PVC, 1 inlet, asphalt pavement rehab	$10,000	Jacksonville Beach	Completed
JB-33	Flood Control Capital Project	Implement project at Birchwood Road at Coral Way	85 LF of 15-inch PVC, 3 inlets, asphalt pavement	$14,000	Jacksonville Beach	Completed
JB-34	Flood Control Capital Project	Implement project at Coral Way between Sunset Drive and Birchwood Road	45 LF of 15-inch PVC, 2 inlets, asphalt pavement	$10,000	Jacksonville Beach	Completed
JB-35	Flood Control Capital Project	Implement project at Pinewood Road between Arden Way and Oakwood Road	60 LF of 42-inch corrugated metal pipe (CMP), asphalt pavement	$10,000	Jacksonville Beach	Completed
JB-36	Flood Control Capital Project	Implement project at 1st Avenue North from 3rd to 4th Street North	170 LF of 15-inch PVC, 2 inlets	$10,000	Jacksonville Beach	Completed
JB-37	Flood Control Capital Project	Implement project at 3rd Avenue North from 4th to 5th Street North	50 LF of 12-inch ductile iron pipe, 2 inlets	$10,000	Jacksonville Beach	Completed
JB-38	Flood Control Capital Project	Implement project at 3rd Avenue North from 5th to 6th Street North	225 LF of 12x18 elliptical reinforced concrete pipe (ERCP),1 inlet	$15,000	Jacksonville Beach	Completed
JB-39	Flood Control Capital Project	Implement project at 3rd Avenue North at 6th Street North	75 LF of 8-inch PVC underdrain, asphalt pavement	$4,000	Jacksonville Beach	Completed
JB-40	Flood Control Capital Project	Implement project at Cilewood Court at Tallwood Road	20 LF of 18-inch PVC underdrain, 1 inlet	$4,000	Jacksonville Beach	Completed
JB-41	Flood Control Capital Project	Implement project at Lois Lane and Seagate Avenue	700 LF of drainage swales	$14,000	Private Developer	Completed
JB-42	Flood Control Capital Project	Implement project at King Oaks Subdivision-Kings Road and Seagate Avenue	670 LF of drainage swales	$12,000	Private Developer	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JB-43	Stormwater System Ditch and Canal Maintenance	Install erosion control along ditches and ponds	Install erosion control along ditches and ponds	Unknown	Jacksonville Beach	Completed
JB-44	Identification and Removal of Illicit Connections	Identify and remove illicit connections	Contract training for Water Plant and Stormwater Divisions	Unknown	Jacksonville Beach	Completed
JB-45	Stormwater Education and Outreach Efforts	Carry out 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	Completed
JB-46	Pet Waste Management	Provide dog bags at Gonzales Park, Tallwood Pines Park and Dog Park	Gonzales Park, Tallwood Pines Park and Dog Park	Unknown	Jacksonville Beach	Completed
JB-47	Pet Waste Ordinance	Pass Ordinance No. 7468-32-91, Section 32-106	Prohibits discharge of feces to MS4; establishes right of inspection and fines	Unknown	Jacksonville Beach	Completed
JB-48	Pet Waste Ordinance	Pass Ordinance No. 2005-7903, 24-18-05, Section 5-34	Prohibits leaving pet waste and requires proper disposal; establishes citation base fine	Unknown	Jacksonville Beach	Completed
JB-49	Noncontributing Basins	Areas in WBID that do not flow to Hopkins Creek: (1) Bentin Drive North south to Beach Boulevard, east to 11th Street and west to WBID boundary; (2) Rosewood Drive, Oakwood Road, Pinewood Road to west WBID boundary; (3) 3rd Street east to 1st Street and 13th Avenue North south to Beach Boulevard	Not applicable	Not applicable	Not applicable	Not applicable
JB-50	Sewer System Inspection	Maintain existing sewer system*	Cleaning of approximately 10,000 LF per year citywide	$25,000	Jacksonville Beach	Ongoing
JB-51	Sewer Manhole Inspections and Rehabilitation	Maintain existing sewer manholes*	Coat interior of approximately 5 manholes per year citywide	$20,000	Jacksonville Beach	Ongoing
JB-52	Sewer Pump Station Inspections and Maintenance	Routinely inspect existing pump stations	Inspect routinely every year citywide and maintain as necessary	Unknown	Jacksonville Beach	Ongoing
JB-53	Restaurant Grease Trap Inspections	Routinely inspect restaurant grease traps*	Inspect restaurant grease traps as necessary on average: (1) interior type monthly; (2) exterior type bi-monthly	Unknown	Jacksonville Beach	Ongoing
JB-54	Stormwater System Ditch and Canal Maintenance	Routinely inspect drainage ditch at 12th Avenue North and 22nd Street North and spray for aquatic weeds	Inspect routinely and ditch spray for aquatic weeds, as necessary	Unknown	Jacksonville Beach	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JB-55	Stormwater System Pond Maintenance	Routinely inspect ponds after significant rainfall event	Inspect routinely and maintain as necessary	Unknown	Jacksonville Beach	Ongoing
JB-56	Stormwater System Pond Maintenance	Inspect annually as required by MS4 NPDES permit	Carry out annual inspection as required by MS4 NPDES permit	Unknown	Jacksonville Beach	Ongoing
JB-57	Stormwater Pump Stations	Inspect stormwater pumps after significant rainfall event	Inspect after significant rainfall event and clean as necessary	Unknown	Jacksonville Beach	Ongoing
JB-58	Street sweeping	Routinely sweep curbed and guttered streets citywide*	Sweep curbed and guttered streets routinely citywide	Unknown	Jacksonville Beach	Ongoing
JB-59	Identification and Removal of Illicit Connections	Field observations to identify and coordinate removal of illicit connections	As necessary	Unknown	Jacksonville Beach	Ongoing

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, it has upgraded 10 lift stations, and upgrades to 3 additional stations are under way with completion scheduled in 2010. Five miles of sewer mains were pipe burst and approximately 85 manholes were lined east of 3rd Street. An additional 5 manholes were rehabilitated throughout the watershed. These projects help to prevent fecal coliform contamination caused by 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 stormwater system. These databases should be completed in 2010 and will allow the city to better maintain its system to prevent future problems and eliminate sources of fecal coliforms. In addition, Neptune Beach plans to organize a Walk the WBID 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; (8) street sweeping; (9) inspections of catch basins after rain events; (10) monthly and annual inspections of the stormwater ponds and ditches; (11) staff training for illicit discharge identification; and (12) regular right-of-way maintenance and litter collection. **Table 88** lists the efforts by Neptune Beach in the Hopkins Creek WBID.

Table 88: 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	Implement phase-outs along Acacia Road, Bay Road, Florida Boulevard, Marsh Point Road, Oleander Place, Rosewood Drive, Sherwood Lane, and Pine Place	70 tanks	$105,000	Neptune Beach	Completed
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	Under way; 2010
NB-3	Gravity Sanitary Sewer Collection System Operation and Maintenance	Carry out normal operation and maintenance of gravity sewer collection system in city	Citywide	$350,000/year	Neptune Beach	Ongoing
NB-4	SSO Investigations	Investigate SSOs as needed	Citywide	$1,000/year	Neptune Beach	Ongoing
NB-5	ARV Replacement	Replace broken ARVs	Citywide	Unknown	Neptune Beach	Completed
NB-6	Light Lane Lift Station Renovation	Upgrade and rehabilitate existing wet well and station piping	1 lift station	$13,000	Neptune Beach	Completed
NB-7	Fletcher Lift Station	Upgrade and rehabilitate existing wet well and station piping	1 lift station	$13,000	Neptune Beach	Completed
NB-8	New Tara Court Lift Station	Install new lift station	1 lift station	$80,000	Developer	Completed
NB-9	New Emma Lane Lift Station	Install new lift station	1 lift station	$80,000	Developer	Completed
NB-10	Bay Street Lift Station Renovation	Upgrade and rehabilitate existing wet well and station piping	1 lift station	$13,000	Neptune Beach	Completed
NB-11	Florida Lift Station Renovation	Upgrade and rehabilitate existing pumps	1 lift station	$11,000	Neptune Beach	Completed
NB-12	Bal Harbor Lift Station Renovation	Upgrade and rehabilitate existing wet well and station piping	1 lift station	$13,000	Neptune Beach	Completed
NB-13	5th Street Lift Station renovation	Upgrade and rehabilitate existing station piping	1 lift station	$8,000	Neptune Beach	Completed
NB-14	Oceanwood Lift Station Renovation	Upgrade and rehabilitate existing station piping	1 lift station	$8,000	Neptune Beach	Completed
NB-15	Oceanwood Lift Station Renovation	Upgrade and rehabilitate existing wet well	1 lift station	$5,000	Neptune Beach	Planned; 2009–10
NB-16	Summer Sands Lift Station renovation	Upgrade and rehabilitate existing wet well and station piping	1 lift station	$13,000	Neptune Beach	Planned; 2009–10
NB-17	Penman Terrace Lift Station renovation	Upgrade and rehabilitate existing station piping	1 lift station	$8,000	Neptune Beach	Completed
NB-18	Penman Terrace Lift Station renovation	Upgrade and rehabilitate 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	Upgrade and rehabilitate existing pumps and station piping	1 lift station	$10,000	Neptune Beach	Completed
NB-20	1st Street Lift Station Renovation	Upgrade and rehabilitate existing station valves	1 lift station	$3,500	Neptune Beach	Completed
NB-21	Daily Inspection of Lift Stations	Visually inspect lift station	13 lift stations	$65,000/year	Neptune Beach	Ongoing
NB-22	Pipe Burst Existing Sewer Lines East of 3rd Street	Replace existing gravity sewer lines east of 3rd Street by means of pipe bursting, and spray manhole liners on existing manholes in work area to reduce I&I	5 miles of gravity sewer mains, 85 manholes, and associated service taps	$3,000,000	FDEP Revolving Fund Loan	Completed
NB-23	Rehabilitation of Manhole #57 on Hamlet Court	Rehabilitate existing manhole to reduce I&I	1 manhole	$4,500	Neptune Beach	Completed
NB-24	Rehabilitation of Manhole #52 on Hamlet Court	Rehabilitate existing manhole to reduce I&I	1 manhole	$4,500	Neptune Beach	Completed
NB-25	Rehabilitation of Manhole #119 on Penman Road	Rehabilitate existing manhole to reduce I&I	1 manhole	$4,500	Neptune Beach	Completed
NB-26	Rehabilitation of Manhole #85 on 3rd Street and Davis Boulevard	Rehabilitate existing manhole to fix sagging/dropping manhole	1 manhole	$4,500	Neptune Beach	Completed
NB-27	Rehabilitation of Manhole #23 on 1st Street at South Street	Rehabilitate existing manhole to reduce I&I	1 manhole	$4,500	Neptune Beach	Completed
NB-28	Create GIS Mapping System for City Lift Station Inventory	Put together GIS mapping system and collect data for city's sanitary sewer lift station facilities	Citywide	$2,000	Neptune Beach	Under way; 2010
NB-29	Create GIS mapping system for City gravity sanitary sewer inventory	Put together GIS mapping system and collect data for city's gravity sanitary sewer facilities	Citywide	$5,000	Neptune Beach	Under way; 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 in city	Citywide	$2,500	Neptune Beach	Under way; 2010
NB-31	FOG Program	Routinely inspect grease traps and downstream sanitary sewer primarily at restaurant locations in city	Restaurants in city	$5,000/year	Neptune Beach	Ongoing
NB-32	Stormwater System Ditch and Canal Maintenance	Continually inspect and maintain 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
NB-33	Stormwater System Pond Maintenance	Continually inspect and maintain city's 4 ponds; routinely inspect, mow, pick up litter, and repair as needed	4 ponds	$2,500/year	Neptune Beach	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
NB-34	Stormwater Education and Outreach Efforts	Participate in WAV Program	Citywide stormwater system	$5,000/year	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)	Citywide	$5,000/year	Neptune Beach	Ongoing
NB-36	Street sweeping	Sweep roads with curb and gutter inside city limits	Approximately 10.9 miles of roads	$35,000/year	Neptune Beach	Ongoing
NB-37	Public Works Employee Training	Conduct annual training covering topics such as stormwater, illicit discharges, and Stormwater Pollution Prevention Plan (SWPPP)	Public Works employees citywide	Unknown	Neptune Beach	Ongoing
NB-38	Testing and Sampling	Increase water sampling of Hopkins Creek	Public Works employees	Unknown	Neptune Beach	Ongoing
NB-39	Stormwater Pollution Prevention Plan	Inspect Public Works facility quarterly and annually	Hopkins Creek in City of Neptune Beach	$5,000	Neptune Beach	Planned
NB-40	Stormwater Education and Outreach Efforts	Participate in WAV Program	Public Works and WWTP facilities	$3,500/year	Neptune Beach	Ongoing
NB-41	Organize a Walk the WBID for Hopkins Creek	Organize and participate in Walk the WBID for Hopkins Creek watershed	Walk the WBID	$6,000	Neptune Beach	Planned
NB-42	Create GIS Mapping System for City Stormwater Related Inventory	Put together GIS mapping system and collect data for city's stormwater facilities; completion in 2010	Citywide	$5,000	Neptune Beach	Under way; 2010
NB-43	Right-of-way maintenance and litter collection	Routinely mow, maintain, and pick up litter in rights-of-way	Citywide	$65,000/year	Neptune Beach	Ongoing

13.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 83 through **Table 88** list the projects and programs to reduce fecal coliform loading in the Hopkins Creek watershed, by entity. 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 (**Table 89**). 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 in Neptune Beach, and the city is working to create a GIS inventory of the remaining tanks to determine what areas could be sewered. There are 2 tanks located on Neptune Lane, adjacent to the creek, both of which 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 these areas are designated in the future for inclusion in the program, they 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 has performed 20 annual lift station inspections and will continue inspections annually. One private lift station located at Beach Boulevard and 15th Street is on the WBID boundary. COJ will determine whether 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 inspected, using CCTV, portions of the sewer main in the city and conducted an I&I analysis of the entire collection system. Jacksonville Beach has also cleaned portions of its 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 to inspect and maintain lift stations, manholes, and the sewer system. Each city also has a FOG Program to prevent restaurant grease from 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, has removed 1 illicit connection in the watershed. COJ and FDOT have committed to continuing the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner. In addition, Jacksonville Beach and Neptune Beach have 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 roadways, and street sweeping is performed monthly on 16 miles of roadways. FDOT will continue stormwater infrastructure maintenance. 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 inspects ditches, canals, and ponds weekly and conducts maintenance as necessary on these conveyances. It also routinely maintains its rights-of-way and picks up litter, preventing trash from entering the creek. In addition, the city has completed several capital projects to reduce fecal coliform loading to the creek through stormwater runoff.

Neptune Beach routinely inspects ditches, canals, and 4 stormwater ponds, carrying out maintenance and repairs as needed. The city also conducts street sweeping throughout the city and has a pet waste ordinance to prevent waste from reaching surface waters. In addition, it routinely maintains its rights-of-way and picks up litter, preventing trash from entering the creek.

Jacksonville Beach routinely inspects and maintains its system and has a pet waste ordinance. It has also completed numerous flood control projects. Those located near surface waters include (1) Arden Way Sewer System Improvements, (2) 18th Street North Stormwater Improvements, (3) 11th Avenue North Stormwater Improvements, (4) easement west of Penman Road from 6th Avenue North to 16th Street North, (5) 11th Avenue North from 16th Street North to Penman Road, (6) 11th Avenue North from 17th to 18th Street North, (7) 21st Street from 9th Avenue to 12th Avenue North, (8) 12th Avenue North at 20th Street North, (9) Tanglewood Road from Pinewood Lane to Sable Palm Lane, (10) Tanglewood Road at Sable Palm Lane, (11) Pinewood Road between Arden Way and Oakwood Road, and (12) 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 potential fecal coliform sources. This effort will occur in the first year after BMAP implementation and will include FDEP and the other stakeholders in the watershed. Appendix J of the supporting document includes considerations for conducting a Walk the WBID.

TABLE 89: SUMMARY OF RESTORATION ACTIVITIES FOR THE HOPKINS CREEK WATERSHED

\- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

SOURCE/ACTION	COJ	DCHD	FDOT	ATLANTIC BEACH	JACKSONVILLE BEACH	NEPTUNE BEACH
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 (PSAs)	-	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 Rehabilitation	X	X	X	√	√	√
Pump Station Inspection and Maintenance	X	X	X	√	√	√
Pump Station Rebuild	X	X	X	√	√	√
Air Release Valve (ARV) Inspection and Rehabilitation	X	X	X	√	√	√
Program Implementation	X	X	X	√	√	√
Private Lift Station Inspections and Enforcement	√	X	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

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 presumably comprise 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, except for 2 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 inside the current WBID boundary is classified as an underground conveyance system, while the segment outside 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 90**). The dominant land use (528 acres; 36% of total coverage) in the 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 of 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 2 most abundant land cover categories are (1) high-density residential (292.8 acres; 20% of total coverage), predominantly found in (i) 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 account 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 close to surface waters, wildlife could potentially 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 in the watershed, averaging 2.52 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 1,132 dogs in the watershed.

FIGURE 18: LOCATION OF THE CORMORANT BRANCH WATERSHED IN THE LSJR TRIBUTARIES BASIN

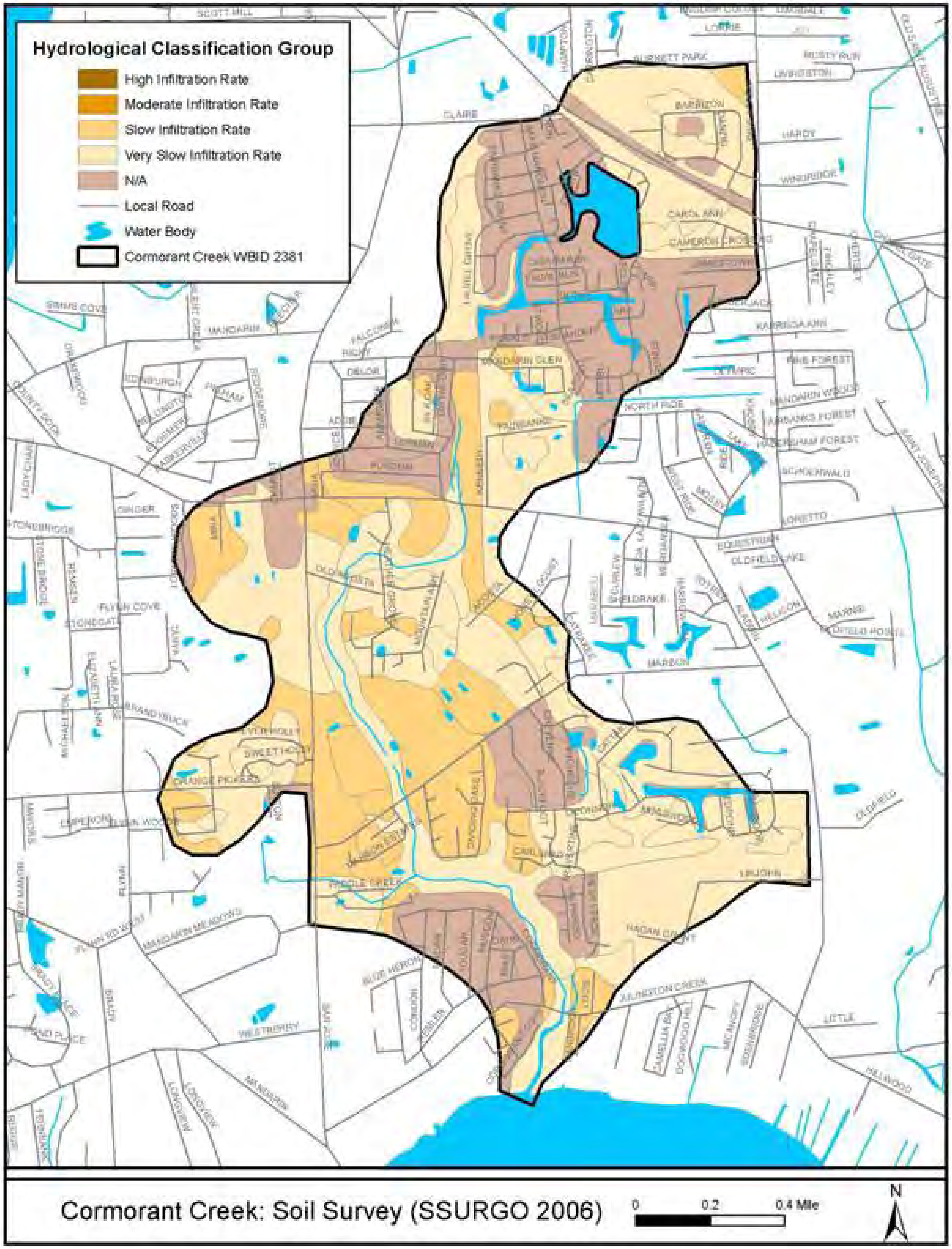

FIGURE 19: CORMORANT BRANCH WBID LOCATOR MAP

Table 90: Land Uses in the Cormorant Branch Watershed in 2004

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%
Nonforested 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 bacteria related, and all 5 were removed by February 16, 2006 (PBS&J, January 2009).

14.2.3 Centralized Sewer Infrastructure and Overflows

The Cormorant Branch watershed is located in the Mandarin WWTF Service Area. About 2,483 households (approximately 88% of households) are connected to the sanitary sewer system in the WBID. This watershed supports nearly 152 kilometers (94 miles) of sewer lines and 13 sanitary sewer lift stations, as well as associated infrastructure, which 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.

JEA has reported 3 SSOs within the Cormorant Branch WBID boundaries (**Table 91**). 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 91: SSOs Reported in the Cormorant Branch Watershed, 2001–07

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

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

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 in this area. Numerous parcels with septic system repair permits are located near Cormorant Branch surface waters, primarily 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 could potentially affect the water quality of Cormorant Branch, mainly 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 watershed 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 found throughout the watershed. Portions of the watershed along San Jose Boulevard contain areas with greater than 25% impervious surface that correspond to commercial/utility and institutional land use classifications; these are located close 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 found 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 in 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, there are few ditch systems. 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. There are also numerous ponds in the watershed, primarily found (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 close to Cormorant Branch, their waters could potentially merge with the surface waters of the creek (PBS&J, January 2009).

Fecal coliform concentrations did not differ 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 I of the supporting document 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 CCTV system and pipe cleaned 857 LF to prevent blockages. JEA will continue its maintenance activities for the sanitary sewer system to prevent future problems. **Table 92** contains additional information on JEA's activities in the watershed.

Table 92: JEA Activities in the Cormorant Branch Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-114	Pipe Bursting–Increase Carrying Capacity	Replace 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 Rehabilitated	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 functioning 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 I of the supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-119	Inspect Force Main Discharge Manholes, Repair/ Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-120	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-121	Pipe TV Inspection	Inspect existing infrastructure through use of CCTV 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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-123	Implement CMOM Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-124	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-125	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-126	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing

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 I of the supporting document 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 93** lists DCHD's projects in the Cormorant Branch watershed.

Table 93: 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	Implement 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	Implement broad-ranging septic tank ordinance	Approximately 50.40% of Julington Hills Septic Tank Failure Area is located in WBID	$146,150	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-59	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-60	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 63 plan reviews and site evaluations performed based on permitting history	$15,750	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-61	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	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-62	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	9 complaint investigations 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 State Road 13 to Old St. Augustine Road Project in the watershed. The project is a wet detention pond that treats stormwater runoff from 55 acres, 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. Between 2005 and 2009, completed maintenance included 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. 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.

In the Cormorant Branch watershed, COJ PWD's activities have included investigating 3 illicit water discharges, 6 illegal discharges, and 9 sewer lines that drained into a yard or ditch, as well as inspecting 7 private lift stations inspections in the watershed. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 94** provides additional detail on COJ's activities in the Cormorant Branch watershed.

Table 94: COJ Activities in the Cormorant Branch Watershed

[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.

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-174	Lorretto Road (State Road 13 to Old St. Augustine Road) (Main Stem COJ-16)	Construct wet detention pond	55 acres	Unknown	COJ	Completed
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	16 (for 2005–09)	$205.24	COJ	Ongoing
COJ-177	Structure Blocked/Repair/ General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	158 (for 2005–09)	$3,251.74	COJ	Ongoing
COJ-178	Illicit Water Discharge	CARE initiated inspection	3 (for 2005–07)	$1,137	COJ	Ongoing
COJ-179	Pollution–Water–Illegal Discharge	CARE initiated inspection	6 (for 2001–08)	$2,274	COJ	Ongoing
COJ-180	Sewer Overflow	CARE initiated inspection	9 (for 2000–08)	$3,411	COJ	Ongoing
COJ-181	Private Lift Station Inspection	Inspect 7 private lift stations in 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 functioning 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	Carry out NPDES permit-related quarterly water quality sampling	54 (for 1995–2009)	Unknown	COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-188	Julington Hills Failure Area–Septic Tank Phase-Out	Phase out 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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-191	Pet/Animal Management Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing

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. The project, which is a wet detention pond that treats 27 acres, 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 they 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. It 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 roadways and associated stormwater conveyance systems.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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 95** lists FDOT's activities in the watershed.

Table 95: FDOT Activities in the Cormorant Branch Watershed

[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.

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	Carry out NPDES permit-related quarterly water quality sampling	54 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-64	Stormwater Management Systems	Construct pond as part of State Road 13 widening	27 acres, wet ponds	Not applicable	FDOT	Completed
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	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and collect trash and debris	Trash collected along 2-mile stretch of road	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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 2 miles of roadways and associated stormwater conveyance systems currently being maintained; approximately 4 miles of roadways swept	See Note 4	FDOT	Ongoing

14.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 92 through **Table 95** list the projects and programs to reduce fecal coliform loading in the Cormorant Branch watershed, by entity. 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 (**Table 96**). 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 sewering because they are located 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 this station is located in the Cormorant Branch WBID. Another station is situated near an inlet leading to a ditch that discharges to the creek. COJ should inspect this station, located at 12015 San Jose Boulevard, to ensure that 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, helping to 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 location of the 2 stations within the WBID boundary and inspect the 4 stations near surface water 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 continuing the PIC Program, including 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. 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 roadways. 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. In addition, it sweeps 4 miles of roadways every month, helping to reduce sediments entering the stormwater conveyance systems.

COJ Program Implementation—Since 2005, COJ PWD has invested an immense amount of time in work orders to clean ditches, rectify stormwater pond problems, and repair blocked structures. The program is currently addressing stormwater sources.

TABLE 96: SUMMARY OF RESTORATION ACTIVITIES FOR THE CORMORANT BRANCH WATERSHED

- = Empty cell/no data

Notes: A checkmark (√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 presumably comprise 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, except for 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 the WBID 2277 branch continue west from the main channel south of Lennox Avenue and extend outside the western WBID boundary to Rose Hill Drive South, where the stream forks north to Interstate 10 and south just past Herlong Road. The WBID 2305 branch 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 U.S. 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 97**). The dominant land use (612.3 acres; 29.8% of total coverage) in the 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 2 most abundant land cover categories are (1) low-density residential areas (257.7 acres; 12.5% of total coverage), located primarily (i) close 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 account for nearly 20% of the total land coverage of Wills Branch and form a boundary around the main channel and associated branches. As these types of land cover provide habitat for various species of wildlife and are close to surface waters, wildlife could potentially contribute to the fecal pollution of Wills Branch in these areas (PBS&J, July 2009).

Three areas in the watershed are classified as cropland and pasturelands: (1) near 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 in these areas are currently not known. In addition, a tree nursery was identified close to the headwaters at the western end of Hassel Road (PBS&J, July 2009).

According to the 2000 Census, there are 2,587 households in the watershed, averaging 2.4 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 1,035 dogs in the watershed.

Table 97: Land Uses in the Wills Branch Watershed in 2004

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%
Nonforested Upland	10.3	0.5%
TOTAL:	**2,055.1**	**100%**

FIGURE 20: LOCATION OF THE WILLS BRANCH WATERSHED IN THE LSJR TRIBUTARIES BASIN

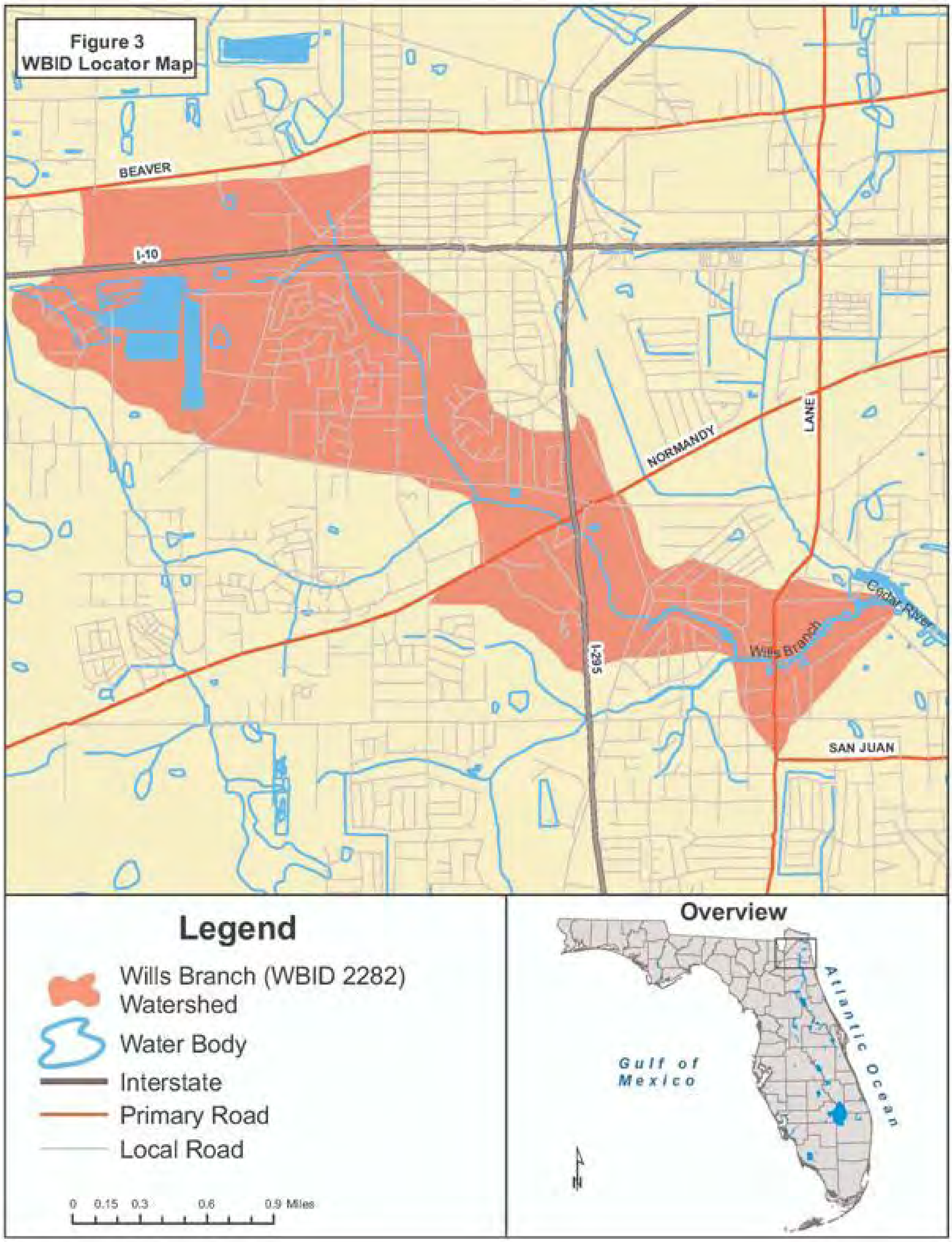

FIGURE 21: WILLS BRANCH WBID LOCATOR MAP

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 in JEA's Buckman and Southwest WWTF Service Areas. About 1,566 households (approximately 61% of households) are connected to the sanitary sewer system in the watershed. The watershed supports nearly 131 kilometers (81 miles) of sewer lines and 16 sanitary sewer lift stations, as well as associated infrastructure, which 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, close 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) near 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.

JEA has reported 14 SSOs within the Wills Branch WBID boundaries (**Table 98**). 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 98: SSOs reported in the Wills Branch Watershed, 2001–07

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

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

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 close 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 the WBID 2277 branch 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 near surface waters, OSTDS could potentially 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 are found 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 close 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 the WBID 2277 branch (PBS&J, July 2009).

Furthermore, the potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients in the Wills Branch 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 near the 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 stormwater could potentially impact 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 in 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 in the watershed, few open ditch systems are present. These are 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 situated between Rockland Drive and Frost Street North connects to a closed conveyance system that has an outfall 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 merges 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 near 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 close to Wills Branch, their waters could potentially merge with Wills Branch surface waters (PBS&J, July 2009).

In the watershed, fecal coliform concentrations did not differ during the wet and dry seasons, 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 I of the supporting document 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 and replaced 14 of the 21 ARVs in the watershed. During FY09, JEA inspected 2,999 LF of pipe using a CCTV 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 99** provides additional information on JEA's activities in the watershed.

Table 99: JEA Activities in the Wills Branch Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-127	Pipe Bursting–Increase Carrying Capacity	Replace failing/leaking infrastructure	Total major pipe project footage of pipe burst in watershed since 2001: 450	$54,824	JEA	Ongoing
JEA-128	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-129	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	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 functioning 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 I of the supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-133	Inspect Force Main Discharge Manholes, Repair/ Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-134	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-135	Pipe TV Inspection	Inspect existing infrastructure through use of CCTV 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-138	Manhole Monitoring	See Appendix I of the supporting document	2 monitors	Unknown	JEA	Ongoing
JEA-139	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-140	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-141	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$200,000*	JEA	Ongoing

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 I of the supporting document 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 100** lists DCHD's projects in the Wills Branch watershed.

Table 100: 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	Implement 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	Issue annual operating permits for PBTS, systems located in IMZs, 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	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-66	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 68 plan reviews and site evaluations based on permitting history	$17,000	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-67	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-68	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations.	37 complaint investigations performed	$12,300	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-69	Intensive Inspection Program	Carry out 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. Between 2005 and 2009, completed 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. 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.

In the Wills Branch watershed, COJ PWD's activities have included investigating 3 illicit water discharges, 11 illegal discharges, 3 sewer lines that drained into a yard or ditch, and 11 SSOs, as well as inspecting 37 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 101** provides additional details on COJ's activities in the Wills Branch watershed.

Table 101: COJ Activities in the Wills Branch Watershed

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	7 (for 2005–09)	Unknown	COJ	Ongoing
COJ-194	Structure Blocked/Repair/General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	159 (for 2005–09)	$13,593.91	COJ	Ongoing
COJ-195	Illicit Water Discharge	CARE initiated inspection	3 (for 2005–06)	$1,137	COJ	Ongoing
COJ-196	Pollution–Water–Illegal Discharge	CARE initiated inspection	11 (for 2001–09)	$4,169	COJ	Ongoing
COJ-197	Sewer Drains into Yard/Ditch	CARE initiated inspection	3 (for 2008–09)	$1,137	COJ	Ongoing
COJ-198	Sewer Overflow	CARE initiated inspection	11 (for 1999–2009)	$4,169	COJ	Ongoing
COJ-199	Private Lift Station Inspection	Inspect 8 private lift stations in 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 Boulevard, 7242 Normandy Boulevard)	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	Carry out NPDES permit-related quarterly water quality sampling	112 (for 1995–2009)	Unknown	COJ	Ongoing
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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-207	Pet/Animal Management Public Education	Develop 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 Interstate 295 and Normandy intersection. The project captures and treats stormwater runoff from the roadways 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 they 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 roadways. 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 roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It also helps to fund 2 monitoring stations in the Wills Branch 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 102 lists FDOT's activities in the watershed.

Table 102: FDOT Activities in the Wills Branch Watershed

[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.

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	Carry out 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	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and collect trash and debris	Trash collection area is 2-mile stretch of road	Unavailable	Not applicable	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
FDOT-72	Stormwater Management Systems	Construct wet ponds at intersection of Interstate 295 and Normandy	21 acres, wet ponds	Not applicable	FDOT	Completed
FDOT-73	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 2 miles of roadways and associated stormwater conveyance systems currently maintained in this WBID; approximately 4 miles of roadways swept	See Note 4	FDOT	Ongoing

15.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 99 through **Table 102** list the projects and programs to reduce fecal coliform loading in the Wills Branch watershed, by entity. 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 (**Table 103)**. 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. Two discrete portions of the WBID 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 these areas are designated in the future for inclusion in the program, they 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. Continuing the inspection program and confirming the 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 repaired 500 feet of force main. There were also several SSOs along Knoll Cove; 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. There are 3 stations located close 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. It will continue its maintenance efforts and 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 coliforms to the MS4 conveyance system and, in turn, the creek. COJ and FDOT have committed to continuing 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 to prevent unpermitted connections. The FDOT Adopt-A-Highway Program removes trash from 2 miles of roadways. 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. In addition, it sweeps 4 miles of roadways 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 103: SUMMARY OF RESTORATION ACTIVITIES FOR THE WILLS BRANCH WATERSHED

- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 presumably comprise 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 Patrol Road and Maine Street (**Figure 23**). The main channel of the creek generally flows west, except for the upstream segment that flows southward, beginning at Patrol Road. The Mayport Canal, located along Patrol Road, and artificial channels that parallel Magazine Road appear to merge with the main channel of Sherman Creek at Patrol Road. Surface waters also extend east from the main channel at the Maine Street and Patrol Road intersection to Lake Wonderwood, located outside the eastern WBID boundary east of England Street. Many branches of Sherman Creek join the main channel within a wetland area located between State Road A1A and Maine Street from Naval Station Street south to Wonderwood Drive (PBS&J, August 2009).

Two contributing branches also 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 merges 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 104**). The dominant land use (762.2 acres; 20.8% of total coverage) in the watershed is classified as high-density residential and is primarily located (1) between Maine Street and the eastern WBID boundary from Moale Avenue south to El Dorado Street, and (2) in patches throughout areas of the watershed south of Wonderwood Drive.

The next 2 most abundant land cover categories are (1) wetlands (652.2 acres; 18.6% of total coverage), located primarily (i) between Magazine Road and Wonderwood Drive from the western WBID boundary east to Maine Street, (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 account for 26% of the total land coverage in 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 close to surface waters, wildlife could potentially contribute to the fecal pollution of Sherman Creek in these areas (PBS&J, August 2009).

Several mobile home parks are located near 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 near Puckett Creek's west fork, west of Fairway Villas Lane; (3) at the Lakeside Mobile Park, 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 in the watershed, averaging 2.0 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 2,344 dogs in the watershed.

Table 104: Land Uses in the Sherman Creek Watershed in 2004

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%
Nonforested 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%**

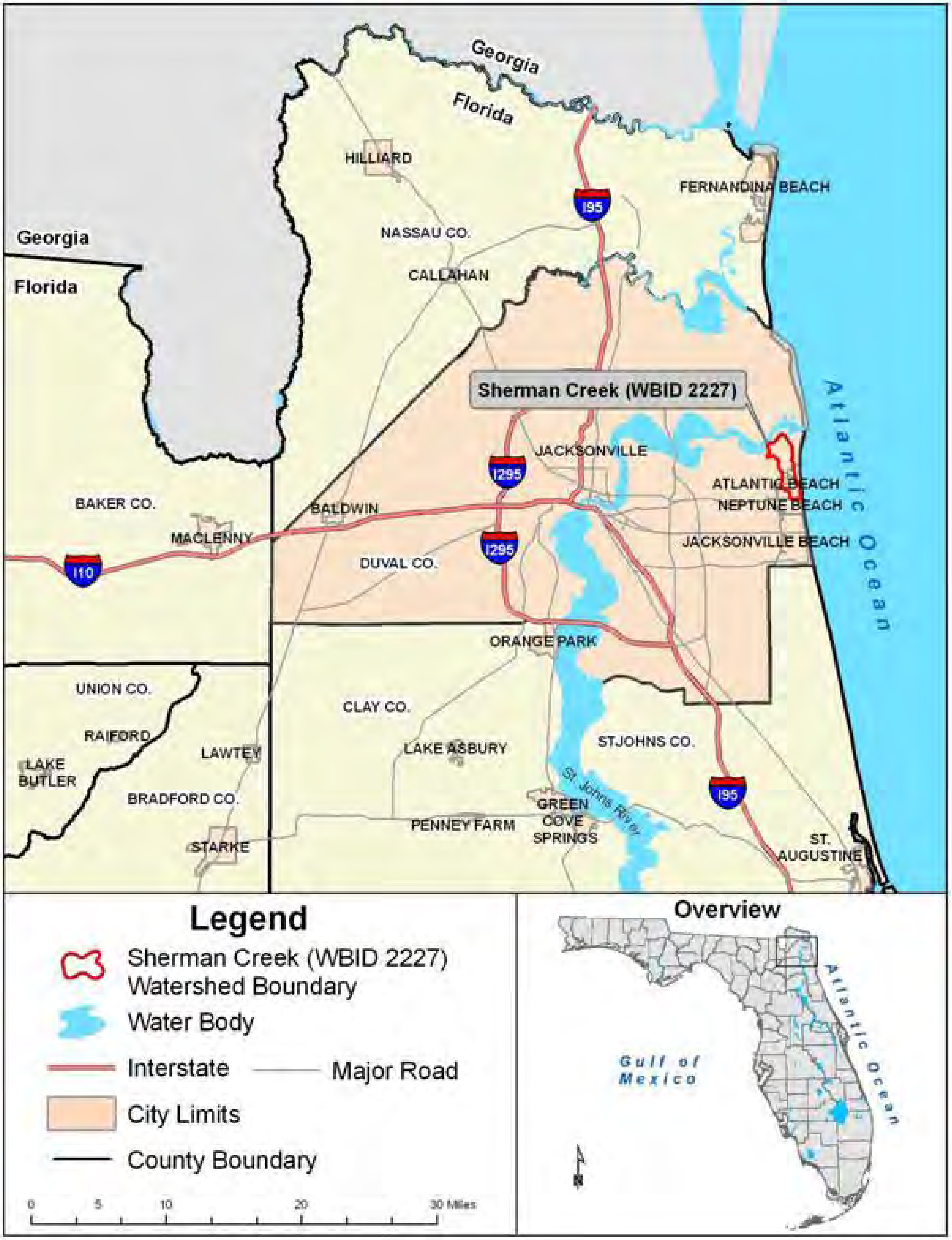

FIGURE 22: LOCATION OF THE SHERMAN CREEK WATERSHED IN THE LSJR TRIBUTARIES BASIN

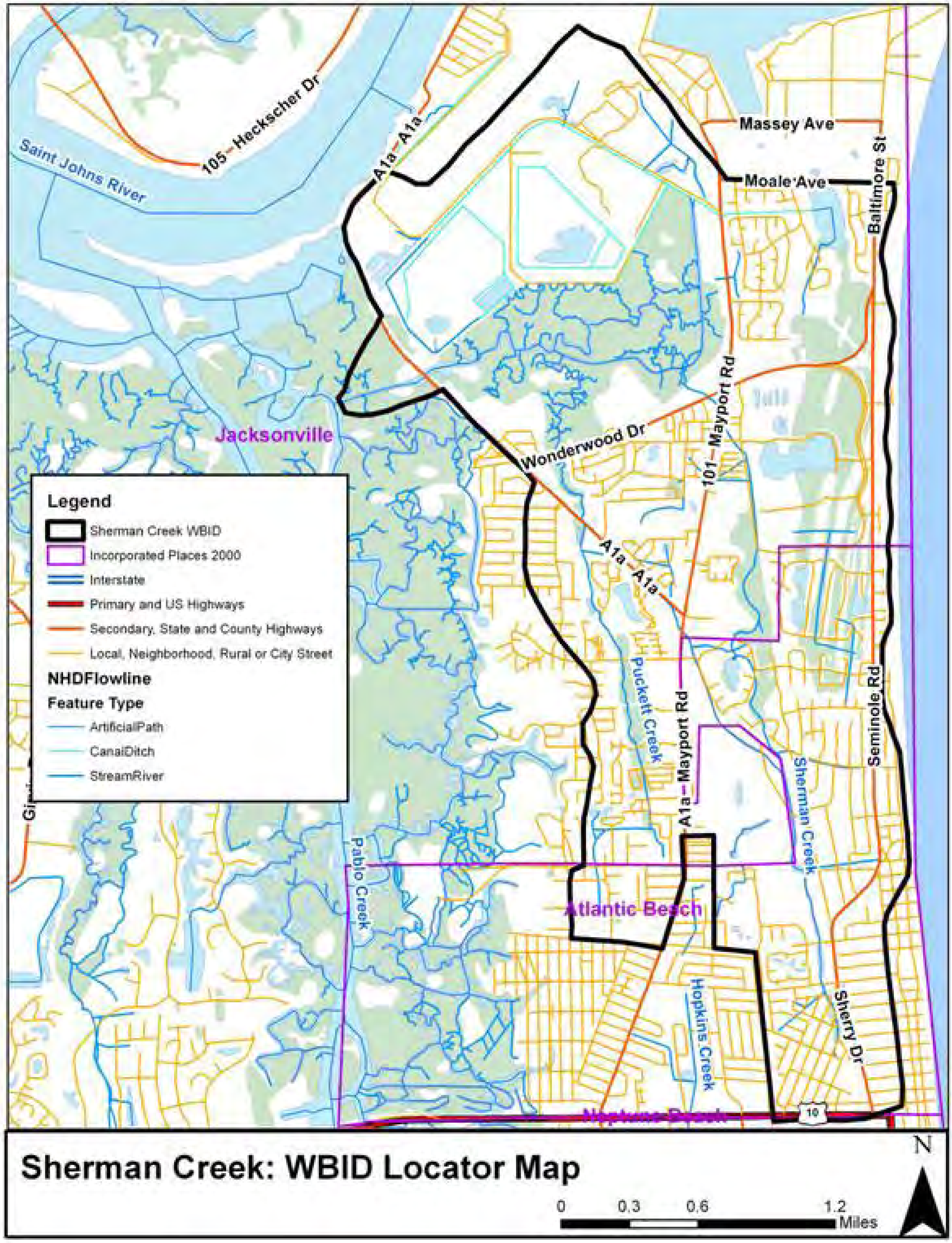

FIGURE 23: SHERMAN CREEK WBID LOCATOR MAP

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, close to the Wonderwood Drive station just west of State Road 101. The City of Atlantic Beach Main WWTF has a domestic wastewater permit with 2 outfalls. The Main WWTF discharges into the St. Johns River, just northwest of State Road A1A, outside the northern WBID boundary. The second outfall discharges to the Intracoastal Waterway and is only used for emergency discharges. In addition, FDOT and COJ, 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 smaller sections in the central portion of the watershed west of Maine Street (PBS&J, August 2009).

16.2.2 Illicit Discharges

COJ EQD identified 2 PICs in the Sherman Creek watershed. One was located approximately 240 meters (787 feet) west of Puckett Creek's east fork on March 1, 2007, and 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 close 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 in the Sherman Creek watershed. The permits, and presumably failed septic systems, are located near 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 close to surface waters, OSTDS could potentially 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 the 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 close 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 Magazine Road at the Mayport Canal and artificial channels that border Magazine Road (PBS&J, August 2009).

Furthermore, the potential for stormwater runoff analysis demonstrates that stormwater runoff coefficients in 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 near 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 Patrol Road. High stormwater coefficients indicate that stormwater could potentially impact 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 Roads 101 and A1A, and in the southern portion of the WBID south of Church Road. Closed conveyance systems in residential areas along the western WBID boundary, south of Levy Road, appear to have an 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 close 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 in the Selva Marina Country Club golf course, located between Fleet Landing Boulevard and Linkside Drive; (3) near the confluence of Puckett Creek's east fork and southeastern branch at Fleet Landing Boulevard; (4) outside 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 intersection of State Road A1A and Puckett Creek's west fork; (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 near the Mayport Canal along Patrol Road; and (10) at Magazine Road in the northern portion of the WBID. As these ponds are close to Sherman Creek, their waters could potentially merge with Sherman Creek surface waters (PBS&J, August 2009).

Fecal coliform concentrations did not differ during the wet and dry seasons, 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 I of the supporting document 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 105** lists DCHD's projects in the Sherman Creek watershed.

Table 105: 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	Implement 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	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	4 annual operating permits issued for commercial properties	$10,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-72	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-73	Application/Plan Review/Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 21 plan reviews and site evaluations performed based on permitting history	$5,250	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-74	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	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-75	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	36 complaint investigations 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. Between 2005 and 2009, completed 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. 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 the other is still pending.

In the Sherman Creek watershed, COJ PWD's activities have included investigating 53 illicit water discharges, 2 illegal discharges, 1 sewer line that drained into a yard or ditch, and 16 SSOs, as well as inspecting 13 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 106** provides additional details on COJ's activities in the Sherman Creek watershed.

Table 106: COJ Activities in the Sherman Creek Watershed

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	7 (for 2005–09)	Unknown	COJ	Ongoing
COJ-210	Structure Blocked/Repair/ General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	61 (for 2005–09)	$10,042.15	COJ	Ongoing
COJ-211	Illicit Water Discharge	CARE initiated inspection	5 (for 2006–07)	$1,895	COJ	Ongoing
COJ-212	Pollution–Water–Illegal Discharge	CARE initiated inspection	2 (for 2008–09)	$758	COJ	Ongoing
COJ-213	Sewer Drains into Yard/Ditch	CARE initiated inspection	1 (for 2008)	$379	COJ	Ongoing
COJ-214	Sewer Overflow	CARE initiated inspection	16 (for 2002–09)	$6,064	COJ	Ongoing
COJ-215	Private Lift Station Inspection	Inspect 8 private lift stations in 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 functioning properly and report status in first annual report	7 stations (1600 Selva Marina Drive, 1 Fleet Landing Boulevard, 865 Mayport Road, Oaks at Atlantic Beach, DBA Associates, 2425 Mayport Road, 2130 Mayport Road)	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

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-220	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	153 (for 1995–2009)	Unknown	COJ	Ongoing
COJ-221	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	8 (for 2007–09)	Unknown	COJ	Ongoing
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	Completed
COJ-223	Septic Tank Maintenance Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-224	Pet/Animal Management Public Education	Develop 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. This project, which is a wet pond that treats 58 acres, captures and treats runoff in the area, reducing the bacterial 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 they 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 roadways and associated stormwater conveyance systems.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It 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 107** lists FDOT's activities in the watershed.

Table 107: FDOT Activities in the Sherman Creek Watershed

[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.

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	Carry out NPDES permit-related quarterly water quality sampling	153 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-76	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	8 (for 2007–09)	See Note 2	FDOT/ COJ	Ongoing
FDOT-77	Stormwater Management Systems	Wonderwood Connector project–construct wet pond	58 acres, wet ponds	Not applicable	FDOT	Completed

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, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 4 miles of roadways and associated stormwater conveyance systems currently being maintained; approximately 8 miles of roadways swept	See Note 4	FDOT	Ongoing

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 have helped to reduce fecal coliform loading to the creek by upgrading faulty systems. It has connected 4 septic tanks to sewer; upgraded, added, or repaired 64,228 LF of pipe; and rehabilitated 101 manholes. Of 19 lift stations, 10 have been repaired, and 4 stations have received new emergency generators. Atlantic Beach has cleaned and inspected 72,030 LF of pipe using CCTV and smoke tested 12,000 LF.

Atlantic Beach has also completed 9 flood control projects and 3 capital projects to reduce flooding and capture and treat stormwater, helping to prevent 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. The project will remove OSTDS that are contributing fecal coliform loading to the creek. In addition, a program to replace Orangeburg storm sewer pipe in the watershed is under way and will be completed in 2014. Replacing these failing pipes will improve the effectiveness of 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 inspection and maintenance, (2) septic tank inspection and enforcement, (3) FOG Program, (4) stormwater system ditch and canal inspection and maintenance, (5) stormwater treatment pond inspection and maintenance, (6) stormwater control structure inspection and maintenance, (7) stormwater pump station inspection and maintenance, (8) inspection and maintenance of stormwater inlets/catch basins/grates, (9) stormwater pipe inspection 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 I of the supporting document. **Table 108** lists the City of Atlantic Beach efforts in the Sherman Creek watershed.

Table 108: Atlantic Beach Activities in the Sherman Creek Watershed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-51	Septic Tank Inspections and Enforcement	When septic tanks fail, city code requires connection to sewer system if available	Ongoing	Unknown	Atlantic Beach	Ongoing
AB-52	Septic Tank Phase-Out	Septic-to-Sewer Resolution by City Commission requiring connection at various dates. Includes Septic Conversion Assistance Policy, passed by Commission in May 2000. Provides city financing of septic-to-sewer conversions and contracting coordination and assistance. Project should be completed in December 2012.	132 conversions	$400,000	Atlantic Beach/ homeowners	Construction
AB-53	Septic Tank Phase-Out	Carry out septic-to-sewer conversions through CDBG	4 conversions	$4,900	CDBG	Completed
AB-54	Sewer Line Upgrades	Install new sewer system on Beach Avenue, Seminole Road, Ocean Grove, Dewees areas	4,794 LF sewer, 24 manholes, 155 connections	$400,000	Atlantic Beach	Completed
AB-55	Sewer Line Upgrades	Replace sewer main in area of Pioneer Drive	234 LF	$17,000	Atlantic Beach	Completed
AB-56	Sewer Line Upgrades	Slipline sewer on Sherry Drive; replace sewer in part of Salt Air subdivision	1,600 LF lined, 3,175 LF replaced	$643,000	Atlantic Beach	Completed
AB-57	Sewer Line Upgrades	Repair, line, and rehabilitate sewer in Oak Harbor subdivision	17,200 LF	$500,000	Atlantic Beach	Completed
AB-58	Sewer Line Upgrades	Repair sewer force main near Renault Drive and Mayport Road	640 LF	$20,000	Atlantic Beach	Completed
AB-59	Sewer Line Upgrades	Install new sewer line on Church Road (now Dutton Island Road)	Unknown	Unknown	Atlantic Beach	Completed
AB-60	Sewer Line Upgrades	Repair effluent gravity outfall on Levy Road	5 point repairs	$33,000	Atlantic Beach	Completed
AB-61	Sewer Line Upgrades	Replace sewer lines crossing Levy Road at Orchid, Rose, Violet, and Hibiscus	365 LF	$28,000	Atlantic Beach	Completed
AB-62	Sewer Line Upgrades	Implement sewer extension on Dudley St.	450 LF	$25,000	Atlantic Beach	Completed
AB-63	Sewer Line Upgrades	Line sewers near Lift Station A, Palm Avenue	1,400 LF	$40,000	Atlantic Beach	Completed
AB-64	Sewer Line Upgrades	Replace sewer force main and sanitary sewer on Wonderwood Road	3,500 LF force main, 180 LF sewer main	$604,609	Atlantic Beach	Completed
AB-65	Sewer Line Upgrades	Replace sewer main and manholes in Town Center–Ocean Boulevard from 1st to 2nd Street	234 LF sewer and 2 manholes	$14,177	Atlantic Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-66	Sewer Line Upgrades	Line sewer and replace 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	Completed
AB-67	Sewer Line Upgrades	Repair effluent force main Sherman Creek crossing pilings	2 crossings	$54,701	Atlantic Beach	Completed
AB-68	Sewer Line Upgrades	Install new force main from Lift Station B, 465 11th Street to 1100 Sandpiper Lane	450 LF	$120,685	Atlantic Beach	Completed
AB-69	Sewer Line Upgrades	Replace sewer main and manholes on 11th Street and 12th Street	2,345 LF sewer main and 11 manholes	$368,425	Atlantic Beach	Completed
AB-70	Sewer Line Upgrades	Clean and inspect (using CCTV) sewer main in Selva Marina subdivision; repair sewer mains, 19th Street and side streets	5,292 LF	$70,000	Atlantic Beach	Completed
AB-71	Sewer Line Upgrades	Line sewer and replace services Seminole Road and 11th Street to Lift Station B	2,965 LF sewer lining and 45 services replaced	$105,630	Atlantic Beach	Completed
AB-72	Sewer Line Upgrades	Install new sewer line for Sawgrass Chapel Place-Mealy Lane, north of Dutton Island Road	736 LF sewer main	$66,808	Atlantic Beach	Completed
AB-73	Sewer Line Upgrades	Install new sewer main and abandon old lift station at Shangri La Drive	614 LF	$146,572	Atlantic Beach	Completed
AB-74	Sewer Line Upgrades	Line sewer main in Seaspray Subdivision	6,604 LF	$239,997	Atlantic Beach	Completed
AB-75	Manhole Inspections and Rehabilitation	Carry out engineering analysis of failing manholes–Seminole Road area	30 manholes	$2,500	Atlantic Beach	Completed
AB-76	Manhole Inspections and Rehabilitation	Line 5 manholes near Lift Station A– Palm Avenue	5 manholes	$15,000	Atlantic Beach	Completed
AB-77	Manhole Inspections and Rehabilitation	Rehabilitate (Spectrashield) manholes on Sherry Drive from Atlantic Boulevard to Plaza	8 manholes	$11,270	Atlantic Beach	Completed
AB-78	Manhole Inspections and Rehabilitation	Rehabilitate (Spectrashield) manholes from Ahern through 10th St. and Sherry Drive to East Coast Drive	60 manholes	$279,826	Atlantic Beach	Completed
AB-79	Manhole Inspections and Rehabilitation	Rehabilitate (Spectrashield) all manholes in Seaspray subdivision	28 manholes	$25,597	Atlantic Beach	Completed
AB-80	Pump Station Inspections and Maintenance	Improve valves at Lift Stations A, B, and D (Palm Ave., 11th Street, Selva Marina Boulevard)	3 lift stations	$40,000	Atlantic Beach	Completed
AB-81	Pump Station Inspections and Maintenance	Rehabilitate wet well at lift station at Courtyards Apartments	1 lift station	$19,690	Atlantic Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-82	Pump Station Inspections and Maintenance	Line wet well at West End lift station, 2567 West End Street,	1 lift station	$18,900	Atlantic Beach	Completed
AB-83	Pump Station Inspections and Maintenance	Line wet well at Selva Norte Lift Station, 404 20th Street	1 lift station	$21,900	Atlantic Beach	Completed
AB-84	Pump Station Inspections and Maintenance	Construct new master lift station to WWTP #1, 1100 Sandpiper Lane	1 lift station	$676,500	Atlantic Beach	Completed
AB-85	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	Completed
AB-86	Pump Station Inspections and Maintenance	Upgrade Lift Station H–2301 Mayport Road; new pumps and electrical	1 lift station	$120,281	Atlantic Beach	Completed
AB-87	Pump Station Inspections and Maintenance	Upgrade Lift Station I–960 Park Street; new pumps and electrical	1 lift station	$70,281	Atlantic Beach	Completed
AB-88	Pump Station Inspections and Maintenance	Replace emergency generator at Lift Station C, 65 Donner Road	1 lift station	$24,000	Atlantic Beach	Completed
AB-89	Pump Station Inspections and Maintenance	Install SCADA system at all 19 lift stations in Sherman Creek watershed	19 lift stations	$130,000	Atlantic Beach	Completed
AB-90	Pump Station Inspections and Maintenance	Replace emergency generator at Lift Station A, 460 Palm Avenue	1 lift station	$27,161	Atlantic Beach	Completed
AB-91	Pump Station Inspections and Maintenance	Replace emergency generator at Lift Station B, 469 11th Street	1 lift station	$21,507	Atlantic Beach	Completed
AB-92	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are functioning properly and report status in first annual report	5 stations (2632 State Road A1A, 404 20th Street, 1799 Selva Marina Drive, 425 11th Street, 460 Palm Avenue)	Unknown	Atlantic Beach	Planned
AB-93	Pump Station Inspections and Maintenance	Replace emergency generator at Mimosa Cove Lift Station, 1030 Mimosa Cove Court	1 lift station	$32,000	Atlantic Beach	Completed
AB-94	SSO Investigations–Preventive	Clean and inspect (using CCTV) effluent gravity outfall line from WWTP #1	2,000 LF	$3,000	Atlantic Beach	Completed
AB-95	SSO Investigations–Preventive	Clean and inspect (using CCTV) sewer mains at State Road A1A and Wonderwood Road	2,000 LF	$1,200	Atlantic Beach	Completed
AB-96	SSO Investigations–Preventive	Clean and inspect (using CCTV) sewer mains in core city from east of East Coast Drive to ocean, from Atlantic Boulevard to 16th Street	39,600 LF	$30,834	Atlantic Beach	Completed
AB-97	SSO Investigations–Preventive	Smoke test sewers in core city from Sherry Drive to East Coast Drive from Atlantic Boulevard to 12th Street	12,000 LF	Unknown	Atlantic Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-98	SSO Investigations–Preventive	Carry out I&I analysis of entire collection system; prepare GIS system; determine GPS locations of all manholes; analyze lift station needs; CIPP recommended	Entire system	$60,000	Atlantic Beach	Completed
AB-99	SSO Investigations–Preventive	Clean and inspect (using CCTV) sewer main on Selva Marina Drive and side streets	7,000 LF	$9,000	Atlantic Beach	Completed
AB-100	SSO Investigations–Preventive	Implement root removal and tuberculation removal on Seminole Road	700 LF	$2,400	Atlantic Beach	Completed
AB-101	SSO Investigations–Preventive	Clean and inspect (using CCTV) sewer main on Seminole Road, Selva Linkside, and Selva Lakes Subdivisions	16,500 LF	$27,094	Atlantic Beach	Completed
AB-102	SSO Investigations–Preventive	Clean and inspect (using CCTV) sewer main at Mayport Road crossings	4,930 LF	$6,656	Atlantic Beach	Completed
AB-103	SSO Investigations–Preventive	Sewer Master Plan Update– Analyze entire sewer system for prioritizing capital improvement program, including review of I&I analysis	Entire system	$58,100	Atlantic Beach	Completed
AB-104	SSO Investigations–Preventive	Implement FOG Program to monitor grease trap maintenance at restaurants	40 food service establishments	Unknown	Atlantic Beach	Ongoing
AB-105	1999 Stormwater Improvements Project	Implement 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	Completed
AB-106	Core City Improvements Project	Implement flood control capital project and stormwater water quality BMPs–area bounded by Sherry Drive and East Coast Drive, 1st Street and 12th Street	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	Completed
AB-107	Core City Improvements Project	Carry out water sampling and public education	Monthly grab and continuous event monitoring as required by Section 319 grant; results submitted to FDEP with final report; public education through WAV	$81,370	Atlantic Beach/ FDEP/EPA	Ongoing
AB-108	Levy Rd. Improvements Project	Implement flood control capital project–Levy Road between Mayport Road and Orchid Street	236 LF of pipe; 6 mitered end sections	$300,284	Atlantic Beach	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-109	Sherry Drive Reconstruction Project	Implement 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	Completed
AB-110	Flood control capital projects	Implement flood control capital project–Dewees, 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	Completed
AB-111	Church Road Extension (now Dutton Island Road)	Implement flood control capital project–between George Street and Mealy Street	2 Type E inlets; 2 end walls; 65 LF of 48-inch RCP; 30 LF of 15-inch HDPE	$152,180	Atlantic Beach	Completed
AB-112	Public Education Through WAV	Implement stormwater water quality BMPs; carry out public education for stormwater and sewer	525 participants	$10,000 per year	Atlantic Beach	Ongoing
AB-113	Stormwater System Ditch and Canal Inspections	Visually inspect stormwater systems weekly, and take corrective action as needed; mow, use weedeater, and pick up litter weekly during growing season, and as needed during colder months	3,361,245 LF	Unknown	Atlantic Beach	Ongoing
AB-114	Stormwater System Ditch and Canal Maintenance	Routinely clean and maintain ditches as required by MS4 permit	2,147,102.25 LF	Unknown	Atlantic Beach	Ongoing
AB-115	Stormwater Treatment Ponds Inspections	Routinely inspect ponds as required by MS4 permit	445 ponds	Unknown	Atlantic Beach	Ongoing
AB-116	Stormwater Treatment Ponds Cleaning and Maintenance	Routinely maintain ponds as required by MS4 permit	298 ponds	Unknown	Atlantic Beach	Ongoing
AB-117	Stormwater Treatment Ponds, Ditch and Canal Aquatic Weed Control	Weed control by Bluewater Environmental	Not applicable	Annual budget–$21,000	Atlantic Beach	Ongoing
AB-118	Stormwater Control Structure Inspections	Carry out routine control structure inspections required by MS4 permit	351 structures	Unknown	Atlantic Beach	Ongoing
AB-119	Stormwater Control Structure Cleaning and Maintenance	Do only when inspection shows additional effort required; carry out routine cleaning and maintenance as required by MS4 permit	230 structures	Unknown	Atlantic Beach	Ongoing
AB-120	Stormwater Inlets/Catch Basins/Grates Inspected	Routinely inspect as required by MS4 permit	834 inlets/ catch basins/grates	Unknown	Atlantic Beach	Ongoing
AB-121	Stormwater Inlets/Catch Basins/Grates Maintained	Maintain as required by MS4 permit	771 inlets/ catch basins/grates	Unknown	Atlantic Beach	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
AB-122	Stormwater Pipe Inspection and Maintenance	Carry out stormwater pipe cleaning routinely and in response to complaints, as required by MS4 permit	7,322.25 LF	Unknown	Atlantic Beach	Ongoing
AB-123	Stormwater Pipe Maintenance (Repair/Replacement)	Repair or replace stormwater pipe	232.5 LF	Unknown	Atlantic Beach	Ongoing
AB-124	Total Miles of Right-of-Way Maintained	Maintain right-of way	39.23 miles	Unknown	Atlantic Beach	Ongoing
AB-125	Collect Litter	Collect litter	132,772.5 pounds/year	Unknown	Atlantic Beach	Ongoing
AB-126	George and Dudley Drainage Improvements	Implement stormwater water quality BMPs–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	Completed
AB-127	County Club Lane Storm Pipe lining	Implement flood control capital project–between Johansen Park and Selva Lagoon; no septic tanks in project area	560 LF PVC line 24-inch RCP; 1 curb inlet; 1 headwall	$83,574	Atlantic Beach	Completed
AB-128	Ocean and 13th Street Drainage Project	Implement flood control capital project	766 LF of 18-inch RCP; 9 ditch bottom Inlet-C; 1 curb inlet; 20 LF concrete flume	$138,734	Atlantic Beach	Completed
AB-129	Seminole Ditch Headwall	Implement flood control capital project– 800 block of Seminole Road	Concrete headwall installation	$12,974	Atlantic Beach	Completed
AB-130	Selva Tierra Ditch Improvements	Implement flood control capital project– north of Saturiba Drive, between Selva Grande and Tierra Verde	Extend 24-inch CMP, 12-inch ADS, and 12-inch PVC pipes going into a new ditch bottom inlet	$25,953	Atlantic Beach	Completed
AB-131	Ocean Blvd. 14th–16th Street Drainage Improvements	Flood Implement 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	Completed
AB-132	Orangeburg Pipe Replacement Program	Replace obsolete/failing Orangeburg (fiber) storm sewer pipe; annual funding ($15,000/year); completion 9/2014	~3,200 LF of Orangeburg remaining in city system	$75,000	Atlantic Beach	Construction
AB-133	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 have prevented sewer infrastructure issues that could potentially 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 have 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 under way to clean and video its entire sewage collection system. The project, which will be completed in 2012, 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 these 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 its system. In addition, it has 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. The station 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 nonhousing areas; this effort has swept 85,316 and 1,462,497 square yards/month, respectively. NS Mayport also conducts public education and outreach efforts and has a pet waste management ordinance. Appendix I of the supporting document contains details on several of these programs. **Table 109** lists the NS Mayport activities in the Sherman Creek watershed.

Table 109: 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	Completed
NSM-2	Repair Housing Sewer Mains	Reline housing area sewer main pipes with CIPP	4,562 LF	$228,100	Navy	Completed
NSM-3	Repair Housing Laterals	Reline housing unit laterals with CIPP	192 connections; 9,475 LF	$480,000	Navy	Completed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
NSM-4	Manhole Rehabilitation	Rehabilitate manhole with cementitious coating	147 manholes	$86,490	Navy	Completed
NSM-5	Telemetry System	Install telemetry/monitoring system at pump stations	4 pump stations	Unknown	Navy	Completed
NSM-6	Collection System Spill Prevention Program	Clean and inspect (using video) sewage collection system	Entire sewage collection system	Unknown	Navy	Under way; completion in 2012
NSM-7	Pump Station Inspections and Maintenance	Inspect, maintain, and clean 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	Recycle oil and grease from all cooking facilities on station; through agreement with COJ, COJ removes used cooking oil and grease and recycles it; COJ has provided storage tanks; NS Mayport has 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	Completed
NSM-12	Debris Removal	Remove trash and debris from grounds	All Naval Station grounds	Unknown	Navy	Ongoing
NSM-13	Illicit Discharge Detection and Elimination	Systematically survey for and eliminate illicit connections/discharges to stormwater system	Entire stormwater collection system	Unknown	Navy	Ongoing
NSM-14	Stormwater Public Education and Outreach Efforts	Publish quarterly articles in NS Mayport newspaper and housing newsletter; publish resident brochure	Entire station	Unknown	Navy	Ongoing
NSM-15	Pet Waste Management/ Ordinance	Regulate pets in housing areas	All housing areas	Unknown	Navy	Ongoing
NSM-16	Pet Waste Collection Stations	Install and maintain pet waste collection stations in recreational areas	2 recreational vehicle parks	Unknown	Navy	Planned
NSM-17	Street Sweeping–Housing	Sweep streets and cul-de-sacs monthly in on-base and off-base housing areas	85,316 square yards/month	Unknown	Public Private Venture	Completed
NSM-18	Street Sweeping–Station	Sweep streets monthly in nonhousing areas	1,462,497 square yards/month	Unknown	Navy	Ongoing

16.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 105 through **Table 109** list the projects and programs to reduce fecal coliform loading in the Sherman Creek watershed, by entity. 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 (**Table 40)**. 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, and NS Mayport has removed 1. It does not appear that OSTDS are a major source in the WBID. DCHD will continue its 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 has performed 38 annual lift station inspections and will continue inspections annually. There are 7 private lift stations located close to surface waters at (1) 1600 Selva Marina Drive, and (2) 1 Fleet Landing Boulevard, (3) 2865 Mayport Road, (4) Oaks at Atlantic Beach, (5) DBA Associates, (5) 2425 Mayport Road, and (7) 2130 Mayport Road. COJ will inspect these stations to ensure they are functioning properly and report on the findings in 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—Atlantic Beach and NS Mayport have completed several projects to upgrade sewer lines and to rehabilitate manholes. In addition, Atlantic Beach has cleaned and inspected (using closed-circuit TV) portions of the sewer main in the city, conducted an I&I analysis of the entire collection system, and upgraded several lift stations. Atlantic Beach has 5 lift stations located near surface waters at (1) 2632 State Road 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 in the first annual report. NS Mayport has also cleaned and inspected (using CCTV) its entire collection system and has repaired the housing laterals with CIPP.

Program Implementation—Atlantic Beach and NS Mayport each have programs to inspect and maintain lift stations, manholes, and the sewer system. Each city also has a program to prevent restaurant grease from 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 open. COJ will complete the investigation and report the results in the first annual report. COJ and FDOT have committed to continuing the PIC

Program, including 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 its 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. FDOT also performs street sweeping monthly on 8 miles of roadways. It will continue stormwater infrastructure maintenance.

Program Implementation—COJ PWD has completed 52 work orders for ditch maintenance, 7 for ponds, and 17 for structures. Atlantic Beach inspects its ditches, canals, and ponds weekly, and conducts maintenance as necessary on these conveyances. The city has also completed several flood control and drainage improvement projects in the watershed to reduce the amount of fecal coliforms entering the creek through stormwater runoff. NS Mayport routinely inspects ditches, canals, and stormwater ponds, with maintenance and repairs as needed. In addition, street sweeping occurs monthly throughout the base.

TABLE 110: SUMMARY OF RESTORATION ACTIVITIES FOR THE SHERMAN CREEK WATERSHED

- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

SOURCE/ACTION	COJ	DCHD	FDOT	ATLANTIC BEACH	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 (PSAs)	√	X	X	-	-
Surface Water Sampling for Conditions and Trends	√	X	X	X	X
Sewer System	-	-	-	-	-
Sewer Line Upgrades	X	X	X	√	√
Manhole Inspection and Rehabilitation	X	X	X	√	√
Pump Station Inspection and Maintenance	X	X	X	√	√
Pump Station Rebuild	X	X	X	√	-
Air Release Valve (ARV) Inspection and Rehabilitation	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	√	√	√

Source/Action	COJ	DCHD	FDOT	Atlantic Beach	NS Mayport
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

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 presumably comprise 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, except for 4 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 2 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 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. Finally, 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 111**). The dominant land use (481.2 acres; 25.6% of total coverage) in the watershed 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 2 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 close to surface waters, wildlife could potentially contribute to the fecal pollution of Greenfield Creek (PBS&J, December 2008).

According to the 2000 Census, there are 2,354 households in the watershed, averaging 2.37 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 942 dogs in the watershed.

Table 111: Land Uses in the Greenfield Creek Watershed in 2004

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%
Nonforested Upland	12.0	0.6%
TOTAL:	**1,882.9**	**100%**

FIGURE 24: LOCATION OF THE GREENFIELD CREEK WATERSHED IN THE LSJR TRIBUTARIES BASIN

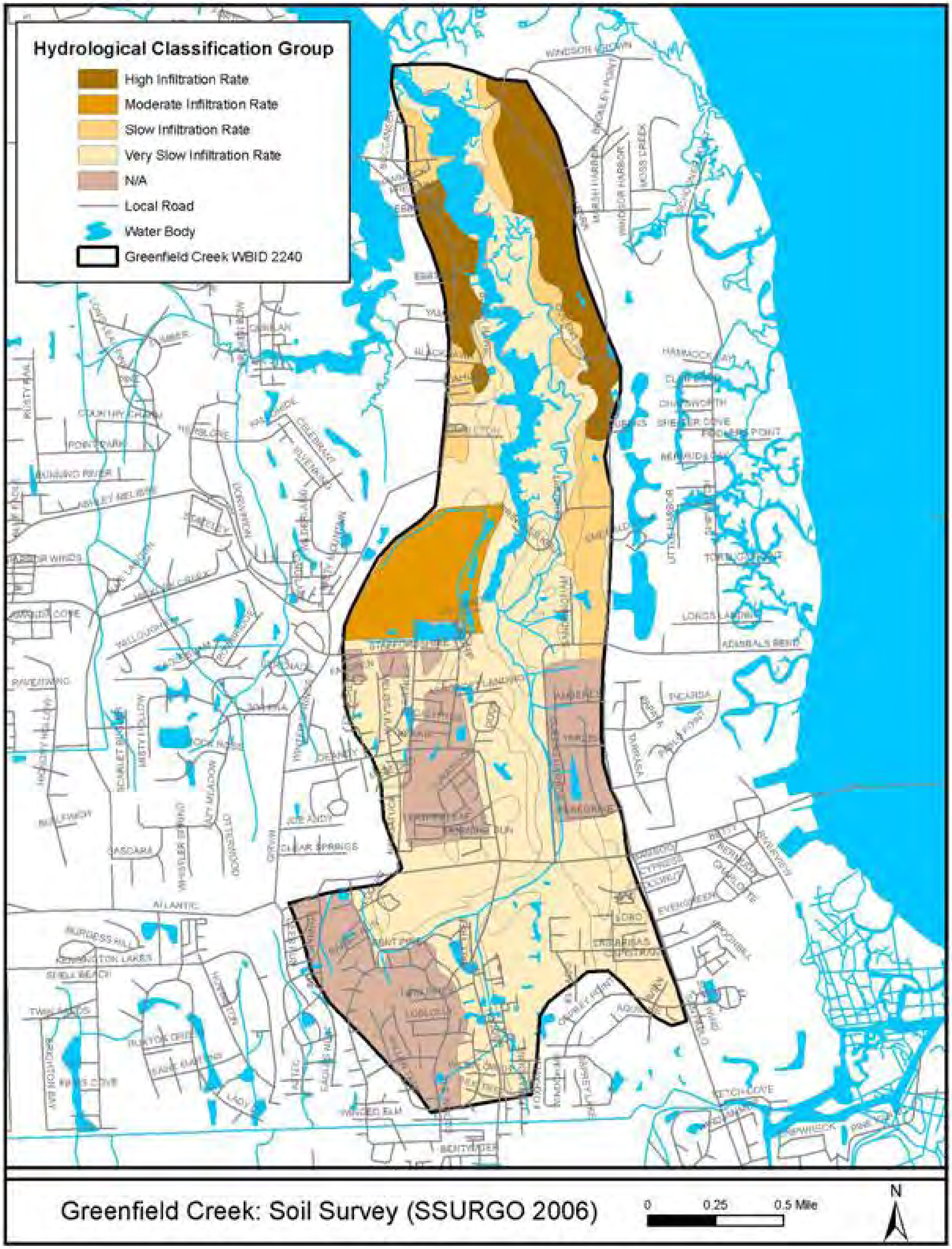

FIGURE 25: GREENFIELD CREEK WBID LOCATOR MAP

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's 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 that 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; thus unidentified illicit connections may be present in the watershed (PBS&J, December 2008).

17.2.3 Centralized Sewage Infrastructure and Overflows

The Greenfield Creek watershed is located in the Arlington East WWTF Service Area. About 1,986 households (approximately 84% of households) are connected to the sanitary sewer system in the WBID. The watershed supports nearly 156 kilometers (97 miles) of sewer lines and 17 sanitary sewer lift stations, as well as associated infrastructure, which 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, except for areas west of the creek north of Staffordshire Drive South.

JEA has reported only 1 SSO within the Greenfield Creek WBID boundaries; it spilled 40,000 gallons and potentially impacted surface waters (**Table 112**) (PBS&J, December 2008).

Table 112: SSOs Reported in the Greenfield Creek Watershed, 2001–07
*Reportable SSOs that spilled more than 1,000 gallons of sewage and/or affected surface waters.

WBID Name (Number)	Date of Overflow	Estimated Volume of Spill (Gallons)	Potentially Impacted Surface Waters
Greenfield Creek (2240)	27-Dec 02*	40,000	Yes

17.2.4 OSTDS

WSEA estimates that there are 177 OSTDS in the Greenfield Creek watershed. DCHD has issued 10 septic system repair permits in this area. Numerous parcels with septic system repair permits are located near the surface waters of Greenfield Creek. The proximity of these parcels to surface waters suggests that septic systems could 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, city and state agencies were working 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 1998–99. 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

The Greenfield Creek WBID contains predominantly less than 10% and 10% to 25% impervious surface. 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 impervious surface areas greater than 25%, corresponding 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, including areas near the creek. The highest runoff coefficients were primarily calculated in areas south of Singleton Street (1) at 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 in 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, there are few ditch systems, except in areas west of the creek north of Staffordshire Drive South. 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, including the installation of culverts to convert the ditch system parallel to Hodges Boulevard into an underground conveyance system. An artificial channel and stormwater ponds also border the Girvin Road Landfill. Stormwater overflow from these ponds may discharge into the surface waters of Greenfield Creek. There are numerous ponds throughout the watershed, especially south of Atlantic Boulevard and in the Queens Harbor area north of Atlantic Boulevard. As these ponds are close to Greenfield Creek, their waters could potentially merge with the surface waters of the creek (PBS&J, December 2008).

Fecal coliform concentrations did not differ 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 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 I of the supporting document describes each of these programs.

JEA has pipe burst 0.06% of the sewer lines in the watershed, replaced or repaired components on 1 of the 17 (5.88%) lift stations in FY09, and replaced 4 of 11 (36.36%) of ARVs in the WBID. During FY09, JEA inspected 911 LF of pipe using CCTV 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 113** lists JEA's activities in the watershed.

Table 113: JEA Activities in the Greenfield Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-142	Pipe Bursting–Increase Carrying Capacity	Replace failing/leaking infrastructure	Total major pipe project footage of pipe burst in watershed since 2001: 306	$36,597	JEA	Ongoing
JEA-143	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-144	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	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 functioning 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 I of the supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-148	Inspect Force Main Discharge Manholes, Repair/Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-149	Pump Station Class I/I 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-151	Pipe TV Inspection	Inspect existing infrastructure through use of a CCTV 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-154	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-155	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-156	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing

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 I of the supporting document 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. It will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 114** lists DCHD's projects in the Greenfield Creek watershed.

Table 114: 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	Implement 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
DCHD-77	Annual Operating Permits	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	Approximately 1 annual operating permit issued for commercial properties	$2,500	FDOH/ LSJR SWIM Grant	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
DCHD-78	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-79	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 18 plan reviews and site evaluations performed based on permitting history	$4,500	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-80	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-81	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	12 complaint investigations performed	$4,000	FDOH/ LSJR SWIM Grant	Ongoing
DCHD-82	Intensive Inspection Program	Carry out 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. Between 2005 and 2009, completed maintenance included 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. 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.

In the Greenfield Creek watershed, COJ PWD's activities have included investigating 1 illegal discharge, 4 sewer lines that drained into a yard or ditch, and 3 SSOs, as well as inspecting 10 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 115** provides additional information on COJ's activities in the Greenfield Creek watershed.

Table 115: COJ Activities in the Greenfield Creek Watershed

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	7 (for 2005–09)	Unknown	COJ	Ongoing
COJ-227	Structure Blocked/Repair/ General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	32 (for 2005–09)	$2,454	COJ	Ongoing
COJ-228	Pollution–Water–Illegal Discharge	CARE initiated inspection	1 (for 2007)	$379	COJ	Ongoing
COJ-229	Sewer Drains into Yard/Ditch	CARE initiated inspection	4 (for 2008–09)	$1,516	COJ	Ongoing
COJ-230	Sewer Overflow	CARE initiated inspection	3 (for 1999–2009)	$1,137	COJ	Ongoing
COJ-231	Private Lift Station Inspection	Inspect 3 private lift stations in 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	Carry out NPDES permit-related quarterly water quality sampling	86 (for 1995–2009)	Unknown	COJ	Ongoing
COJ-236	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	6 (for 2007–09)	Unknown	COJ	Ongoing
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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-239	Pet/Animal Management Public Education	Develop 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 stormwater from a 51-acre portion of the watershed, helping 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 they 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 roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It 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 116** provides additional information on FDOT's activities in the Greenfield Creek watershed.

Table 116: FDOT Activities in the Greenfield Creek Watershed

[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.

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	Carry out NPDES permit-related quarterly water quality sampling	86 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-82	Source Identification Sampling	Conduct source identification sampling 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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
FDOT-84	Stormwater Management Systems	Atlantic Boulevard Widening stormwater project–construct wet ponds	51 acres, wet ponds	Unknown	FDOT	Completed
FDOT-85	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 2 miles of roadways and associated stormwater conveyance systems currently maintained in this WBID; approximately 4 miles of roadways swept	See Note 4	FDOT	Ongoing

17.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 113 through **Table 116** list the projects and programs to reduce fecal coliform loading in the Greenfield Creek watershed, by entity. 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 (**Table 117**). 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. A discrete portion of the WBID 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 these areas are designated in the future for inclusion in the program, they 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 at (1) San Pablo Road, (2) Atlantic Boulevard and Girvin Road, and (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 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 close to surface waters at (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 continuing 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 to prevent unpermitted connections. FDOT will continue stormwater infrastructure maintenance. In addition, it sweeps 4 miles of roadways every month, helping to reduce sediments entering the stormwater conveyance systems.

COJ Program Implementation—COJ has 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 117: SUMMARY OF RESTORATION ACTIVITIES FOR THE GREENFIELD CREEK WATERSHED

\- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehabilitation	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

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 presumably comprise stormwater runoff that appears to originate from its associated branches and forks (**Figure 27**). From upstream to downstream, the general locations of the various headwaters 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, except for 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 in 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 118**). The dominant land use (1,203.1 acres; 20.7% of total coverage) in the 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 2 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 account 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 close to surface waters, wildlife could potentially contribute to the fecal pollution of the creek in these areas. A specialty farm, Skinners' Dairy, is located on the west side of the main channel at Bowden Road. According to SJRWMD, it is no longer active, and many portions of the former dairy have been developed (PBS&J, September 2009).

According to the 2000 Census, there are 9,317 households in the watershed, averaging 1.84 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 3,727 dogs in the watershed.

TABLE 118: LAND USES IN THE POTTSBURG CREEK WATERSHED IN 2004

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%
Nonforested 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 IN THE LSJR TRIBUTARIES BASIN

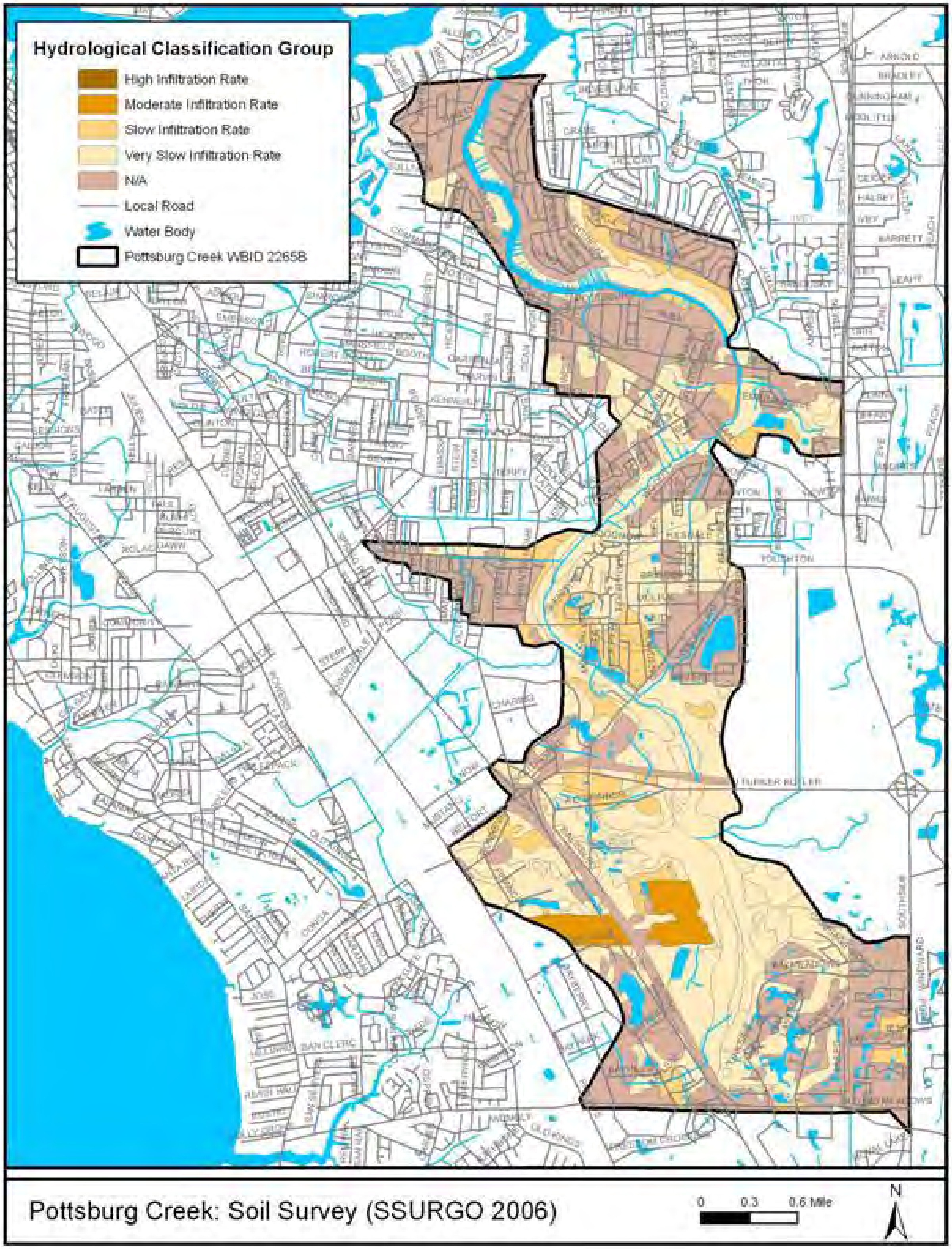

FIGURE 27: POTTSBURG CREEK WBID LOCATOR MAP

18.2 Potential Sources

18.2.1 Point Sources

The Pantry #6224, a convenience 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 in 3 JEA WWTF service areas. The Mandarin WWTF Service Area is situated in the southern portion of the watershed from Glenn Abbey Way south to Baymeadows Road. The Arlington East WWTF Service Area covers 2 areas of the watershed: (1) from Dorothea Terrace south to Glenn Abbey Way; and (2) the east side of the creek from the northern WBID boundary south to Grant Owens Road. The Buckman WWTF Service Area encompasses the central portion of the watershed from Beach Boulevard south to Dorothea Terrace.

About 3,080 households (approximately 33% of households) are connected to the sanitary sewer system in the watershed. This WBID supports over 118 kilometers (73 miles) of sewer lines and 54 sanitary sewer lift stations, as well as associated infrastructure, which 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 throughout the watershed close to surface waters, except for the wetland located between J. Turner Butler Boulevard and Baymeadows Road. It is also worth noting that there is sewer infrastructure near 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).

JEA reported 13 SSOs within the Pottsburg Creek WBID boundaries between March 2001 and May 2006 (**Table 119**). 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 lies 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 119: SSOs Reported in the Pottsburg Creek Watershed, 2001–07

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

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

WBID Name (Number)	Date of Overflow	Estimated Volume of Spill (Gallons)	Potentially Impacted Surface Waters
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
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

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 in this area. The permits, and presumably failed septic systems, are located near 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 close to surface waters, OSTDS could potentially contribute to the fecal pollution in these areas of the creek (September 2009).

One nuisance area, Glynlea, was located in the WBID on the east side of the creek from Nightingale Road north to the northern WBID boundary. In October 2006, the transition from septic to sewer was completed in this area. 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 close 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 in 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 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 situated close 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 stormwater could potentially impact 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 in 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 in the watershed, a few open ditch systems are present. These (1) form segments of the northern fork along Hidden Lake Drive West; (2) are located along Brest Road; (3) are situated between Merrie Anne Drive and Mills Court; (4) form segments of the northern branch; (5) extend outside the eastern WBID boundary along Nightingale Road, forming segments of Silversmith Creek; (6) are found in 2 locations that have an outfall to the main channel near Wren Road; (7) are located parallel to Spring Forest Circle at the main channel; and (8) are found near 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 have an outfall into a closed conveyance system, which field investigations (September 2008) indicated then flows into ditches that are part of the Leeds Pond watershed (PBS&J, September 2009).

There are also numerous ponds located close 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, situated 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 near the creek, their waters could potentially 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 in this area most bacterial loading was delivered to the 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, appear to merge with the main channel in this area and 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 I of the supporting document describes each of these programs.

JEA has pipe burst 8.19% of the sewer lines in the watershed. It has also replaced 7 of the 24 ARVs. During FY09, JEA inspected 3,617 LF of pipe using a CCTV 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 120** lists JEA's activities in the watershed.

Table 120: JEA Activities in the Pottsburg Creek Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-157	Pipe Bursting–Increase Carrying Capacity	Replace 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 Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-159	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	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 functioning properly and report status in first annual report	7 stations (San Souci, Watson Realty Corp., Murray Hill Condo, Glynlea, South Brook Condo, Pottsburg 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 I of the supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-163	Inspect Force Main Discharge Manholes, Repair/Rehabilitate as Necessary	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-164	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-165	Pipe TV Inspection	Inspect existing infrastructure through use of CCTV 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 I of the supporting document	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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-169	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-170	Non-Destructive Testing Program/Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing

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 I of the supporting document 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 within 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 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. It will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 121** lists DCHD's projects in the Pottsburg Creek watershed.

Table 121: 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	Implement 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/ FDOH	Ongoing
DCHD-84	Annual Operating Permits	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	Approximately 28 annual operating permits issued for commercial properties; 1 PBTS is monitored annually	$70,000	General Revenue/ FDOH	Ongoing
DCHD-85	SWIM Project	Implement broad-ranging septic tank ordinance	Approximately 34% of Oakhaven failure area and 85% of former Glynlea nuisance area are located in this WBID	$98,000	General Revenue/ FDOH	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
DCHD-86	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	General Revenue/ FDOH	Ongoing
DCHD-87	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 252 plan reviews and site evaluations performed based on permitting history	$63,000	General Revenue/ FDOH	Ongoing
DCHD-88	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	General Revenue/ FDOH	Ongoing
DCHD-89	Failure Area Evaluation	Work with COJ to evaluate why area south of Glynlea is not ranked as failure area	Consider adding failure area	Unknown	General Revenue/ FDOH	Planned
DCHD-90	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	131 complaint investigations performed	$43,600	General Revenue/ FDOH	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 all capture and treat stormwater runoff, reducing 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. Between 2005 and 2009, completed maintenance included 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. 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.

In the Pottsburg Creek watershed, COJ PWD's activities have included investigating 17 illicit water discharges, 13 illegal discharges, 6 sewer lines that drained into a yard or ditch, 26 SSOs, and 154 septic tank inspections, as well as investigating 201 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 122** provides additional information on COJ's activities in the Pottsburg Creek watershed.

TABLE 122: COJ ACTIVITIES IN THE POTTSBURG CREEK WATERSHED

[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.

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
COJ-240	Barnes Road (University Boulevard to Parental Home) (Main Stem COJ-11)	Construct wet detention pond	97 acres	Unknown	COJ	Completed
COJ-241	Parental Home Road Phase 2 (Beach Boulevard to Ibach Road) (Main Stem COJ-15)	Construct wet detention pond	82 acres	Unknown	COJ	Completed
COJ-242	Parental Home Road Phase 1 (Bowden Road from Salisbury to Dean Road) (Main Stem COJ-14)	Construct wet detention pond	28 acres	Unknown	COJ	Completed
COJ-243	Wren Road Drainage	Implement drainage improvements along Wren Road	Unknown	$45,000	COJ	Construction
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	19 (for 2005–09)	$104.81	COJ	Ongoing
COJ-246	Structure Blocked/Repair/General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	405 (for 2005–09)	$26,928	COJ	Ongoing
COJ-247	Illicit Water Discharge	CARE initiated inspection	17 (for 2005–07)	$6,443	COJ	Ongoing
COJ-248	Pollution–Water–Illegal Discharge	CARE initiated inspection	13 (for 2000–09)	$4,927	COJ	Ongoing
COJ-249	Sewer Drains into Yard/Ditch	CARE initiated inspection	6 (for 2008–09)	$2,274	COJ	Ongoing
COJ-250	Sewer Overflow	CARE initiated inspection	26 (for 2000–09)	$9,854	COJ	Ongoing
COJ-251	Septic Tank Inspection	CARE initiated inspection	154 (for 2005–07)	$58,366	COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-252	Private Lift Station Inspection	Inspect 51 private lift stations in 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 Boulevard near River Hill Drive, 3500 Southside Boulevard, 3444 Southside Boulevard, 3401 Southside Boulevard, 3332 Southside Boulevard)	Unknown	COJ	Planned
COJ-255	Pump Station Inspections	Inspect pump stations near surface waters to ensure they are functioning properly and report status in first annual report	3 stations (Atlantic Boulevard 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
COJ-257	PIC Program	Follow up on outstanding PICs	21 (for 2010–11)	Unknown	COJ	Planned
COJ-258	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	112 (for 1995–2009)	Unknown	COJ	Ongoing
COJ-259	Glynlea Failure Area–Septic Tank Phase-Out	Phase out septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project)[1]	354 tanks, 354 connected	Unknown	COJ	Completed
COJ-260	Oakhaven Failure Area–Septic Tank Phase-Out	Phase out 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 septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project)[1]	1 tank, 1 connected	Unknown	COJ	Completed
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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-264	Pet/Animal Management Public Education	Develop PSAs)	Ongoing	Unknown	COJ	Ongoing

18.3.4 FDOT Activities in the Pottsburg Creek Watershed

18.3.4.1 Completed FDOT Projects

FDOT has completed a wet detention systems project at the Southside Boulevard and Beach Boulevard interchange. The project captures and treats stormwater runoff from 33 acres, reducing the amount of fecal coliform loading to the creek.

18.3.4.2 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 they 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. It 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 roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It also helps to fund 2 monitoring stations in the Pottsburg Creek 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 123** lists FDOT's activities in the Pottsburg Creek watershed.

Table 123: FDOT Activities in the Pottsburg Creek Watershed

[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.

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	Identify illicit connections and remove if found to be truly illicit	2 identified, 1 found to be truly illicit and removed	See Note 1	FDOT/ COJ	Ongoing
FDOT-88	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	112 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-89	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-90	Stormwater Management Systems	Construct stormwater ponds at Southside Blvd. and Beach Blvd. Interchange	33 acres, wet detention systems	Unknown	FDOT	Completed
FDOT-91	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mow, remove roadside litter, respond to citizen complaints, and sweep roadways	About 6 miles of roadways and associated stormwater conveyance systems currently maintained in this WBID; approximately 12 miles of roadways swept	See Note 4	FDOT	Ongoing

18.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 120 through **Table 123** list the projects and programs to reduce fecal coliform loading in the Pottsburg Creek watershed, by entity. 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 (**Table 124**). 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 because they are located 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 the watershed (177 permits), and many are located outside the failure area. During the next failure area ranking, DCHD and COJ should consider looking at the portion of the WBID south of the former Glynlea nuisance area as a potential new failure area. Surface waters in this part of the watershed would benefit from the removal of 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, it has a drainage improvement 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, 3 stations are 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 their 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 has conducted several projects in the watershed to address SSOs. It replaced the ARV on Hazel Hurst Drive, which was the location of a past SSO. There were 2 SSOs on Salisbury Road, and JEA replaced the electric panel at the station in FY05 and repiped the station in FY07. 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. Sewer line problems also occurred 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, 7 stations are located close 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 has removed 1 illicit connection. COJ and FDOT have committed to continuing the PIC Program, including identifying additional illicit connections and removing those connections in a timely manner. COJ currently has 21 open PIC cases, and it 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 to prevent unpermitted connections. FDOT will continue stormwater infrastructure maintenance. In addition, it sweeps 12 miles of roadways every month, helping to reduce sediments entering the stormwater conveyance systems.

COJ Program Implementation—COJ has 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 124: SUMMARY OF RESTORATION ACTIVITIES FOR THE POTTSBURG CREEK WATERSHED

\- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	√
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	-
Air Release Valve (ARV) Inspection and Rehabilitation	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

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
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

CHAPTER 19: UPPER TROUT RIVER (WBID 2203)

19.1 WBID DESCRIPTION

The upper Trout River (WBID 2203) is located in Duval County, northwest of the Lower St. Johns River within the 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 (see **Chapter 20**). The "headwaters" of the Trout River presumably comprise 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, except for numerous contributing branches that join the 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 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 the WBID boundary between Old Kings Road and Plummer Road, and merges with the main channel slightly south of the Dunn Avenue and 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 U.S. Highway 1 (New Kings Road) are narrower than the downstream segment of the main channel east of U.S. Highway 1. The waters of the 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 upper Trout River watershed were identified using 2004 land use coverage data from the SJRWMD (**Table 125**). The dominant land use (3,622.2 acres; 36.5% of total coverage) in the 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 2 most abundant land cover categories are (1) wetlands (2,948.9 acres; 29.8% of total coverage), predominantly located bordering the upper 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 account for nearly 66.3% of the total land coverage of the upper Trout River 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 close to surface waters, wildlife could potentially contribute to the fecal pollution of the upper Trout River in these areas (PBS&J, May 2009).

There are 2 specialty farmland uses identified in the upper Trout River watershed. One area, identified as a horse farm, is located near the southeastern branch in a small area just south of Sycamore Street. The second specialty farm, identified as a dairy farm (Oaklane Dairy LLC), is located close to the northwestern branch at 9800 Plummer Road. More recent information provided by SJRWMD indicates that this area is no longer agricultural and is transitioning to residential land use.

In addition, the Bowie Dairy, located at 6687 Bowie Road in the most downstream portion of the WBID, has 25 to 30 cattle. This facility is near the main channel, approximately 850 meters downstream of U.S. Highway 1. There are also numerous parts of the watershed classified as cropland and pasturelands; however, the types of agricultural operations in these areas are currently unknown. As these operations are located close to surface waters, they could potentially contribute to the fecal contamination of the upper Trout River (PBS&J, May 2009).

According to the 2000 Census, there are 923 households in the watershed, averaging 2.01 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 369 dogs in the watershed.

Table 125: Land Uses in the Upper Trout River Watershed in 2004

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%
Nonforested 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%**

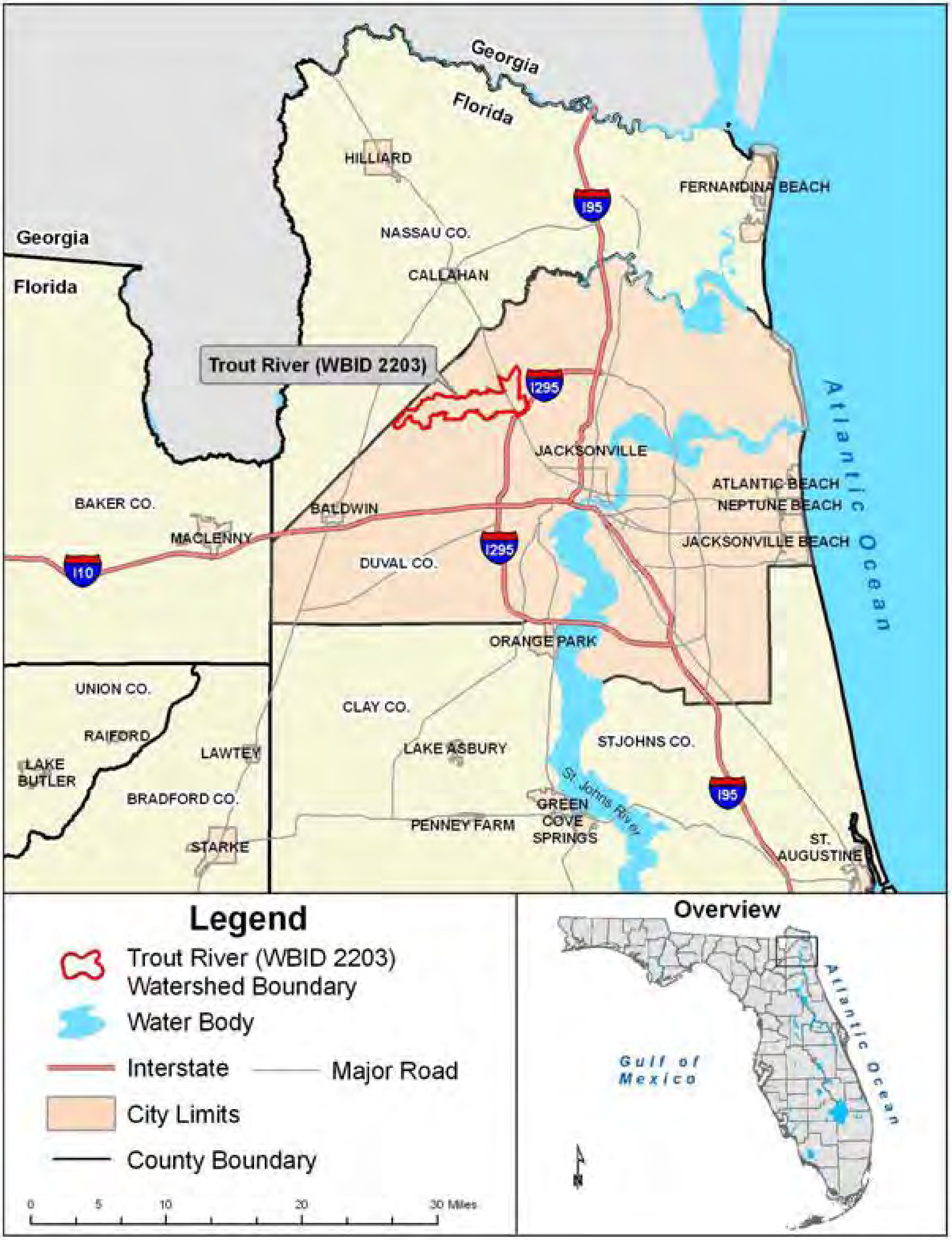

FIGURE 28: LOCATION OF THE UPPER TROUT RIVER WATERSHED IN THE LSJR TRIBUTARIES BASIN

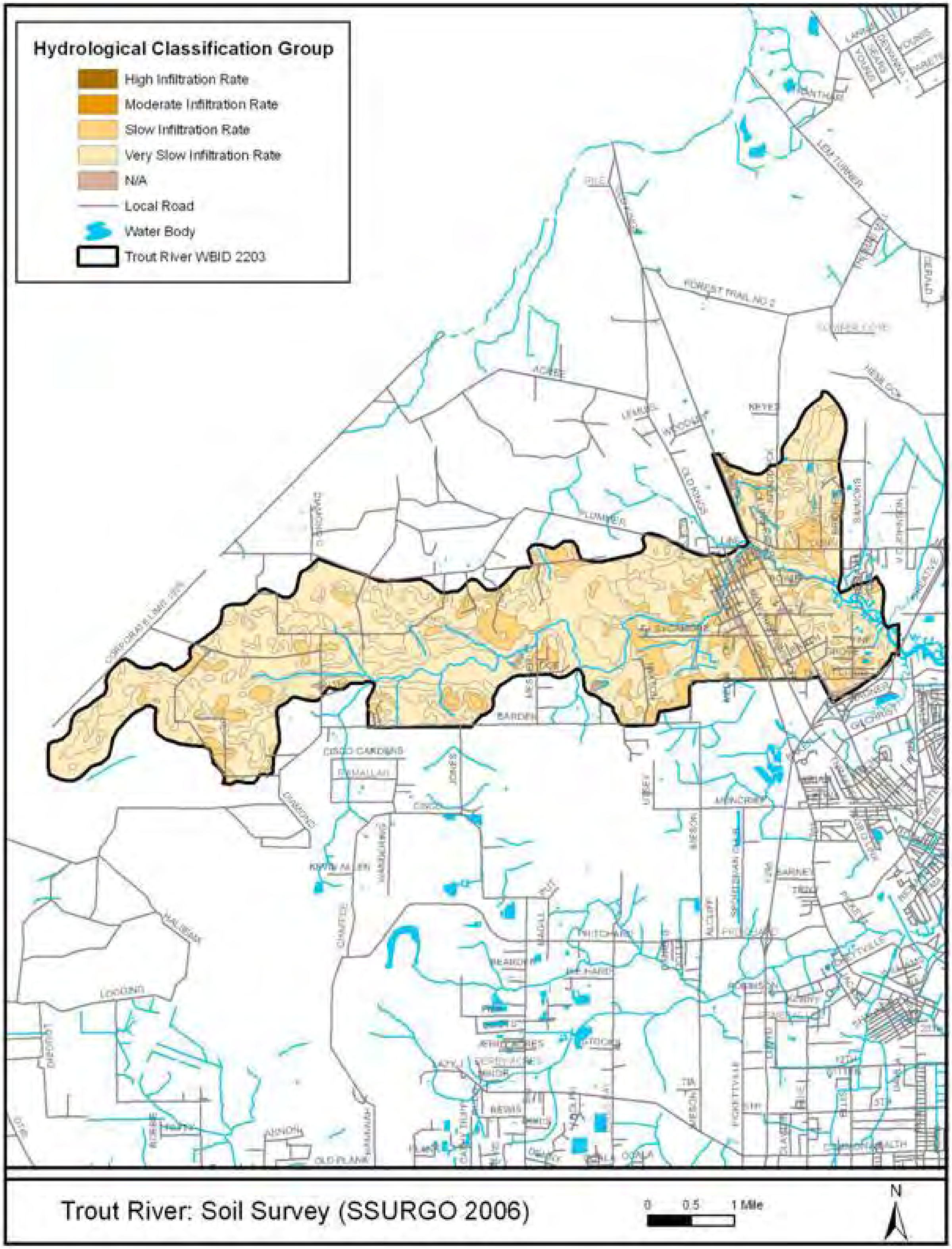

FIGURE 29: UPPER TROUT RIVER WBID LOCATOR MAP

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 the 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 upper Trout River watershed (PBS&J, May 2009).

19.2.2 Illicit Discharges

COJ EQD identified 2 PICs in the upper Trout River watershed. One PIC was found on March 2005 north of the main channel at U.S. Highway 1. The source 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 upper Trout River watershed is located in the JEA Buckman and District II WWTF Service Areas. About 1,338 households (approximately 100% of households) are connected to the sanitary sewer system in the watershed. This WBID supports nearly 82 kilometers (51 miles) of sewer lines and 5 sanitary sewer lift stations, as well as associated infrastructure, which 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, near 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 Rabbit Ridge Road intersection and the southeastern branch forks; (3) in areas along the southeastern branch and associated forks from the Sycamore Street and Civic Club Drive intersection south to the southern WBID boundary; (4) in the northeast corner of the WBID close to the main channel just east of New Kings Road; (5) along the northeastern branch south of the Dunn Avenue and Simmons Road intersection; and (6) outside the WBID boundary along the northeastern branch between Dunn Avenue and Interstate 295. JEA has not reported any SSOs within the upper 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 in this area. Several septic system repair permits were located near 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 Sycamore Street intersection and Braddock Road, (5) on the Little Trout River at Old Kings Road, and (6) along Gully Branch (PBS&J, May 2009).

19.2.5 Nonpoint Sources

An analysis of impervious surface indicates that the upper Trout River WBID contains predominantly less than 10% impervious surface. These areas are found throughout the watershed and primarily correspond to wetland and upland forest land use classifications. Areas with 10% to 25% impervious surface occur mainly in 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 near 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 in 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 close to surface waters, mainly at U.S. Highway 1 (PBS&J, May 2009).

The storm sewer network in the upper Trout River watershed includes 32 permitted stormwater treatment areas, encompassing approximately 5.82% to 26.14% of the WBID area. Stormwater infrastructure in the WBID includes 33 outfalls by receiving water (none are classified by FDEP as major outfalls) and 212 inlets. Inlets and outfalls are located mainly in the eastern portion of the WBID. There are few closed conveyance systems and ditches. The most significant ditch parallels Moncrief Dinsmore Road from the southern WBID boundary north to Civic Club Drive. Numerous ponds are also located near the upper Trout River surface waters (1) close to the main channel at Dunn Terrace Avenue, (2) along the main channel at Civic Club Drive, (3) near the southeastern branch at Lancashire Drive, (4) at the upper Trout River at Garden Street, and (5) at Gully Branch between Old Kings Road and New Kings Road. As these ponds are close to the upper Trout River, their waters could potentially merge with the river's 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 the upper 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 Upper Trout River 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 I of the supporting document describes each of these programs.

JEA replaced or repaired components on 1 of the 5 (20%) lift stations in the WBID in FY09. Also during FY09, JEA inspected 26,743 LF of pipe using a CCTV 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 126** lists JEA's projects in the WBID.

TABLE 126: JEA ACTIVITIES IN THE UPPER TROUT RIVER WATERSHED

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-171	Manhole Linings Rehabilitated	Repair deteriorating manhole linings	Not applicable	$150,000*	JEA	Ongoing
JEA-172	ARV Inspection and Rehabilitation	See Appendix I of the supporting document	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 I of the supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-174	Inspect Force Main Discharge Manholes, Repair/ Rehabilitate as Necessary	See Appendix I of the supporting document	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 functioning properly and report status in first annual report	1 station (Rabbit Ridge)	Unknown	JEA	Planned
JEA-178	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-179	Pipe TV Inspection	Inspect existing infrastructure through use of CCTV 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 feet of HDPE pipe 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 I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-184	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-185	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-186	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$200,000*	JEA	Ongoing

19.3.2 DCHD Activities in the Upper Trout River 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 I of the supporting document 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 addition, 27 annual operating permits have been issued for PBTS. DCHD has conducted 290 plan reviews and site evaluations as well as 52 investigations in response to complaints received. It will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 127** lists DCHD's projects in the Trout River watershed.

Table 127: DCHD Activities in the Upper Trout River Watershed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
DCHD-91	OSTDS Program	Implement 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/ FDOH	Ongoing
DCHD-92	Annual Operating Permits	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	Approximately 27 annual operating permits issued for commercial systems; 2 PBTS are monitored annually	$72,500	General Revenue/ FDOH	Ongoing
DCHD-93	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	General Revenue/ FDOH	Ongoing
DCHD-94	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 290 plan reviews and site evaluations performed based on permitting history	$72,500	General Revenue/ FDOH	Ongoing
DCHD-95	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	General Revenue/ FDOH	Ongoing
DCHD-96	Failure Area Evaluation	Work with COJ to evaluate if area south of Plummer Road, north of Garden Street and Trout River Boulevard, west to Interstate 295, and east to Messer Road should be designated as failure area	Consider adding new failure area	Unknown	General Revenue/ FDOH	Planned

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
DCHD-97	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	52 complaint investigations performed	$17,300	General Revenue/ FDOH	Ongoing

19.3.3 COJ Activities in the Upper Trout River Watershed

19.3.3.1 **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, helping to reduce bacteria loading to the creek from stormwater runoff in these areas.

19.3.3.2 **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 the upper Trout River, 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. Between 2005 and 2009, completed maintenance included 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. 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.

In the upper Trout River watershed, COJ PWD's activities have included investigating 2 illicit water discharges, 6 illegal discharges, 2 sewer lines that drained into a yard or ditch, and 5 SSOs, as well as inspecting 27 private lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 128** provides additional information on COJ's activities in the upper Trout River watershed.

TABLE 128: COJ ACTIVITIES IN THE UPPER TROUT RIVER WATERSHED

PROJECT NUMBER	PROJECT NAME	PROJECT DESCRIPTION	LEVEL OF EFFORT	TOTAL COST	FUNDING SOURCE	PROJECT STATUS
COJ-265	Messer Area Drainage	Provide positive drainage to eliminate flooding; completion in 2013	Unknown	$4,750,000	COJ	Planned
COJ-266	Garden Street Drainage Improvements	Address flooding at intersection of Garden Street and Iowa Avenue	Unknown	$158,170	COJ	Construction
COJ-267	Allene Road Ditch Improvement	Address problem with eroding ditch that is flooding street	Unknown	Unknown	COJ	Design
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	4 (for 2005–09)	Unknown	COJ	Ongoing
COJ-270	Structure Blocked/Repair/ General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	117 (for 2005–09)	$6,119	COJ	Ongoing
COJ-271	Illicit Water Discharge	CARE initiated inspection	2 (for 2006)	$758	COJ	Ongoing
COJ-272	Pollution–Water–Illegal Discharge	CARE initiated inspection	6 (for 2003–06)	$2,274	COJ	Ongoing
COJ-273	Sewer Drains into Yard/Ditch	CARE initiated inspection	2 (for 2009)	$758	COJ	Ongoing
COJ-274	Sewer Overflow	CARE initiated inspection	5 (for 2001–06)	$1,895	COJ	Ongoing
COJ-275	Private Lift Station Inspection	Inspect 5 private lift stations in 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 functioning 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	Carry out NPDES permit-related quarterly water quality sampling	91 (for 1995–2009)	Unknown	COJ	Ongoing
COJ-280	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	2 (for 2007–09)	Unknown	COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-283	Pet/Animal Management Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing

19.3.4 FDOT Activities in the Upper Trout River 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 they 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. It supports the Adopt-A-Highway Program in the watershed and collects trash from 4 miles of roadways. 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 roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It also helps to fund 2 monitoring stations in the upper Trout River 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 129** lists FDOT's activities in the upper Trout River watershed.

Table 129: FDOT Activities in the Upper Trout River Watershed

[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.

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
FDOT-92	PIC Program	Search for illicit connections	Effort is continuous in WBID; none identified	See Note 1	FDOT/ COJ	Ongoing
FDOT-93	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	91 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-94	Source Identification Sampling	Conduct source identification sampling when high levels of fecal coliform bacteria are noted	2 (for 2007–09)	See Note 2	FDOT/ COJ	Ongoing
FDOT-95	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-96	Adopt-A-Highway Program	Allow individuals or groups (after receiving FDOT training) to adopt stretch of road and 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-97	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, mow, remove roadside litter, respond to citizen complaints and roadways sweeping	About 2.5 miles of roadways and associated stormwater conveyance systems currently maintained in this WBID; approximately 5 miles of roadways swept	See Note 4	FDOT	Ongoing

19.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 126 through **Table 129** list the projects and programs to reduce fecal coliform loading in the upper Trout River watershed, by entity. 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 (**Table 130**). The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in the upper Trout River 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 upper Trout River 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 in the WBID. However, during the next failure area ranking, DCHD and COJ should consider evaluating the portion of the WBID south of Plummer Road, north of the intersection of Garden Street and Trout River Boulevard, west to Interstate 295, and east to Messer Road. This area is close to the convergence of the 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 the removal of 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, a drainage improvements project is in design on Allene Road. These projects are all located in OSTDS areas and have reduced, 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, 3 are 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 in FY09 and replaced 27 of the 36 ARVs. JEA has 2 lift stations, BIG-6671 and Bigby Lane, situated on the WBID boundary. It will verify which WBID these stations are located in and provide an update in the first annual BMAP progress report. In addition, JEA will inspect 1 station located close to surface waters at Rabbit Ridge Road to ensure it is functioning properly and report the results in the first annual BMAP progress report. It will continue its maintenance efforts and 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 continuing 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 to prevent unpermitted connections. In addition, FDOT sweeps 5 miles of roadways monthly and supports Adopt-A-Highway along 4 miles of roadways, preventing sediments from entering the stormwater conveyance system. It will continue stormwater infrastructure maintenance. 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 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, wildlife is probably the main source of fecal coliforms 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 near surface waters, wildlife could potentially contribute to the fecal pollution of the upper Trout River in these areas (PBS&J, May 2009).

Table 130: Summary of Restoration Activities for the Upper Trout River Watershed

- = Empty cell/no data

Notes: A checkmark (√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	-
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehabilitation	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

CHAPTER 20: LOWER TROUT RIVER (WBID 2203A)

20.1 WBID DESCRIPTION

The lower 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, listed from upstream to downstream, 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, except for contributing branches that join the lower Trout River from the west ("Ninemile Creek"), south ("southwestern branch," "south central branch," "southeastern branch," "Ribault River," and "Moncrief Creek"), and 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 the lower Trout River just east of Interstate 295. The southwestern branch stretches south from the lower Trout River to Arrowsmith Road, where it forks west and southwest to Sibbald Road. Just downstream, the south central branch extends south from the lower 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 the lower 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 the lower Trout River at Captain Jim Drive. Blockhouse Creek merges with the lower Trout River south of Broward Road. Highlands Creek stretches north from the lower 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 the lower 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 the 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 the lower Trout River.

The most downstream branch, Moncrief Creek, empties into the lower Trout River north of Tallulah Avenue. The waters of the lower 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 lower Trout River watershed were identified using 2004 land use coverage data from the SJRWMD (**Table 131**). The dominant land use (1,698.8 acres; 22% of total coverage) in the 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 the lower 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 2 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 the lower 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 extending from the Interstate 95 and Heckscher Drive intersection east to Hayden Road, including the Heckscher branch (PBS&J, October 2009).

Wetlands and upland forests account for nearly 20% of the total land coverage of the lower Trout River watershed and form a boundary around most of the northwestern branch and Heckscher branch, as well as 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 near surface waters, wildlife could potentially contribute to the fecal pollution of the lower Trout River in these areas (PBS&J, October 2009).

According to the 2000 Census, there are 8,348 households in the watershed, averaging 2.25 people per household. In addition, assuming that 40 percent of households have 1 dog (Tyler 2006), there are about 3,339 dogs in the watershed (PBS&J, October 2009).

Table 131: Land Uses in the Lower Trout River Watershed in 2004

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%
Nonforested 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 LOWER TROUT RIVER WATERSHED IN THE LSJR TRIBUTARIES BASIN

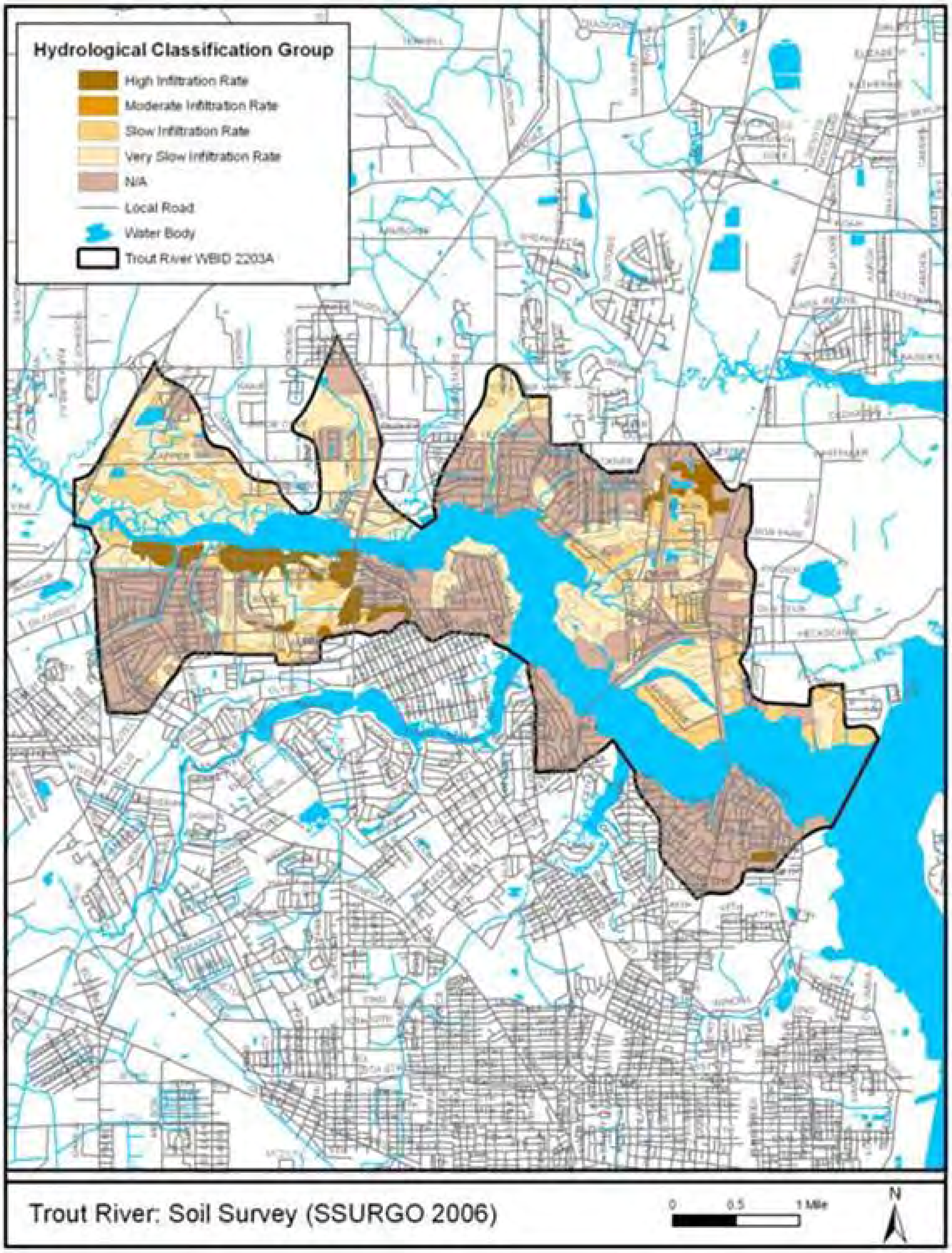

FIGURE 31: LOWER TROUT RIVER WBID LOCATOR MAP

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 lower 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 lower Trout River watershed (PBS&J, October 2009).

20.2.2 Illicit Discharges

COJ EQD identified 10 illicit connections in the lower Trout River 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 lower Trout River watershed is located in the District II and Buckman JEA WWTF service areas, which are situated north and south of the lower Trout River, respectively. About 6,072 households (approximately 73% of households) are connected to the sanitary sewer system in the watershed. This WBID supports over 417 kilometers (259 miles) of sewer lines and 32 sanitary sewer lift stations, as well as associated infrastructure, which 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 the lower Trout River from Dodd Road east to Monaco Drive, including areas close to Highlands Creek and the Menlo Park branch; (5) near the southern WBID boundary at Lem Turner Road; (6) near the Sisson branch at Interstate 95; (7) close 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).

JEA reported 21 SSOs within the lower Trout River WBID boundaries between March 2001 and December 2007 (**Table 132**). The estimated volume of spills associated with these overflows ranged from 10 to 2,500 gallons and averaged approximately 596 gallons; 6 SSOs were reported to have potentially impacted surface waters. Two of these (September 29 and October 14, 2003) occurred in the same location near Highlands Creek at Villanova Road and totaled 3,000 gallons (PBS&J, October 2009).

Table 132: SSOs Reported in the Lower Trout River Watershed, 2001–07

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

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
Trout River (2203A)	24-Jan-03	50	No

WBID Name (Number)	Date of Overflow	Estimated Volume of Spill (Gallons)	Potentially Impacted Surface Waters
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

20.2.4 OSTDS

WSEA estimates that there are 2,964 OSTDS in the lower Trout River watershed. According to DCHD, 163 septic system repair permits were issued in this area. The permits, and presumably failed septic systems, are located near 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 close to surface waters, OSTDS could potentially contribute to the fecal pollution in these areas of the river (PBS&J, October 2009).

In addition, 1 septic system nuisance area, Lake Forest, and 1 failure area, Riverview, are located in the WBID. The Lake Forest nuisance area covers the southern portion of the WBID from the confluence of Ribault River and lower Trout River southeast to the intersection of Interstate 95 and the southern WBID boundary. 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 the lower Trout River. According to JEA, Phase 1 and Phases 2A and 2B of the Lake Forest nuisance area completed the transition to centralized sewer in December 2005 and November 2006, respectively; the final phase (Phase 3) completed the transition to centralized sewer in July 2009. As of August 2009, there is no timeline set for design or construction in the Riverview failure area (PBS&J, October 2009).

20.2.5 Nonpoint Sources

An analysis of impervious surface indicates that the lower 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 close 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 in 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 near 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 stormwater could potentially 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 in the WBID includes 235 outfalls by receiving water (2 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. Ditches form segments of (1) the southwestern branch along Arrowsmith Drive, Northfolk Boulevard, and Roanoke Boulevard; (2) the south central branch beginning at Arrowsmith Drive south to the southern WBID boundary; (3) the northwestern branch from Capper Road north to the northern WBID boundary; (4) the 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 near 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, except those 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 near the lower 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 close to the lower Trout River, their waters could potentially merge with the river's surface waters (PBS&J, October 2009).

Fecal coliform concentrations did not differ during the wet and dry seasons, suggesting that the majority of bacterial loading was delivered to the lower 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 Lower Trout River 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 I of the supporting document describes each of these programs.

JEA replaced or repaired components on 1 of the 32 (3.13%) lift stations in the WBID in FY09. It will continue maintenance activities in the future to maintain the sanitary sewer system and prevent future problems. **Table 133** lists JEA's activities in the watershed.

Table 133: JEA Activities in the Lower Trout River Watershed

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

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
JEA-187	Manhole Linings Rehabilitated	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 I of the supporting document	Not applicable	$22,000,000*	JEA	Completed
JEA-189	Inspect Force Main Discharge Manholes, Repair/Rehabilitate as Necessary	See Appendix I of the supporting document	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 functioning properly and report status in first annual report	13 stations	Unknown	JEA	Planned
JEA-193	FOG Reduction Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-194	Implement CMOM Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-195	SSO Root Cause Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-196	Pop-Top Program	See Appendix I of the supporting document	Not applicable	Unknown	JEA	Ongoing
JEA-197	Non-Destructive Testing Program/ Pipe Integrity Testing	See Appendix I of the supporting document	Not applicable	$100,000*	JEA	Ongoing

20.3.2 DCHD Activities in the Lower Trout River 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 I of the supporting document describes each of these programs.

Approximately 51% of the Riverview failure area is located in the lower Trout River watershed. 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 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. DCHD has conducted 338 plan reviews and site evaluations, and investigated 168 complaints received. It will continue these activities in the future to reduce and prevent issues related to OSTDS. **Table 134** lists DCHD's projects in the lower Trout River watershed.

Table 134: DCHD Activities in the Lower Trout River Watershed

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
DCHD-98	OSTDS Program	Implement 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/ FDOH	Ongoing
DCHD-99	Annual Operating Permits	Issue annual operating permits for PBTS, systems located in IMZs, and commercial systems	Approximately 34 annual operating permits issued for commercial properties; 11 PBTS and 7 aerobic treatment units monitored annually	$130,000	General Revenue/ FDOH	Ongoing
DCHD-100	SWIM Project	Implement broad-ranging septic tank ordinance	About 51% of Riverview failure area and 32% of Lake Forest nuisance area located in this WBID	$147,050	General Revenue/ FDOH	Ongoing
DCHD-101	DCHD-Sponsored Training Programs	Hold annual training programs for septic tank contractors, certified plumbers, maintenance entities, and environmental health professionals	1 to 2 training sessions per year providing up to 12 contact hours	$2,500	General Revenue/ FDOH	Ongoing
DCHD-102	Application/ Plan Review/ Site Evaluations	DCHD performs plan review and site evaluation for each application received for OSTDS new construction, repair, or modification of existing system	Approximately 338 plan reviews and site evaluations performed based on permitting history	$84,500	General Revenue/ FDOH	Ongoing
DCHD-103	Septic Tank Failure Area Ranking	Score and prioritize septic tank failure areas annually	Less than 1 year since previous update	Not applicable	General Revenue/ FDOH	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
DCHD-104	Complaint Investigations	DCHD investigates all complaints received, performs site visit, and initiates enforcement action on sanitary nuisance violations	168 complaint investigations performed	$55,950	General Revenue/ FDOH	Ongoing
DCHD-105	Intensive Inspection Program	Carry out 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 Lower Trout River Watershed

20.3.3.1 Completed COJ Projects

COJ has completed the Sherwood Forest Area and Riverview North flood control projects, which reduce flooding in these areas to decrease fecal coliform loading to the lower Trout River.

20.3.3.2 COJ Projects in Construction and Design

COJ also has a drainage improvement project along Soutel/Bassett in design. The project, once completed, will reduce flooding in this area and associated stormwater bacterial 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. Between 2005 and 2009, completed maintenance included 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. 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.

In the lower Trout River watershed, COJ PWD's activities between 1995 and 2009 have included investigating 14 illicit water discharges, 22 illegal discharges, 4 sewer lines that drained into a yard or ditch, and 9 SSOs, as well as inspecting 54 lift stations. PWD will maintain a future level of effort based on requests, which are logged and tracked through the CARE database. **Table 135** provides additional details on COJ's activities in the lower Trout River watershed.

Table 135: COJ Activities in the Lower Trout River Watershed

[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.

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
COJ-284	Sherwood Forest Area	Implement project to reduce flooding	Unknown	$3,190,400	COJ	Completed
COJ-285	La Villa Brooklyn (Broward Road at Smith Road)	Implement flood control project and compensatory treatment for new downtown library	Unknown	$2,750,000	COJ	Construction
COJ-286	Riverview North	Implement wet detention/flood control project	Unknown	$1,646,045	COJ	Completed
COJ-287	Soutel/Bassett Drainage Improvements	Implement drainage improvements–drain pipe beyond pond is 1 foot too high	Unknown	Unknown	COJ	Design
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	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	20 (for 2005–09)	Unknown	COJ	Ongoing
COJ-290	Structure Blocked/Repair/General Flooding	All maintenance activities presented were completed in response to CARE requests. Costs shown are limited to activities completed after release of work order system.	569 (for 2005–09)	$34,167.47	COJ	Ongoing
COJ-291	Illicit Water Discharge	CARE initiated inspection	14 (for 2005–07)	$5,306	COJ	Ongoing
COJ-292	Pollution–Water–Illegal Discharge	CARE initiated inspection	22 (for 2001–08)	$8,338	COJ	Ongoing
COJ-293	Sewer Drains into Yard/Ditch	CARE initiated inspection	4 (for 2008–09)	$1,516	COJ	Ongoing
COJ-294	Sewer Overflow	CARE initiated inspection	43 (for 2000–09)	$16,297	COJ	Ongoing
COJ-295	Septic Tank Inspection	CARE initiated inspection	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	Inspect 9 private lift stations in WBID	54 (for 1997–2009)	$20,466	COJ	Ongoing

Project Number	Project Name	Project Description	Level of Effort	Total Cost	Funding Source	Project Status
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 functioning 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	Carry out NPDES permit-related quarterly water quality sampling	95 (for 1995–2009)	Unknown	COJ	Ongoing
COJ-303	Lake Forest Failure Area–Septic Tank Phase-Out	Phase out septic tanks in failure areas (also listed as part of larger LSJR Main Stem BMAP project)[1]	389 tanks, 13 connected	Unknown	COJ	Ongoing
COJ-304	Riverview Failure Area–Septic Tank Phase-Out	Phase out 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	Develop PSAs	Ongoing	Unknown	COJ	Ongoing
COJ-307	Pet/Animal Management Public Education	Develop PSAs	Ongoing	Unknown	COJ	Ongoing

20.3.4 FDOT Activities in the Lower Trout River Watershed

20.3.4.1 Completed FDOT Projects

FDOT has completed 2 wet detention systems projects in the watershed: (1) Interstate 295 from west of Duval to Biscayne Boulevard, which treats 20 acres; and (2) Interstate 95 from south of Clark Road to Interstate 295, which treats 94 acres. These projects capture and treat stormwater runoff from these areas, reducing the fecal coliform loading to the lower Trout River.

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 they 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. It supports the Adopt-A-Highway Program in the watershed and collects trash from 20 miles of roadways. Street sweeping also occurs 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 roadways and associated stormwater conveyance systems in the WBID.

FDOT also works with COJ on several efforts related to the MS4 permit. It 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. It also helps to fund 2 monitoring stations in the lower Trout River 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 136** lists FDOT's activities in the watershed.

Table 136: FDOT Activities in the Lower Trout River Watershed

[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.

Project Number	Project Name	Project Description	Level of Effort	Estimated Cost	Funding Source	Project Status
FDOT-98	PIC Program	Search for illicit connections	Effort is continuous in WBID; none identified	See Note 1	FDOT/ COJ	Ongoing
FDOT-99	Routine Surface Water Sampling	Carry out NPDES permit-related quarterly water quality sampling	95 (for 1995–2009)	See Note 2	FDOT/ COJ	Ongoing
FDOT-100	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-101	Adopt-A-Highway Program	Allows individuals or groups (after receiving FDOT training) to adopt stretch of road and collect trash and debris	Trash collection area is 20 miles	Unavailable	Not applicable	Ongoing
FDOT-102	Interstate 295 from West of Duval to Biscayne Boulevard	Construct stormwater pond to capture and treat runoff	20 acres, wet detention systems	Unknown	FDOT	Completed
FDOT-103	Interstate 95 Improvement from South of Clark Road to Interstate 295	Construct stormwater pond to capture and treat runoff	94 acres, wet detention systems	Unknown	FDOT	Completed
FDOT-104	Maintain FDOT Stormwater Systems	Clean drainage structures, replace/repair storm/cross/side drains, clean/reshape roadside ditches, clear/repair outfall ditches, mow, remove roadside litter, respond to citizen complaints and roadway sweeping	About 6 miles of roadways and associated stormwater conveyance systems currently maintained in WBID; approximately 12 miles of roadways swept	See Note 4	FDOT	Ongoing

20.4 Summary of Restoration Activities and Sufficiency of Efforts

Table 133 through **Table 136** list the projects and programs to reduce fecal coliform loading in the lower Trout River watershed, by entity. 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 (**Table 137**). The efforts outlined in the project tables, including the activities highlighted below, will reduce fecal coliform loading and improve water quality in the lower Trout River 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 lower Trout River 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 because they are located in the Lake Forest nuisance area and Riverview 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 Lake Forest and Riverview areas in the lower Trout River 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 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, a discrete portion of the WBID 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 reduced, 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, 3 are 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 their status in the first annual BMAP progress report. In addition, 3 stations are situated 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. A 13,000-gallon SSO at 9415 Norfolk Boulevard was caused by 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. It 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 near 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 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 continuing 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 to prevent unpermitted connections. In addition, FDOT sweeps 12 miles of roadways 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. 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 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 137: SUMMARY OF RESTORATION ACTIVITIES FOR THE LOWER TROUT RIVER WATERSHED

\- = Empty cell/no data

Notes: A checkmark **(**√) indicates that the entity is participating in an activity. Shaded cells (marked with an X) indicate that the entity is not participating in that activity. A plus sign (+) indicates that FDOT participation in an activity is provided by funding in the NPDES MS4 agreements with COJ.

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 (PSAs)	√	X	X	X
Surface Water Sampling for Conditions and Trends	√	X	X	X
Sewer System	-	-	-	-
Sewer Line Upgrades	X	X	X	-
Manhole Inspection and Rehabilitation	X	X	X	-
Pump Station Inspection and Maintenance	X	X	X	√
Pump Station Rebuild	X	X	X	√
Air Release Valve (ARV) Inspection and Rehabilitation	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

SOURCE/ACTION	COJ	DCHD	FDOT	JEA
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