

# **2009 HILLSBOROUGH RIVER BASIN MANAGEMENT ACTION PLAN**

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

*in the*

## ***Hillsborough River Basin***

*for*

### **Fecal Coliform Bacteria**

*developed by the*

***Hillsborough River Basin Working Group***

*in cooperation with the*

***Florida Department of Environmental Protection***

***Division of Water Resource Management***

***Bureau of Watershed Management***

***Tallahassee, Florida 32399***

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The *Hillsborough River Basin Management Action Plan (BMAP)* for fecal coliform bacteria was prepared as part of a statewide watershed management approach to restore and protect Florida's water quality. It was developed by the Hillsborough River Basin Working Group (BWG) with participation from Technical Stakeholders (TS). The BWG and TS consisted of affected local, regional, and state governmental interests; elected officials and citizens; and private interests. Heartfelt thanks are also given to all of the other (non BWG and TS groups) organizations, citizen groups and private citizens which were involved in this process. A listing of individuals (BWG, TS and others) who participated in this process is provided on the next few pages.

The development of this Hillsborough River Basin Management Action Plan was coordinated by the Tampa Bay Estuary Program (TBEP), with funding assistance provided by the Florida Department of Environmental Protection (FDEP). Significant in-kind services were provided by the Basin Working Group members, particularly the Environmental Protection Commission of Hillsborough County and the Hillsborough County Public Works Department. HSW Engineering, Inc. and BCI Engineers and Scientists provided technical and facilitation support under contract to both TBEP and FDEP throughout the multi-year development of this document. PBS&J and USF provided source tracking expertise.

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## LIST OF ACRONYMS

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ARA	Antibiotic Resistance Analysis
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BWC	Blackwater Creek
BWG	Basin Working Group
BWL	Below Water Level
DNA	Deoxyribonucleic Acid
DO	Dissolved Oxygen
EPA	U.S. Environmental Protection Agency
EPCHC	Environmental Protection Commission of Hillsborough County
ERP	Environmental Resource Permit
F.A.C.	Florida Administrative Code
FC	Fecal Coliform
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
F.S	Florida Statutes
FWRA	Florida Watershed Restoration Act
FY	Fiscal Year
HCHD	Hillsborough County Health Department
IO	Indicator Organism
IWR	Impaired Surface Water Rule
LA	Load Allocation
LHR	Lower Hillsborough River
LID	Low-Impact Development
MFL	Minimum Flows and Levels
MOS	Margin of Safety
MOSI	Museum of Science and Industry
MS4	Municipal Separate Storm Sewer System
MST	Microbial Source Tracking
NGVD	National Geodetic Vertical Datum
NM	Not Measured
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NR	New River
NRCS	Natural Resources Conservation Service
OAWP	Office of Agricultural Water Policy
OFW	Outstanding Florida Water
OHWL	Ordinary High Water Level
OSTDS	On-Site Sewage Treatment and Disposal System
QA	Quality Assurance
PLRG	Pollutant Load Reduction Goal
SBF	Spartman Baker and Flint Creeks

SSO	Sanitary Sewer Overflow
SWFWMD	Southwest Florida Water Management District
TBEP	Tampa Bay Estuary Program
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TOC	Total Organic Carbon
TP	Total Phosphorus
TS	Technical Stakeholder
TSI	Trophic State Index
TSS	Total Suspended Solids
UF	University of Florida
UF/IFAS	University of Florida–Institute of Food and Agricultural Sciences
WBID	Waterbody Identification
WLA	Waste Load Allocation
WMI	Watershed Management Initiative
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

## EXECUTIVE SUMMARY

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The Hillsborough River Basin Management Action Plan (BMAP) was developed by the Hillsborough River Basin Working Group (BWG) and Technical Stakeholders (TS) in a process spanning multiple years. This BMAP addresses sections of waterbodies designated as waterbody identifications (WBIDs) in the Hillsborough River Basin impaired for fecal coliform bacteria (fecal coliform). It focuses on tracking and reducing fecal coliform discharges to streams verified as impaired under the Florida Watershed Restoration Act (FWRA) (Chapter 403.067, Florida Statutes [F.S.]) and the Impaired Surface Waters Rule (IWR) (Rule 62-303, Florida Administrative Code [F.A.C.]), and for which total maximum daily loads (TMDLs) are established.

The Florida Department of Environmental Protection (FDEP) adopts TMDLs by rule. These TMDLs establish the maximum amount of specific pollutants a waterbody can assimilate while maintaining water quality standards and their designated uses. All surface waters in the Hillsborough River Basin are designated as Class III waters in accordance with Rule 62-302, F.A.C. with a portion designated as an Outstanding Florida Water (OFW). An Outstanding Florida Water is a waterbody worthy of special protection because of its natural attributes. Surface waters are designated Class III when they have suitable water quality to maintain recreational use and to maintain healthy propagation of a well-balanced fish and wildlife population.

This Hillsborough River BMAP provides for phased implementation as specified in Paragraph 403.067(7)(a)1, F.S. The management actions/projects and adaptive management approach described in the BMAP will address fecal coliform bacteria reduction/management actions/projects needed to meet the TMDLs. This adaptive management process will continue in five-year cycles until the TMDLs are met for fecal coliform bacteria within these WBIDs.

The Hillsborough River BMAP was developed based on adaptive management concepts applied at a watershed scale. Most of the municipalities, agencies, and private businesses contributing to the BMAP are also active members of the Tampa Bay Nitrogen Management Consortium, initiated in 1998 as part of the Tampa Bay Estuary Program. The consortium's successful collective approach in maintaining nitrogen loads to Tampa Bay at target levels was the model used by the Environmental Protection Commission of Hillsborough County (EPCHC) in proposing a Watershed Management Initiative (WMI) for waterbodies in Hillsborough County in 2005. When the FDEP approved TMDLs in 2006, the affected parties in the Hillsborough River Basin and FDEP accepted the EPCHC's WMI concept as an appropriate framework for BMAP development and brought as many parties to the table as possible.

As a result of the ongoing nitrogen consortium efforts, municipalities, agencies, private and agricultural interests already have developed a working relationship for the improvement of water quality conditions within the basin. There is an established tradition of cooperative effort between a large number of these stakeholders and interested parties. Most of these stakeholders in the consortium are the same as the stakeholders for this current BMAP effort. Extensive efforts have been made to ensure all potential stakeholders and interested parties have been informed of, and included in the proceedings.

This collection of BMAP stakeholders is divided into two groupings. The Basin Working Group and Technical Stakeholders are comprised of technical experts and interested parties from local government; regional, state, and federal agencies; and the private sector. One group is considered the Technical Stakeholders which is open to all affected parties gathering, providing or using data pertinent to this BMAP process. The Technical Stakeholders evaluate the data and generate recommendations on that information to achieve TMDL goals. These recommendations are then presented by DEP to the Basin Working Group for decision making on preferred options to achieve TMDLs. The Basin Working Group then recommends approval of the BMAP.

This BMAP addresses fecal coliform management actions/projects for impaired waterbodies within the Hillsborough River Basin. The Introduction (Chapter 1) summarizes the process used by the Basin Working Group and Technical Stakeholders to develop BMAPs and briefly describes the physical, geological, and population characteristics of the WBIDs within the Hillsborough River Basin. Subsequent chapters contain descriptions of the individual impaired segments with waterbody identification (WBID) numbers, the action plan developed to address impairments in each WBID, a summary of actions, and commitments to implementing the plan.

The following streams and lakes have TMDLs for fecal coliform and are depicted in **Figure ES.1**:

**Blackwater Creek, WBID 1482.** Blackwater Creek, located in northern Hillsborough County, is 13.6 miles long and has a 113-square-mile drainage area. The creek drains to the Hillsborough River.

**New River, WBID 1442.** The New River is located in the southeastern portion of Pasco County and northern portion of Hillsborough County. The river is 11.1 miles long, has a 20.9-square-mile watershed, and drains to the Hillsborough River.

**Spartman Branch, WBID 1561.** Spartman Branch, which is 4.5 miles long, is located in north-central Hillsborough County and the City of Plant City. It has a 27.4-square-mile watershed and drains to Pemberton Creek, which discharges to Baker Creek and Lake Thonotosassa.

**Baker Creek, WBID 1522C.** Baker Creek's 27.4-square-mile watershed is located in north-central Hillsborough County. The creek is 2 miles long and drains to Lake Thonotosassa, which discharges to the Hillsborough River through Flint Creek.

**Flint Creek, WBID 1522A.** Flint Creek, which is 2.3 miles long, is located in north-central Hillsborough County and discharges from Lake Thonotosassa to the Hillsborough River. Its watershed encompasses more than 60 square miles and includes the Spartman Branch and Baker Creek WBIDs as sub-basins.

**Lower Hillsborough River, WBID 1443E.** The Lower Hillsborough River is located in the City of Tampa, between Sulphur Springs and the river mouth at Hillsborough Bay. The length from Sulphur Springs to the river mouth is 7.8 miles. Its 675-square-mile watershed includes all of the WBIDs listed above.

Management actions/projects addressing TMDLs for the WBIDs described above were included in this BMAP because the “connectedness” of the TMDL waterbodies facilitates more efficient use of local government expertise, the waterbodies share common problems and expected sources, and several local pollution control programs and maintenance and operation activities apply to all the waterbodies.

The BMAP process was structured to achieve cooperation and consensus among a broad range of interested parties. Invitations were sent out to numerous stakeholders, governmental agencies, citizen organizations and private citizens to be involved in this process. As the process went on, participation narrowed to the interested parties and involved stakeholders specific to these particular WBIDs to form the existing group of Technical Stakeholders and Basin Working Group (as listed on page vi and vii). The process promoted the engagement of local stakeholders in a coordinated and collaborative manner to address the tracking of bacterial sources and implementation of management strategies needed to achieve the Hillsborough River Basin TMDLs. It built upon existing water quality improvement programs and local partnerships to address water quality problems. Members of the Hillsborough River Basin Working Group represent the following agencies and organizations:

- City of Plant City;
- City of Tampa;
- City of Temple Terrace;
- Environmental Protection Commission of Hillsborough County (EPCHC);
- Florida Department of Agriculture and Consumer Services (FDACS);
- Florida Department of Transportation (FDOT);
- Hillsborough County;
- Hillsborough County Health Department (HCHD);
- Pasco County;
- Polk County;
- Southwest Florida Water Management District (SWFWMD); and
- University of Florida, Institute of Food and Agricultural Sciences (UF/IFAS).

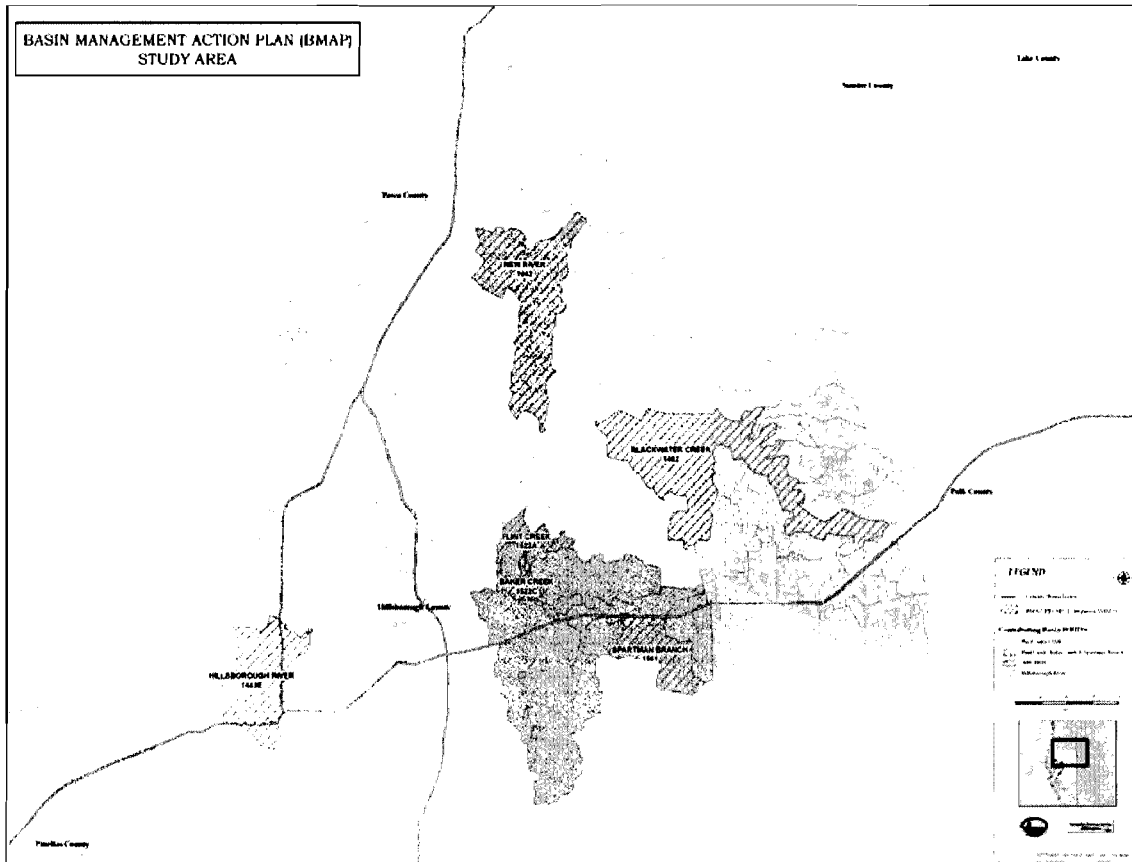


FIGURE ES.1. HILLSBOROUGH RIVER BASIN BOUNDARY AND LOCATION OF BMAP WATERBODIES

### ES.1 Management Actions/Projects

The BMAP builds upon existing water quality improvement programs and local partnerships, and is created to address sources of fecal coliform bacteria. State and local governments, community groups and local agency operations have committed to the implementation of the BMAP and have signed statements or resolutions to that effect.

The BMAP documents the management actions/projects that are being or will be undertaken by local, regional, state, or private entities to reduce the amount of fecal coliform bacteria released into waterbodies with established TMDLs. The BMAP also addresses the following:

- *Identification of potential sources of fecal coliform bacteria;*
- *Assignment or allocation of loadings to sources;*
- *Funding and timeline for projects;*

- *Monitoring (water quality) plans for follow-up of BMAP implementation;*
- *Tracking of projects;*
- *Loadings from future growth; and*
- *Commitment to plan implementation by local partners.*

This BMAP contains information on over 75 management actions/projects (Tables 6.2 through 6.7 and Tables 10.1 through 10.7) to address elevated fecal coliform levels within the river and creek WBIDs. Many of these projects are part of existing programs, but some were expanded in scope to address the TMDLs (see Table 6.3) or undertaken by local partners at their expense for the sole purpose of supporting TMDL development and implementation (Table 6.2). Table 1.1 summarizes the number of management actions/projects for the TMDL waterbodies by management category.

Though a substantial body of scientific and technical literature exists on the hydrology, ecology, and function of the TMDL waterbodies, the relation of water quality to fecal coliform pollutant sources is not well understood for many of these waterbodies. For waterbodies where scientific understanding is well developed, projects were proposed that will meet the TMDL. For waterbodies where current scientific understanding contains large uncertainties, the BMAP includes focused studies expected to increase the understanding of impaired waterbodies and to support development of future management actions/projects. Examples of these focused studies are the technical work supporting development of pollution load reduction goals (PLRGs), fecal coliform water quality sampling and extensive microbial source tracking work (Table 10.7 contains details).

The TS have committed to more than 75 management actions. The percentage of projects that are either ongoing or that stakeholders will have completed by 2009 are 100% within Blackwater Creek (WBID 1482), 100% within New River (WBID 1442), 97% within Spartman Branch, Baker Creek and Flint Creek (WBID 1561, 1522C, and 1522A), and 93% within Lower Hillsborough River (WBID 1443E)(Table 3.1).

A “weight-of-evidence” assessment of potential fecal coliform bacteria sources was completed in June 2008 to determine concentrations in the impaired WBIDS for this BMAP. The results of the microbial source tracking (MST) together with an extensive review of infrastructure mapping, historic monitoring, and land-use data provided the weight-of-evidence needed to point to potential source contributions of fecal coliform indicator organisms (IO) in the impaired WBIDs (PBSJ 2008). A summary of the data and discussion on the variability of fecal coliforms in response to changing conditions can be found in the final MST report published June 2008.

In addition to stakeholder management actions, BMAP monitoring efforts are anticipated to continue (by the Stakeholders) in this basin for the long term. With a majority of the planned management actions being addressed by the end of 2009, water quality data collected after 2009 is anticipated to begin to show reductions in fecal coliform levels. Implementation of the Monitoring Plan (Appendix B) will confirm this improvement and adjustments in management actions will be made as needed to show continued progress.

***Blackwater Creek***

For Blackwater Creek (WBID 1482), the most likely sources throughout the WBID appear to be both human and animal-related. Based on predominant land-uses, the stream can be separated into three portions with fecal coliform sources varying for each portion of the creek (PBSJ 2008). Stakeholders are addressing these sources within this WBID with a total of forty-four (44) management actions. Some of these management actions also apply to other WBIDs, especially if it is a county-wide endeavor. As a result, some management actions may be counted more than once.

Fecal Coliform sources in the upstream portion of Blackwater Creek appear to be from sanitary sewer overflows (SSO), mobile home park wastewater facilities and onsite treatment and disposal systems (OSTDS). There are seventeen (17) management actions within this WBID that address possible septic and sanitary sewer fecal coliform sources.

The fecal coliform sources in the middle portion of Blackwater Creek primarily appear to be from cattle on a local large cattle ranch. Other areas that may contribute fecal coliform bacteria are older residential neighborhoods near a contributing tributary to Blackwater Creek and a wastewater treatment facility (WWTF) outfall to East Canal (PBSJ 2008). Stakeholders address the ruminant-related fecal coliform sources in this portion of the WBID with five (5) projects. This is in addition to the seventeen (17) projects addressing septic and sanitary sewer sources. One project that addresses the cattle source contribution is the Cone Ranch Restoration Project. This project restored the hydroperiod in 400 acres of pastureland feeding into the Blackwater Creek basin. In addition, the City of Plant City maintains a Wastewater Treatment Plant (WWTP) Fecal Coliform Bacteria Reduction Program of operational protocols to reduce bacteriological contamination in the effluent discharged to the East Canal tributary of Blackwater Creek.

For the most downstream area of Blackwater Creek, land use is rural with few homes and cattle. The primary source for this area is not as clearly defined.

Locations of potential fecal coliform hot spots within the WBID are documented and described in **Appendix C**. The Hillsborough County Health Department (HCHD) did not identify any high-probability areas for septic system failure within the Blackwater Creek WBID boundaries or immediately contributing waters within Hillsborough County (PBSJ 2008). Management actions for this WBID can be found in Section 6.0, including **Table 6.4**, which details the forty-four (44) projects addressing the entire Blackwater Creek WBID. Additional information on these projects can also be found in Appendix D of the *Draft Hillsborough River Basin Basin Management Action Plan (HRB BMAP) Supporting Document (FDEP 2009)*.

### ***New River***

For New River (WBID 1442), potential sources for fecal coliform primarily appear to be OSTDS from low-lying older residential communities with un-mounded septic system drainfields, with cattle and wildlife potentially contributing fecal coliform in the most downstream portions (PBSJ 2008). Stakeholders address the septic and sanitary sewer sources with seven (7) projects. The New River Watershed Management Plan, a combined effort of Pasco County and the Southwest Florida Water Management District (SWFWMD), has been funded for this area to address watershed water quality. In addition, Stakeholders are addressing the ruminant-related fecal coliform sources with appropriate agriculture Best Management Practices (BMPs) for this WBID.

The HCHD did not identify any high-probability areas for septic system failure within the New River WBID boundaries or immediately contributing waters within Hillsborough County (PBSJ 2008). Management actions for this WBID can be found in Section 6.0 including **Table 6.5**, which details the nineteen (19) projects addressing the entire New River WBID. Additional information on these projects can also be found in Appendix D of the *Draft HRB BMAP Supporting Document*.

### ***Spartman Branch, Baker Creek, and Flint Creek***

Spartman Branch and Baker Creek are part of a stream network that drains into Lake Thonotosassa, the largest natural lake in Hillsborough County (Figures 6.3 and 6.4). Both streams are located entirely within Hillsborough County. Flint Creek is the outlet stream that drains from Lake Thonotosassa into the Hillsborough River. Because the three streams are hydrologically connected, the management actions/projects proposed for them are combined here. Stakeholders are addressing fecal coliform sources within these combined WBIDs with a total of thirty-five (35) management actions.

For Spartman Branch (WBID 1561), fecal coliform sources are spatially isolated. Human-related sources appear to originate from mobile home septic systems and animal-related sources from wildlife (such as deer) and horses transported via stormwater runoff (PBSJ 2008).

Baker Creek (WBID 1552C) sources appear to be primarily from low-lying residential communities with both mounded and un-mounded septic system drainfields with a history of failures, and from livestock closely associated with tributary surface waters. Flint Creek (WBID 1552A) sources appear to be from a combination of human and animal sources (PBSJ 2008).

Stakeholders are addressing fecal coliform sources from septic systems within this combined WBID with four (4) management actions. Agriculture, livestock and stormwater quality within these combined WBIDs are being addressed with ten (10) management actions. Projects designed to address contributions from stormwater runoff in these WBIDs are the Pemberton Creek Stormwater Improvements and the Lake Thonotosassa Project. Pemberton Creek is the primary headwater of Baker Creek and this project has created a five-acre water treatment pond to improve water quality.

The Lake Thonotasassa project treats 80 acres of agriculture land with a constructed wetland and sedimentation basin to improve water quality in the lake.

The Hillsborough County Health Department (HCHD) did not identify any high-probability areas for septic system failure within the Spartman Branch, Baker or Flint Creek WBID boundaries or immediately contributing waters within Hillsborough County (PBSJ 2008). Details of the thirty-five (35) management actions for these combined WBIDs can be found in Section 6.0 including **Table 6.6**. Additional information on these projects can also be found in Appendix D of the *Draft HRB BMAP Supporting Document*.

### ***Lower Hillsborough River***

For Lower Hillsborough River (WBID 1443E), the leading source of fecal coliform contamination appears to be human-related, particularly in the sediments, which contribute to chronic and elevated levels of surface water contamination. Reservoirs of fecal coliform bacteria in sediment throughout the Lower Hillsborough River have the potential to re-inoculate the water column and contribute to elevated levels of surface water contamination. Human-specific sources were detected in all but one surface water site tested. Although ruminant and horse-specific markers were occasionally present and transported via stormwater, existing land use suggests that the human source is more significant (PBSJ 2008).

As of the adoption of this BMAP, Stakeholders are addressing the sources within this WBID with a total of forty-three (43) management actions. There are nine (9) management actions within this WBID that address possible sanitary sewer fecal coliform sources. There are two (2) management actions within this WBID that address possible septic fecal coliform sources. There are sixteen (16) management actions within this WBID that address surface water quality improvement from possible stormwater transported fecal coliform sources. One measure being taken to address the anthropogenic (human) fecal coliform sources is the City of Tampa 12<sup>th</sup> Street Forcemain Replacement, which will address a previous 22 million gallon release and minimize future overflow occurrences. Another measure is the City of Tampa North Tampa Pond Enlargement. The City built a retention pond at Orchid Sink, which eventually drains to the Lower Hillsborough River. This retention pond helps improve drainage that treats 160 acres of residential land.

The HCHD did not identify any high-probability areas for septic system failure within the Lower Hillsborough River WBID boundaries or immediately contributing waters within Hillsborough County (PBSJ 2008). Details of the forty-three (43) management actions for this WBID can be found in Section 6.0, including **Table 6.7**. Additional information on these projects can also be found in FDEP's Appendix D of the *Draft HRB BMAP Supporting Document*.

### ***ES.2 Managing Pollutant Loads from Future Growth***

As required by the FWRA, fecal coliform loadings associated with future growth were considered as part of the BMAP. These estimates were based on anticipated population growth in the basin obtained from U.S. Census Bureau data gathered and evaluated through the BMAP process. Basinwide, future growth predicted through 2015 is not expected to substantially increase fecal coliform pollutant loads.

The vast majority of anticipated residential developments within these WBIDs will be on centralized sewer, rather than on small package treatment plants or septic tanks. The centralized sewage treatment plants are all either advanced secondary or tertiary treatment with high level disinfection. In addition, the number of cow-calf operations in the WBID areas may decrease over time. The Florida Department of Agriculture and Consumer Services (FDACS) has very recently finalized BMPs for cow-calf operations, and will be recruiting cattle producers to enroll in and implement BMPs. BMP implementation should diminish any direct discharges into these rivers/streams.

### ***ES.3 BMAP Implementation and Tracking***

BMAP implementation will be a long-term process. Many unknowns remain with respect to fecal coliform sources and causes. The TMDLs established for the basin's rivers and creeks may not be achieved in the near term. Initial management actions/projects taken to identify sources of fecal coliform bacteria have been successful. The initial identification of bacteria sources using a variety of techniques, including detailed microbial source tracking, and field observations, has been completed.

In the early stages of BMAP implementation, the TS has initiated a project to better evaluate elevated levels of fecal coliform bacteria in the Hillsborough River Basin rivers and creeks. In this first phase, the TS will track its projects and other implementation efforts and monitor water quality in the TMDL waterbodies (through existing water quality monitoring programs), to ensure that the BMAP is carried out and to measure its effectiveness. The TS and BWG will meet at least annually to discuss implementation issues, consider new information, and determine other management actions/projects needed for waterbodies that may not be projected to meet their TMDLs in the future. These meetings will be held so that progress is documented and information forwarded to FDEP.

If significant changes have occurred over the year, a progress report will be created to discuss those changes and highlight alternatives to reaching the TMDL goal. Each entity responsible for implementing management actions/projects as part of the BMAP will submit information to the Tampa Bay Estuary Program for incorporation into the progress report for submittal to the BWG and FDEP. Information on the coordination efforts of TBEP can be found in Appendix D of the *Draft HRB BMAP Supporting Document*. The progress report will track the implementation status of any management actions/projects listed in the BMAP and document additional management actions/projects undertaken to further the water quality improvements in the basin.

As part of the BMAP, the BWG has designed a strategy for monitoring water quality based on specific indicators and measuring pollutant concentrations and loads to determine if water quality is improving and the TMDL is being met. **Table ES.1** itemizes proposed water quality indicators and their expected responses to water quality improvements.

Observations of water quality conditions and trends will be reported to the BWG and FDEP at least annually as part of the BMAP annual meeting. Water quality data will be used to support the adaptive management process, assess projects, and identify the possible need for new actions. A more complete analysis of trends in progress towards achieving designated use will be made on a five-year basis, corresponding with FDEP’s watershed management cycle.

**TABLE ES.1. ANTICIPATED TRENDS IN CORE AND SUPPLEMENTAL WATER QUALITY INDICATORS**

<b>CORE INDICATORS*</b>	<b>EXPECTED RESPONSE IN RIVERS AND CREEKS</b>
Fecal coliform	Decrease in concentration
<b>SUPPLEMENTAL INDICATORS**</b>	<b>EXPECTED RESPONSE IN RIVERS AND CREEKS</b>
Specific conductance	Monitored to facilitate interpretation of core indicator trends
Dissolved oxygen (DO)	Monitored to facilitate interpretation of core indicator trends
Alkalinity	Monitored to facilitate interpretation of core indicator trends
pH	Monitored to facilitate interpretation of core indicator trends
Temperature	Monitored to facilitate interpretation of core indicator trends
Color	Monitored to facilitate interpretation of core indicator trends
Turbidity	Monitored to facilitate interpretation of core indicator trends
Total suspended solids (TSS)	Monitored to facilitate interpretation of core indicator trends
Total organic carbon (TOC)	Monitored to facilitate interpretation of core indicator trends

\*Core indicator – Indicator that measures progress made towards achieving TMDL.

\*\*Supplemental indicator – Additional indicators measured to facilitate the interpretation of core indicators.

## **2008 HILLSBOROUGH RIVER BASIN MANAGEMENT ACTION PLAN ADDRESSING THE TMDLS FOR BLACKWATER CREEK, NEW RIVER, SPARTMAN BRANCH, BAKER CREEK, FLINT CREEK, AND LOWER HILLSBOROUGH RIVER**

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### ***1.0 Introduction***

The Hillsborough River Basin Management Action Plan (BMAP) was developed by the Technical Stakeholders (TS) and the Hillsborough River Basin Working Group (BWG) over a multiyear period. It addresses waterbodies in the Hillsborough River Basin with water quality impairments for fecal coliform. The BMAP focuses on reducing fecal coliform discharges to rivers and creeks verified as impaired under the Florida Watershed Restoration Act (FWRA) (Chapter 403.067, Florida Statutes [F.S.]) and the Impaired Surface Waters Rule (IWR) (Rule 62-303, Florida Administrative Code [F.A.C.]), and for which total maximum daily loads (TMDLs) have been established. TMDLs were established for Blackwater Creek (WBID 1482), New River (WBID 1442), Spartman Branch (WBID 1561), Baker Creek (1522C), Flint Creek (WBID 1522A), and Lower Hillsborough River (WBID 1443E) for fecal coliform bacteria (fecal coliform).

The BMAP documents the management actions/projects that have been, are being, or will be undertaken by local, regional, state, or private entities to reduce the amount of these pollutants released into waterbodies with established TMDLs. Reducing the amounts of fecal coliform released in the basin will help achieve water quality standards and designated uses established by the FDEP. Waters in the Hillsborough River Basin are designated as Class III, suitable for recreational use and for the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. A portion of the Hillsborough River is also designated as an Outstanding Florida Water (OFW) (Section 403.061(27) Florida Statutes), due to its special natural attributes. The OFW designation places restrictions on any new activities that would lower water quality or otherwise degrade the body of water.

Management actions/projects addressing these TMDLs for the identified WBIDs were included in this BMAP together because of the “connectedness” of the TMDL waterbodies, the commonality of problems and expected sources, and the fact that local pollution control programs and maintenance and operation activities apply to these waterbodies.

This BMAP provides for phased implementation under Paragraph 403.067(7)(a)1, F.S. The management actions/projects and adaptive management approach described in the BMAP will address the fecal coliform bacteria reductions needed to meet the TMDLs. This adaptive management process will continue until the TMDLs are met.

The Hillsborough River BMAP adoption as a phased BMAP allows for the implementation of projects designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand water quality dynamics (sources and response variables) in each impaired waterbody. Subsequent five-year management cycles will evaluate progress and make adjustments or add new projects, as needed, to meet the TMDLs.

## 1.1 Overview of Management Actions/Projects

An important result of the BMAP process in the Hillsborough River Basin has been the unprecedented level of local stakeholder participation and commitment. Over 90 different citizen groups, governmental agencies, and over 40 individuals have attended public meetings for this endeavor. Enhanced communication and cooperation among basin stakeholders and citizens created through the BMAP process will have benefits beyond the BMAP. Together, stakeholders identified solutions to some of the basin's complex water pollution issues and are taking decisive steps toward actualizing those solutions.

Signatories to this BMAP share a common goal: restoring the designated uses of impaired waterbodies in the Hillsborough River Basin. Their management actions/projects, including more than 75 specific projects identified in this BMAP, will improve the water quality of impaired waterbodies. These management actions/projects cover a wide variety of pollutant sources and are categorized as follows:

- *Basic Stormwater Management Programs;*
- *Education and Outreach Efforts;*
- *Agricultural BMPs;*
- *Regulations, Ordinances, and Guidelines;*
- *Special Studies, Planning, Monitoring and Assessments;*
- *Restoration and Water Quality Improvements; and*
- *Wastewater Infrastructure Management.*

**Table 1.1** summarizes the number of management actions/projects by category for each TMDL waterbody identified by WBID. Projects may apply to more than one management category. The number and type of projects vary by waterbody. Basinwide management actions/projects are counted for each individual waterbody.

Considerable effort was taken to understand the hydroecology of and internal dynamics of the six TMDL waterbodies. Even so, the exact source(s) of fecal contamination and the relation of water quality to pollutant sources are still not well understood for some of these waterbodies. Consequently, projects and actions identified in this BMAP include additional efforts to further isolate potential/likely sources, and ascertain whether sources are human-based or animal-based. For each project/action (**Table 1.1**) the BMAP assesses potential fecal coliform reductions either qualitatively or quantitatively. The lack of identifiable point source(s) within the water bodies (by definition) limits the ability to quantify reductions in many instances, or to provide specific timeframes for improvements. The projects/actions listed in **Table 1.1** will each either help identify source(s) or reduce fecal coliform inputs. Additional quantification of such reductions will become possible as monitoring and projects are implemented in a coordinated fashion.

For waterbodies where scientific understanding of likely sources is well-developed, projects were proposed that will contribute to meeting the TMDL. For example, the bacteria “hot spot” project (identified as BWC-3, NR-4, SBF-2, & LHR-2 in **Tables 6.4-6.7**) began with microbial source tracking (MST) studies that provided sufficient certainty to identify geographic areas of concern for human sources of bacteria (USF 2005, PBSJ 2008). The geographic guidance obtained from the MST studies is now being used in coordination with a field-based source identification and remediation effort by multiple stakeholders. In this way, projects in the BMAP are the TS and the BWG’s best effort to combine current scientific understanding with a pragmatic and adaptive approach to decrease coliform bacteria in rivers and creeks. The TS and the BWG have initiated these activities in order to contribute to improvements in fecal coliform impaired waterbodies within the HRB. Additional quantification will become possible as monitoring, source tracking, and project implementation proceed together in a coordinated manner.

**TABLE 1.1. PROJECT MANAGEMENT CATEGORIES IN THE HILLSBOROUGH RIVER BASIN FOR FECAL COLIFORM**

TMDL CATEGORY/ PARAMETER	WATERBODY WBID*	HILLSBOROUGH RIVER BMAP MANAGEMENT CATEGORY	NUMBER OF PROJECTS
Fecal Coliform Bacteria (Fecal Coliform)	Blackwater Creek 1482	Basic Stormwater Management Program	3
		Education and Outreach Efforts	5
		Agricultural BMPs	2
		Regulations, Ordinances, and Guidelines	6
		Special Studies, Planning, Monitoring, and Assessment	12
		Restoration and Water Quality Improvement	4
		Wastewater Infrastructure Management	13
	New River 1442	Basic Stormwater Management Program	2
		Education and Outreach Efforts	4
		Agricultural BMPs	1
		Regulations, Ordinances, and Guidelines	2
		Special Studies, Planning, Monitoring, and Assessment	9
	Spartman Branch 1561 Baker Creek 1522C Flint Creek 1522A	Wastewater Infrastructure Management	7
		Basic Stormwater Management Program	2
		Education and Outreach Efforts	10
		Agricultural BMPs	1
		Regulations, Ordinances, and Guidelines	1
	Lower Hillsborough River 1443E	Special Studies, Planning, Monitoring, and Assessment	5
		Wastewater Infrastructure Management	13
		Basic Stormwater Management Program	15
Education and Outreach Efforts		10	
Regulations, Ordinances, and Guidelines		1	
Special Studies, Planning, Monitoring, and Assessment		7	
	Restoration and Water Quality Improvement	3	
	Wastewater Infrastructure Management	12	

\* WBID – Waterbody identification.

This BMAP contains over 75 documented management actions/projects to address elevated fecal coliform levels in specific basin rivers and creeks (Tables 6.1 through 6.7). Some of these management actions/projects are part of existing programs, but some were expanded in scope to address the TMDLs (Table 6.3) or undertaken for the sole purpose of supporting TMDL development and implementation (Table 6.2). Other projects or management activities are new.

## 1.2 Document Organization

**Section 2.0** of the Hillsborough River BMAP provides a background discussion of the region and targeted waterbodies. **Section 3.0** describes the TMDLs in the six WBIDS within the basin. The process used to develop the Hillsborough River BMAP, including a discussion of how the public and other stakeholders were encouraged to participate in developing the BMAP, is found in **Section 4.0**. Allocation of pollutant reductions is discussed in **Section 5.0**. **Section 6.0** describes the possible pollutant sources and management actions/projects to achieve the TMDLs, including management actions/projects that address future growth. This section is primarily organized by each BMAP waterbody. Monitoring activities (**Section 7.0**) to evaluate reasonable progress and tracking and follow-up actions (**Section 8.0**) are presented next. The signed commitment of the parties to implement and support the BMAP is shown in **Section 9.0**. **Section 10.0** presents detailed tables describing the water quality improvement projects to which stakeholders have committed in this BMAP. Detailed and additional information on each project is presented in Appendix D of the *Draft Hillsborough River Basin Basin Management Action Plan (HRB BMAP) Supporting Document*. A glossary of terms is provided in **Appendix A**.

The Hillsborough River BMAP includes or addresses the elements required by the 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 4.0);*
- *Equitably allocate pollutant reductions within the basin (Section 5.0);*
- *Identify the mechanisms by which potential future increases in pollutant loading will be addressed (Section 6.0);*
- *Document management actions/projects to achieve the TMDLs (Section 7.0);*
- *Document the implementation schedule, funding, responsibilities, and milestones (Tables 10.1 through 10.7); and*
- *Identify monitoring, evaluation, and a reporting strategy to evaluate reasonable progress over time (Section 7.0).*

## **2.0 Background**

The Hillsborough River BMAP has been developed as part of FDEP's TMDL Program. FDEP implements the TMDL Program using a watershed management approach. The approach applies a five-year rotating basin cycle, with each year of the cycle representing a different phase of the basin rotation cycle: (a) Initial Basin Assessment; (b) Strategic Monitoring; (c) Data Analysis and TMDL Development; (d) BMAP Development; and (e) BMAP Implementation. At the end of each five-year cycle, a new cycle begins for each group of basins.

### **2.1 Regional Setting**

The Hillsborough River Basin is located in Hillsborough County, including a significant part of the City of Tampa, and portions of central and eastern Pasco County and western Polk County. The Hillsborough River Basin is a TMDL basin. The BMAP addresses six basin waterbodies verified as impaired for fecal coliform (**Figure 2.1** shows their locations). TMDLs have been established for each of the following waterbodies:

- *Blackwater Creek (WBID 1482)*
- *New River (WBID 1442)*
- *Spartman Branch (WBID 1561)*
- *Baker Creek (WBID 1522C)*
- *Flint Creek (WBID 1522A)*
- *Lower Hillsborough River (WBID 1443E)*

Management actions/projects addressing all these TMDLs for the listed WBIDs were included in this BMAP for several reasons: (1) the 'connectedness' of the TMDL waterbodies facilitated the more efficient use of local government expertise; (2) there are common problems and expected sources; (3) and several local pollution control programs and maintenance and operation activities apply to all the waterbodies.

Hillsborough River Basin BMAP – March 5, 2009

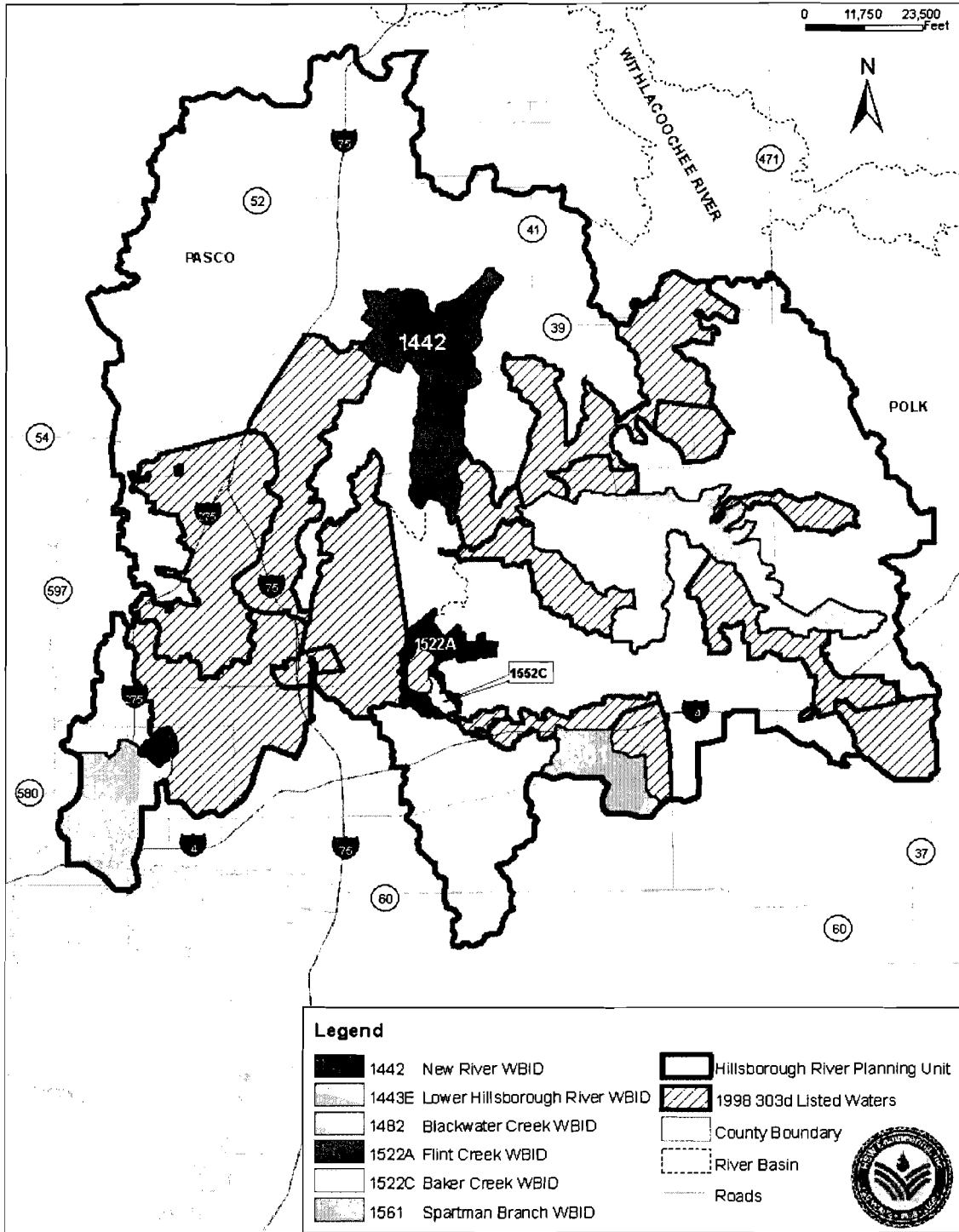


FIGURE 2.1. HILLSBOROUGH RIVER BASIN FECAL COLIFORM IMPAIRED BMAP WATERBODIES

### **3.0 Total Maximum Daily Loads in the Hillsborough River Basin**

TMDLs, which FDEP adopts by rule, establish the maximum amount of specific pollutants that a waterbody can assimilate while maintaining water quality standards, including designated uses. TMDLs quantify the pollutant reductions that are needed to achieve water quality targets, based on state water quality standards. All surface waters in the Hillsborough River Basin are designated as Class III waters in accordance with Rule 62-302, F.A.C., and are defined as having suitable water quality for recreational use and for the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. A portion of the Hillsborough River is also designated as an Outstanding Florida Water (OFW) for its unique natural attributes.

A TMDL is expressed as the sum of all point source loads, nonpoint source loads, and an appropriate margin of safety (MOS), which takes into account uncertainty about the relationship between effluent limitations and water quality.

TMDLs are developed by FDEP for specific pollutants [such as total nitrogen (TN), total phosphorus (TP), fecal coliform bacteria, and others] in specific waterbodies. To establish a TMDL, FDEP assesses each impaired waterbody, the pollutant(s) contributing to the impairment, the amount of pollutant(s) entering the waterbody during a specified period, and the degree to which those pollutant loads must be reduced to meet the TMDL water quality target. FDEP uses computer modeling and statistical evaluations as part of the assessment process. It determines the level of pollutant(s) that each waterbody can receive while maintaining its goal of Class III designated use and criteria, and identifies the corresponding pollutant reduction needed to achieve the TMDL.

Within portions of the Hillsborough River Basin, fecal coliform bacteria were identified as the primary pollutants causing impairment. In 2003, FDEP adopted TMDLs for six of the impaired waterbodies in the Hillsborough River Basin. **Table 3.1** lists the adopted TMDLs. Details on all Hillsborough River Basin TMDLs can be found in the following resources:

- Florida Department of Environmental Protection. 2002. *Tampa Bay Tributaries Basin status report*. Tallahassee, Florida. Tallahassee, Florida. Available: <http://www.dep.state.fl.us/water/basin411/tbtribs/status.htm>.
  - 2004a. *Fecal and total coliform TMDLs for Blackwater Creek (WBID 1482)*. TMDL Report. Tallahassee, Florida.
  - 2004b. *Fecal and total coliform TMDLs for Hillsborough River (WBID 1443E)*. TMDL Report. Tallahassee, Florida.
  - 2004c. *Fecal and Total Coliform TMDL for New River (WBID 1442)*. TMDL Report. Tallahassee, Florida.
  - 2004d. *Fecal and total coliform TMDLs for Flint Creek (WBID 1522A)*. TMDL Report. Tallahassee, Florida.
  - 2004e. *Fecal and total coliform TMDLs for Baker Creek (WBID 1522C)*. TMDL Report. Tallahassee, Florida.
  - 2004f. *Fecal and total coliform TMDLs for Spartman Branch (WBID 1561)*. TMDL Report. Tallahassee, Florida.

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Table 3.1 TMDLs Addressed in the Hillsborough River Basin

TMDL CATEGORY	WATERBODY WBID	PARAMETER	TMDL <sup>1</sup> (COUNTS/DAY)	WASTELOAD ALLOCATION		LOAD ALLOCATION <sup>5</sup> (COUNTS/100ML OR % REDUCTION)	PERCENT REDUCTION NEEDED	PERCENT PROJECTS ONGOING OR COMPLETED By 2009
				WASTEWATER <sup>3</sup> (COUNTS/DAY)	NPDES STORMWATER <sup>4</sup> (% REDUCTION)			
	Blackwater Creek 1482	Fecal Coliform	2.07E+12 cfu/day	8.72E+09 <sup>3</sup>	71.6%	71.6%	71.6%	100%
	New River 1442	Fecal Coliform	6.48E+10 cfu/day	N/A	35.3%	35.3%	35.3%	100%
	Spartman Branch 1561	Fecal Coliform	6.52E+08 cfu/day	N/A	59.3%	59.3%	59.3%	97 <sup>6</sup> %
	Baker Creek 1522C	Fecal Coliform	1.35E+11 cfu/day	N/A	42.9%	42.9%	42.9%	97 <sup>6</sup> %
	Flint Creek 1522A	Fecal Coliform	400/100mL	N/A	51.2%	51.2%	51.2%	97 <sup>6</sup> %
	Lower Hillsborough River 1443E	Fecal Coliform	NM <sup>2</sup>	2.00E+10	51.2%	51.2%	51.2%	93%

Notes:

1. A TMDL is expressed as the sum of all point source loads (Waste Load Allocations, or WLAs), nonpoint source loads (Load Allocations, or LAs), and an appropriate margin of safety (MOS), which takes into account any uncertainty concerning the relationship between effluent limitations and water quality:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

2. NM – not measured
3. Because adequate flow data were not required, the LA was not adjusted to account for the WLA.
4. Fecal coliform load reductions required to achieve water quality criteria were established by comparing the existing loading with the allowable load under the critical conditions defined in the previous section. The actual needed load reduction was calculated using the flowing equation:

$$Load\ Reduction = \frac{Existing\ Loading - Allowable\ Loading}{Existing\ Loading} \times 100\%$$

5. TMDL – total maximum daily load.
6. Spartman Branch, Baker Creek, and Flint Creek WBIDs were combined together for project percentage calculation.

During the second rotation of the basin management cycle in the Hillsborough River Basin, FDEP will collect new water quality data, identify additional impaired waters, and develop additional TMDLs. This may necessitate the revision of the BMAP in the future to accommodate new TMDL waterbodies and/or pollutants.

#### **4.0 BMAP Development Process**

The BMAP process was structured to achieve cooperation and consensus among a broad range of interested parties. The process promoted the engagement of local stakeholders in a coordinated and collaborative manner to address the reductions of loadings of bacteria needed to achieve the Hillsborough River Basin TMDLs. The process has built upon existing water quality improvement programs and local partnerships to address water quality problems.

Meaningful public involvement was a key component of the Hillsborough River BMAP development process. In January 2006, the Tampa Bay Estuary Program (TBEP) and FDEP convened the Hillsborough River Basin TS and the BWG, comprising representatives of local, regional, state, business, and community interests, to develop a BMAP to achieve the TMDLs for the basin. Stakeholders originally established a BWG and TS to address specific issues relevant to the TMDLs for both nutrients and fecal coliform. It was subsequently determined, however, that the nutrient TMDLs would be addressed at a later date.

The TS and the BWG took a consensus-based, collaborative approach when making decisions on the content of the BMAP. The BWG agreed to make every effort to develop proposals that all members could support.

Multiple stakeholder meetings were held beginning in January 2006. Invitations were sent to more than 80 organizations and individuals. As the technical efforts progressed, and information was obtained on the six WBIDS, it became clear that only a portion of the original stakeholder list would have specific interest in the six WBIDS impaired for fecal coliform bacteria. Throughout the process, potential stakeholders associated with these six WBIDS were kept informed on the BMAP process. As discussions with TS and BWG members proceeded to a point where decisions about the specific responsibilities of each partner were discussed, meetings were formally noticed in the *Florida Administrative Weekly*.

In addition to the TS and BWG meetings, a general public meeting was held to discuss the BMAP. **Table 4.1** summarizes the Hillsborough River BWG structure, membership, and these broader public involvement efforts. Groups or organizations contacted included the Tampa Bay Builders Association, Friends of the River, CF Industries, Mosaic Fertilizer LLC, Hillsborough River Watershed Alliance, US Army Corps of Engineers, MacDill Air Force Base Environmental Program, Florida Strawberry Growers, Coalition for Responsible Growth, Crystal Springs Preserve, Boy Scouts of America, University of Tampa, Tampa Catholic School, and Florida Institute of Phosphate Research among others.

TABLE 4.1. BASIN WORKING GROUP ORGANIZATIONAL STRUCTURE

<p><b>BASIN WORKING GROUP (BWG)</b></p> <p><b>Function:</b></p> <ul style="list-style-type: none"> <li>• Develop a consensus-based BMAP to implement TMDLs in the Hillsborough River Basin.</li> <li>• Has final decision-making role on BMAP development.</li> </ul> <p><b>Makeup:</b></p> <ul style="list-style-type: none"> <li>• City of Plant City</li> <li>• City of Tampa</li> <li>• City of Temple Terrace</li> <li>• Environmental Protection Commission of Hillsborough County</li> <li>• Florida Department of Environmental Protection</li> <li>• Florida Department of Transportation</li> <li>• Florida Department of Agriculture and Consumer Services</li> <li>• Hillsborough County Health Department</li> <li>• Hillsborough County (Public Works, Stormwater, Water, and Parks &amp; Recreation )</li> <li>• Pasco County</li> <li>• Polk County</li> <li>• Southwest Florida Water Management District</li> <li>• University of Florida - IFAS</li> </ul> <p><b>Meetings/Workshops Held:</b>                      January 2006 (initial meeting with all TS &amp; BWG), March 2006 (TS), May 2006 (TS), June 2007 (TS), May 2008 (TS), July 2008 (TS), August 2008 (TS), November 2008 (TS), November 2009 (TS), December 2008 (both TS &amp; BWG), January 2009 (both TS &amp; BWG)</p>
<p><b>CITIZEN INPUT</b></p> <p><b>Function:</b></p> <ul style="list-style-type: none"> <li>• Ensure that all interested parties are involved and heard in the TMDL process.</li> <li>• Ensure the broad dissemination of TMDL information and the BMAP.</li> <li>• Allow for the public discussion of issues and strategies.</li> </ul> <p><b>Makeup:</b></p> <ul style="list-style-type: none"> <li>• Interested parties and the public at large. Tampa Bay Builders Association, Friends of the River, Alafia River Watch, Florida Consumer Action Network, Tampa Electric Company, Association of Valrico Communities, Upper Tampa Bay Alliance, CF Industries, Mosaic Fertilizer LLC, St. Leo University, Hillsborough River Watershed Alliance, US Army Corps of Engineers, MacDill Air Force Base Environmental Program, Florida Strawberry Growers, Carrollwood Area Association of Neighborhoods, Coalition for Responsible Growth, Ducks Unlimited, New Tampa Community Council, Keystone Civic Association, Crystal Springs Preserve, Boy Scouts of America, Interbay Peninsula Partnership, Charlotte Harbor Environmental Center, Florida Institute of Phosphate Research attended various meetings held.</li> </ul> <p><b>Public Meetings/Workshops Held:</b></p> <ul style="list-style-type: none"> <li>• June 2007</li> </ul>
<p><b>SPECIAL BRIEFINGS/PRESENTATIONS</b></p> <p><b>Function:</b></p> <ul style="list-style-type: none"> <li>• To brief councils, commissions, special interest groups, community organizations, and others on the TMDL process and the progress of the BWG, as requested or needed.</li> </ul> <p><b>Makeup:</b></p> <ul style="list-style-type: none"> <li>• Affected and/or interested elected bodies, organizations, and other groups in the basin.</li> </ul>

### **5.0 Pollutant Reduction Allocations**

Under the FWRA (Subsection 403.067[7], F.S.), the TMDL allocation may be an “initial” pollutant allocation among point and nonpoint sources. In such cases, the further allocation to specific point sources and specific categories of nonpoint sources is established in a 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 as examples, cost-benefit, technical and environmental feasibility, implementation time frames, and feasible funding strategies.

The Hillsborough River BWG agreed that it would be appropriate to use the initial allocations adopted as part of each TMDL. The following factors were considered in making this decision:

- *Despite significant tracking efforts, uncertainty about the sources of fecal coliform bacteria remains. This requires further source investigation to determine whether it is necessary and feasible to allocate specific responsibility among nonpoint sources.*
- *Formulating allocations more detailed than those adopted in the TMDLs, particularly for bacteria, is speculative with the current data and information available.*
- *Bacterial monitoring data suggests that variability in loadings is high, and that multiple factors may be involved. Antecedent hydrologic conditions (surface and groundwater), rainfall patterns, “first flush” phenomenon, ambient temperatures can all play roles in determining fecal coliform transport from sources and subsequent survival/persistence in the waterbodies.*

## 6.0 Pollutant Sources and Management Actions/Projects

The Hillsborough River BMAP contains a series of current and planned management actions/projects, identified by local entities, whose purpose is to manage anthropogenic fecal coliform inputs. The actions (completed, ongoing, and planned) identified in the BMAP are targeted at addressing both the pollutant loads from historical, current, and estimated future sources associated with basin population growth and from the resulting land use changes.

This section begins with some general assumptions and considerations, a description of expected fecal coliform bacteria reductions, and BMAP implementation costs. Next, the impact of future growth is discussed. The remainder of the section describes the waterbodies, the pollutant sources, and the management actions/projects completed, under way, or planned to achieve the TMDL. A large number of projects are included in the tables within this section. For ease of reference, these large tables (as specified below) are located at the end of the report (Tables).

<b>Table 6.0</b>	Office of Agricultural Water Policy BMPs
<b>Table 6.1.0</b>	Projects by Management Action/Categories ( <b>Tables</b> )
<b>Table 6.1.1</b>	Blackwater Creek Projects by Management Category
<b>Table 6.1.2</b>	Blackwater Creek Projects by Stakeholder
<b>Table 6.1.3</b>	New River Projects by Management Category
<b>Table 6.1.4</b>	New River Projects by Stakeholder
<b>Table 6.1.5</b>	Spartman Branch, Flint Creek, Baker Creek Projects by Management Category
<b>Table 6.1.6</b>	Spartman Branch, Flint Creek, Baker Creek Projects by Stakeholder
<b>Table 6.1.7</b>	Lower Hillsborough River Projects by Management Category
<b>Table 6.1.8</b>	Lower Hillsborough River Projects by Stakeholder
<b>Table 6.2</b>	New Projects Proposed by BWG Members that Address TMDLs ( <b>Tables</b> )
<b>Table 6.3</b>	Projects Proposed by BWG Members that Were Enhanced to Address TMDLs ( <b>Tables</b> )
<b>Table 6.4</b>	Completed and Planned Projects to Reduce Fecal Coliform Bacteria Levels in Blackwater Creek and Prevent Future Discharges ( <b>Tables</b> )
<b>Table 6.5</b>	Completed and Planned Projects to Reduce Fecal Coliform Bacteria Levels in New River and Prevent Future Discharges ( <b>Tables</b> )
<b>Table 6.6</b>	Completed and Planned Projects to Reduce Fecal Coliform Bacteria Levels in Spartman Branch, Baker Creek and Flint Creek and Prevent Future Discharges ( <b>Tables</b> )
<b>Table 6.7</b>	Completed and Planned Projects to Reduce Fecal Coliform Bacteria . ( <b>Tables</b> )

## 6.1 BMAP Assumptions and Considerations

The water quality benefits of BMAP implementation are based on a number of fundamental assumptions and considerations, as follows:

- **Unquantified Project Impacts** – *Some of the projects and activities contained in the BMAP cannot be quantified with regard to the reductions in coliform they are expected to achieve. However, because of their positive impact, it is anticipated that these actions will help reduce pollutant loads. Coordinated efforts to monitor fecal coliform concentrations in*

*conjunction with project implementations will provide enhanced capabilities to quantify positive effects in the future.*

- **Source Identification** – *Fecal coliform impairment sources are particularly difficult to trace. For this reason, source identification studies are included as management actions/projects.*
- **Future Growth** – *Based upon growth projections and patterns from Hillsborough, Pasco and Polk counties, City of Tampa, and Plant City, increases in human population are anticipated in the six WBIDs over time. However, the majority of the projected increases will be serviced by central sewer. All public utility wastewater treatment plants within and/or servicing these WBIDs are either advanced secondary or tertiary treatment, with high level disinfection. Additionally, new stormwater systems require that flows first go to retention ponds, rather than flowing directly to the rivers and streams. Hence, future growth is not expected to result in additional loadings of fecal coliform bacteria.*
- **Water Quality Issues** – *This BMAP addresses water quality issues in the basin for which impairments were identified at the start of the BMAP process. Other water quality issues (e.g., erosion control, hazardous waste, etc.) are addressed through programs other than the TMDL Program.*
- **Implementation Schedule** – *BMAP implementation will be a long-term process. While many of the projects and activities contained in the BMAP are recently completed or currently ongoing, key projects and studies may extend beyond the first five-year BMAP cycle. Therefore, TMDLs established for impaired waters in the basin will not necessarily be achieved in the near term. Regular follow-up and continued TS and BWG activity will ensure that management actions/projects are carried out and that their incremental effects are assessed. As each five-year basin cycle is completed and more information is gathered, additional management actions/projects to achieve TMDLs will be developed.*

## **6.2 Management Action/Project Overview**

As part of this BMAP, stakeholders have committed to a wide variety of management actions/projects. Activities fall into several categories, as follows:

- *Public Education and Outreach;*
- *Wastewater Infrastructure Management;*
- *Stormwater Management Program;*
- *Agricultural BMPs;*
- *Regulations, Ordinances and Guidelines;;*
- *Fecal Coliform Bacteria “Hot Spot” Program;*
- *Restoration, Land Acquisition and Water Quality Improvements; and*
- *Special Studies, Planning, Monitoring and Assessment.*

**Table 6.0** (see page 26) summarizes the FDACS Office of Agriculture Water Policy (OAWP) adopted Agricultural BMPs and ones still under development. **Table 6.1.0** (see page 68) summarizes which stakeholders are actively involved in particular types of management actions/projects. In addition to these activities, stakeholders are also implementing regulations, policies, and procedures to minimize pollutant loads to impaired waters in the Hillsborough River Basin. Appendix D of the *Draft HRB BMAP Supporting Document* contains detailed descriptions of stakeholder programs.

### 6.3 Management Actions/Projects

Management actions/projects are the activities or projects that BWG members are implementing to reduce pollutant loadings in TMDL waterbodies. These are listed in **Tables 6.2** through **6.7** (located in the Tables Section for ease of reference).

- *New projects prepared by BWG members are listed in Table 6.2;*
- *Projects that were enhanced to address fecal coliform TMDLs are listed in Table 6.3;*
- *Projects either completed or planned to address fecal coliform TMDLs for **Blackwater Creek** are listed in Table 6.4;*
- *Projects either completed or planned to address fecal coliform TMDLs for **New River** are listed in Table 6.5;*
- *Projects either completed or planned to address fecal coliform TMDLs for **Spartman Branch, Baker Creek and Flint Creek** are listed in Table 6.6;*
- *Projects either completed or planned to address fecal coliform TMDLs for **Lower Hillsborough River** are listed in Table 6.7;*

### 6.4 Local Initiatives and Programs

TS and BWG members added new projects or programs to better address both the understanding of water quality impairments and improvements in water quality required by the TMDLs (**Table 6.2**, page 72). Many of the projects that members of the BWG identified for incorporation in the BMAP were part of existing programs but were expanded in scope to help address the TMDLs (**Table 6.3**, see page 102). Water quality monitoring efforts were expanded to aid in TMDL development.

The Florida Watershed Restoration Act (FWRA) authorizes the FDACS to develop and adopt BMPs to assist agriculture in reducing pollutant loads. FDACS works with agricultural producers and industry groups, environmental representatives, the FDEP, the water management districts, the university system, and other interested parties to develop nutrient management, irrigation management, and other agricultural BMPs. The FDACS divisions of Forestry and Aquaculture adopt and oversee the implementation of silviculture and aquaculture BMPs, respectively. The FDACS OAWP adopts and oversees the implementation of BMPs for “traditional” agricultural commodities (those other than silviculture or aquaculture).

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Prior to OAWP adopting BMPs, the FDEP conducts initial verification of the effectiveness of these BMPs in reducing pollutant loads, using Best Professional Judgment. Under the FWRA, agricultural nonpoint pollutant sources addressed by a BMAP must either implement FDEP-verified, FDACS-adopted BMPs or conduct monitoring to demonstrate compliance with the TMDLs. The OAWP has adopted BMPs for citrus, container nurseries, vegetables and row crops, and sod. Within a few years, all the key commodities and specialty crops in the state should have FDACS-adopted BMPs. **Table 6.0** below summarizes the key OAWP-adopted BMPs, and those under development.

**TABLE 6.0. OFFICE OF AGRICULTURAL WATER POLICY BMPs**

<b>BMP INITIATIVES</b>	<b>RULE</b>	<b>AREA(S) OF APPLICATION</b>	<b>DEVELOPMENT/REVISION STATUS</b>
<i>Ridge Citrus</i>	SE-1	Lake Wales Citrus Ridge area; other areas with well-drained soils	<i>Planned update/consolidation into a statewide manual</i>
<i>Citrus Groves in Peace River-Manasota Basin</i>	5M-5	All or part of Manatee, Sarasota, Hardee, DeSoto and Charlotte counties	
<i>Gulf Citrus</i>	5M-7	All or parts of Hendry, Glades, Lee, Collier and Charlotte counties	
<i>Indian River Area Citrus</i>	5M-2	All or part of Volusia, Brevard, Indian River, St. Lucie, Martin, Okeechobee, Palm Beach counties	
<i>Lake Okeechobee Watershed</i>	5M-3	Lake Okeechobee watershed	<i>To be revised/expanded to the Northern Everglades</i>
<i>Container Nurseries</i>	5M-6	Statewide applicability	<i>To be revised to include in-ground nurseries and leatherleaf ferns</i>
<i>Vegetable/ Agronomic Crops</i>	5M-8	Statewide applicability	<i>Under revision – to include forage grass</i>
<i>Sod Farms</i>	5M-9	Water quality/quantity BMPs statewide	<i>Adopted 10/08</i>
<i>Cow/Calf Operations)</i>	TBD	Statewide applicability	<i>Adoption early 2009</i>
<i>Equine/Horse Farms</i>	TBD	Statewide – on rule-defined operations w/greenbelt exemption	<i>Under development – Targeted for adoption 2009</i>
<i>Specialty Fruit and Nut</i>	TBD	Blueberries, pecans, etc.	<i>Currently under development – Targeted for adoption 2009</i>

The OAWP employs field staff and contracts with service providers to work with producers to submit Notices of Intent (NOIs) to implement the BMPs appropriate for their operations. These providers include the soil and water conservation districts, The University of Florida/Institute of Food and Agricultural Sciences (UF/IFAS), and resource development and conservation councils. In the Hillsborough River Basin, OAWP staff and contractors will focus efforts on enrolling cow/calf, equine operations, and any other commodities that may apply, to implement BMPs. The major cattle ranches within the WBIDs have already implemented some of the relevant part of FDACS' draft cow/calf BMP manual. To the extent that funding is available, OAWP contractors provide technical and educational assistance, and help implement cost-share programs. In cooperation with local producers, these programs will help decrease nutrient loads from existing and future agricultural activities in the basin.

FDACS' Division of Forestry will continue to implement the Silviculture BMP Program and conduct educational efforts, including outreach for nonindustrial silviculture landowners. Most of the commercial silviculture acreage in the basin is managed by large industrial operators, all of whom participate in the Division of Forestry BMP implementation program. These BMPs establish minimum standards for protecting and maintaining water quality and wildlife habitat during

forestry activities, and were adopted as rule under Section 51-6.002, F.A.C. The Division of Forestry routinely performs biennial compliance inspections of BMPs. As part of this BMAP, the Division will conduct annual inspections.

Local governments also implement operation and maintenance programs to promote long-term infrastructure function and integrity. A few examples are provided in the following paragraphs:

- The City of Plant City has recently spent over \$50 million upgrading their Waste Water Treatment Plant (WWTP). This WWTP discharges to East Canal which eventually drains to Blackwater Creek via Itchepackesassa Creek.
- City of Tampa's water/wastewater systems operation and maintenance and capital costs exceeded \$18 million for 2008. This expenditure funded the following types of activities of direct relevance to the fecal coliform TMDLs: rehabilitation of gravity sewer lines; infiltration and inflow (I & I) testing; force main replacement; manhole rehabilitation.
- Hillsborough County, Hillsborough County Health Department, City of Tampa and The Florida Department of Transportation (FDOT) all have multiple regular operation and maintenance programs that manage pollutant loads through pollution prevention activities. Two examples are: (a) regular street sweeping to remove dirt and debris; and (b) the maintenance of swales.
- Some of local government's activities of direct relevance to the fecal coliform TMDLs are covered under Municipal Stormwater Sewer System National Pollutant Discharge Elimination System (MS4 NPDES) stormwater permits. The detection and elimination of illicit discharges; construction site sediment and erosion control; post-construction runoff control; pollution prevention/good housekeeping; and public education, outreach, and participation are examples of activities implemented as part of MS4 permit requirements.

Polk County, Plant City, City of Tampa, and Hillsborough County Health Department have all added or modified ordinances and regulations to minimize overflows or add preventive measures for septic system overflows. For example, the Hillsborough County Health Department permits the installation and repair of septic systems and has statutory authority to enforce corrective actions on failing or improperly maintained septic systems.

Stakeholders for this Basin have invested substantial money, time and effort into addressing fecal coliform TMDLs. Additional information about local government operation and maintenance programs may also be obtained from Appendix D of the *Draft HRB BMAP Supporting Document*.

## 6.5 Managing Pollutant Loads from Future Growth

As required by the FWRA, fecal coliform loadings associated with future growth were considered as part of the BMAP. These estimates were based on anticipated population growth in the basin obtained from U.S. Census Bureau data gathered and evaluated through the BMAP process. Hillsborough County's rate of growth basinwide through the year 2005 is expected to be 9% (EDR 2008). However, based on the additional regulations, ordinances and permitting established for stormwater, septic systems, and water/wastewater systems, growth is not expected to substantially increase pollutant loads in the six WBIDs under consideration. A review of the Comprehensive Growth Management Plans for Hillsborough, Pasco, and Polk Counties indicates that the majority of growth projected to occur within these WBIDs will be serviced by centralized wastewater treatment plants, all of which are either advanced secondary or tertiary treatment with high level disinfection.

The management actions/projects considered by stakeholders include a number of activities that proactively address pollutant loadings from new development (or redevelopment) through regulations, ordinances, or guidelines. Local government utilities currently review land development in their permitting process which can incorporate Low Impact Development (LID) principles. The basic concept for LID is to manage runoff at the source with decentralized techniques that replicate a site's predevelopment hydrology. As reflected through revised ordinances and permitting practices which may incorporate LID, stakeholders will continue to promote these principles, programs, and incentives to limit the pollutant loads associated with new development. In addition to these concepts, all local governments (Hillsborough, Pasco, Polk Counties, plus Cities of Tampa and Plant City) work closely with SWFWMD for the proper design of stormwater systems, under SWFWMD's Environmental Resource Permitting (ERP) program. ERPs require substantial retention pond-related treatment prior to discharge to rivers and streams.

## 6.6 Waterbody Assessments

This sub-section is organized around the six impaired waterbodies in the basin. For each waterbody there is a brief overview of the location and hydrology; the sources of pollutant loadings; the completed, ongoing, or planned management actions/projects; key unknowns and future studies; and anticipated results from management actions/projects.

### 6.6.1 Blackwater Creek (WBID 1482)

Blackwater Creek (**Figure 6.1**), which is 13.6 miles long, comprises a 113-square-mile drainage area located in northeastern Hillsborough and northwestern Polk Counties, and is a significant tributary to the Hillsborough River (FDEP, 2004a). Several population centers are located partially within the watershed. A portion of Plant City (a city of over 32,000 people approximately 5 miles south of the creek), drains to Blackwater Creek via the Itchepackesassa and East Canal, and a portion of Lakeland, (a city of over 90,000 people approximately 4 miles southeast of the creek) drains to the headwaters of both the Blackwater and Itchepackesassa Creeks. Blackwater Creek is a third-order, darkwater stream and, along its entire length, exhibits characteristics associated with riverine aquatic environments along its entire length (FDEP, 2002; 2004a).

Much of the Blackwater Creek watershed is located within the Zephyrhills Gap physiographic region. This area lies to the south of the Brooksville Ridge and east of the Gulf Coastal Lowlands, and encompasses the greatest proportion of the Hillsborough River Basin, including

most of the main river channel. The Zephyrhills Gap is an erosional feature with sluggish surface drainage and many karst features (SWFWMD, 1996). A thin layer of sand and clay overlies karst limestone, and springs and sinkholes are common. Elevations range from 10 to 140 feet National Geodetic Vertical Datum (NGVD), with poorly drained swamps and marshes in the lower elevations and pine flatwoods in the higher elevations. A small portion of the Blackwater Creek watershed is located within the Polk Upland Province. Elevations in the Polk Upland are typically between 100 and 130 feet NGVD; however, elevations are mostly between 20 and 50 feet in the watershed, dipping toward the Hillsborough River Valley (White, 1970).

The dominant land uses in the Blackwater Creek watershed are agriculture (predominantly cattle operations), which makes up 44 percent of the acreage, followed by water and wetlands at 25 percent. Urban and residential land uses make up only about 10 percent of the total (FDEP, 2004a). Most of the developed area is located in the upper reaches of Blackwater Creek and its main tributaries. Recent, detailed field investigations by HSW (2007) indicate that the 2004(c) estimates remain accurate.

According to the U.S. Census Bureau, the population density in and around Blackwater Creek, WBID 1482, in the year 2000 was at or less than 951 people per square mile. This estimate probably overstates the actual population density, as only small portions of the cities of Plant City and Lakeland actually lie within the Blackwater Creek watershed

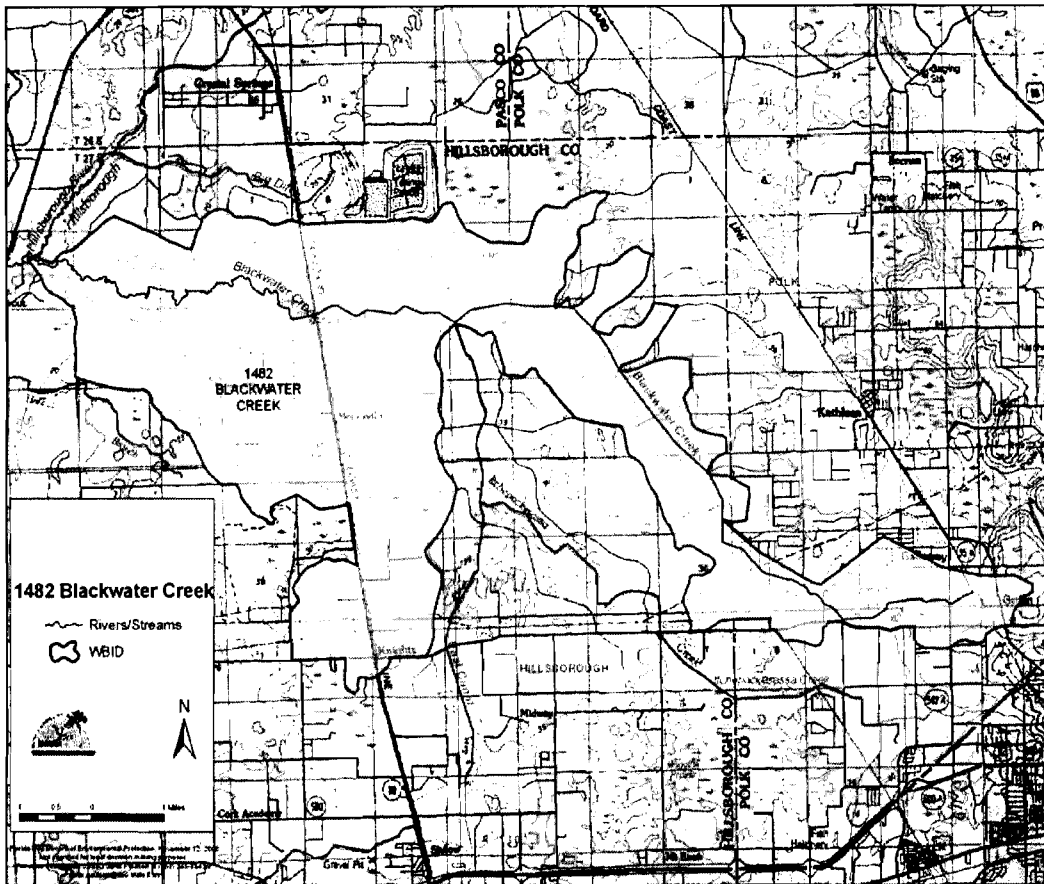


Figure 6.1. Blackwater Creek WBID 1482

### **Pollutant Sources and Management Actions/Projects**

Given the uncertainties inherent in addressing elevated fecal coliform levels, a combination of source prevention and additional data-gathering efforts is being taken under a phased approach to address coliform reductions. The basic approach is as follows:

- *Existing monitoring data and source identification projects were used to identify "hot spots."*
- *Primary fecal coliform sources will be investigated in each of these "hot spots" through the coordinated effort of Hillsborough County, City of Tampa, Lakeland, Plant City, Polk County, Pasco County, FDOT, FDEP, EPCHC, and local residents to address all controllable sources of fecal coliform in one location in a short time before moving onto another priority area.*
- *At the same time, individual fecal coliform load management projects will continue to be implemented. Examples are wastewater infrastructure maintenance and MS4 permit requirements for identifying illicit discharges.*
- *Fecal coliform monitoring will continue to be used to help assess progress and guide the selection of future management actions/projects.*

An initial source tracking project—funded by Hillsborough County and conducted by USF in 2002—used antibiotic resistance analysis to gain information about the probable sources of fecal coliform contamination to Blackwater Creek and Flint Creek (WBIDs 1482 and 1552A) in the Hillsborough River Basin. The study results showed that agricultural animals were major contributors at all sites. Wildlife and human sources were implicated at a subset of monitoring sites.

In 2007-2008, FDEP funded an intensive source tracking effort via Post, Buckley, Schuh, & Jernigan (PBSJ) with subcontractors University of South Florida and HSW Engineering. This effort helped narrow the search for possible sources and helped determine whether a given impairment area was of anthropogenic (i.e. human) origin. The results from the first phase of the project were published in June 2008 and showed both human and animal-related fecal coliform sources for this WBID (PBSJ 2008).

In Blackwater Creek (WBID 1482), the stream can be separated into three portions based on predominant land-uses, with fecal coliform sources varying for each portion of the creek (PBSJ 2008). Stakeholders are addressing these sources within this WBID with a total of forty-four (44) management actions (**Table 6.1.1**, page 32). Some projects play multiple roles and may apply to more than one management category such as public education or regulations. By the end of 2009, 100% of these forty-four (44) management actions will be implemented. Twenty-six (26) of these are ongoing projects. Public education and three (3) monitoring programs are planned to continue. Details of these management actions can be found in Appendix D of the *Draft HRB BMAP Supporting Document*. A summary of MST probable fecal coliform source locations and BMAP management actions addressing those sources can be found in **Appendix C**.

**Table 6.1.1 Blackwater Creek Projects by Management Category**

WATERBODY WBID*	HILLSBOROUGH RIVER BMAP MANAGEMENT CATEGORY	NUMBER OF PROJECTS
Blackwater Creek 1482	Basic Stormwater Management Program	3
	Education and Outreach Efforts	5
	Agricultural BMPs	2
	Regulations, Ordinances, and Guidelines	6
	Special Studies, Planning, Monitoring, and Assessment	12
	Restoration and Water Quality Improvement	5
	Wastewater Infrastructure Management	13

\* WBID – Waterbody identification.

The upstream portion of the basin appears to be affected by sanitary sewer overflows (SSO), mobile home park wastewater facilities and septic systems (OSDTS). These areas contain soils which may hinder septic tank drainfield effectiveness (PBSJ 2008). Measures to address the sources include high-probability septic tank failure mapping and septic system setbacks for septic sources of fecal coliform. Projects that address sanitary sewer and wastewater treatment source contributions are sewer line maintenance programs, lift station maintenance and auxiliary power, an inflow/infiltration program, a sanitary sewer overflow database, and a wastewater residuals management ordinance.

The fecal coliform sources in the middle portion of Blackwater Creek primarily appear to be from cattle on a local ranch. Other areas that may contribute to the source are older residential areas near a contributing tributary to Blackwater Creek and a wastewater treatment facility (WWTF) outfall to East Canal (PBSJ 2008). Stakeholders address these identified fecal coliform sources in addition to maintaining ongoing prevention programs. To address the cattle contribution to the fecal coliform source, measures include stormwater treatment ponds, floodplain fencing on a cattle ranch, and Blackwater Creek drainage maintenance. Though FDACS has recently finalized its BMP for cow/calf cattle operations, at least one large ranch within the Blackwater Creek watershed (Cone Ranch) has already implemented many of the draft applicable BMP measures, and spent substantial effort in minimizing direct cattle access to the creek.

For the most downstream portion of Blackwater Creek, land use is rural with few homes and cattle. The primary source for this area is not as clearly defined (PBSJ 2008).

In 2007, Hillsborough County Health Department (HCHD) completed an updated septic system map using geographic information system (GIS) and billing information, and evaluated potential “hot spots” based on hydrologic and soil conditions. They found no high-probability areas for septic system failure within the Hillsborough County portion of the Blackwater Creek WBID or in immediately contributing surfaces waters to this WBID.

The stakeholders with the majority of projects within this WBID are City of Plant City, Polk and Hillsborough Counties, and EPCHC (Table 6.1.2, page 33). The City of Plant City has nine (9) projects within this WBID, nine (9) of which are ongoing efforts. Polk County has nine (9) projects, with four (4) as ongoing efforts. Hillsborough County Public Works

has eight (8) projects within this WBID, with three (3) as ongoing efforts. EPCHC has six (6) projects, three (3) of which are ongoing efforts.

**Table 6.1.2 Blackwater Creek Projects by Stakeholder**

BWG Member	BMAP Management Action / Project Categories								
	Public Education and Outreach	Wastewater Infrastructure Management (Sewer and/or Septic Systems)	Stormwater Management Program	Agriculture BMPs	Regulations, Ordinances, and Guidelines	Conservation/BMPs/ Land Acquisition	Fecal Coliform Bacteria "Hot Spot" Program	Restoration and Water Quality Improvement	Special Studies, Planning, Monitoring & Assessment
City of Plant City	2	7	2		1			1	1
City of Tampa									
City of Temple Terrace									
EPCHC	1	3						1	3
FDACS/IFAS	1			1					
FDEP									1
FDOT	1								
HCHD	1	2			1		1		1
HC Parks & Recreation						1		1	
HC Public Works	1	1					1	2	2
Pasco County							1	1	1
Polk County		2	1		4	3		2	1
SWFWMD									

Note: Shading denotes WBID area in which stakeholder is not located.

**Table 6.4** (see page 109) provides details on all projects for Blackwater Creek, including the lead entity, project partners, cost and funding source(s), schedule, and anticipated benefits and load reductions (if known).

In addition to stakeholder management actions, some BMAP monitoring efforts are anticipated to continue in this basin over the long run. Monitoring efforts are concentrated through projects such as bacteriological source tracking, fecal coliform monitoring, and ambient water quality monitoring for Blackwater Creek. Note that during field visits in the Spring of 2007, low volumes and flow of surface water were observed throughout Blackwater Creek and some portions were dry (PBSJ 2008). These low flow conditions along with periods of drought can hinder sampling and monitoring efforts in this WBID.

With 100% of the planned management actions in Blackwater Creek being addressed by the end of 2009, water quality data collected after 2009 is expected to show reductions in fecal coliform levels. Implementation of the Monitoring Plan (**Appendix B**) will confirm this improvement and adjustments will be made as needed to demonstrate continued progress.

#### **ASSESSING PROGRESS AND MAKING CHANGES**

##### *Monitoring and Assessment*

The EPCHC has conducted monthly water quality monitoring at one station (Blackwater Creek at SR 39) in the Hillsborough County portion of the watershed since 1988. EPCHC has added more stations within Blackwater Creek basin beginning in 2006. EPCHC monitoring is planned to continue within this WBID. In addition, the HRB BMAP Monitoring Plan (**Appendix B**) will outline steps the stakeholders will take to track fecal coliform bacteria levels and source changes likely to pose risks to human health within this WBID.

With 100% of the planned management actions for Blackwater Creek being addressed by the end of 2009, water quality data collected after 2009 should begin to show reductions in fecal coliform levels. Implementation of the HRB BMAP Monitoring Plan will document this improvement and adjustments will be made as needed to show continued progress.

##### *Tracking Progress Towards Water Quality Improvements*

The results of the HRB BMAP and EPCHC monitoring programs, in addition to more sampling from headwater areas in Polk County, will be used to assess progress toward water quality improvements in fecal coliforms through the annual application of a decision matrix, developed by EPCHC staff (Terra Ceia 2008). This decision matrix is modeled on one developed by the TBEP to track water quality in Tampa Bay. The matrix includes a statistical evaluation of water quality trends in Blackwater Creek and will be applied annually.

One hundred percent (100%) of the forty-four (44) Management Actions for the Blackwater Creek WBID will be either completed or ongoing by the end of 2009. If water quality trends show degradation or a lack of improvement over time, the decision matrix will be used to determine the types of actions to be considered by the implementing partners. With the implementation of these management actions, it is reasonable to expect that fecal coliform levels will decline over time, and that these improvements will be evident from the monitoring that has been put in place as part of this BMAP.

#### **6.6.2 New River (WBID 1442)**

New River (**Figure 6.2**), which is located in the southeastern portion of Pasco County and the northern portion of Hillsborough County, drains 20.9 square miles and is 11.1 miles in length. The majority of the basin is located within Pasco County. Population centers which drain to New River include a small portion of the City of Zephyrhills (a city of nearly 25,000 people at the east end of the basin), and a portion of New Tampa (a recently developed suburban area that has

been annexed by the City of Tampa) (FDEP, 2004c). New River is a darkwater stream, with a well-defined, moderately incised channel along the majority of its length (Lewelling, 2004). Surface water flows in some portions of the New River are ephemeral during dry periods.

Much of the New River watershed lies within the Zephyrhills Gap physiographic province. The Zephyrhills Gap is an erosional watershed with sluggish surface drainage and many karst features (SWFWMD, 1996). A thin layer of sand and clay overlies karst limestone. Predevelopment conditions were dominated by poorly drained swamps and marshes plus pine flatwoods (SWFWMD, 2000). Primary soil groups include the Myakka-Basinger-Holopaw association and the Pomona-EauGallie-Sellers group.

The dominant land uses in the New River watershed in 2002 were mixed agriculture and rural residential. Recent detailed field work (HSW, 2007) noted an increase in residential subdivisions since 2002, with mixed agriculture and rural residential still dominant. Water and wetlands cover over 2,000 acres of the watershed. Less than 10 percent of land use is currently dedicated to residences (FDEP, 2002).

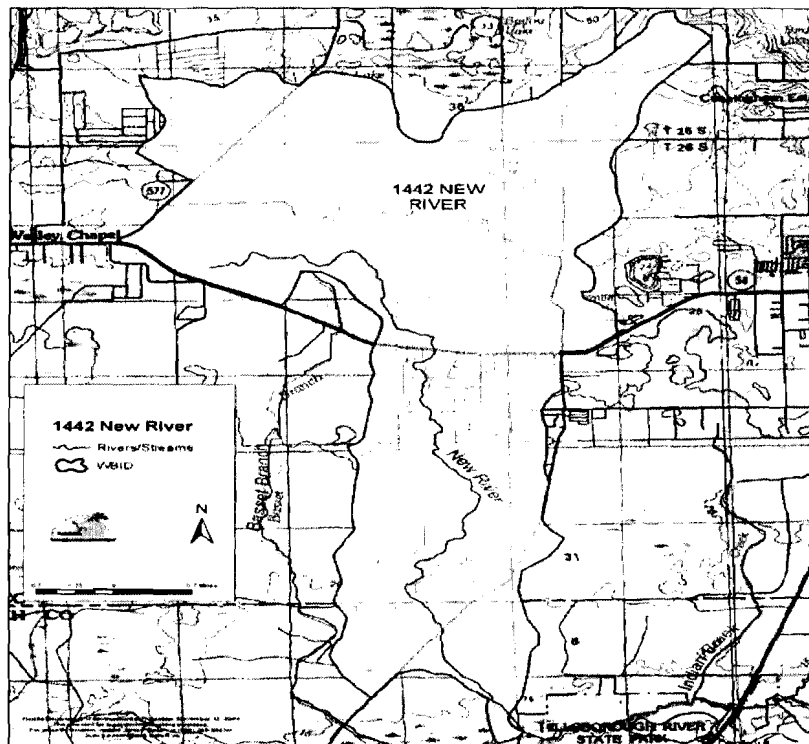


Figure 6.2. New River WBID 1442

### Pollutant Sources and Management Actions/Projects

Given the uncertainties inherent in addressing elevated fecal coliform levels, a combination of source prevention and additional data-gathering efforts is being taken to address coliform reductions. The basic approach is as follows:

- *Existing monitoring data and source identification projects were used to identify “hot spots.”*
- *Primary fecal coliform sources will be investigated in each of these “hot spots” through the coordinated effort of Hillsborough County, City of Tampa, Pasco County, FDOT, FDEP, EPCHC, and local residents to address all controllable sources of fecal coliform in one location in a short time before moving onto another priority area.*
- *At the same time, individual fecal coliform load management projects will continue to be implemented. Examples are wastewater infrastructure maintenance and MS4 permit requirements for identifying illicit discharges.*

In 2007-2008 FDEP funded an intensive source tracking effort via PBS&J (and subcontracting University of South Florida and HSW Engineering, Inc.). The results of this project (published in June 2008) define appropriate additional preventive or corrective actions, if the sources are anthropogenic. Throughout 2007-08, MST efforts have been greatly hindered by lack of flow in much of New River for extended time periods. Funding for Pasco County's source tracking project is included in the county's fiscal 2008 budget. Pasco County plans to continue this funding into future budgets.

In 2007, the HCHD identified (for areas within Hillsborough County) and mapped areas of high potential for septic system failure, based on criteria including density, plat age, proximity to a waterbody, soil type and texture, seasonal high-water table, repair records, and proximity to central sewer. Hillsborough County Public Works completed an updated septic tank map using GIS and billing information, and evaluated potential “hot spots” based on hydrologic and soil conditions. Areas of high potential were not noted in the Hillsborough County portion of the New River watershed.

For New River (WBID 1442), potential sources of fecal coliform primarily appear to be OSTDS from low-lying older residential communities with un-mounded septic system drainfields, with cattle and wildlife potentially contributing fecal coliform downstream (PBSJ 2008). Stakeholders are addressing these sources within this WBID with a total of nineteen (19) management actions (Table 6.1.3, page 38). Note that a given project may apply to more than one management category. By the end of 2009, 100% of these nineteen (19) management actions will be implemented. Twelve (12) of these are ongoing projects. Public education efforts and two (2) monitoring programs are planned to continue past 2009. Details of these management actions can be found in Appendix D of the *Draft HRB BMAP Supporting Document*.

**Table 6.1.3 New River Projects by Management Category**

WATERBODY WBID*	HILLSBOROUGH RIVER BMAP MANAGEMENT CATEGORY	NUMBER OF PROJECTS
New River 1442	Public Education	4
	Wastewater Infrastructure Management (Sewer and/or Septic Systems)	7
	Stormwater Management Program	2
	Agriculture and Silviculture BMPs	1
	Regulations, Ordinances, and Guidelines	1
	Bacteria "Hot Spot" Program	2
	Restoration, Water Quality Improvement, Land Acquisition	3
	Special Studies, Planning, Monitoring & Assessment	9

\* WBID – Waterbody identification.

Stakeholders are addressing the septic system sources and monitoring in this WBID through high probability septic system failure mapping, septic system setbacks, and septic system complaint response, along with microbial and Deoxyribonucleic Acid (DNA) source identification and tracking. To address potential cattle and wildlife source contributions, participation by the local agricultural community in agricultural BMPs is being actively solicited.

The stakeholders with the majority of projects within this WBID are EPCHC, Hillsborough County Public Works, and HCHD (Table 6.1.4, page 39). EPCHC has five (5) projects, two (2) of which are ongoing efforts in 2009. Hillsborough County Public Works has four (4) projects within this WBID, with three (3) as ongoing efforts. HCHD has four (4) projects within this WBID, with three (3) as ongoing efforts.

Management actions for this WBID can be found in Table 6.5 (see page 127), which details the nineteen (19) projects addressing the entire New River WBID. Additional information on these projects can be found in Appendix D of the *Draft HRB BMAP Supporting Document*.

Table 6.1.4 New River Projects by Stakeholder

BWG Member	BMAP Management Action / Project Categories								
	Public Education and Outreach	Wastewater Infrastructure Management (Sewer and/or Septic Systems)	Stormwater Management Program	Agriculture BMPs	Regulations, Ordinances, and Guidelines	Conservation/BMPs Land Acquisition	Fecal Coliform Bacteria "Hot Spot" Program	Restoration and Water Quality Improvement	Special Studies, Planning, Monitoring & Assessment
City of Plant City									
City of Tampa									
City of Temple Terrace									
EPCHC	1	3							4
FDACS/IFAS	1			1					
FDEP									1
FDOT	1								
HCHD	1	2			1		1		1
HC Parks & Recreation									
HC Public Works	1	1					1		1
Pasco County							1	1	1
Polk County									
SWFWMD									

Note: Shading denotes WBID area in which stakeholder is not located.

In addition to stakeholder management actions, some BMAP monitoring efforts are anticipated to continue in this basin over the long run. Both EPCHC and Pasco County plan quarterly monitoring for fecal coliforms in future years (PBSJ 2008). Flows within New River are intermittent, which makes sampling for fecal coliforms problematic during below average rainfall years (such as in 2007 and 2008). These low flow conditions may hinder future sampling and monitoring efforts in this WBID.

With 100% of the planned management actions in New River being addressed by the end of 2009, water quality data collected after 2009 should begin to show reductions in fecal coliform levels. Implementation of the Monitoring Plan (**Appendix B**) is expected to document this improvement. The monitoring plan allows for adjustments in future years as may be deemed beneficial in documenting continued progress in fecal coliform reductions.

## ***Assessing Progress and Making Changes***

### *Monitoring and Assessment*

New River is located predominantly in Pasco County, with the most downstream portion of the river in Hillsborough County. Pasco County started quarterly sampling in the river late in 2005 for a range of parameters, including coliform bacteria. The samples are being collected at Creek Road, close to the county line. The results are expected to provide information to help guide any additional monitoring stations and assessment programs that prove necessary in Pasco County, further upstream in New River.

In Hillsborough County, the EPCHC initiated quarterly sampling (including fecal coliforms) at one fixed station in the lower portion of the New River in 2005. Given the short stretch of river upstream of this location that is within Hillsborough County, a single sampling location is appropriate. EPCHC monitoring is planned to continue within this WBID. In addition, the HRB BMAP Monitoring Plan (**Appendix B**) will outline steps the stakeholders will take to track fecal coliform bacteria levels and source changes likely to pose risks to human health within this WBID.

### *Tracking Progress Towards Water Quality Improvements*

The results of the monitoring programs by Pasco County, EPCHC, and HRB BMAP will be used to assess progress toward water quality improvements related to fecal coliform bacteria concentration through the annual application of a decision matrix, developed by EPCHC staff. This decision matrix will also be applicable to watersheds outside of Hillsborough County. This decision matrix is modeled on one developed by the TBEP, used to track water quality in Tampa Bay. The matrix includes a statistical evaluation of water quality trends in New River and will be applied annually.

One hundred percent (100%) of the nineteen (19) Management Actions for the New River WBID will be either completed or ongoing by the end of 2009. If water quality trends show degradation or a lack of improvement over time, the decision matrix will be used to determine the types of actions to be considered by the implementing partners.

### ***6.6.3 Spartman Branch (WBID 1561), Baker Creek (WBID 1522C), and Flint Creek (WBID 1522A)***

Spartman Branch and Baker Creek are part of a stream network that drains into Lake Thonotosassa, the largest natural lake in Hillsborough County (**Figures 6.3 and 6.4**). Both streams are located entirely within Hillsborough County. Flint Creek is the outlet stream that drains from Lake Thonotosassa into the Hillsborough River. Because the three streams are hydrologically connected, the management actions/projects proposed for them are combined into a single section.

Spartman Branch is a first-order stream located in north-central Hillsborough County, in the headwaters of the Flint Creek/Lake Thonotosassa watershed. It flows in a northwesterly direction from its headwaters (Walden Lake) into Pemberton Creek, which eventually discharges to Baker Creek, Lake Thonotosassa, and Flint Creek. Spartman Branch drains about 27.4 square miles.

The stream, which is about five miles long, is flanked by I-4 to the north and SR 39 to the east. The eastern portion of Spartman Branch is located within City of Plant City, with a population of approximately 32,000. Residential is the largest land use category, accounting for 28 percent of the total watershed area. The natural land use category accounts for 25 percent of the watershed area, with another 17 percent as agriculture and rangeland (PBSJ 2008). Recent detailed field investigations (HSW, 2007) indicate these land uses remain the dominant ones today.

Baker Creek drains about 27 square miles and discharges to Lake Thonotosassa. Its tributaries include Pemberton Creek and the Baker Creek Tributary Canal. The creek, which is about 2.5 miles long, is flanked by Lake Thonotosassa to the north and I-4 to the south. The nearest incorporated urban area is the City of Plant City, located several miles to the east and which contributes to the flow via Spartman Branch. The dominant land use in the Baker Creek watershed is agriculture (including rangeland), which comprises about 61 percent of the total area. The natural land use, which includes upland forest, water, and wetland, accounts for about 20 percent of the total watershed area. Low- and medium-density residential is third, at 15 percent. Based on 1999 land use coverage (SWFWMD 1998), the total area occupied by the residential land use category is about 228 acres. Recent detailed field investigations by HSW (2007) indicate that agriculture (rangeland) remains the dominant land use today.

Flint Creek drains about 60 square miles, including Lake Thonotosassa (and all upstream systems), Campbell Branch, and Hollomans Branch watersheds. The creek, which is about 2.3 miles long, flows from Lake Thonotosassa to the Hillsborough River. The City of Tampa, with a population of over 300,000 (2005 U.S. Census), is about 14 miles to the southwest. Plant City is about 5 miles southeast of Flint Creek and contributes flow via Spartman Branch. The dominant land use in the Flint Creek watershed is cropland and pastureland, which covers 47 percent of the area, followed by low-density residential at 27 percent. Approximately 18 percent of land use in the watershed is characterized as stream and lake swamps. Recent detailed field investigations by HSW (2007) indicate that these land use characterizations remain valid today.

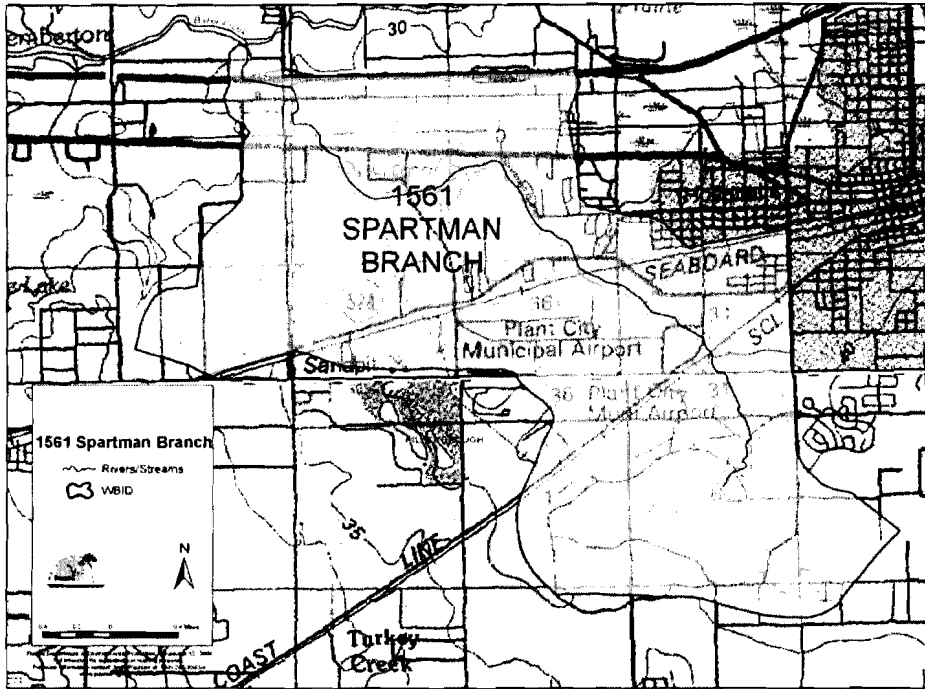


Figure 6.3. Spartman Branch WBID 1561

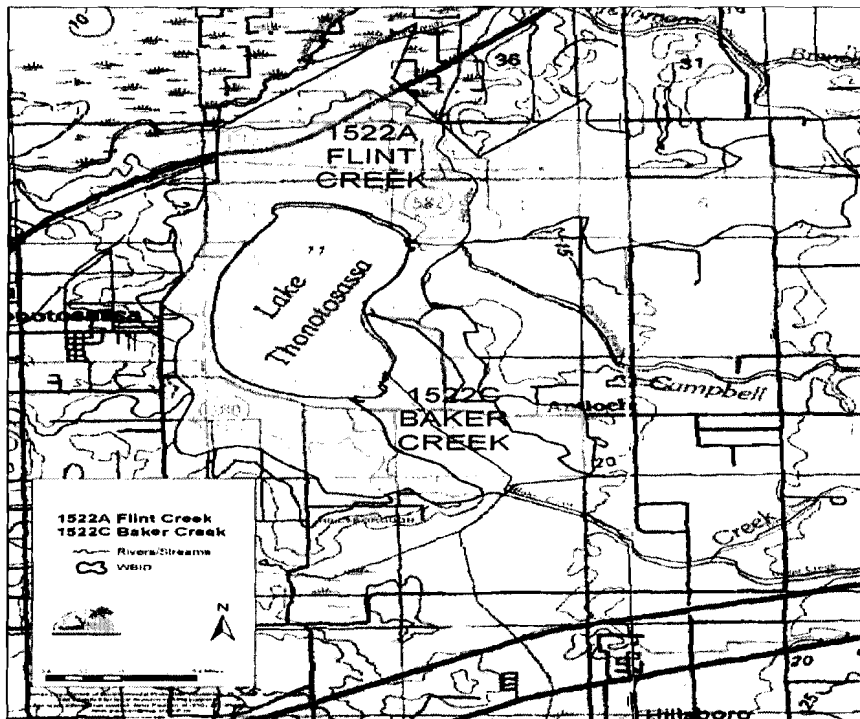


Figure 6.4. Flint and Baker Creeks WBIDs 1522A and 1522C

## Pollutant Sources and Management Actions/Projects

Given the uncertainties inherent in addressing elevated fecal coliform levels, a combination of source prevention and additional data-gathering efforts is being taken to address coliform reductions. The basic approach is as follows:

- *Existing monitoring data and source identification projects were used to identify “hot spots.”*
- *Primary fecal coliform sources will be investigated in each of these “hot spots” through the coordinated effort of Hillsborough County, City of Tampa, Plant City, FDOT, FDEP, EPCHC, and local residents to address all controllable sources of fecal coliform in one location in a short time before moving onto another priority area.*
- *At the same time, individual fecal coliform load management projects will continue to be implemented. Examples are wastewater infrastructure maintenance and MS4 permit requirements for identifying illicit discharges.*

An initial source tracking project (funded by Hillsborough County and conducted by USF in 2002) using antibiotic resistance analysis, a method of microbial source tracking, was used to gain information about the probable sources of fecal coliform contamination to Flint Creek (WBID 1552A). The study results showed that agricultural animals were major contributors at the site; wild animals and human sources were also implicated.

In 2007-2008, FDEP funded an intensive source tracking effort via PBSJ (and subcontractors University of South Florida and HSW Engineering). This effort helped narrow the search for possible sources and helped determine whether a given impairment area was of anthropogenic (i.e. human) origin. The results from the first phase of the project were published in June 2008 and showed both human and animal-related fecal coliform sources for this WBID.

In Spartman Branch (WBID 1561), Baker Creek (WBID 1522C) and Flint Creek (WBID 1522A), stakeholders are addressing these fecal coliform sources within these combined WBIDs with a total of thirty-five (35) management actions (**Table 6.1.5**, page 44). Note that a given project may apply to multiple management categories. By the end of 2009, 97% of these thirty-five (35) management actions will be implemented. Nineteen (19) of these are ongoing projects. Public education efforts and one (1) monitoring program are planned to continue past 2009. Details of these management actions can be found in Appendix D of the *Draft HRB BMAP Supporting Document*.

**Table 6.1.5 Spartman Branch, Baker Creek and Flint Creek Projects by Management Category**

WATERBODY WBID*	HILLSBOROUGH RIVER BMAP MANAGEMENT CATEGORY	NUMBER OF PROJECTS
Spartman Branch 1561 Baker Creek 1522C Flint Creek 1522A	Public Education	10
	Wastewater Infrastructure Management (Sewer and/or Septic Systems)	13
	Stormwater Management Program	2
	Agriculture and Silviculture BMPs	1
	Regulations, Ordinances, and Guidelines	2
	Bacteria "Hot Spot" Program	2
	Restoration, Water Quality Improvement, and Land Acquisition	9
	Special Studies, Planning, Monitoring & Assessment	5

\* WBID – Waterbody identification.

For Spartman Branch (WBID 1561), fecal coliform sources are spatially isolated. Human-related sources appear to originate from mobile home septic systems or stormwater and animal-related sources from wildlife such as deer and horses (PBSJ 2008).

Baker Creek (WBID 1552C) sources appear to be primarily from low-lying residential communities with both mounded and un-mounded septic system drainfields with a history of failures, and from livestock closely associated with tributary surface waters (PBSJ 2008).

Flint Creek (WBID 1552A) sources appear to be from a combination of human and animal sources (PBSJ 2008). Measures put in place by stakeholders within all three of these WBIDs to address septic sources include high probability septic tank failure mapping, septic system setback, and septic system complaint response. Stakeholders address animal sources transported via stormwater through a pet waste campaign, Lake Thonotosassa water quality treatment, 4 Adopt-a-Pond projects, stormwater improvements/retrofits, and participation in agricultural BMPs by nurseries and vegetable farms to address stormwater quality. Details of these and additional management actions can be found in Section 6.0 and in **Table 6.6** (see page 136).

The stakeholders with the majority of projects within this WBID are the City of Plant City, Hillsborough County, and EPCHC (**Table 6.1.6** below). The City of Plant City has eleven (11) projects within this WBID, nine (9) of which are ongoing efforts. Hillsborough County Public Works has ten (10) projects within this WBID, with three (3) as ongoing efforts. EPCHC has six (6) projects, three (3) of which are ongoing efforts.

In 2007, Hillsborough County completed an updated septic tank map using GIS and billing information, and evaluated potential "hot spots" based on hydrologic and soil conditions. The HCHD did not identify any high-probability areas for septic system failure within Spartman Branch, Baker or Flint Creek WBID boundaries or immediately contributing waters within Hillsborough County (PBSJ 2008). Details of the thirty-five (35) management actions for these

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combined WBIDs can be found in **Table 6.6** (see page 136). This table provides details on all projects, including the lead entity, project partners, cost and funding source(s), schedule, and anticipated benefits and load reductions (if known). Additional information on these projects can be found in Appendix D of the *Draft HRB BMAP Supporting Document*.

**Table 6.1.6 Spartman Branch, Flint Creek, Baker Creek Projects by Stakeholder**

BWG Member	BMAP Management Action / Project Categories								
	Public Education and Outreach	Wastewater Infrastructure Management (Sewer and/or Septic Systems)	Stormwater Management Program	Agriculture BMPs	Regulations, Ordinances, and Guidelines	Conservation/BMPs Land Acquisition	Fecal Coliform Bacteria "Hot Spot" Program	Restoration and Water Quality Improvement	Special Studies, Planning, Monitoring & Assessment
City of Plant City	2	7	3		1			2	1
City of Tampa									
City of Temple Terrace									
EPCHC	1	3							4
FDACS/IFAS	1			1					
FDEP									1
FDOT	1								
HCHD	1	2			1		1		1
HC Parks & Recreation									
HC Public Works	6	1					1	4	2
Pasco County									
Polk County									
SWFWMD						1		1	

Note: Shading denotes WBID area in which stakeholder is not located.

In addition to stakeholder management actions, BMAP monitoring efforts are anticipated to continue in this basin over the long run. Monitoring efforts include monthly fecal coliform monitoring for these combined WBIDs and the BMAP Monitoring Plan (**Appendix B**). During a May 2007 field visit to Walden Lake, (the headwaters of Spartman Branch), no flow was observed coming out of the lake. These low flow conditions have in the past and can in the future hinder sampling and monitoring efforts in this WBID. Details of these and additional management actions can be found in **Table 6.6** (see page 136) and Appendix D of the *Draft HRB BMAP Supporting Document*.

With 97% of the planned management actions in these WBIDs being addressed by the end of 2009, water quality data collected after 2009 should begin to show reductions in fecal coliform

levels. Implementation of the Monitoring Plan (**Appendix B**) is expected to document this improvement. The Monitoring Plan allows for adjustments in future years as may be deemed beneficial.

### ***Assessing Progress and Making Changes***

#### *Monitoring and Assessment*

The Spartman Branch, Baker Creek, and Flint Creek watersheds include Hillsborough County and the City of Plant City. In Hillsborough County, the EPCHC has conducted monthly water quality monitoring since 1989. In addition, the results of FDEP's MST project (PBSJ 2008) provide information identifying the need for additional monitoring stations and assessment programs in the WBIDs or their contributing watersheds.

EPCHC monitoring is planned to continue within this WBID. In addition, the HRB BMAP Monitoring Plan (**Appendix B**) outlines steps the stakeholders will take to track fecal coliform bacteria levels and source changes likely to pose risks to human health within this BMAP WBID.

#### *Tracking Progress Towards Water Quality Improvements*

The results of the EPCHC monitoring programs will be used to assess progress toward water quality improvements associated with fecal coliform bacteria contamination through the annual application of a decision matrix, developed by EPCHC staff. The decision matrix is modeled on a similar one, developed by the TBEP, used to track water quality in Tampa Bay. The matrix includes a statistical evaluation of water quality trends in Spartman Branch, Flint Creek, and Baker Creek, and will be applied annually.

Ninety-seven percent (97%) of the thirty-five (35) Management Actions for the Spartman Branch, Baker and Flint Creeks WBID will be either completed or ongoing by the end of 2009. If water quality trends show degradation or a lack of improvement over time, the matrix will be used to determine the types of actions to be considered by the implementing partners.

### **6.6.4 Lower Hillsborough River (WBID 1443E)**

The Lower Hillsborough River (LHR) is a highly urbanized waterbody located within the City of Tampa (**Figure 6.5**).

FDEP developed a fecal coliform TMDL for WBID 1443E, which is encompassed by the LHR, in 2004 (FDEP, 2004b). At the time the TMDL was developed, WBID 1443E was defined as extending from the City of Tampa dam to the river mouth. Based on the further analysis of salinity data from the LHR, in 2005 FDEP subsequently divided the WBID into a less saline reach (WBID 1443F) that extends from the City of Tampa dam approximately to Sulphur Springs, and a predominately marine reach (WBID 1443E) that extends from Sulphur Springs to the river mouth (about 8 miles). Because the two WBIDs are hydrologically connected and share similar pollutant sources and other environmental stressors, the management actions/projects proposed for WBID

1443E may end up being relevant for WBID 1443F as well. However, WBID 1443F is not currently listed as impaired for fecal coliform.

FDEP (2004b) provides the following overview of the Hillsborough River and its watershed:

*“...tributaries to the Hillsborough River (which end up draining to the Tampa Reservoir) are Big Ditch, Flint Creek, ...Indian Creek, New River, Two Hole Branch, Basset Branch, Hollomans Branch, Clay Gully, Trout Creek, Blackwater Creek, and Cypress Creek. High floodwaters are diverted from the Hillsborough River at the confluence of Trout Creek and upstream of the Tampa Reservoir Dam through the Tampa Bypass Canal to McKay Bay. Channelization has extended Sixmile Creek west and north to intersect the Hillsborough River at two points, at the confluence of Trout Creek and near the midpoint of Tampa Reservoir, which supplies drinking water to the City of Tampa. The modified Sixmile Creek was then renamed the Tampa Bypass Canal, which comprises two canals. The Harney Canal (C-136) runs from the Tampa Reservoir to join the second and longer canal, C-135, which connects the Hillsborough River at Trout Creek and Palm River. Both canals control flooding in the City of Tampa.”*

Hydrologic inputs to the LHR consist of a combination of river water flowing over or through the dam, ground water discharges from Sulphur Springs and several smaller springs, and stormwater inflows from the heavily urbanized watershed that is located downstream from the dam. There is also some evidence that there are direct ground water discharges into the riverbed, especially in the area upstream from Sulphur Springs. During dye tests of the North Tampa Sinks in 1993 some fluorescein dye was observed along the north bank of the river, upstream of Nebraska Avenue and in the riverbed itself just downstream of Nebraska. The dam provides a water supply reservoir for the City of Tampa. As the city's population has increased during the past several decades, the amount of fresh water taken from the reservoir has also increased. Over the past 30 years, the median annual flows of water from the reservoir to the lower river have been close to zero. However, during and following periods of high rainfall, flows over the dam into the Lower Hillsborough River can be substantial, resulting in scouring of river bottom from the dam almost to Sulphur Springs. In the 1960s, the City of Tampa constructed a pumping facility to divert some of Sulphur Spring flow to the reservoir during periods of low rainfall. The SWFWMD and local stakeholders have studied freshwater inflows to the lower river as part of a minimum flows and levels (MFL) analysis (SWFWMD, 2006).

The length of the Lower Hillsborough River from the river mouth at Hillsborough Bay to the City of Tampa dam is about 10 miles. Between the dam and Sulphur Springs, the river itself is narrow, mostly less than 100m in width. Along this stretch of river, there still exists some undeveloped shoreline. Depending on the amount of flow from the reservoir (and more recently from the diversion of Sulphur Spring water to the base of the dam), salinity in this upper portion of the lower river can range from fresh (< 0.5 parts per thousand [ppt] to polyhaline (> 18 ppt).

Downstream of Sulphur Springs, the river shoreline is almost completely developed. The river begins to widen noticeably downstream of the Sligh Avenue Bridge. River widths from Sligh Avenue to the mouth range between 100m and 250m (SWFWMD, 2006).

Land use is 94 percent urban in the portion of the Lower Hillsborough River watershed that is downstream from the dam. This has been further sub-divided into: (1) high-density residential land use, which comprises about 60 percent of the WBID; (2) general “urban” land use at about 30 percent; followed by (3) transportation at 4 percent.

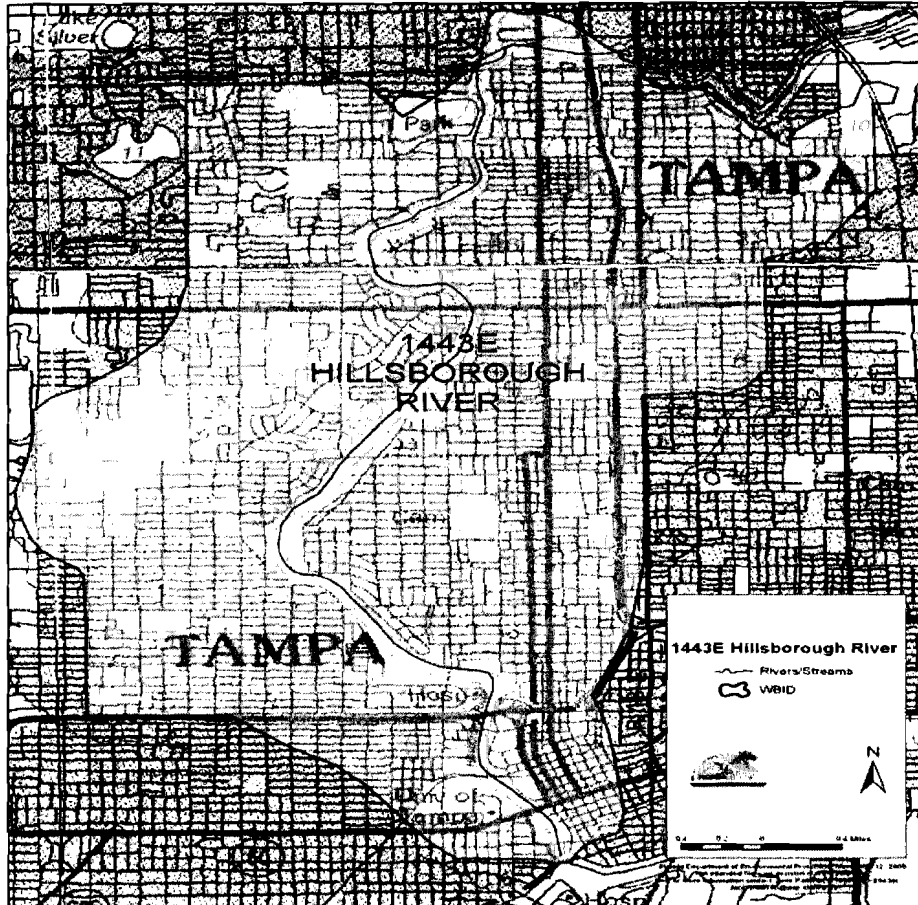


Figure 6.5. Lower Hillsborough River WBID 1443E

### Pollutant Sources and Management Actions/Projects

Given the uncertainties inherent in addressing elevated fecal coliform levels, a combination of source prevention and additional data-gathering efforts is being taken to address coliform reductions. The basic approach is as follows:

- Existing monitoring data and source identification projects were used to identify "hot spots."
- Primary fecal coliform sources will be investigated in each of these "hot spots" through the coordinated effort of Hillsborough County, City of Tampa, FDOT, FDEP, EPCHC, and local residents to address all controllable sources of fecal coliform in one location in a short time before moving onto another priority area.

- *At the same time, individual fecal coliform load management projects will continue to be implemented. Examples are wastewater infrastructure maintenance and MS4 permit requirements for identifying illicit discharges.*

In 2007-2008, FDEP funded an intensive source tracking effort via PBS&J (and subcontractors University of South Florida and HSW Engineering). This effort helped narrow the search for possible sources and helped determine whether a given impairment area was of anthropogenic (i.e. human) origin. The results from the first phase of the project were published in June 2008 and showed both human and animal-related fecal coliform sources for WBID 1443E.

In Lower Hillsborough River (WBID 1443E), stakeholders are addressing fecal coliform sources within this WBID with a total of forty-three (43) management actions (Table 6.1.7 below). Some projects have multiple functions and may apply to more than one management category. By the end of 2009, 93% of these management actions will be implemented, fourteen (14) of which are ongoing projects. Public education efforts and two (2) monitoring programs are planned to continue past 2009. Details of these management actions can be found in Table 6.7 (see page 150) and Appendix D of the Draft HRB BMAP Supporting Document.

**Table 6.1.7 Lower Hillsborough River Projects by Management Category**

<b>WATERBODY WBID*</b>	<b>HILLSBOROUGH RIVER BMAP MANAGEMENT CATEGORY</b>	<b>NUMBER OF PROJECTS</b>
Lower Hillsborough River 1443E	Public Education	10
	Wastewater Infrastructure Management (Sewer and/or Septic Systems)	12
	Stormwater Management Program	15
	Regulations, Ordinances, and Guidelines	1
	Bacteria "Hot Spot" Program	2
	Restoration, Water Quality Improvement, and Land Acquisition	17
	Special Studies, Planning, Monitoring & Assessment	7

\* WBID – Waterbody identification.

For the Lower Hillsborough River (WBID 1443E), the leading cause for fecal coliform appears to be human-related contamination, particularly from sediments, which contribute to chronic and elevated levels of surface water contamination. These sources were detected in all but one location tested during the intensive source tracking effort (PBSJ 2008). Although ruminant and horse-specific markers were occasionally present, existing land use suggests that the human source is more significant. Fecal coliform "hot spots" are likely due to OSTDSs in older residential areas, problems with private collection systems, and to historic repetitive lift station Sanitary Sewer Overflows (SSOs)(PBSJ 2008).

Stakeholders address the septic system sources using high probability septic failure mapping, septic system complaint response, along with public education and outreach. Addressing SSOs, stakeholders utilize a wastewater collection system study, wastewater gravity sewer repairs, wastewater pump station emergency generators for lift stations near the river, and database tracking of SSOs. To address stormwater quality and fecal coliform contributed by animal waste, stakeholders have initiated a variety of measures

including a survey of industrial stormwater facilities; stormwater rehabilitation at Lowry Park Zoo, gravity sewer line siphon rehabilitations, to name a few. Details of these and additional management actions can be found in **Table 6.7** (see page 150).

The shoreline within this WBID is a combination of sea walls, rip rap, and “soft” edges (not hardened with seawalls). The entire area within the WBID boundary is serviced by the City of Tampa sewer system. It is possible, however, that some individual residences still maintain an OSTDS (PBSJ 2008).

In 2007, Hillsborough County completed an updated septic tank map using GIS and billing information, and evaluated potential “hot spots” based on hydrologic and soil conditions. The HCHD did not identify any high-probability areas for septic system failure within the Lower Hillsborough River WBID boundaries or from immediately contributing waters within Hillsborough County (PBSJ 2008).

The stakeholders with the majority of projects within this WBID are City of Tampa, Hillsborough County Public Works, and EPCHC (**Table 6.1.8**, page 51). The City of Tampa has seventeen (17) projects within this WBID, one (1) of which is a continuing program. Hillsborough County Public Works has seven (7) projects within this WBID, with three (3) as ongoing efforts. EPCHC has seven (7) projects, four (4) of which are ongoing efforts.

**Table 6.1.8 Lower Hillsborough River Projects by Stakeholder**

BWG Member	BMAP Management Action / Project Categories								
	Public Education and Outreach	Wastewater Infrastructure Management (Sewer and/or Septic Systems)	Stormwater Management Program	Agriculture BMPs	Regulations, Ordinances, and Guidelines	Conservation/BMPs Land Acquisition	Fecal Coliform Bacteria "Hot Spot" Program	Restoration and Water Quality Improvement	Special Studies, Planning, Monitoring & Assessment
City of Plant City									
City of Tampa	2	7	1		1	1	1	7	1
City of Temple Terrace								1	
EPCHC	1	3							4
FDACS/IFAS									
FDEP									2
FDOT	1					1		2	
HCHD	1	1					1		1
HC Parks & Recreation									
HC Public Works	1	1					1	3	1
Pasco County									
Polk County									
SWFWMD									

Note: Shading denotes WBID area in which stakeholder is not located.

With 93% of the planned management actions being addressed by the end of 2009, water quality data collected after that should begin to show reductions in fecal coliform levels. Ongoing monitoring plus implementation of the Monitoring Plan (**Appendix B**) will document this improvement.

### **Assessing Progress and Making Changes**

#### *Monitoring and Assessment*

The EPCHC conducts monthly water quality monitoring for a number of constituents (including fecal coliform and enterococci bacteria) at three fixed stations in WBID 1443E, and at one fixed

station in WBID 1443F. FDEP carries out monitoring at a Temporal Variability Station located in WBID 1443E. The results of the Microbial Source Tracking (MST) project (PBSJ 2008) also provide information on the need for monitoring stations and assessment programs in this WBID.

EPCHC monitoring is planned to continue within this WBID and BMAP monitoring efforts are anticipated to continue in this basin over the long run. Monitoring efforts include monthly fecal coliform monitoring, a Surface Water Temporal Variability Network monitoring site for this WBID and the HRB BMAP Monitoring Plan (**Appendix B**). The HRB BMAP Monitoring Plan outlines steps the stakeholders will take to track fecal coliform bacteria levels and source changes likely to pose risks to human health within this WBID.

#### *Tracking Progress Towards Water Quality Improvements*

The results of the monitoring programs by EPCHC and FDEP will be used to assess progress toward water quality improvements associated with fecal coliform concentrations through the annual application of a decision matrix, developed by EPCHC staff. The decision matrix is modeled on a similar one, developed by the TBEP, that is used to track water quality in Tampa Bay. The matrix will include a statistical evaluation of water quality trends in the Lower Hillsborough River and will be applied annually.

Ninety-three percent (93%) of the forty-three (43) Management Actions for the New River WBID will be either completed or ongoing by the end of 2009. If water quality trends show degradation or a lack of improvement over time, the decision matrix will be used to determine the types of actions to be considered by the implementing partners.

**7.0 Monitoring Program**

Implementing the multiple management actions/projects contained in this BMAP will lead to water quality improvements. **Table 7.1** depicts select indicators of water quality that are often used to help integrate trends in fecal coliform bacteria concentrations. As part of the BMAP, the TS and BWG designed a strategy for monitoring water quality based on these indicators and measuring pollutant loads to determine if water quality is improving and the TMDL is being met (**Appendix B**).

**TABLE 7.1. ANTICIPATED TRENDS IN CORE AND SUPPLEMENTAL WATER QUALITY INDICATORS**

<b>CORE INDICATORS*</b>	<b>EXPECTED RESPONSE IN RIVERS AND CREEKS</b>
Fecal coliform	Decrease in concentration
<b>SUPPLEMENTAL INDICATORS**</b>	<b>EXPECTED RESPONSE IN RIVERS AND CREEKS</b>
Specific conductance	Monitored to facilitate interpretation of core indicator trends
Dissolved oxygen (DO)	Monitored to facilitate interpretation of core indicator trends
Alkalinity	Monitored to facilitate interpretation of core indicator trends
pH	Monitored to facilitate interpretation of core indicator trends
Temperature	Monitored to facilitate interpretation of core indicator trends
Color	Monitored to facilitate interpretation of core indicator trends
Turbidity	Monitored to facilitate interpretation of core indicator trends
Total suspended solids (TSS)	Monitored to facilitate interpretation of core indicator trends
Total organic carbon (TOC)	Monitored to facilitate interpretation of core indicator trends

\*Core indicator – Indicator that measures progress made towards achieving TMDL.

\*\*Supplemental indicator – Additional indicators measured to facilitate the interpretation of core indicators.

## 7.1 Issues Involving Quantification of Reductions in Fecal Coliform Concentrations

Bacteria can enter water via either point or nonpoint sources of contamination. Sources are often of a sporadic nature. Failed on-site wastewater disposal systems (septic systems) in residential or rural areas can contribute large numbers of coliforms and other bacteria to surface water and groundwater. Stormwater runoff from residential, rural, and urban areas can transport waste material from domestic pets and wildlife into surface waters. Communities with central sewer may not have enough capacity to treat extremely large volumes of water sometimes experienced after heavy rainfalls, and must bypass some of the wastewater as either sanitary sewer overflow or as combined stormwater overflow (Jamieson et al 2002). Power outages and flooding can also contribute to the discharge of untreated wastewater. Treated wastewater and treatment plant residuals can also have adverse impacts on sensitive areas. Agricultural sources include livestock excrement from barnyards, pastures, rangelands, feedlots, and uncontrolled manure storage areas. Land application of manure and sewage sludge can also result in water contamination, which is why states require permits, waste utilization plans, or other forms of regulatory compliance (Jamieson et al 2002).

Factors influencing fecal bacteria survival include moisture, soil type, temperature, pH, manure application rate, nutrient availability, and competition. A substantial amount of information has been produced within the past 30 years on the survival of various enteric bacterial species in soil and groundwater systems. Gerba et al. (1975) reported that survival times of enteric bacteria in soil and groundwater ranged from 2 to 4 months. Filip et al. (1988) examined the survivability of several organisms in simulated conditions of saturated soil and observed that most organisms tested for, including *E. coli*, survived for over 100 days (at 10°C). Other researchers have noted the regrowth of indicator organisms in soil systems (Van Donsell et al. 1967; Howell et al. 1996). This means that the detection of fecal coliform may not represent recent contamination and may obscure the source and extent of fecal contamination (Howell et al. 1996).

Fecal indicators were common in the surface waters of agricultural areas in southern Finland (Niemi and Niemi 1991), generally exceeding 100 counts per 100 mL and occasionally exceeding 1000 counts per 100 mL. However, these researchers found that fecal indicators were also found in 50% of water samples from non-agricultural or pristine watersheds, sometimes exceeding 100 counts per 100 mL. Numerous studies have revealed the presence of indicator organisms and pathogens in farmed and non-agricultural watersheds (Jamieson et al 2002). Although fecal indicator bacteria are commonly found in both farmed and non-agricultural watersheds, it is often difficult to ascertain the precise source of contamination in surface water due to the multiple sources of bacteria (Joy et al. 1998). The need to quantify the contributions of fecal coliform from natural or background sources is an important consideration in source tracking studies.

Moist/wet environments are considered optimal for bacterial survival. Numerous researchers have suggested that the principal factor affecting the survival of enteric bacteria in soil systems is the moisture status (Gerba et al. 1975; Tate 1978; Kibbey et al. 1978; Crane et al. 1981; Reddy et al. 1981; Faust 1982; Mubiru et al. 2000; Entry et al. 2000a,b). Tate (1978) found *E. coli* survival to be greatest in organic soils under flooded conditions. Hagedorn et al. (1978) found *E. coli* populations highest after a rise in the water table following major rainfall events. *Streptococcus faecalis* died more rapidly under low soil moisture conditions (Kibbey et al. 1978). Mubiru et al. (2000) linked lower mortality rates of *E. coli* to higher unsaturated soil matric potentials and Entry et al. (2000b) correlated the increased survival of fecal coliform with increased soil moisture in grass buffer strips receiving swine waste. Moisture retention in soils is a function of particle size distribution and organic matter content (Jamieson et al 2002).

Multiple articles have documented an inverse relationship between temperature and bacterial mortality (see, for examples Gerba et al. 1975; Reddy et al. 1981) with higher temperatures decreasing the survival times of fecal bacteria. Van Donsel et al. (1967) found that 90% of coliform bacteria died within 3.3 days of land application in the summer compared to 13.4 days in the winter. The review compiled by Reddy et al. (1981) found that die-off rates approximately doubled with a 10°C increase in temperature. Zibilske and Weaver (1978) concluded that the only set of conditions that consistently led to the death of *Salmonella* were high temperatures and low moisture. Filip et al. (1988) determined that *E. coli* could survive for over 100 days in water-soil mixtures kept at 10°C. *E. coli* survived longer in sheep and cattle manure at temperatures below 23°C (Kudva et al. 1998). Contrary to this, Howell et al. (1996) measured fecal coliform and fecal strep mortality rates at three different temperatures in feces-amended sediments in the laboratory, noting greater fecal coliform survival and sometimes regrowth under warmer conditions. This may be of relevance to the situation in the Tampa Bay area, where warm temperatures may facilitate regrowth in stormwater systems.

All of the above-listed factors make attempts to quantifiably predict future reductions in fecal coliform concentrations from a given project (**Tables 6.4 through 6.7**) difficult. Consequently, a detailed monitoring program is a major part of the BMAP actions. This monitoring program is designed to be coordinated with the implementation of projects, to demonstrate likely cause and effect conditions.

## 7.2 Water Quality Monitoring Objectives

The strategy for HRB BMAP water quality monitoring addresses the monitoring design, quality assurance (QA), data management, and data interpretation that measures progress in achieving the TMDLs. The HRB BMAP Monitoring Plan (**Appendix B**) does this while allowing for evaluation and feedback that better refine the monitoring strategy and provide information to better define how to achieve the TMDLs. The primary and secondary objectives of the monitoring strategy are as follows:

### 7.2.1 Primary Objectives

1. Identify and track water quality trends in BMAP waterbodies to determine if water quality standards for fecal coliform are being achieved; and
2. Where feasible, measure the effectiveness of specific BMPs in reducing external loadings of fecal coliform.

### 7.2.2 Secondary Objectives

1. *Measure reductions in watershed loadings of TMDL target pollutants; and*
2. *Refine understanding of the type and relative magnitude of pollutant loading sources.*

A network of river and creek stations representative of the inflow and outflow of each impaired waterbody will be monitored for applicable parameters (**Table 7.1**). Information provided by the monitoring network will be used for the following purposes where possible:

- *Evaluate progress toward achieving the primary and secondary objectives listed above;*
- *Demonstrate stakeholders' progress toward meeting their individual TMDL obligations;*
- *Facilitate comparisons of water quality before and after BMP implementation; and*
- *Inform the selection of possible future BMPs or management actions/projects to address water quality.*

Data collected by the network are maintained by FDEP in a central database available to partners and must meet QA requirements set by FDEP. Additional interagency data comparisons and QA checks will be conducted as practicable. This strategy builds on existing water quality monitoring program commitments made by FDEP, the SWFWMD, and EPCHC. The monitoring strategy will involve an investment of resources and funding by these Stakeholders.

Observations of water quality conditions and trends will be reported to the TS and the BWG and FDEP at least annually as part of the BMAP annual meeting. Water quality data will be used to support the adaptive management process, assess projects, and identify the need for new actions. A more complete analysis of trends in progress towards achieving designated use will be made on a five-year basis, corresponding with FDEP's watershed management cycle.

## **8.0 Tracking and Follow-up Actions**

The FWRA provides for flexibility in the implementation of a BMAP by allowing a phased approach. The TS and BWG are implementing some WBID projects designed to improve current conditions and other projects to better evaluate elevated fecal coliform bacteria in the Hillsborough River Basin.

The TS and BWG will track its projects and other implementation efforts and monitor water quality in TMDL waterbodies (through water quality monitoring programs discussed earlier), to ensure that the BMAP is carried out and to measure its effectiveness. The TBEP has volunteered to coordinate annual progress meetings with the TS and the BWG. The TS and BWG will meet to discuss implementation issues, consider new information, and determine other management actions/projects needed for waterbodies that are not projected to meet their TMDLs.

Each entity responsible for implementing management actions/projects as part of the BMAP will submit information to the TS, BWG and FDEP, as needed, at the annual meeting. If significant changes have occurred which may hinder achievement of the TMDL goal, a progress report will be submitted to FDEP. This progress report will track the implementation status of any management actions/projects listed in the BMAP, document additional management actions/projects undertaken in response to these changes to further the water quality improvements in the basin. The progress report will primarily comprise a table of data elements to include the following:

- *BMAP project name;*
- *Affected area;*
- *Brief description;*
- *Project start/end;*
- *Project/activity status;*
- *Fecal coliform removal estimate when available;*
- *Project monitoring results; and*
- *Comments.*

The TS and BWG will review the progress reports to assess whether the BMAP goals are being met. As part of its annual BMAP assessment meeting, the TS and BWG will evaluate the findings of ongoing studies and apply this new information to refine existing and develop new management actions/projects as part of an adaptive management approach to achieve the targeted pollutant reductions. The results from projects implemented to identify sources of bacteria will play a particularly critical role in shaping future management actions/projects taken by members of the TS and BWG.

Adaptive management involves setting up a mechanism for making course corrections in the BMAP when circumstances change or feedback mechanisms indicate that a more effective strategy is needed. Key components of adaptive management are tracking implementation, monitoring water quality and pollutant loads, and holding periodic TS and BWG meetings to share information and expertise. The FWRA requires that the plan be revised, as appropriate, in collaboration with basin stakeholders. All or part of a revised BMAP must be adopted by secretarial order.

Adaptive management measures include the following:

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

## **9.0 Commitment to Plan Implementation**

While the BMAP is linked by statute to permitting and other enforcement processes that affect individual entities, successful implementation requires that local stakeholders willingly and consistently work together to achieve adopted TMDLs. This collaboration fosters the sharing of ideas, information, and resources. The members of the Hillsborough TS and BWG have demonstrated their willingness to confer and coordinate with and support each other in their efforts.

On a practical level, BMAP implementation also depends on adequate resources and necessary authorizations. The management actions/projects contained in the BMAP are either under way or are planned in good faith. Current and future actions are contingent on necessary funding and approvals for their initiation and/or continuation.

BWG members have signed individual statements or letters of commitment to BMAP implementation or adopted resolutions that will be included as part of this adopted BMAP. These commitments address the following actions:

- *Continue to use an equitable and cost-effective, coordinated, comprehensive watershed management approach that applies the best available science to achieve TMDL-related pollutant load reductions and water quality improvements within a BWG member's authority;*
- *Seek necessary approvals and funding to implement consensus management actions/projects identified in the BMAP and implement those actions as required approvals and funding are secured;*
- *Track the implementation of management actions/projects for which a BWG member is responsible to ensure that the BMAP is carried out;*
- *Inform FDEP and the BWG of any obstacles to carrying out management actions/projects for which they are responsible, including technical, funding, and legal obstacles;*
- *Conduct water quality monitoring (if applicable) according to the monitoring strategy approved by the BWG; and*
- *Continue to communicate and coordinate actions and funding across TS and BWG member agencies and community groups with regard to BMAP implementation.*

**Table 9.1** lists the governments, agencies, and community groups that have made a commitment to the implementation of this BMAP.

TABLE 9.1. SIGNATORIES

ENTITY	SIGNATORY	TITLE	DATE
CITY OF PLANT CITY	David R. Sollenberger	City Manager	
CITY OF TAMPA	Pam Iorio	Mayor	
CITY OF TEMPLE TERRACE	Kim Leinbach	City Manager	
ENVIRONMENTAL PROTECTION COMMISSION OF HILLSBOROUGH COUNTY	Richard Garrity	Executive Director	
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION	Deborah Getzoff	Southwest District Director	
FLORIDA DEPARTMENT OF TRANSPORTATION	James V. Moulton	Director of Transportation Operations	
FLORIDA DEPARTMENT OF AGRICULTURE & CONSUMER SERVICES	Charles Bronson	Commissioner	
HILLSBOROUGH COUNTY HEALTH DEPARTMENT	Douglas Holt	Director	
HILLSBOROUGH COUNTY PARKS & RECREATION	Chair, Hillsborough County BOCC	Chairperson	
HILLSBOROUGH COUNTY PUBLIC WORKS	Chair, Hillsborough County BOCC	Chairperson	
PASCO COUNTY	John Gallagher	County Administrator	
POLK COUNTY	Michael Herr	County Manager	
SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT	David Moore	Executive Director	
UNIVERSITY OF FLORIDA/IFAS	Robyn Stone	Executive Director	

## **10.0 Detailed Project Information**

### **10.1 Introduction**

Management actions/projects were grouped in a table by category of activity. Within each table, projects are organized by the waterbodies or geographic area to which the management actions/projects apply. The tables include a description of each project, the lead entity/project partners, cost and funding source(s), schedule, and anticipated benefits and load reductions (if known). All tables for Section 10.0 are found in the Tables Section at the end of this report for ease of reference.

**Table 10.1. Agricultural BMPs**

**Table 10.2. Restoration and Water Quality Improvement Projects**

**Table 10.3. Regulations, Ordinances, and Guidelines**

**Table 10.4. Education and Outreach Efforts**

**Table 10.5. Basic Stormwater Management Program Implementation**

**Table 10.6. Wastewater Infrastructure Management, Maintenance Repair, and Upgrade**

**Table 10.7. Special Studies, Planning, Monitoring, and Assessment**

## **10.2 FDACS' Process of BMP Implementation**

FDACS' OAWP BMP implementation role involves assisting agricultural producers in selecting, funding, properly implementing, and maintaining BMPs as described in Section 6.0 under Local Initiatives for Pollutant Sources and Management Actions/Projects. Although FDACS' BMP programs are not regulatory requirements, Subsection 403.067(7)(b), F.S., requires that nonpoint pollutant sources (such as agriculture) included in a BMAP demonstrate compliance with pollutant reductions established to meet a TMDL, either by implementing applicable BMPs or by conducting water quality monitoring prescribed by FDEP or a water management district.

## **10.3 Quantifiable Fecal Coliform Bacteria Load Reductions**

Most management actions/projects proposed in this BMAP to decrease coliform loads to urban creeks (e.g., public education regarding pet waste management) are not conducive to quantitative load reduction estimates for reasons discussed in Section 7.0. As such, the project by project benefits of coliform management actions/projects are largely evaluated on a qualitative basis determined by the number of projects/programs completed or continuing over time. For a particular WBID, quantification of fecal coliform load reductions from multiple projects will be demonstrated as part of the detailed monitoring plan.

## **10.4 BMAP Implementation Costs**

Total implementation costs for the Lower Hillsborough River BMAP are estimated between \$75 million and \$85 million dollars. Total capital costs for the management actions within the impaired WBIDs are estimated to range from \$70 million to \$ 75 million dollars. Total operational costs for the management actions are estimated to range from \$ 5 million to \$ 10 million dollars. Sources for BMAP implementation come from local initiatives, state funding and federal dollars. Local funding for this BMAP is estimated to be \$45-49 million dollars, with State funding estimated at \$ 20-22 million, and Federal funding estimated at \$ 10-14 million dollars. Specific cost information for many of the projects is provided in the tables.

Where the cost of a project could not be adequately defined, it is indicated as unavailable in the tables. Certain types of projects (such as nonstructural BMP implementation, land acquisition, and maintenance) do not easily lend themselves to a full accounting of costs for the waterbody addressed by the project. In the case of BMP implementation and land acquisition, some of the true cost of implementation is carried by private landowners and is not readily available, or involves in-kind service, or the transactions are still ongoing and the complete cost is still not known. Other costs for maintenance and operation activities are generally not accounted for on an individual waterbody basis but cover larger areas, as indicated in the tables, including many waterbodies. Similarly, some special study projects are not fully developed, and the final costs are not known at this time.

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**TABLES**

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Hillsborough River Basin BMAP – March 5, 2009

TABLE 6.1.0 PROJECTS BY MANAGEMENT ACTION/CATEGORIES										
BWG Member	WBID	BMAP Management Action/Project Categories							Comments	
		Public Education and Outreach	Wastewater Infrastructure Management (Sewer and /or Septic Systems)	Stormwater Management Program	Agricultural BMPs	Regulations, Ordinances, and Guidelines	Fecal Coliform Bacteria "Hot Spot" Program	Restoration, Land Acquisition, and Water Quality Improvement		Special Studies, Planning, Monitoring & Assessment
City of Plant City	BWC	2	7	2		1		1	1	<ul style="list-style-type: none"> <li>• Significant investments made in stormwater and wastewater infrastructure and retrofits</li> <li>• Partner in McIntosh Park Water Quality/Wetland Enhancement Project</li> <li>• Stormwater Inlet Marking Program &amp; Public Education</li> </ul>
	NR									
	SBF	1	7	1		1		2	1	
	LHR									
City of Tampa	BWC									<ul style="list-style-type: none"> <li>• Grease Ordinance, Water Quality Code implementation and education/outreach activities</li> <li>• Wastewater Collection System Study, Sewer System Evaluation Study for Manhole Rehabilitation</li> <li>• Significant investments made in stormwater and wastewater infrastructure maintenance and retrofit</li> <li>• Partner in bacteria "hot spots" project</li> </ul>
	NR									
	SBF									
	LHR	2	8	3		1	1	3	1	

Hillsborough River Basin BMAP – March 5, 2009

Organization	Management Action	Projects								Description	
		1	2	3	4	5	6	7	8		
City of Temple Terrace	BWC										<ul style="list-style-type: none"> <li>Stormwater retrofits</li> </ul>
	NR										
	SBF										
	LHR			1					1		
Environmental Protection Commission of Hillsborough County	BWC	1	3	1					1	3	<ul style="list-style-type: none"> <li>Ambient surface water quality monitoring, citizen complaint response, investigation of illicit discharges, Water Quality Code implementation, along with education and outreach activities</li> <li>Industrial stormwater survey, private pump station ID &amp; compliance program, SSO database</li> </ul>
	NR	1	3						1	3	
	SBF	1	3	1					1	3	
	LHR	1	3	1					1	3	
Florida Department of Agriculture and Consumer Services/UF IFAS and Private Landowners	BWC	1				1					<ul style="list-style-type: none"> <li>Container nursery, vegetable &amp; agronomic crop, Lake Wales Ridge Citrus, and sod BMP manuals adopted</li> <li>Additional BMP manuals pending are: Specialty fruit &amp; nut, equine, and cow/calf</li> </ul>
	NR	1				1					
	SBF	1				1					
	LHR										
Florida Department of Environmental Protection	BWC									1	<ul style="list-style-type: none"> <li>Surface Water Temporal Variability Network Monitoring</li> <li>Microbial Source Tracking</li> </ul>
	NR									1	
	SBF									1	
	LHR									2	
Florida Department of Transportation	BWC	1		1							<ul style="list-style-type: none"> <li>Extensive stormwater management facilities constructed in association with road maintenance activities</li> <li>Extensive street sweeping</li> <li>Public education program</li> </ul>
	NR	1		1							
	SBF	1		1					1		
	LHR	1		1					5		

Hillsborough River Basin BMAP – March 5, 2009

Hillsborough County Health Department	BWC	1	2			1	1		1	<ul style="list-style-type: none"> <li>• Septic System Impact Area Maps</li> <li>• Septic System Setback and complaint response</li> <li>• Public Health Education Program</li> </ul>
	NR	1	2			1	1		1	
	SBF	1	2			1	1		1	
	LHR	1	1				1		1	
Hillsborough County Parks & Recreation	BWC			1	1				2	<ul style="list-style-type: none"> <li>• Agriculture cow/calf BMPs for Audubon Ranch, with FDACS</li> </ul>
	NR									
	SBF									
	LHR									
Hillsborough County Public Works	BWC	3	1				1	2	3	<ul style="list-style-type: none"> <li>• Septic Tank Hot Spot Analysis, Bacteriological Source Tracking Study, Pet Waste Campaign Study</li> <li>• Lakewatch, Hillsborough County Stream Water Watch, &amp; Adopt-A-Pond programs</li> <li>• Septic System Setback within Land Development Code</li> <li>• Countywide Public Education Program, and Stormwater Ponds &amp; Wetland Restoration</li> </ul>
	NR	2	2			1	1		1	
	SBF	4	1	2			1	4	3	
	LHR	3	1	1			1	3	2	
Pasco County	BWC			1			1	1	2	<ul style="list-style-type: none"> <li>• DNA Source Identification, Watershed Management Plan</li> <li>• Fecal Coliform Monitoring</li> </ul>
	NR						1	1	1	
	SBF									
	LHR									
Polk County	BWC		2	1		4		5	2	<ul style="list-style-type: none"> <li>• Land Development Regulations, Surface Water Protection, Wastewater Residuals Management &amp; Stormwater Quality Management Ordinances</li> <li>• Routine drainage maintenance &amp; erosion control on Blackwater Creek</li> <li>• Water Quality Ambient Monitoring on Blackwater Creek &amp; Watershed Management Plan</li> <li>• Illicit discharge complaint investigations</li> </ul>
	NR									
	SBF									
	LHR									

Hillsborough River Basin BMAP – March 5, 2009

TABLE 6.1.0 PROJECTS BY MANAGEMENT ACTION/CATEGORIES										
Southwest Florida Water Management District	BWC							1		<ul style="list-style-type: none"> <li>• Lake Thonotosassa Wetland &amp; Sedimentation Basin Project (effects Flint and Baker Creeks)</li> </ul>
	NR									
	SBF			1				2		
	LHR									

Notes: BWC – Blackwater Creek  
 NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

Hillsborough River Basin BMAP – March 5, 2009

TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
BWC-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase I Completed (2008)			\$42,528 for 6 WBIDs (Phase 1) / FDEP	Under contract to FDEP, PBS&J is providing services to help identify sources of fecal coliform contamination in 6 Hillsborough River tributaries. Phase I comprises initial screening; Phases II and III (implementation and evaluation of results, respectively) will be developed based on Phase I Work Plan.
BWC-3	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget	Update septic tank map using GIS and billing information, and evaluate potential "hot spots" based on hydrologic and soil conditions.
BWC-4	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 for each of 6 WBIDs / -	Areas of high probability for septic system failure were mapped throughout Hillsborough River Basin, not including areas in City of Tampa Wastewater or City of Plant City Wastewater service areas.
BWC-5	Bacteriological Source Tracking Study	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept., USF / SWFWMD, Ayres	Completed (2002)			\$100,000 for Blackwater and Flint Creeks / \$50,000 Hillsborough County, \$50,000	Study used antibiotic resistance analysis to gain information on probable sources of fecal coliform

Hillsborough River Basin BMAP – March 5, 2009

TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
			Associates				SWFWMD	contamination to the 2 creeks.
BWC-6	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			- / Absorbed within existing EPCHC budget	Survey and identify industrial facilities that operate stormwater management systems.
BWC-11	LakeWatch and Hillsborough County Stream Water Watch	Monitoring and Assessment	Hillsborough County Public Works Dept. / -	Ongoing (since 2001)			\$116,000 annually for 125 sites throughout county / Stormwater operating budget, SWFWMD cooperative funding	Countywide public education program on pollution prevention and BMPs through volunteer monitoring networks on lakes and streams in Hillsborough County. Includes data analysis of samples collected for nutrients.
BWC-12	2 Adopt-a-Ponds in Blackwater Creek Watershed	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Hillsborough County Public Works Dept., Stormwater Management Section / SWFWMD	Completed (1995 and 1997)			\$138,000 annually for countywide Adopt-a Pond Program / Stormwater Operations Budget	Pond restoration and environmental education.
BWC-13	Polk County Land Development Regulations	Regulations, Ordinances, and Guidelines	Polk County / -	Completed (2000)			- / -	Polk County Land Development Regulations adopted in 2000 contain many ordinances, including Surface Water Protection Ordinance. Regulations limit development in surface water protection zone of 200 feet landward of

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								<p>OHWL of lakes and water courses to provide additional protection over that required by state law. Septic tank drainfield installations on land with slightly to moderately limited soils cannot be installed within 150 feet of OHWL. On land with severe soil limitations, 200-foot setback of septic system drainfield from OHWL must be maintained. Undisturbed vegetative buffer averaging 25 feet wide (15-foot minimum) must be maintained perpendicular to all jurisdictional wetland lines or OHWLs. Complete revegetation of surface water protection zone is required following construction. Additional limitations specific to mining activities in this zone are also included.</p>
BWC-14	Plant City Stormwater Inlet Marking Program	Basic Stormwater Management	City of Plant City Water Resource Management	Ongoing/annual			FY2006-07 \$1,000 for countywide program / Utilities	Ongoing program to apply plaques to stormwater inlets that state in English

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
			Division / -				Revenues	and Spanish, "DO NOT POLLUTE THE WATER. DUMP NO WASTE. IT'S THE LAW." Printed educational pamphlets are distributed to residents in areas where plaques are applied, stressing importance of pollution prevention and describing BMPs that can be used to prevent pollution.
BWC-17	Cone Ranch Restoration Project	Restoration and Water Quality Improvement	Hillsborough County / FDEP	Completed (1999)			\$392,000 / EPA 319(h) grant, in-kind services from project partners	Project restored hydroperiod to 400 acres of ditched and drained wetlands in agricultural pasture. Seven constructed wetland ponds were created in project area for stormwater treatment. Project resulted in calculated TN load reduction of 331 lbs/yr.
BWC-18	McIntosh Park Water Quality/Wetland Enhancement	Restoration and Water Quality Improvement	SWFWMD / City of Plant City, Hillsborough County, FDEP	Completed (2006)			\$3,824,564 / EPA 319(h) grant, in-kind services from project partners	Wetland creation and enhanced stormwater treatment using alum. Project resulted in calculated TN load reduction of 2,702 lbs/yr.
BWC-22	Plant City Lift Station Auxiliary Power	Wastewater Infrastructure	City of Plant City Utilities	Ongoing/ annual			\$80,000 for FY2006-07;	Ongoing program to provide auxiliary

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
	Program	Management, Maintenance, Repair, and Upgrade	Maintenance Division / -				\$94,000 grant for 6 units / Utilities revenues; FDCA grant	power generators at sanitary sewer lift stations. Currently 15 of 38 stations are provided with permanent on-site generators. Eight portable generators are also available for use as needed.
BWC-27	Floodplain Fencing for Cattle Restriction	Agricultural BMP	Hillsborough County Parks and Recreation Dept./ Audubon Ranch	Completed (2003)			- / -	Following construction of wetlands rehydration project (joint effort by EPA, FDEP, SWFWMD, and Hillsborough County, based on concept developed by Hillsborough River Greenways Task Force) on Tiger Creek, a main tributary to Blackwater Creek on Cone Ranch, Audubon Ranch developed, installed, and maintains new network of fencing designed to keep cattle from entering Tiger Creek tributary. This helps to meet water quality improvements central to the project design. Over past decade, Audubon Ranch has also installed new fencing designed to

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								better control cattle movements and keep cattle from entering Blackwater Creek floodplain and streambed over most of Cone Ranch.
BWC-31	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -	Results of monitoring programs will be used to assess progress toward water quality improvements through annual application of "decision matrix" developed by EPCHC in 2007. Decision rule will be modeled after one developed by TBEP and used to track water quality in Tampa Bay. Decision matrix will include statistical evaluation of water quality trends in Blackwater Creek watershed, and will be applied annually. If water quality trends show degradation or lack of improvement over time, matrix will include definition of types of actions to be considered by implementing partners.

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
BWC-33	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 / FDOT	Tampa Bay Regional Planning Council to coordinate selection and distribution of public education programs such as MOSI's Marine Gang, Keep Hillsborough Beautiful, Bay Soundings Environmental Journal, storm drain markers, "All the Way to the Ocean" books, etc.
BWC-34	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -	Ongoing annual countywide public health education program distributed via permit issuance.
BWC-35	Fecal Coliform Quarterly Monitoring	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -	Ongoing			\$6,000 / -	Annual funding for fecal coliform quarterly monitoring for 3 years in response to NPDES permit.
BWC-38	Wastewater Residuals Management Ordinance	Regulation, Ordinances, and Guidelines	Polk County / -	Completed (1995)			\$10,000 / -	Ordinance 95-69 applies wastewater residuals management to unincorporated areas of Polk County.
BWC-39	Drainage Maintenance on Blackwater Creek	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Polk County / -	Ongoing			\$9,000 / -	Annual removal of debris and snags from Blackwater Creek for past 5 years.
BWC-40	Water Quality	Special Studies,	Polk County / -	Ongoing			\$5,200 / -	Yearly monitoring of

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
	Ambient Monitoring for Blackwater Creek	Planning, Monitoring, and Assessment						water quality in Blackwater Creek.
BWC-41	Illicit Discharge Complaint Investigations	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Polk County / -	Ongoing			\$100 / -	Complaint investigations of NPDES illicit discharges annually on Blackwater Creek and Itchepackesassa Creek.
BWC-48	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -	Results of monitoring programs will be used to assess progress toward water quality improvements. An annual review of the monitoring results will be made to determine the water quality trends over time. The results will be applied to the "Decision Matrix" developed by FDEP/EPCHC so that appropriate action in the Blackwater Creek watershed can be identified to the implementing partners
NR-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase I Completed (2008)			\$42,528 for Phase 1 / FDEP	Under contract to FDEP, PBS&J is providing services to help identify sources of fecal coliform contamination in 6 Hillsborough River

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								Inletaries. Phase I comprises initial screening; Phases II and III (implementation and evaluation of results, respectively) will be developed based on Phase 1 Work Plan.
NR-3	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 for each of 6 WBIDs / -	Areas of high probability for septic system failure were mapped throughout Hillsborough River Basin, not including areas in City of Tampa Wastewater or City of Plant City Wastewater service areas.
NR-5	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			\$30,090 total program costs / Absorbed in existing EPCHC budget	Survey and identify industrial facilities that operate stormwater management systems.
NR-17	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -	Results of monitoring programs will be used to assess progress toward water quality improvements through annual application of "decision matrix" developed by EPCHC in 2007. Decision rule will be modeled after one developed by TBEP

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								and used to track water quality in Tampa Bay. Decision matrix will include statistical evaluation of water quality trends in New River watershed, and will be applied annually. If water quality trends show degradation or lack of improvement over time, matrix will include definition of types of actions to be considered by implementing partners.
NR-18	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 (annual countywide program cost) / -	FDOT has supplied annual funding to Tampa Bay Regional Planning Council to coordinate selection and distribution of public educational programs such as MOSI's Manne Gang, Keep Hillsborough Beautiful, Bay Soundings Environmental Journal, storm drain markers, "All the Way to the Ocean" books, etc.
NR-19	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -	Ongoing countywide public health education program

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								distributed via permit issuance.
NR-20	Annual Progress Report Coordination	Education and Outreach Efforts	TBEP / -		2009		\$1000 / year	On an annual basis, TBEP will coordinate the development of a brief update summarizing bacteriological monitoring data and updated project status, including 1). Collating updated project descriptions from BMAP partners; 2). Working with EPCHC to develop an annual monitoring report; 3). Convening an annual meeting of the BMAP BWG and Technical Stakeholders to review and approve the annual update, and 4). Identifying any additional action needed to maintain progress towards meeting fecal coliform TMDLs in these six Hillsborough River segments.
NR-21	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -	Results of monitoring programs will be used to assess progress toward

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								water quality improvements. An annual review of the monitoring results will be made to determine the water quality trends over time. The results will be applied to the "Decision Matrix" developed by FDEP/EPCHC so that appropriate action in the Blackwater Creek watershed can be identified to the implementing partners
SBF-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase 1 Completed (2008)			\$42,528 for Phase 1 for 6 WBIDs / FDEP	Under contract to FDEP, PBS&J is providing services to help identify sources of fecal coliform contamination in 6 Hillsborough River tributaries. Phase I comprises initial screening; Phases II and III (implementation and evaluation of results, respectively) will be developed based on Phase 1 Work Plan.
SBF-2	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept., Stormwater Management Section / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget	Update septic tank map using GIS and billing information, and evaluate potential "hot spots" based on hydrologic

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								and soil conditions.
SBF-3	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 / -	Areas of high probability for septic system failure were mapped throughout Hillsborough River Basin, not including areas in City of Tampa Wastewater or City of Plant City Wastewater service areas.
SBF-4	Bacteriological Source Tracking Study	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County, USF / SWFWMD, Ayres Associates	Completed (2002)			\$100,000 for Blackwater and Flint Creeks / \$50,000 Hillsborough County, \$50,000 SWFWMD	Study used antibiotic resistance analysis to gain information on probable sources of fecal coliform contamination to the 2 creeks.
SBF-5	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			\$30,080 (total countywide costs) / Absorbed in existing EPCHC budget	Survey and identify industrial facilities that operate stormwater management systems.
SBF-10	LakeWatch and Hillsborough County Stream Water Watch	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Ongoing (since 2001)			\$116,000 (covers about 125 active sites throughout county) / Stormwater operating budget and SWFWMD cooperative funding	Public education on pollution prevention and BMPs through volunteer monitoring networks on lakes and streams in Hillsborough County. Includes data analysis of samples collected for nutrients.
SBF-11	Emerald Lakes Adopt-A-Pond	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management	Completed (2004)			\$138,000 annually for countywide program / Specialized Services Unit	Pond restoration and environmental education.

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
			Section / SWFWMD				Operations Budget	
SBF-12	Lake Thonotosassa Diagnostic Assessment and Water Quality Treatment Project	Special Studies, Planning, Monitoring, and Assessment	City of Plant City Resource Management Division / SWFWMD (SWIM Section, Resource Management Dept.)	Ongoing			FY 2006–07, City of Plant City, \$50,000; SWFMD, \$50,000 / Utilities revenues, Grant (SWFWMD Cooperative Funding)	Objective of project is to evaluate feasibility of implementing stormwater treatment system to treat mixture of stormwater and highly treated reclaimed water before discharging into Westside Canal. If determined feasible, project has potential to improve water quality in Westside Canal and ultimately Lake Thonotosassa. Westside Canal discharges into Pemberton/Baker Creek, a tributary to Lake Thonotosassa, which is a SWIM priority waterbody.
SBF-13	4 Adopt-a-Ponds in Baker-Spartman-Flint Watersheds	Restoration and Water Quality Improvement	Hillsborough County Public Works Dept. / SWFWMD	Completed (1998–2006)			\$138,000 annually for countywide program / Specialized Services Unit Operations Budget	Pond restoration and environmental restoration.
SBF-15	Pemberton Creek Stormwater Improvements	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2005)			\$992,000 / CIT II	Project created 5-acre water treatment pond.
SBF-16	Pistol Range Stormwater Retrofit Project	Basic Stormwater Management Program Implementation	City of Plant City / SWFWMD	Completed (2000)			\$649,810 / -	Diversion of flow from about 620 acres through reconfigured borrow

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								pit system to provide treatment prior to discharge into Pemberton Creek and Spartman Branch. TN reduction is calculated at 2,809 lbs/yr.
SBF-17	Lake Thonotosassa Project	Basic Stormwater Management Program Implementation	SWFWMD / Hillsborough County, FDOT	Completed (1999)			\$1,380,000	Project was designed to reduce TN, TP, and sediment load from 80 acres of agricultural lake to lake by treatment through constructed wetland and sedimentation basin.
SBF-23	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -	Results of monitoring programs will be used to assess progress toward water quality improvements through annual application of "decision matrix" developed by EPCHC in 2007. Decision rule will be modeled after one developed by TBEP and used to track water quality in Tampa Bay. Decision matrix will include statistical evaluation of water quality trends in

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								Spartman-Baker-Flint watersheds, and will be applied annually. If water quality trends show degradation or lack of improvement over time, matrix will include definition of types of actions to be considered by implementing partners.
SBF-25	Public Education Program for Tampa Bay Regional Planning Council	Education and Outreach Efforts	FDOT / -	Ongoing			\$50,000 (annual countywide program cost) / -	FDOT has supplied annual funding to Tampa Bay Regional Planning Council to coordinate selection and distribution of public educational programs such as MOSI's Marine Gang, Keep Hillsborough Beautiful, Bay Soundings Environmental Journal, storm drain markers, "All the Way to the Ocean" books, etc.
SBF-26	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -	Ongoing annual countywide public health education program distributed via permit issuance.
SBF-36	Annual Progress Report Coordination	Education and Outreach Efforts	TBEP / -		2009		\$1000 / year	On an annual basis, TBEP will coordinate the development of a brief update

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								summarizing bacteriological monitoring data and updated project status, including 1). Collating updated project descriptions from BMAP partners; 2). Working with EPCHC to develop an annual monitoring report; 3). Convening an annual meeting of the BMAP BWG and Technical Stakeholders to review and approve the annual update, and 4). Identifying any additional action needed to maintain progress towards meeting fecal coliform TMDLs in these six Hillsborough River segments.
SBF-37	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -	Results of monitoring programs will be used to assess progress toward water quality improvements. An annual review of the monitoring results will be made to determine the water quality trends over time. The results

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								will be applied to the "Decision Matrix" developed by FDEP/EPCHC so that appropriate action in the Blackwater Creek watershed can be identified to the implementing partners
LHR-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase 1 Ongoing (2008)			\$42,528 for Phase 1, for 6 WBIDs	Under contract to FDEP, PBS&J is providing services to help identify sources of fecal coliform contamination in 6 Hillsborough River tributaries. Phase I comprises initial screening; Phases II and III (implementation and evaluation of results, respectively) will be developed based on Phase 1 Work Plan.
LHR-2	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget	Update septic tank map using GIS and billing information, and evaluate potential "hot spots" based on hydrologic and soil conditions.
LHR-3	High-probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 / -	Areas of high probability for septic system failure were mapped throughout Hillsborough River Basin, not including areas in City of

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								Tampa Wastewater or City of Plant City Wastewater service areas.
LHR-4	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			\$30,080 countywide, absorbed within existing EPCHC budget / EPCHC budget	Survey and identification of industrial facilities that operate stormwater management systems.
LHR-8	LakeWatch and Hillsborough County Stream Water Watch	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Ongoing (since 2001)			\$116,000 (covers about 125 active sites throughout county) / Stormwater operating budget and SWFWMD cooperative funding	Public education on pollution prevention and BMPs through volunteer monitoring networks on lakes and streams in Hillsborough County. Includes data analysis of samples collected for nutrients.
LHR-9	City of Tampa Interactive Watershed Atlas	Education and Outreach Efforts	City of Tampa / USF, Hillsborough County	Completed (2008)			\$35,000 design and initiation fees, \$25,000 annual operation and maintenance/ City of Tampa	USF has been contracted to develop interactive, web-based water atlas for City of Tampa. Atlas is comprehensive data resource that helps citizens and scientists make informed decisions about water resources. Public education elements will be built into Atlas informing public of stormwater system, pollution, and TMDL activities. Beginning in 2009.

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								USF will be contracted to continually update and improve content and public education within Watershed Atlas.
LHR-10	10 Adopt-a-Ponds in LHR watershed	Restoration and Water Quality Improvement	Hillsborough County Public Works Dept. / SWFWMD	Completed (1992–2004)			\$138,000 annually for countywide program / Specialized Services Unit Operating Budget	Pond restoration and environmental education.
LHR-11	North Tampa Pond Enlargements – Orchid Sink Retention Pond	Basic Stormwater Management Program Implementation	City of Tampa / -	Completed (2002)			\$1,300,000 / City of Tampa general fund	Stormwater Dept. constructed retention pond at Orchid Sink to help improve drainage that treats 160 acres of residential land. Orchid Sink eventually drains to Lower Hillsborough River. The project is currently maintained by the Tampa Stormwater Department.
LHR-12	Lowry Park Zoo Stormwater Rehabilitation	Basic Stormwater Management Program Implementation	City of Tampa / -	Completed (2002)			\$345,000 / City of Tampa General Fund	Construction of 2-acre wet detention system to treat runoff from 100-acre basin.
LHR-13	Stormwater Research Facility at 132 <sup>nd</sup> and Taliaferro	Basic Stormwater Management Program Implementation	Hillsborough County / -	Ongoing			\$1,400,000	Stormwater Dept. constructed retention pond along Sligh Ave. within Lowry Park Zoo. Retention pond accepts drainage from a ditch via the west, provides

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								treatment to this drainage, and then discharges via a ditch to Lower Hillsborough River.
LHR-14	FDOT 56 <sup>th</sup> Street Retrofit	Restoration and Water Quality Improvement	City of Temple Terrace / FDOT, SWFWMD SWIM	Completed (2003)			- / FDOT, SWFWMD SWIM	Installation of continuous deflecrive separation (CDS) unit into existing stormwater system.
LHR-15	Tampa–Wastewater Collection System Study	Special Studies, Planning, Monitoring, and Assessment	City of Tampa Wastewater Dept. / -	Completed (2007)			Variable, City of Tampa	Wastewater Dept. is conducting comprehensive survey of wastewater collection system to prioritize areas that should be scheduled for replacement, relining, and/or repair. Study will factor in prior occurrences of wastewater overflows and bypasses.
LHR-16	Nebraska SR 69 to Hillsborough Ave. Pipeline Improvements	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -		Planned (2007)		Variable / City of Tampa Wastewater Enterprise Fund	FDOT will be constructing improvements along Nebraska Ave. between SR 60 and Hillsborough Ave. Wastewater Dept. has identified several defects in gravity sewers in this corridor that could cause failures that would damage new roadway. To

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								prevent possible damage to roadway, Dept. plans to rehabilitate defective pipelines. Failure of these pipelines could also cause wastewater overflow that could enter Hillsborough River through stormwater collection system.
LHR-17	Tampa–Emergency Generators at Hanna Pump Station	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -	Completed (2007)			\$265,000 / City of Tampa Wastewater Enterprise Fund	Backup emergency generators installed to maintain Hanna pump station in event of power outage. This will prevent overflows and bypasses directly to Hillsborough River.
LHR-18	Tampa–Grease Ordinance	Regulations, Ordinances, and Guidelines	City of Tampa Wastewater Dept. / -	Completed (2006)			About \$100,000 annually / -	City enacted grease ordinance that prohibits discharge of grease and establishes inspection program for businesses. Grease ordinance should significantly reduce occurrence of blockages that contribute to overflows. Enforcement of grease ordinance is supported by 2 FTEs that are funded by City's Wastewater

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
LHR-19	12 <sup>th</sup> Street Forcemain Replacement	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -	Ongoing (December 2007)			\$17,000,000 / City of Tampa	Enterprise Fund. Forcemain replacement along 12 <sup>th</sup> St. in area where there was 22-million-gallon release in past. Forcemain will be replaced to minimize future overflows.
LHR-20	River Tower Park Shoreline Restoration and Stormwater Improvements	Restoration and Water Quality Improvement	City of Tampa, FDOT District 7, SWFWMD / -		2009 (project in construction design phase)		\$2,100,000 / Cooperative funding (City of Tampa, FDOT)	City will be restoring northern bank of Hillsborough River from I-275 to Florida Ave. Project will stabilize bank, provide habitat, and improve water quality. Project will also include stormwater treatment controls for runoff from I-275 and contributing drainage area.
LHR-21	City of Tampa Riverwalk Project	Education and Outreach Efforts	City of Tampa / -		Planned (portions under construction; completion in 2011)		\$40 million for entire project / City, state, federal, private funds	Tampa Riverwalk project will create 15-foot walkway and bike path along east banks of Hillsborough River and Garrison Channel. Pedestrian-friendly walkway will be 2.2 miles long and will integrate various activities and destinations in downtown area by linking them with

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								attractive promenade with vibrant public art. Project will provide significant opportunities for public to connect with river. To benefit from this opportunity, city will construct public educational displays and information on stormwater control and treatment, as well as cleaning up pet waste. Stations will be constructed for dog waste cleanup and disposal.
LHR-22	Claonia-May Stormwater Pond	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2000)			\$160,000 / CIT/CIP monies	Long detention pond with skimmer.
LHR-23	Curiosity Creek Phase III	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2004)			\$567,000 / -	
LHR-24	Sharon Drive Stormceptor	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Hillsborough County Public Works Dept. / -	Completed (2002)			\$112,000 / -	
LHR-25	58 <sup>th</sup> St. and 122 <sup>nd</sup> Ave. Retention Pond	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2002)			\$456,000 / -	
LHR-29	Tracking of City of Tampa Consent Order	Wastewater Infrastructure Management,	EPCHC Water Management Division /	Ongoing (until 2012)			\$1,750 annually, absorbed within existing EPCHC	Track progress of City of Tampa consent order

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Maintenance, Repair, and Upgrade	FDEP, City of Tampa				budget / EPCHC budget	addressing SSOs and other problems with sanitary sewer collection system; target completion date is 2012.
LHR-31	Surface Water Temporal Variability Network Monitoring Site	Special Studies, Planning, Monitoring, and Assessment	FDEP– Integrated Water Resource Watershed Monitoring Program / Contracted with SWFWMD from 1999– 2004; all monitoring now conducted by FDEP	Ongoing (since 1999)			\$ 385,000 statewide (funding varies from year to year, and has been reduced in recent years) / EPA 694 funds	Sampling at site is part of multiyear temporal variability (Trend) monitoring network that consists of 13 surface water sites (SWTV) and 11 ground water sites (GWTV) within SWFWMD boundary. Sites are part of Surface Water Temporal Variability Network in FDEP's Watershed Monitoring Program. Data from this fixed station design network are used to examine changes in water quality and flow over time throughout area, and are used in concert with Status Network (random surface water and ground water stations) to provide scientifically defensible information on important chemical, physical, and biological

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								characteristics of surface waters and major aquifer systems of area/basin and state. Both networks are designed to measure condition using variety of threshold values. Resources monitored by temporal variability monitoring network include rivers, streams, and confined and unconfined aquifers. Data on fecal coliform and enterococci levels from Hillsborough River surface water site (Station # FLO 13 33 D) are available from FDEP.
LHR-37	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 (annual countywide program) / -	Funding by FDOT supplied annually since 1996 to Tampa Bay Regional Planning Council to coordinate selection and distribution of public education programs such as MOSI's Marine Gang, Keep Hillsborough Beautiful, Bay Soundings

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								environmental journal, storm drain markers, "All the Way to the Ocean" books, etc.
LHR-39	North Boulevard Siphon Rehabilitation Project	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa	Ongoing (2008)			Approximately \$350,000 / City of Tampa	North Blvd. Project includes rehabilitation of approximately 300 linear feet of 24-inch diameter CIP gravity sewer line and 770 linear feet of 20-inch diameter CIP siphon at North Blvd. Bridge River Crossing (North Blvd. and Ross Ave.). Work also includes rehabilitation of 1 inlet structure. Project should take 4-6 weeks to complete.
LHR-40	Manhole Rehabilitation Project	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept.	Ongoing (December 2007)			Approximately \$750,000 annually	Manhole rehabilitation project is intended to stop inflow and infiltration and increase structural integrity/life of manholes. City has 2 contracts for manhole rehabilitation: (1) Fiberglass liner that is inserted into existing manhole and (2) application of calcium aluminate cementitious

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								structural coating system sprayed onto existing walls of manhole. Project locations are identified routinely.
LHR-41	Urban Lake Rescue- Lake Roberta	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa / SWFWMD	Completed (2008)			\$272,000 / SWFWMD cooperative funding (City 50% match)	With funding from SWFWMD, City installed nutrient-separating baffle box to capture pollutants in stormwater before they entered Lake Roberta. Additionally, exotic vegetation was removed and littoral shelf was planted with arrowhead and pickerelweed. Engineering controls were constructed in lake to improve residence time for stormwater treatment.
LHR-42	Downstream Defender – Lake Roberta	Restoration and Water Quality Improvement	City of Tampa / FDOT	Completed (2006)			\$140,000 / City of Tampa Stormwater Utility, FDOT	On west side of Lake Roberta, stormwater drainage from Nebraska Ave. contributes large amount of trash and debris. City and FDOT partnered to install sediment and trash collection divide to treat stormwater prior to entering lake. Offline unit, Downstream

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TABLE 6.2. NEW PROJECTS PROPOSED BY BWG MEMBERS THAT ADDRESS TMDLS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								Defender, was installed and is being maintained by Tampa Stormwater Dept.
LHR-43	Epps Park Sediment Trap Installation	Restoration and Water Quality Improvement	City of Tampa / FDOT	Completed (2003)			Approximately \$350,000 / City of Tampa Stormwater Utility, FDOT	City in partnership with FDOT installed series of 6 sediment traps near Epps Park. Sediment traps capture trash and debris, preventing these materials from being discharged to Hillsborough River. Tampa Stormwater Department crews maintain and operate sediment traps, removing debris on routine basis.
LHR-46	Broadway Outfall Continuous Deflective Separation Unit	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade						
LHR-48	Hillsborough River Watershed Alliance (HSPA)	Education and Outreach Efforts	HRWA	Ongoing since 1994			Approximately \$30,000/year from multiple sources, including SWFWMD	Non-profit organizations, educates citizens on the value of the Hillsborough River Watershed. Undertakes water quality runoff studies from various land uses along river.
LHR-50	Evaluation of Progress Towards	Restoration and Water Quality	EPCHC / -		2009		- / -	Results of monitoring

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
	Water Quality Improvements	Improvement						programs will be used to assess progress toward water quality improvements. An annual review of the monitoring results will be made to determine the water quality trends over time. The results will be applied to the "Decision Matrix" developed by FDEP/EPCHC so that appropriate action in the Blackwater Creek watershed can be identified to the implementing partners

Notes: BWC – Blackwater Creek  
 NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

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TABLE 6.3. PROJECTS PROPOSED BY BWG MEMBERS THAT WERE ENHANCED TO ADDRESS TMDLS								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
BWC-8	Officer Snook	Education and Outreach	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	This countywide, in-school educational program, which targets 2 <sup>nd</sup> graders, consists of 30-minute presentations on how students can prevent water pollution in their daily lives. Presentation addresses pet waste as source of pollution.
BWC-9	Stormwater Ecologist Education Program	Education and Outreach	Hillsborough County Stormwater Management Section / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	The program targets 3 <sup>rd</sup> through 12 <sup>th</sup> grades. Students participate in critical thinking activities, demonstrations, and volunteer projects that highlight stormwater pollution and address pet waste, agricultural waste, septic systems, and water treatment plant overflow as they relate to stormwater pollution.
BWC-16	Agricultural BMP Actions through FDACS Statewide Program	Agricultural BMPs	FDACS, farmers participating in FDACS agricultural BMP program /			Possible but funding not yet obtained	- / -	FDACS' BMP Coordinator initiated working with farmers throughout Hillsborough River Basin for

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								participation in state's BMP program in 2007, and is expected to have participants for Blackwater Creek watershed by 2009.
BWC-19	Plant City Spill Response Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Water Resource Management Division / -	Ongoing/ annual			FY2006-07 \$50,000 for citywide program / Utilities revenues	Ongoing program to properly address spill incidents to prevent introduction of pollutants to environment. Detailed standard operating procedures have been established to specifically address SSOs and proper remediation of these incidents. Sewer System Overflow Response Plan was included in CMOM Self Audit Report that was completed by city and submitted to EPA Region 4 and FDEP in 2006.
BWC-30	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			- / Project absorbed in annual personnel and operating costs	Create and populate database to track SSOs from Hillsborough County, City of Tampa, and other municipalities. Database will quantify spill

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								amounts and discharge locations, and may be able to link to GIS.
NR-7	Hillsborough County Land Development Code (Section 4.01.16)—Septic System Setback	Regulations, Ordinances, and Guidelines	Hillsborough County Planning and Growth Management Dept. / -	Ongoing (since 2006)			- / -	In 2006, the Hillsborough Land Development Code was amended and Section 4.01.16, River Protection, was added; it requires 200-foot setbacks to the Hillsborough, Alafia, and Little Manatee Rivers, and their primary tributaries.
NR-8	Officer Snook	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management Section/ -	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	This countywide, in-school educational program, which targets 2 <sup>nd</sup> graders, consists of 30-minute presentations on how students can prevent water pollution in their daily lives. Presentation addresses pet waste as source of pollution.
NR-9	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management Section/ -	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	The program targets 3 <sup>rd</sup> through 12 <sup>th</sup> grades. Students participate in critical thinking activities, demonstrations, and volunteer projects

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								that highlight stormwater pollution and address pet waste, agricultural waste, septic systems, and water treatment plant overflow as they relate to stormwater pollution.
NR-11	Agricultural BMP Actions—FDACS Farm BMP Program	Agricultural BMPs	FDACS and farmers participating in FDACS' Agricultural BMP Program / -	Ongoing			- / Private farms	FDACS' BMP coordinator initiated process of working with farmers throughout Hillsborough River Basin for participation in state's BMP Program in 2007, and is expected to have participants for New River watershed by 2009.
NR-16	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			No additional funding; project absorbed in annual personnel and operating costs / EPCHC budget	Create and populate database to track SSOs from Hillsborough County, City of Tampa, and other municipalities. Database will quantify spill amounts and discharge locations, and may be able to link to GIS.
SBF-7	Officer Snook	Education and Outreach Efforts	Hillsborough County Public	Ongoing			\$9,000 annual countywide	This in-school program, which

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
			Works Dept. / SWFWMD				educational program / Stormwater fee plus cooperative funding	targets 2 <sup>nd</sup> graders, consists of 30-minute presentations on how students can prevent water pollution in their daily lives. Presentation addresses pet waste as source of pollution.
SBF-8	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	The program targets 3 <sup>rd</sup> through 12 <sup>th</sup> grades. Students participate in critical thinking activities, demonstrations, and volunteer projects that highlight stormwater pollution and address pet waste, agricultural waste, septic systems, and water treatment plant overflow as they relate to stormwater pollution.
SBF-14	Agricultural BMP Actions– FDACS Farm BMP Program	Agricultural BMPs	FDACS, farmers participating in FDACS' Agricultural BMP Program /	Ongoing			Amount depends on BMPs implemented / Private farms	A number of farms have signed NOI To implement BMPs with FDACS and are presumed to be in compliance with environmental regulations.
SBF-22	Sanitary Sewer Overflow Database	Wastewater Infrastructure	EPCHC Water Management	Ongoing			No additional funding, project	Create and populate database to track

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Management, Maintenance, Repair, and Upgrade	Division / -				absorbed in annual personnel and operating costs / EPCHC budget	SSOs from Hillsborough County, City of Tampa, and other municipalities. Database will quantify spill amounts and discharge locations, and may be able to link to GIS.
LHR-5	Officer Snook	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	This program, which targets 2 <sup>nd</sup> graders, consists of 30-minute presentations on how students can prevent water pollution in their daily lives. Presentation addresses pet waste as source of pollution.
LHR-6	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	Program targets 3 <sup>rd</sup> through 12 <sup>th</sup> grades. Students participate in critical thinking activities, demonstrations, and volunteer projects that highlight stormwater pollution and address pet waste, agricultural waste, septic systems, and water treatment plant overflow as they

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								relate to stormwater pollution.
LHR-30	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			\$3,600 total cost for expenditure of \$1,200 annually for WBID, 2006–08; no additional funding / Project absorbed in annual personnel and operating costs.	Create and populate database to track SSOs from Hillsborough County, City of Tampa, and other municipalities. Database will quantify spill amounts and discharge locations, and may be able to link to GIS.
LHR-38	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -	Ongoing countywide public health education program distributed via permit issuance.

Notes: BWC – Blackwater Creek  
 NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

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<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>	<b>General Location / Project Description and Benefits</b>
BWC-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase 1 Completed (2008)			\$42,528 for 6 WBIDs (Phase 1) / FDEP	Under contract to FDEP, PBS&J is providing services to help identify sources of fecal coliform contamination in 6 Hillsborough River tributaries. Phase I comprises initial screening; Phases II and III (implementation and evaluation of results, respectively) will be developed based on Phase I Work Plan.
BWC-2	DNA Source Identification	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -			Possible but funding not yet obtained (November 2007)	Estimated amount needed: \$100,000 / Pasco County	Source tracking for 3 waters with coliform TMDLs in Pasco County. Funding was included in FY2008 budget and future funding in subsequent budgets. Once source is identified, testing will focus on identifying its location.
BWC-3	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Completed (2008)			\$28,000 for annual countywide program / Specialized	Update septic tank map using GIS and billing information, and evaluate

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TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
							Services Unit Operating Budget	potential "hot spots" based on hydrologic and soil conditions.
BWC-4	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 for each of 6 WBIDs / -	Areas of high probability for septic system failure were mapped throughout Hillsborough River Basin, not including areas in City of Tampa Wastewater or City of Plant City Wastewater service areas.
BWC-5	Bacteriological Source Tracking Study	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept., USF / SWFWMD, Ayres Associates	Completed (2002)			\$100,000 for Blackwater and Flint Creeks / \$50,000 Hillsborough County, \$50,000 SWFWMD	Study used antibiotic resistance analysis to gain information on probable sources of fecal coliform contamination to the 2 creeks.
BWC-6	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			- / Absorbed within existing EPCHC budget	Survey and identify industrial facilities that operate stormwater management systems.
BWC-7	Septic System 200-foot Setback	Regulations, Ordinances, and Guidelines	HCHD	Ongoing (since 1980s)				Consists of ongoing enforcement. HCHD OSTDS Program has enforced state law on Hillsborough River since late 1980s. Any waivers were made by City

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TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								of Tampa Water Dept.
BWC-8	Officer Snook	Education and Outreach	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	This countywide, in-school educational program, which targets 2 <sup>nd</sup> graders, consists of 30-minute presentations on how students can prevent water pollution in their daily lives. Presentation addresses pet waste as source of pollution.
BWC-9	Stormwater Ecologist Education Program	Education and Outreach	Hillsborough County Stormwater Management Section / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	The program targets 3 <sup>rd</sup> through 12 <sup>th</sup> grades. Students participate in critical thinking activities, demonstrations, and volunteer projects that highlight stormwater pollution and address pet waste, agricultural waste, septic systems, and water treatment plant overflow as they relate to stormwater pollution.
BWC-10	Pet Waste Campaign Study	Education and Outreach	Hillsborough County Public Works Dept. / -		Planned (2008-09)		\$24,000 / Specialized Services Unit	Social marketing study on effectiveness of pet

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TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
							Operating Budget	waste public education vs. ordinance enforcement
BWC-11	LakeWatch and Hillsborough County Stream Water Watch	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Ongoing (since 2001)			\$116,000 annually for 125 sites throughout county / Stormwater operating budget, SWFWMD cooperative funding	Countywide public education program on pollution prevention and BMPs through volunteer monitoring networks on lakes and streams in Hillsborough County. Includes data analysis of samples collected for nutrients.
BWC-12	2 Adopt-a-Ponds in Blackwater Creek Watershed	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Hillsborough County Public Works Dept., Stormwater Management Section / SWFWMD	Completed (1995 and 1997)			\$138,000 annually for countywide Adopt-a Pond Program / Stormwater Operations Budget	Pond restoration and environmental education.
BWC-13	Polk County Land Development Regulations	Regulations, Ordinances, and Guidelines	Polk County / -	Completed (2000)			- / -	Polk County Land Development Regulations adopted in 2000 contain many ordinances, including Surface Water Protection Ordinance. Regulations limit development in surface water protection zone of

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**TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES**

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								<p>200 feet landward of OHWL of lakes and water courses to provide additional protection over that required by state law. Septic tank drainfield installations on land with slightly to moderately limited soils cannot be installed within 150 feet of OHWL. On land with severe soil limitations, 200-foot setback of septic system drainfield from OHWL must be maintained. Undisturbed vegetative buffer averaging 25 feet wide (15-foot minimum) must be maintained perpendicular to all jurisdictional wetland lines or OHWLs. Complete revegetation of surface water protection zone is required following construction. Additional limitations specific to mining</p>

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TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								activities in this zone are also included.
BWC-14	Plant City Stormwater Inlet Marking Program	Basic Stormwater Management	City of Plant City Water Resource Management Division / -	Ongoing/ annual			FY2006-07 \$1,000 for countywide program / Utilities Revenues	Ongoing program to apply plaques to stormwater inlets that state in English and Spanish, "DO NOT POLLUTE THE WATER. DUMP NO WASTE. IT'S THE LAW." Printed educational pamphlets are distributed to residents in areas where plaques are applied, stressing importance of pollution prevention and describing BMPs that can be used to prevent pollution.
BWC-15	New River and Hillsborough River Watershed Management Plans in Pasco County	Basic Stormwater Management	Pasco County / SWFWMD	Ongoing			\$1,600,000 (4-year program funding) / Pasco County, SWFWMD	Ardaman and Associates is under contract to develop a SWMMP. Currently, \$600,000 is available, with additional funding in 2007-08 and 2008-09. Water quality portion of plan will focus on existing TMDLs. Program has been delayed

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
BWC-16	Agricultural BMP Actions through FDACS Statewide Program	Agricultural BMPs	FDACS, farmers participating in FDACS agricultural BMP program /			Possible but funding not yet obtained	- / -	due to FEMA Flood Map revisions. FDACS' BMP Coordinator initiated working with farmers throughout Hillsborough River Basin for participation in state's BMP program in 2007, and is expected to have participants for Blackwater Creek watershed by 2009.
BWC-17	Cone Ranch Restoration Project	Restoration and Water Quality Improvement	Hillsborough County / FDEP	Completed (1999)			\$392,000 / EPA 319(h) grant, in-kind services from project partners	Project restored hydroperiod to 400 acres of ditched and drained wetlands in agricultural pasture. Seven constructed wetland ponds were created in project area for stormwater treatment. Project resulted in calculated TN load reduction of 331 lbs/yr.
BWC-18	McIntosh Park Water Quality/Wetland Enhancement	Restoration and Water Quality Improvement	SWFWMD / City of Plant City, Hillsborough County, FDEP	Completed (2006)			\$3,824,564 / EPA 319(h) grant, in-kind services from project partners	Wetland creation and enhanced stormwater treatment using alum. Project resulted in calculated TN load reduction of 2,702.

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TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
BWC-19	Plant City Spill Response Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Water Resource Management Division / -	Ongoing/ annual			FY2006-07 \$50,000 for citywide program / Utilities revenues	lbs/yr. Ongoing program to properly address spill incidents to prevent introduction of pollutants to environment. Detailed standard operating procedures have been established to specifically address SSOs and proper remediation of these incidents. Sewer System Overflow Response Plan was included in CMOM Self Audit Report that was completed by city and submitted to EPA Region 4 and FDEP in 2006.
BWC-20	Plant City Sewer Line Maintenance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division	Ongoing/ annual			FY2006-07 \$742,000 for citywide program / Utilities revenues	Ongoing program to maintain and repair over 120 miles of sanitary sewer lines, including repair of all associated manholes and connection of new service laterals to main collection lines. Program helps to prevent both

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<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>	<b>General Location / Project Description and Benefits</b>
								infiltration/inflow of ground water to collection system, and exfiltration of wastewater to ground and surface waters.
BWC-21	Plant City Lift Station Security Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division	Ongoing/ annual			FY2006-07 \$10,000 for citywide program / Utilities revenues	Ongoing program that provides basic security (fences, gates, locks) for sanitary sewer lift stations. Currently 25 of 38 stations are secured in this fashion.
BWC-22	Plant City Lift Station Auxiliary Power Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division	Ongoing/ annual			\$80,000 for FY2006-07; \$94,000 grant for 6 units / Utilities revenues; FDCA grant	Ongoing program to provide auxiliary power generators at sanitary sewer lift stations. Currently 15 of 38 stations are provided with permanent on-site generators. Eight portable generators are also available for use as needed.
BWC-23	Plant City Lift Station Maintenance	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division	Ongoing/ annual			\$14,000 for annual maintenance program / Utilities revenues; FDCA grant	Ongoing program to provide maintenance at sanitary sewer lift stations.
BWC-24	Plant City Inflow and Infiltration (I&I) Program	Wastewater Infrastructure Management,	City of Plant City Utilities Maintenance	Ongoing/ annual			FY2006-07 \$1,484,000 / Utilities revenues	Ongoing program to clean, carry out video inspection of,

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Maintenance, Repair, and Upgrade	Division					and grout sanitary sewer lines and manholes. Program helps to prevent infiltration/ inflow of ground water to collection system, and exfiltration of wastewater to ground and surface waters.
BWC-25	Plant City Grease Management Program	Regulation, Ordinances, and Guidelines	City of Plant City Water Resource Management Division / Utilities Maintenance Division; Building Dept.	Ongoing/ annual			FY2006-07 \$50,000 / Utilities revenues	Ongoing program to inspect and monitor commercial, industrial, and residential sites that generate and dispose of cooking grease and oils. Program also educates representatives of these sites on proper grease management practices and provides location for community residents to recycle household cooking grease and oils.
BWC-26	Septic System Complaint Response	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	HCHD / EPCHC Water Management Division	Ongoing			\$1,250 / EPCHC budget	Respond to citizen complaints on sanitary sewer and septic system discharges.

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TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
BWC-27	Floodplain Fencing for Cattle Restriction	Agricultural BMP	Hillsborough County Parks and Recreation Dept. / Audubon Ranch	Completed (2003)			- / -	Following construction of wetlands rehydration project (joint effort by EPA, FDEP, SWFWMD, and Hillsborough County, based on concept developed by Hillsborough River Greenways Task Force) on Tiger Creek, a main tributary to Blackwater Creek on Cone Ranch, Audubon Ranch developed, installed, and maintains new network of fencing designed to keep cattle from entering Tiger Creek tributary. This helps to meet water quality improvements central to the project design. Over past decade, Audubon Ranch has also installed new fencing designed to better control cattle movements and keep cattle from entering Blackwater

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<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>	<b>General Location / Project Description and Benefits</b>
								Creek floodplain and streambed over most of Cone Ranch.
BWC-28	Private Pump Station Identification and Compliance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -			Possible (2009)	One full-time employee funded at Environmental Scientist II level / -	Identify private pump stations in cities of Tampa, Plant City, and Temple Terrace. Establish compliance inspection program to reduce number of SSOs from private pump stations.
BWC-29	Fecal Coliform Monthly Monitoring–Hillsborough County	Special Studies, Planning, Monitoring, and Assessment	EPCHC / Hillsborough County Public Works Dept.; SWFWMD	Ongoing (since 1980s)			\$1,521 for Blackwater Creek WBID / Annual countywide water quality monitoring program	EPCHC has maintained extensive, comprehensive water quality monitoring program with network of stations throughout Hillsborough County and Tampa Bay since 1974. All sample collection and analysis are conducted in accordance with FDEP rules and guidance. EPCHC staff collect monthly water quality samples that are analyzed for bacterial

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								contamination—i.e., fecal coliform and enterococcus—at 38 locations in Hillsborough River Basin. EPCHC also collects bacteria samples from 30 locations representing major and minor tributaries of Hillsborough River; 11 of these are sampled monthly, and 19 locations represent minor tributaries and are sampled quarterly.
BWC-30	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			- / Project absorbed in annual personnel and operating costs	Create and populate database to track SSOs from Hillsborough County, City of Tampa, and other municipalities. Database will quantify spill amounts and discharge locations, and may be able to link to GIS.
BWC-31	Development and Application of Decision Matrix To Track Progress Towards Water	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -	Results of monitoring programs will be used to assess progress toward

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<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>	<b>General Location / Project Description and Benefits</b>
	Quality Criteria							<p>water quality improvements through annual application of "decision matrix" developed by EPCHC in 2007. Decision rule will be modeled after one developed by TBEP and used to track water quality in Tampa Bay. Decision matrix will include statistical evaluation of water quality trends in Blackwater Creek watershed, and will be applied annually. If water quality trends show degradation or lack of improvement over time, matrix will include definition of types of actions to be considered by implementing partners.</p>
BWC-32	Bacterial Contamination Complaint Response to Hillsborough County Health Dept.	Basic Stormwater Management	EPCHC / -	Ongoing			- / -	Respond to bacterial contamination complaints received by EPCHC, possibly caused by septic system failure;

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<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>	<b>General Location / Project Description and Benefits</b>
								complaints forwarded to HCHD for follow-up.
BWC-33	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 / FDOT	Tampa Bay Regional Planning Council to coordinates selection and distribution of public education programs such as MOSI's Marine Gang, Keep Hillsborough Beautiful, Bay Soundings environmental journal, storm drain markers, "All the Way to the Ocean" books, etc.
BWC-34	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -	Ongoing annual countywide public health education program distributed via permit issuance.
BWC-35	Fecal Coliform Quarterly Monitoring	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -	Ongoing			\$6,000 / -	Annual funding for fecal coliform quarterly monitoring for 3 years in response to NPDES permit.
BWC-36	Stormwater Quality Management Ordinances	Regulation, Ordinances, and Guidelines	Polk County / -	Completed (1993)			\$10,000 / -	Ordinance 93-06 provides protection to surface waters from illicit discharges and requires

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Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								construction BMPs to meet NPDES MS4 permit requirements.
BWC-37	Surface Water Protection Ordinance	Regulation, Ordinances, and Guidelines	Polk County / -	Completed (1988)			\$5,000 / -	Ordinance 88-04 regulates setbacks from waterways for installation of OSTDS.
BWC-38	Wastewater Residuals Management Ordinance	Regulation, Ordinances, and Guidelines	Polk County / -	Completed (1995)			\$10,000 / -	Ordinance 95-69 applies wastewater residuals management to unincorporated areas of Polk County.
BWC-39	Drainage Maintenance on Blackwater Creek	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Polk County / -	Ongoing			\$9,000 / -	Annual removal of debris and snags from Blackwater Creek for past 5 years.
BWC-40	Water Quality Ambient Monitoring for Blackwater Creek	Special Studies, Planning, Monitoring, and Assessment	Polk County / -	Ongoing			\$5,200 / -	Yearly monitoring of water quality in Blackwater Creek.
BWC-41	Illicit Discharge Complaint Investigation	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Polk County / -	Ongoing			\$100 / -	Complaint investigations of NPDES illicit discharges annually on Blackwater Creek and Itchepackesassa Creek.
BWC-42	Blackwater Creek Watershed Management Plan	Restoration and Water Quality Improvement	Polk County / -	Completed (2004)			\$206,000 / -	Preparation of easement documents for

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TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Projects						parcels acquired for maintenance for flood control.
BWC-43	Routine Maintenance Erosion Control	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Polk County / -	Ongoing			- / -	Routine erosion control maintenance countywide.
BWC-46	Plant City WWTP Fecal Coliform Bacteria Reduction Plan	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City / -	Ongoing			\$125,200 / -	Ongoing program that involves the development and implementation of operational protocol at the City's Wastewater Treatment Plant to reduce bacteriological contamination in the effluent. This program has provided the City with a consistently successful means to meet the established State of Florida Fecal Coliform Bacteria discharge limits.
BWC-48	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -	Results of monitoring programs will be used to assess progress toward water quality

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**TABLE 6.4 COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN BLACKWATER CREEK AND PREVENT FUTURE DISCHARGES**

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								improvements. An annual review of the monitoring results will be made to determine the water quality trends over time. The results will be applied to the "Decision Matrix" developed by FDEP/EPCHC so that appropriate action in the Blackwater Creek watershed can be identified to the implementing partners

Notes: BWC – Blackwater Creek

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
NR-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase 1 Completed (2008)			\$42,528 for Phase 1 / FDEP	Under contract to FDEP, PBS&J is providing services to help identify sources of fecal coliform contamination in 6 Hillsborough River tributaries. Phase I comprises initial screening; Phases II and III (implementation and evaluation of results, respectively) will be developed based on Phase I Work Plan.
NR-2	DNA Source Identification	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -			Possible but funding not yet obtained (November 2007)	Estimated funding needed: \$100,000 / Pasco County	Source tracking for 3 waters with coliform TMDLs in Pasco County. Funding was included in FY2008 budget and future funding in subsequent budgets. Once source is identified, testing will focus on identifying its location.
NR-3	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 for each of 6 WBIDs / -	Areas of high probability for septic system failure were mapped throughout Hillsborough River Basin, not including areas in City of

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								Tampa Wastewater or City of Plant City Wastewater service areas.
NR-4	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept., Stormwater Management Section / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget	Update septic tank map using GIS and billing information, and evaluate potential "hot spots" based on hydrologic and soil conditions.
NR-5	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			\$30,090 total program costs / Absorbed in existing EPCHC budget	Survey and identify industrial facilities that operate stormwater management systems.
NR-6	Septic System 200-foot Setback for Hillsborough River—Potable Supply Protection	Regulations, Ordinances, and Guidelines	HCHD / -	Ongoing (since 1980s)			\$2,000 / -	Consists of ongoing enforcement. HCHD OSTDS Program has enforced state law on Hillsborough River since late 1980s. Any waivers were made by City of Tampa Water Dept.
NR-7	Hillsborough County Land Development Code (Section 4.01.16)—Septic System Setback	Regulations, Ordinances, and Guidelines	Hillsborough County Planning and Growth Management Dept. / -	Ongoing (since 2006)			- / -	In 2006, the Hillsborough Land Development Code was amended and Section 4.01.16, River Protection, was added; it requires 200-foot setbacks to the Hillsborough, Alafia, and Little Manatee Rivers, and

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								their primary tributaries.
NR-8	Officer Snook	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management Section/ -	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	This countywide, in-school educational program, which targets 2 <sup>nd</sup> graders, consists of 30-minute presentations on how students can prevent water pollution in their daily lives. Presentation addresses pet waste as source of pollution.
NR-9	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management Section/ -	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	The program targets 3 <sup>rd</sup> through 12 <sup>th</sup> grades. Students participate in critical thinking activities, demonstrations, and volunteer projects that highlight stormwater pollution and address pet waste, agricultural waste, septic systems, and water treatment plant overflow as they relate to stormwater pollution.
NR-10	New River and Hillsborough River Watershed Management Plans in Pasco County	Basic Stormwater Management Program Implementation	Pasco County/ SWFWMD	Ongoing			\$1,600,000 for 4-year program	Ardaman and Associates is under contract to develop a SWMMP. Currently, \$600,000 is

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								available, with additional funding in 2007–08 and 2008–09. Water quality portion of plan will focus on existing TMDLs. Program has been delayed due to FEMA Flood Map revisions.
NR-11	Agricultural BMP Actions–FDACS Farm BMP Program	Agricultural BMPs	FDACS and farmers participating in FDACS' Agricultural BMP Program /	Ongoing			- / Private farms	FDACS' BMP coordinator initiated process of working with farmers throughout Hillsborough River Basin for participation in state's BMP Program in 2007, and is expected to have participants for New River watershed by 2009.
NR-12	Septic System Complaint Response	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC / HCHD	Ongoing			EPCHC budget / Absorbed within existing EPCHC budget	Respond to citizen complaints on sanitary sewer and septic system discharges.
NR-13	Private Pump Station Identification and Compliance Program	Wastewater infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -		Planned (2009)		One full-time employee funded at Environmental Scientist II level / -	Identify private pump stations in cities of Tampa, Plant City, and Temple Terrace. Establish compliance inspection program to reduce number of

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								SSOs from private pump stations.
NR-14	Fecal Coliform Quarterly Monitoring—Hillsborough County	Special Studies, Planning, Monitoring, and Assessment	EPCHC / Hillsborough County Public Works Dept.; SWFWMD	Ongoing (since 1980s)			Hillsborough County / \$190 annual cost for this WBID	EPCHC has maintained extensive, comprehensive water quality monitoring program with network of stations throughout Hillsborough County and Tampa Bay since 1974. All sample collection and analysis are conducted in accordance with FDEP rules and guidance. EPCHC staff collect monthly water quality samples that are analyzed for bacterial contamination—i.e., fecal coliform and enterococcus—at 38 locations in Hillsborough River Basin. EPCHC also collects bacteria samples from 30 locations representing major and minor tributaries of Hillsborough River; 11 of these

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								are sampled monthly, and 19 locations represent minor tributaries and are sampled quarterly.
NR-15	Fecal Coliform Quarterly Monitoring—Pasco County	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -	Ongoing			\$6,000 (annual funding for 3 years) / -	Pasco County initiated quarterly sampling in New River late in 2005 for a range of parameters for NPDES, including coliform. Sampling location is at Creek Road, very close to Pasco–Hillsborough County line.
NR-16	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			No additional funding; project absorbed in annual personnel and operating costs / EPCHC budget	Create and populate database to track SSOs from Hillsborough County, City of Tampa, and other municipalities. Database will quantify spill amounts and discharge locations, and may be able to link to GIS.
NR-17	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -	Results of monitoring programs will be used to assess progress toward water quality improvements through annual

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								application of "decision matrix" developed by EPCHC in 2007. Decision rule will be modeled after one developed by TBEP and used to track water quality in Tampa Bay. Decision matrix will include statistical evaluation of water quality trends in New River watershed, and will be applied annually. If water quality trends show degradation or lack of improvement over time, matrix will include definition of types of actions to be considered by implementing partners.
NR-18	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 (annual countywide program cost) / -	FDOT has supplied annual funding to Tampa Bay Regional Planning Council to coordinate selection and distribution of public educational programs such as MOSI's Marine Gang, Keep Hillsborough

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								Beautiful, Bay Soundings Environmental Journal, storm drain markers, "All the Way to the Ocean" books, etc.
NR-19	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -	Ongoing countywide public health education program distributed via permit issuance.
NR-20	Annual Progress Report Coordination	Education and Outreach Efforts	TBEP / -		2009		\$1000 / year	On an annual basis, TBEP will coordinate the development of a brief update summarizing bacteriological monitoring data and updated project status, including 1). Collating updated project descriptions from BMAP partners; 2). Working with EPCHC to develop an annual monitoring report; 3). Convening an annual meeting of the BMAP BWG and Technical Stakeholders to review and approve the annual update, and 4). Identifying any additional action needed to maintain

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TABLE 6.5. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN NEW RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								progress towards meeting fecal coliform TMDLs in these six Hillsborough River segments.
NR-21	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -	Results of monitoring programs will be used to assess progress toward water quality improvements. An annual review of the monitoring results will be made to determine the water quality trends over time. The results will be applied to the "Decision Matrix" developed by FDEP/EPCHC so that appropriate action in the Blackwater Creek watershed can be identified to the implementing partners

Notes: NR – New River

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
SBF-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase 1 Completed (2008)			\$42,528 for Phase 1 for 6 WBIDs / FDEP	Under contract to FDEP, PBS&J is providing services to help identify sources of fecal coliform contamination in 6 Hillsborough River tributaries. Phase I comprises initial screening; Phases II and III (implementation and evaluation of results, respectively) will be developed based on Phase I Work Plan.
SBF-2	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept., Stormwater Management Section / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget	Update septic tank map using GIS and billing information, and evaluate potential "hot spots" based on hydrologic and soil conditions.
SBF-3	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 / -	Areas of high probability for septic system failure were mapped throughout Hillsborough River Basin, not including areas in City of Tampa Wastewater or City of Plant City Wastewater service areas.
SBF-4	Bacteriological Source Tracking Study	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County, USF / SWFWMD,	Completed (2002)			\$100,000 for Blackwater and Flint Creeks /	Study used antibiotic resistance analysis to gain information on

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Assessment	Ayres Associates				\$50,000 Hillsborough County, \$50,000 SWFWMD	probable sources of fecal coliform contamination to the 2 creeks.
SBF-5	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			\$30,080 (total countywide costs) / Absorbed in existing EPCHC budget	Survey and identify industrial facilities that operate stormwater management systems.
SBF-6	Septic System 200-foot Setback	Regulations, Ordinances, and Guidelines	HCHD / -	Completed (ongoing enforcement since the 1980s)			\$2,000 / -	Consists of ongoing enforcement. HCHD OSTDS Program has enforced state law on Hillsborough River since late 1980s. Any waivers were made by City of Tampa Water Dept.
SBF-7	Officer Snook	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	This in-school program, which targets 2 <sup>nd</sup> graders, consists of 30-minute presentations on how students can prevent water pollution in their daily lives. Presentation addresses pet waste as source of pollution.
SBF-8	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	The program targets 3 <sup>rd</sup> through 12 <sup>th</sup> grades. Students participate in critical thinking activities, demonstrations, and volunteer projects that highlight

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								stormwater pollution and address pet waste, agricultural waste, septic systems, and water treatment plant overflow as they relate to stormwater pollution.
SBF-9	Pet Waste Campaign Study	Education and Outreach Efforts	Hillsborough County Public Works Dept. / -		Planned (2008-09)		\$24,000 total program costs / Specialized Services Unit Operating Budget	Social marketing study on effectiveness of pet waste public education vs. pet waste ordinance enforcement.
SBF-10	LakeWatch and Hillsborough County Stream Water Watch	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Ongoing (since 2001)			\$116,000 (covers about 125 active sites throughout county) / Stormwater operating budget and SWFWMD cooperative funding	Public education on pollution prevention and BMPs through volunteer monitoring networks on lakes and streams in Hillsborough County. Includes data analysis of samples collected for nutrients.
SBF-11	Emerald Lakes Adopt-A-Pond	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management Section / SWFWMD	Completed (2004)			\$138,000 annually for countywide program / Specialized Services Unit Operations Budget	Pond restoration and environmental education.
SBF-12	Lake Thonotosassa Diagnostic Assessment and Water Quality Treatment Project	Special Studies, Planning, Monitoring, and Assessment	City of Plant City Resource Management Division / SWFWMD	Ongoing			FY 2006-07, City of Plant City, \$50,000; SWFMD, \$50,000 / Utilities revenues, Grant	Objective of project is to evaluate feasibility of implementing stormwater treatment system to treat

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
			(SWIM Section, Resource Management Dept.)				(SWFWMD Cooperative Funding)	mixture of stormwater and highly treated reclaimed water before discharging into Westside Canal. If determined feasible, project has potential to improve water quality in Westside Canal and ultimately Lake Thonotosassa. Westside Canal discharges into Pemberton/Baker Creek, a tributary to Lake Thonotosassa, which is a SWIM priority waterbody.
SBF-13	4 Adopt-a-Ponds in Baker-Spartman-Flint Watersheds	Restoration and Water Quality Improvement	Hillsborough County Public Works Dept. / SWFWMD	Completed (1998–2006)			\$138,000 annually for countywide program / Specialized Services Unit Operations Budget	Pond restoration and environmental restoration.
SBF-14	Agricultural BMP Actions— FDACS Farm BMP Program	Agricultural BMPs	FDACS, farmers participating in FDACS' Agricultural BMP Program / -	Ongoing			Amount depends on BMPs implemented / Private farms	A number of farms have signed NOI To Implement BMPs with FDACS and are presumed to be in compliance with environmental regulations.
SBF-15	Pemberton Creek Stormwater Improvements	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2005)			\$992,000 / CIT II	Project created 5-acre water treatment pond.
SBF-16	Pistol Range	Basic	City of Plant	Completed			\$649,810 / -	Diversion of flow from

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
	Stormwater Retrofit Project	Stormwater Management Program Implementation	City / SWFWMD	(2000)				about 620 acres through reconfigured borrow pit system to provide treatment prior to discharge into Pemberton Creek and Spartman Branch. TN reduction is calculated at 2,809 lbs/yr.
SBF-17	Lake Thonotosassa Project	Basic Stormwater Management Program Implementation	SWFWMD / Hillsborough County, FDOT	Completed (1999)			\$1,380,000	Project was designed to reduce TN, TP, and sediment load from 80 acres of agricultural lake to lake by treatment through constructed wetland and sedimentation basin.
SBF-18	Valrico Forest Subdivision Pond	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -		Planned (2010)		\$607,000 / CIP/CIT funds	Construct 10-acre retention pond.
SBF-19	Septic System Complaint Response	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	HCHD / EPCHC Water Management Division / -	Ongoing			\$1,250 / EPCHC budget	Respond to citizen complaints on sanitary sewer and septic system discharges.
SBF-20	Private Pump Station Identification and Compliance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -			Possible but funding not yet obtained (2009)	One full-time employee funded at Environmental Scientist II level / -	Identify private pump stations in cities of Tampa, Plant City, and Temple Terrace. Establish compliance inspection program to reduce number of SSOs from private

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
SBF-21	Fecal Coliform Monitoring—Hillsborough County	Special Studies, Planning, Monitoring, and Assessment	EPCHC / Hillsborough County Public Works Dept., SWFWMD	Ongoing (since 1980s)			\$4,563 for this WBID / Hillsborough County	<p>pump stations.</p> <p>EPCHC has maintained extensive, comprehensive water quality monitoring program with network of stations throughout Hillsborough County and Tampa Bay since 1974. All sample collection and analysis are conducted in accordance with FDEP rules and guidance. EPCHC staff collect monthly water quality samples that are analyzed for bacterial contamination—i.e., fecal coliform and enterococcus—at 38 locations in Hillsborough River Basin. EPCHC also collects bacteria samples from 30 locations representing major and minor tributaries of Hillsborough River; 11 of these are sampled monthly, and 19 locations represent minor tributaries and are sampled quarterly.</p>

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
SBF-22	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			No additional funding, project absorbed in annual personnel and operating costs / EPCHC budget	Create and populate database to track SSOs from Hillsborough County, City of Tampa, and other municipalities. Database will quantify spill amounts and discharge locations, and may be able to link to GIS.
SBF-23	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -	Results of monitoring programs will be used to assess progress toward water quality improvements through annual application of "decision matrix" developed by EPCHC in 2007. Decision rule will be modeled after one developed by TBEP and used to track water quality in Tampa Bay. Decision matrix will include statistical evaluation of water quality trends in Spartman-Baker-Flint watersheds, and will be applied annually. If water quality trends show degradation or lack of improvement over

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								time, matrix will include definition of types of actions to be considered by implementing partners.
SBF-24	Bacterial Contamination Complaint Response to Hillsborough County Health Dept.	Basic Stormwater Management Program Implementation	EPCHC / -	Ongoing			- / -	Bacterial contamination complaints received by EPCHC possibly caused by septic system failure, complaints forwarded to HCHC for follow-up.
SBF-25	Public Education Program for Tampa Bay Regional Planning Council	Education and Outreach Efforts	FDOT / -	Ongoing			\$50,000 (annual countywide program cost) / -	FDOT has supplied annual funding to Tampa Bay Regional Planning Council to coordinate selection and distribution of public educational programs such as MOSI's Marine Gang, Keep Hillsborough Beautiful, Bay Soundings Environmental Journal, storm drain markers, "All the Way to the Ocean" books, etc.
SBF-26	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -	Ongoing annual countywide public health education program distributed via permit issuance.
SBF-27	City of Plant City; Grease Ordinance	Regulations, Ordinances, and	City of Plant City / -	Ongoing			\$50,000 / -	Ongoing program that involves the

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Guidelines						inspection and monitoring of commercial, industrial, and residential sites that generate and dispose of cooking grease and oils. The program also provides education to representatives of these sites on proper grease management practices. Program provides a location for the residents of the community to recycle household cooking grease and oils.
SBF-28	Plant City Inflow & Infiltration (I&I) Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$1,500,000 / -	Ongoing program that involves the cleaning, video inspection, and grouting of sanitary sewer lines and manholes. This program helps to prevent both the infiltration/inflow of groundwater to the collection system, and also prevents ex-filtration of wastewater to groundwater and surface waters
SBF-29	Plant City WWTP/Lift Station Maintenance	Wastewater Infrastructure	City of Plant City/ -	Ongoing			\$1,500,000 / -	Ongoing program that involves the

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Management, Maintenance, Repair, and Upgrade						maintenance and repair of the City's Wastewater Treatment Plant (WWTP) and 41 lift stations in the sanitary sewer collection system. This program helps to prevent sanitary sewer overflows from occurring at lift stations in the collection system and assures that the WWTP is able to operate at the highest efficiency.
SBF-30	Plant City Stormwater Inlet Marketing Program	Basic Stormwater Management Program Implementation	City of Plant City/ -	Ongoing			\$1,000 / -	Ongoing program that involves the application of plaques to stormwater inlets. The plaques state in English and Spanish, "DO NOT POLLUTE THE WATER. DUMP NO WASTE. IT'S THE LAW." Printed environmental education pamphlets are distributed to residents in areas where the plaques are applied. These materials stress the importance of pollution prevention.

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								and indicate BMPs that can be used to prevent pollution.
SBF-31	Plant City Spill Prevention/Response Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$50,000 / -	An ongoing program to properly address spill incidents to prevent the introduction of pollutants to the environment. Detailed standard operating procedures have been established to specifically address SSOs and the proper remediation of these incidents. The Sewer System Overflow Response Plan was included in the CDM Self Audit Report that was completed by the city and submitted to the EPA Region 4 and FDEP in 2006.
SBF-32	Plant City Sewer Line Maintenance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$1,500,000 / -	Ongoing program that involves the maintenance of over 120 miles of sanitary sewer lines. This includes the repair of all associated manholes and the connection of new service laterals to the main collection lines. This program helps

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								to prevent both infiltration/inflow of groundwater to the collection system, and also prevents exfiltration of wastewater to groundwater and surface waters
SBF-33	Plant City Lift Station Security Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$10,000 / -	Ongoing program that provides basic security (fences, gates, locks) for sanitary sewer lift stations. Currently 28 of 41 stations are secured in this fashion
SBF-34	Plant City Lift Station Auxiliary Power Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$80,000 for purchase of generators & \$14,000 Annual Maintenance Program	Ongoing program that provides auxiliary power generators at sanitary sewer lift stations. Currently 15 of 41 stations are provided with permanent on-site generators. Eight portable generators are also available for use as needed
SBF-35	Plant City WWTP Fecal Coliform Bacteria Reduction Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$50,000/ -	Ongoing program that involves the inspection and monitoring of commercial, industrial, and residential sites that generate and dispose

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TABLE 6.6. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								of cooking grease and oils. The program also provides education to representatives of these sites on proper grease management practices. Program provides a location for the residents of the community to recycle household cooking grease and oils.
SBF-36	Annual Progress Report Coordination	Education and Outreach Efforts	TBEP / -		2009		\$1000 / year	On an annual basis, TBEP will coordinate the development of a brief update summarizing bacteriological monitoring data and updated project status, including 1). Collating updated project descriptions from BMAP partners; 2). Working with EPCHC to develop an annual monitoring report; 3). Convening an annual meeting of the BMAP BWG and Technical Stakeholders to review and approve the annual update, and 4). Identifying any additional action needed to maintain

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TABLE 6.6: COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN SPARTMAN BRANCH, BAKER CREEK, AND FLINT CREEK AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								progress towards meeting fecal coliform TMDLs in these six Hillsborough River segments.
SBF-37	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -	Results of monitoring programs will be used to assess progress toward water quality improvements. An annual review of the monitoring results will be made to determine the water quality trends over time. The results will be applied to the "Decision Matrix" developed by FDEP/EPCHC so that appropriate action in the Blackwater Creek watershed can be identified to the implementing partners

Notes: SBF – Spartman, Baker, & Flint Creeks

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
LHR-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase 1 Completed (2007)			\$42,528 for Phase 1, for 6 WBIDs	Under contract to FDEP, PBS&J is providing services to help identify sources of fecal coliform contamination in 6 Hillsborough River tributaries. Phase I comprises initial screening; Phases II and III (implementation and evaluation of results, respectively) will be developed based on Phase 1 Work Plan.
LHR-2	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget	Update septic tank map using GIS and billing information, and evaluate potential "hot spots" based on hydrologic and soil conditions.
LHR-3	High-probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 / -	Areas of high probability for septic system failure were mapped throughout Hillsborough River Basin, not including areas in City of Tampa Wastewater or City of Plant City Wastewater service areas.
LHR-4	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			\$30,080 countywide, absorbed within existing EPCHC	Survey and identification of industrial facilities that operate

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
							budget / EPCHC budget	stormwater management systems.
LHR-5	Officer Snook	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	This program, which targets 2 <sup>nd</sup> graders, consists of 30-minute presentations on how students can prevent water pollution in their daily lives. Presentation addresses pet waste as source of pollution.
LHR-6	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding	Program targets 3 <sup>rd</sup> through 12 <sup>th</sup> grades. Students participate in critical thinking activities, demonstrations, and volunteer projects that highlight stormwater pollution and address pet waste, agricultural waste, septic systems, and water treatment plant overflow as they relate to stormwater pollution.
LHR-7	Pet Waste Campaign Study	Education and Outreach Efforts	Hillsborough County Public Works Dept. / -		Planned (2008–09)		\$24,000 / Specialized Services Unit Operating Budget	Social marketing study on effectiveness of pet waste public education vs. pet waste ordinance enforcement.
LHR-8	LakeWatch and	Special Studies,	Hillsborough	Ongoing			\$116,000 (covers	Public education on

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
	Hillsborough County Stream Water Watch	Planning, Monitoring, and Assessment	County Public Works Dept. / -	(since 2001)			about 125 active sites throughout county) / Stormwater operating budget and SWFWMD cooperative funding	pollution prevention and BMPs through volunteer monitoring networks on lakes and streams in Hillsborough County. Includes data analysis of samples collected for nutrients.
LHR-9	City of Tampa Interactive Watershed Atlas	Education and Outreach Efforts	City of Tampa / USF, Hillsborough County	Completed (2008)			\$35,000 design and initiation fees, \$25,000 annual operation and maintenance/ City of Tampa	USF has been contracted to develop interactive, web-based water atlas for City of Tampa. Atlas is comprehensive data resource that helps citizens and scientists make informed decisions about water resources. Public education elements will be built into Atlas informing public of stormwater system, pollution, and TMDL activities. Beginning in 2009, USF will be contracted to continually update and improve content and public education within Watershed Atlas.
LHR-10	10 Adopt-a-Ponds in LHR watershed	Restoration and Water Quality Improvement	Hillsborough County Public Works Dept. /	Completed (1992-2004)			\$138,000 annually for countywide program /	Pond restoration and environmental education.

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
			SWFWMD				Specialized Services Unit Operating Budget	
LHR-11	North Tampa Pond Enlargements – Orchid Sink Retention Pond	Basic Stormwater Management Program Implementation	City of Tampa / -	Completed (2002)			\$1,300,000 / City of Tampa general fund	Stormwater Dept. constructed retention pond at Orchid Sink to help improve drainage that treats 160 acres of residential land. Orchid Sink eventually drains to Lower Hillsborough River. The project is currently maintained by the Tampa Stormwater Department.
LHR-12	Lowry Park Zoo Stormwater Rehabilitation	Basic Stormwater Management Program Implementation	City of Tampa / -	Completed (2002)			\$345,000 / City of Tampa General Fund	Construction of 2-acre wet detention system to treat runoff from 100-acre basin.
LHR-14	FDOT 56 <sup>th</sup> Street Retrofit	Restoration and Water Quality Improvement	City of Temple Terrace / FDOT, SWFWMD SWIM	Completed (2003)			- / FDOT, SWFWMD SWIM	Installation of continuous deflective separation (CDS) unit into existing stormwater system.
LHR-15	Tampa–Wastewater Collection System Study	Special Studies, Planning, Monitoring, and Assessment	City of Tampa Wastewater Dept. / -	Completed (2007)			Variable, but ongoing / City of Tampa	Wastewater Dept. is conducting comprehensive survey of wastewater collection system to prioritize areas that should be scheduled for replacement, relining, and/or repair. Study will

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								factor in prior occurrences of wastewater overflows and bypasses.
LHR-16	Nebraska SR 69 to Hillsborough Ave. Pipeline Improvements	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -		Planned (2007)		Variable / City of Tampa Wastewater Enterprise Fund	FDOT will be constructing improvements along Nebraska Ave. between SR 60 and Hillsborough Ave. Wastewater Dept. has identified several defects in gravity sewers in this corridor that could cause failures that would damage new roadway. To prevent possible damage to roadway, Dept. plans to rehabilitate defective pipelines. Failure of these pipelines could also cause wastewater overflow that could enter Hillsborough River through stormwater collection system.
LHR-17	Tampa—Emergency Generators at Hanna Pump Station	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -	Completed (2007)			\$265,000 / City of Tampa Wastewater Enterprise Fund	Backup emergency generators will be installed to maintain Hanna pump station in event of power outage. This will prevent overflows and bypasses

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								directly to Hillsborough River.
LHR-18	Tampa-Grease Ordinance	Regulations, Ordinances, and Guidelines	City of Tampa Wastewater Dept. / -	Completed (2006)			About \$100,000 annually / -	City enacted grease ordinance that prohibits discharge of grease and establishes inspection program for businesses. Grease ordinance should significantly reduce occurrence of blockages that contribute to overflows. Enforcement of grease ordinance is supported by 2 FTEs that are funded by City's Wastewater Enterprise Fund.
LHR-19	12 <sup>th</sup> Street Forcemain Replacement	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -	Ongoing (December 2007)			\$17,000,000 / City of Tampa	Forcemain replacement along 12 <sup>th</sup> St. in area where there was 22-million-gallon release in past. Forcemain will be replaced to minimize future overflows.
LHR-20	River Tower Park Shoreline Restoration and Stormwater Improvements	Restoration and Water Quality Improvement	City of Tampa, FDOT District 7, SWFWMD / -		2009 (project in construction design phase)		\$2,100,000 / Cooperative funding (City of Tampa, FDOT)	City will be restoring northern bank of Hillsborough River from I-275 to Florida Ave. Project will stabilize bank, provide habitat, and improve water quality. Project will

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								also include stormwater treatment controls for runoff from I-275 and contributing drainage area.
LHR-21	City of Tampa Riverwalk Project	Education and Outreach Efforts	City of Tampa / -		Planned (portions under construction; completion in 2011)		\$40 million for entire project / City, state, federal, private funds	Tampa Riverwalk project will create 15-foot walkway and bike path along east banks of Hillsborough River and Garrison Channel. Pedestrian-friendly walkway will be 2.2 miles long and will integrate various activities and destinations in downtown area by linking them with attractive promenade with vibrant public art. Project will provide significant opportunities for public to connect with river. To benefit from this opportunity, city will construct public educational displays and information on stormwater control and treatment, as well as cleaning up pet waste. Stations will be constructed

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								for dog waste cleanup and disposal.
LHR-22	Clonnia-May Stormwater Pond	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2000)			\$160,000 / CIT/CIP monies	Long detention pond with skimmer.
LHR-26	Septic System Complaint Response	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	HCHD / EPCHC Water Management Division	Ongoing			\$1,250 (absorbed in existing EPCHC budget) / EPCHC budget	Respond to citizen complains on sanitary sewer and septic system discharges.
LHR-27	Private Pump Station Identification and Compliance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing (since 2005)		Possible but funding not yet obtained (2009)	<b>Ongoing:</b> \$22,200 total costs annually since 2005; no additional funding; project absorbed in annual personnel and operating costs. <b>Possible:</b> One full-time employee funded at Environmental Scientist II level / -	Identify private pump stations in cities of Tampa, Plant City, and Temple Terrace. Establish compliance inspection program to reduce number of SSOs from private pump stations.
LHR-28	Fecal Coliform Monthly Monitoring— Hillsborough County	Special Studies, Planning, Monitoring, and Assessment	EPCHC / Hillsborough County Public Works Dept., SWFWMD	Ongoing (since 1974)			\$3, 232 annually for this WBID / Hillsborough County	EPCHC has maintained extensive, comprehensive water quality monitoring program with network of stations throughout Hillsborough County and Tampa Bay since 1974. All sample collection and analysis are

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								conducted in accordance with FDEP rules and guidance. EPCHC staff collect monthly water quality samples that are analyzed for bacterial contamination—i.e., fecal coliform and enterococcus—at 38 locations in Hillsborough River Basin. EPCHC also collects bacteria samples from 30 locations representing major and minor tributaries of Hillsborough River; 11 of these are sampled monthly, and 19 locations represent minor tributaries and are sampled quarterly.
LHR-29	Tracking of City of Tampa Consent Order	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / FDEP, City of Tampa	Ongoing (until 2012)			\$1,750 annually, absorbed within existing EPCHC budget / EPCHC budget	Track progress of City of Tampa consent order addressing SSOs and other problems with sanitary sewer collection system; target completion date is 2012.
LHR-30	Sanitary Sewer Overflow Database	Wastewater Infrastructure	EPCHC Water Management	Ongoing			\$3,600 total cost for expenditure of	Create and populate database to track

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Management, Maintenance, Repair, and Upgrade	Division / -				\$1,200 annually for WBID, 2006-08; no additional funding / Project absorbed in annual personnel and operating costs.	SSOs from Hillsborough County, City of Tampa, and other municipalities. Database will quantify spill amounts and discharge locations, and may be able to link to GIS.
LHR-31	Surface Water Temporal Variability Network Monitoring Site	Special Studies, Planning, Monitoring, and Assessment	FDEP-- Integrated Water Resource Watershed Monitoring Program / Contracted with SWFWMD from 1999-2004; all monitoring now conducted by FDEP	Ongoing (since 1999)			\$ 385,000 statewide (funding varies from year to year, and has been reduced in recent years) / EPA 694 funds	Sampling at site is part of multiyear temporal variability (Trend) monitoring network that consists of 13 surface water sites (SWTV) and 11 ground water sites (GWTV) within SWFWMD boundary. Sites are part of Surface Water Temporal Variability Network in FDEP's Watershed Monitoring Program. Data from this fixed station design network are used to examine changes in water quality and flow over time throughout area, and are used in concert with Status Network (random surface water and ground water stations) to provide scientifically defensible

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								information on important chemical, physical, and biological characteristics of surface waters and major aquifer systems of area/basin and state. Both networks are designed to measure condition using variety of threshold values. Resources monitored by temporal variability monitoring network include rivers, streams, and confined and unconfined aquifers. Data on fecal coliform and enterococci levels from Hillsborough River surface water site (Station # FLO 13 33 0) are available from FDEP.
LHR-32	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -		Planned (2007)		- / -	Results of monitoring programs will be used to assess progress toward water quality improvements through annual application of "decision matrix" developed by

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								EPCHC in 2007. Decision rule will be modeled after one developed by TBEP and used to track water quality in Tampa Bay. Decision matrix will include statistical evaluation of water quality trends in Lower Hillsborough River watershed, and will be applied annually. If water quality trends show degradation or lack of improvement over time, matrix will include definition of types of actions to be considered by implementing partners.
LHR-33	Bacterial Contamination Complaint Response to Hillsborough County Health Department	Basic Stormwater Management Program Implementation	EPCHC / -	Ongoing			- / -	Bacterial contamination complaints received by EPCHC possibly caused by septic system failure; complaints forwarded to HCHC for follow-up.
LHR-34	Robels Park – SWMM Project	Basic Stormwater Management Program Implementation	City of Tampa / SWFWMD, FDOT			Possible but funding not yet obtained	- / -	Robels Park SWMM project at downstream Hillsborough River dam structure.
LHR-36	Street Sweeping Curb	Basic	FDOT / City of	Ongoing			- / -	Street sweeping of

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
	and Bridge Roadway Sections	Stormwater Management Program Implementation	Tampa					all interstate roadway sections with curb and bridges in Hillsborough County, and street sweeping of all FDOT roadways with curb in City of Tampa.
LHR-37	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 (annual countywide program) / -	Funding by FDOT supplied annually since 1996 to Tampa Bay Regional Planning Council to coordinate selection and distribution of public education programs such as MOSI's Marine Gang, Keep Hillsborough Beautiful, Bay Soundings Environmental Journal, storm drain markers, "All the Way to the Ocean" books, etc.
LHR-38	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -	Ongoing countywide public health education program distributed via permit issuance.
LHR-39	North Boulevard Siphon Rehabilitation Project	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa / -	Ongoing (2008)			Approximately \$350,000 / City of Tampa	North Blvd. Project includes rehabilitation of approximately 300 linear feet of 24-inch diameter CIP gravity

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								sewer line and 770 linear feet of 20-inch diameter C/P siphon at North Blvd. Bridge River Crossing (North Blvd. and Ross Ave.). Work also includes rehabilitation of 1 inlet structure. Project should take 4-6 weeks to complete.
LHR-40	Manhole Rehabilitation Project	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -	Ongoing (December 2007)			Approximately \$750,000 annually / -	Manhole rehabilitation project is intended to stop inflow and infiltration and increase structural integrity/life of manholes. City has 2 contracts for manhole rehabilitation: (1) Fiberglass liner that is inserted into existing manhole and (2) application of calcium aluminate cementitious structural coating system sprayed onto existing walls of manhole. Project locations are identified routinely.
LHR-41	Urban Lake Rescue-- Lake Roberta	Wastewater Infrastructure Management,	City of Tampa / SWFWMD	Completed (2008)			\$272,000 / SWFWMD cooperative funding	With funding from SWFWMD, City installed nutrient-

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Maintenance, Repair, and Upgrade					(City 50% match)	separating baffle box to capture pollutants in stormwater before they entered Lake Roberta. Additionally, exotic vegetation was removed and littoral shelf was planted with arrowhead and pickerelweed. Engineering controls were constructed in lake to improve residence time for stormwater treatment.
LHR-42	Downstream Defender – Lake Roberta	Restoration and Water Quality Improvement	City of Tampa / FDOT	Completed (2006)			\$140,000 / City of Tampa Stormwater Utility, FDOT	On west side of Lake Roberta, stormwater drainage from Nebraska Ave. contributes large amount of trash and debris. City and FDOT partnered to install sediment and trash collection divide to treat stormwater prior to entering lake. Offline unit, Downstream Defender, was installed and is being maintained by Tampa Stormwater Dept.
LHR-43	Epps Park Sediment Trap Installation	Restoration and Water Quality	City of Tampa / FDOT	Completed (2003)			Approximately \$350,000 / City of	City in partnership with FDOT installed

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
		Improvement					Tampa Stormwater Utility, FDOT	series of 6 sediment traps near Epps Park. Sediment traps capture trash and debris, preventing these materials from being discharged to Hillsborough River. Tampa Stormwater Department crews maintain and operate sediment traps, removing debris on routine basis.
LHR-44	Robles Park Drainage Improvements (City of Tampa)	Restoration and Water Quality Improvement	City of Tampa / FDOT, SWFWMD		Planned (2009)		Approximately \$500,000 / SWFWMD cooperative funding, FDOT and city match	City of Tampa, FDOT, and SWFWMD are planning drainage improvements, water quality treatment, and park improvements to Robles Park, located in Tampa Heights neighborhood of Central Tampa. Project cooperators are compiling conceptual improvements that will be part of overall project but will likely include flood relief and stormwater quality treatment. Each entity will likely contribute funds for improvements as a

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
LHR-45	City of Tampa Street Sweeping Maintenance	Basic Stormwater Management Program Implementation	City of Tampa / FDOT (for FDOT road segments within City of Tampa limits)	Routine and ongoing			Funding amount varies annually / City of Tampa Stormwater Utility, FDOT	50% match with SWFWMD funds. Street sweeping services are delivered by City of Tampa Stormwater Dept. on regularly scheduled basis for residential and business areas. Dept. also sweeps before and after special events, including parades and marathons. Only streets that have curb and gutter are scheduled for sweeping services. Residential sweeping program covers approximately 1,860 curbed miles. Commercial sweeping program covers major streets in urban area, including Channelside District, Ybor City, Kennedy Blvd., Bayshore Blvd., and Downtown. Commercial streets are swept every week as they are major transportation routes. Total of 140 curbed miles of

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
								commercial streets are swept weekly.
LHR-46	Broadway Outfall CDS Unit	Basic Stormwater Management Program Implementation	City of Plant City/ -	Completed 2001			- / -	Installation of a continuous defective separation (CDS) unit into existing stormwater system.
LHR-47	Pooches for the Planet	Agricultural BMP	TBEP	Completed 2001			\$5000 / -	Tampa Bay Estuary Program developed this pilot project in a small neighborhood park using a poster/map that showed the locations of dog waste piles. These locations were recorded with a GPS during an initial visual assessment and used monthly as a key educational tool at the park information station. This information resulted in a significant decline in number of dog waste piles recorded in the park since the start of the project.
LHR-48	Hillsborough River Watershed Alliance (HSWA)	Education and Outreach Efforts	HRWA	Ongoing since 1994			Approximately \$30,000/year from multiple sources, including SWFWMD	Non-profit organizations, educates citizens on the value of the Hillsborough River Watershed. Undertakes water quality runoff studies from various land

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TABLE 6.7. COMPLETED AND PLANNED PROJECTS TO REDUCE FECAL COLIFORM BACTERIA LEVELS IN LOWER HILLSBOROUGH RIVER AND PREVENT FUTURE DISCHARGES								
Project Number	Project Name	Management Category	Lead Entity / Project Partner(s)	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding	General Location / Project Description and Benefits
LHR-50	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -	uses along river. Results of monitoring programs will be used to assess progress toward water quality improvements. An annual review of the monitoring results will be made to determine the water quality trends over time. The results will be applied to the "Decision Matrix" developed by FDEP/EPCHC so that appropriate action in the Blackwater Creek watershed can be identified to the implementing partners

Notes: LHR – Lower Hillsborough River

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**TABLE 10.1. AGRICULTURAL BMPs**

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding
BWC-16	Agricultural BMP Actions through FDACS Statewide Program	Agricultural BMPs	FDACS, farmers participating in FDACS agricultural BMP program / -			Possible but funding not yet obtained	- / -
BWC-27	Floodplain Fencing for Cattle Restriction	Agricultural BMP	Hillsborough County Parks and Recreation Dept. / Audubon Ranch	Completed (2003)			- / -
NR-11	Agricultural BMP Actions—FDACS Farm BMP Program	Agricultural BMP	FDACS and farmers participating in FDACS' Agricultural BMP Program / -	Ongoing			- / Private farms
SBF-14	Agricultural BMP Actions—FDACS Farm BMP Program	Agricultural BMP	FDACS, farmers participating in FDACS' Agricultural BMP Program / -	Ongoing			Amount depends on BMPs implemented / Private farms

Notes: BWC – Blackwater Creek  
 NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

**Hillsborough River Basin BMAP – March 5, 2009**

**TABLE 10.2. RESTORATION AND WATER QUALITY IMPROVEMENT PROJECTS**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
BWC-17	Cone Ranch Restoration Project	Restoration and Water Quality Improvement	Hillsborough County / FDEP	Completed (1999)			\$392,000 / EPA 319(h) grant, in-kind services from project partners
BWC-18	McIntosh Park Water Quality/Wetland Enhancement	Restoration and Water Quality Improvement	SWFWMD / City of Plant City, Hillsborough County, FDEP	Completed (2006)			\$3,824,564 / EPA 319(h) grant, in-kind services from project partners
BWC-42	Blackwater Creek Watershed Management Plan	Restoration and Water Quality Improvement	Polk County / -	Completed (2004)			\$206,000 / -
BWC-48	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -
NR-21	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -
SBF-13	4 Adopt-a-Ponds in Baker-Spartman-Flint Watersheds	Restoration and Water Quality Improvement	Hillsborough County Public Works Dept. / SWFWMD	Completed (1998–2006)			\$138,000 annually for countywide program / Specialized Services Unit Operations Budget
SBF-37	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -
LHR-14	FDOT 56 <sup>th</sup> Street Retrofit	Restoration and Water Quality Improvement	City of Temple Terrace / FDOT, SWFWMD SWIM	Completed (2003)			- / FDOT, SWFWMD SWIM
LHR-20	River Tower Park Shoreline Restoration and Stormwater Improvements	Restoration and Water Quality Improvement	City of Tampa, FDOT District 7, SWFWMD / -		2009 (project in construction design phase)		\$2,100,000 / Cooperative funding (City of Tampa, FDOT)
LHR-42	Downstream Defender – Lake Roberta	Restoration and Water Quality Improvement	City of Tampa / FDOT	Completed (2006)			\$140,000 / City of Tampa Stormwater Utility, FDOT
LHR-43	Epps Park Sediment Trap Installation	Restoration and Water Quality Improvement	City of Tampa / FDOT	Completed (2003)			Approximately \$350,000 / City of Tampa Stormwater Utility, FDOT
LHR-44	Robles Park Drainage Improvements (City of Tampa)	Restoration and Water Quality Improvement	City of Tampa / FDOT, SWFWMD		Planned (2009)		Approximately \$500,000 / SWFWMD cooperative funding, FDOT and city match
LHR-50	Evaluation of Progress Towards Water Quality Improvements	Restoration and Water Quality Improvement	EPCHC / -		2009		- / -

Notes: BWC – Blackwater Creek, NR – New River, SBF – Spartman, Baker, & Flint Creeks, LHR – Lower Hillsborough River

**Hillsborough River Basin BMAP – March 5, 2009**

**TABLE 10.3. REGULATIONS, ORDINANCES, AND GUIDELINES**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
BWC-7	Septic System 200-foot Setback	Regulations, Ordinances, and Guidelines	HCHD / -	Ongoing (since 1980s)			
BWC-13	Polk County Land Development Regulations	Regulations, Ordinances, and Guidelines	Polk County / -	Completed (2000)			- / -
BWC-25	Plant City Grease Management Program	Regulation, Ordinances, and Guidelines	City of Plant City Water Resource Management Division / Utilities Maintenance Division; Building Dept.	Ongoing/ annual			FY2006-07 \$50,000 / Utilities revenues
BWC-36	Stormwater Quality Management Ordinances	Regulation, Ordinances, and Guidelines	Polk County / -	Completed (1993)			\$10,000 / -
BWC-37	Surface Water Protection Ordinance	Regulation, Ordinances, and Guidelines	Polk County / -	Completed (1988)			\$5,000 / -
BWC-38	Wastewater Residuals Management Ordinance	Regulation, Ordinances, and Guidelines	Polk County / -	Completed (1995)			\$10,000 / -
NR-6	Septic System 200-foot Setback for Hillsborough River— Potable Supply Protection	Regulations, Ordinances, and Guidelines	HCHD / -	Ongoing (since 1980s)			\$2,000 / -
NR-7	Hillsborough County Land Development Code (Section 4.01.16)—Septic System Setback	Regulations, Ordinances, and Guidelines	Hillsborough County Planning and Growth Management Dept. / -	Ongoing (since 2006)			- / -
SBF-6	Septic System 200-foot Setback	Regulations, Ordinances, and Guidelines	HCHD / -	Completed (ongoing enforcement since the 1980s)			\$2,000 / -
SBF-27	City of Plant City; Grease Ordinance	Regulations, Ordinances, and Guidelines	City of Plant City / -	Ongoing			\$50,000 / -
LHR-18	Tampa—Grease Ordinance	Regulations, Ordinances, and Guidelines	City of Tampa Wastewater Dept. / -	Completed (2006)			About \$100,000 annually / -

Notes: BWC – Blackwater Creek  
 NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

Hillsborough River Basin BMAP – March 5, 2009

**TABLE 10.4. EDUCATION AND OUTREACH EFFORTS**

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding
BWC-8	Officer Snook	Education and Outreach	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding
BWC-9	Stormwater Ecologist Education Program	Education and Outreach	Hillsborough County Stormwater Management Section / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding
BWC-10	Pet Waste Campaign Study	Education and Outreach	Hillsborough County Public Works Dept. / -		Planned (2008–09)		\$24,000 / Specialized Services Unit Operating Budget
BWC-33	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 / FDOT
BWC-34	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -
NR-8	Officer Snook	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management Section / -	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding
NR-9	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management Section / -	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding
NR-18	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 (annual countywide program cost) / -
NR-19	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -
NR-20	Annual Progress Report Coordination	Education and Outreach Efforts	TBEP / -		2009		\$1000 / year
SBF-7	Officer Snook	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding
SBF-8	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee

Hillsborough River Basin BMAP – March 5, 2009

TABLE 10.4. EDUCATION AND OUTREACH EFFORTS

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding
							plus cooperative funding
SBF-9	Pet Waste Campaign Study	Education and Outreach Efforts	Hillsborough County Public Works Dept. / -		Planned (2008–09)		\$24,000 total program costs / Specialized Services Unit Operating Budget
SBF-11	Emerald Lakes Adopt-A-Pond	Education and Outreach Efforts	Hillsborough County Public Works Dept., Stormwater Management Section / SWFWMD	Completed (2004)			\$138,000 annually for countywide program / Specialized Services Unit Operations Budget
SBF-25	Public Education Program for Tampa Bay Regional Planning Council	Education and Outreach Efforts	FDOT / -	Ongoing			\$50,000 (annual countywide program cost) / -
SBF-26	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -
SBF-36	Annual Progress Report Coordination	Education and Outreach Efforts	TBEP / -		2009		\$1000 / year
LHR-5	Officer Snook	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding
LHR-6	Stormwater Ecologist Education Program	Education and Outreach Efforts	Hillsborough County Public Works Dept. / SWFWMD	Ongoing			\$9,000 annual countywide educational program / Stormwater fee plus cooperative funding
LHR-7	Pet Waste Campaign Study	Education and Outreach Efforts	Hillsborough County Public Works Dept. / -		Planned (2008–09)		\$24,000 / Specialized Services Unit Operating Budget
LHR-9	City of Tampa Interactive Watershed Atlas	Education and Outreach Efforts	City of Tampa / USF, Hillsborough County	Completed (2008)			\$35,000 design and initiation fees, \$25,000 annual operation and maintenance/ City of Tampa
LHR-21	City of Tampa Riverwalk Project	Education and Outreach Efforts	City of Tampa / -		Planned (portions under construction; completion in 2011)		\$40 million for entire project / City, state, federal, private funds
LHR-37	Public Education Program for Tampa Bay Regional Planning Council Distribution	Education and Outreach Efforts	FDOT / -	Ongoing (since 1996)			\$50,000 (annual countywide program) / -
LHR-38	Public Health Education Program	Education and Outreach Efforts	HCHD / -	Ongoing			\$500 / -
LHR-47	Pooches for the Planet	Agricultural BMP	TBEP	Completed 2001			\$5000 / -

**Hillsborough River Basin BMAP – March 5, 2009**

**TABLE 10.4. EDUCATION AND OUTREACH EFFORTS**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
LHR-48	Hillsborough River Watershed Alliance (HSWA)	Education and Outreach Efforts	HRWA	Ongoing since 1994			Approximately \$30,000/year from multiple sources, including SWFWMD

Notes: BWC – Blackwater Creek  
 NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

**Hillsborough River Basin BMAP – March 5, 2009**

**TABLE 10.5. BASIC STORMWATER MANAGEMENT PROGRAM IMPLEMENTATION**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
BWC-14	Plant City Stormwater Inlet Marking Program	Basic Stormwater Management Program Implementation	City of Plant City Water Resource Management Division / -	Ongoing/ annual			FY2006–07 \$1,000 for countywide program / Utilities Revenues
BWC-15	New River and Hillsborough River Watershed Management Plans in Pasco County	Basic Stormwater Management Program Implementation	Pasco County / SWFWMD	Ongoing			\$1,600,000 (4-year program funding) / Pasco County, SWFWMD
BWC-32	Bacterial Contamination Complaint Response to Hillsborough County Health Dept.	Basic Stormwater Management Program Implementation	EPCHC / -	Ongoing			- / -
NR-10	New River and Hillsborough River Watershed Management Plans in Pasco County	Basic Stormwater Management Program Implementation	Pasco County/ SWFWMD	Ongoing			\$1,600,000 for 4-year program
SBF-15	Pemberton Creek Stormwater Improvements	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2005)			\$992,000 / CIT II
SBF-16	Pistol Range Stormwater Retrofit Project	Basic Stormwater Management Program Implementation	City of Plant City / SWFWMD	Completed (2000)			\$649,810 / -
SBF-17	Lake Thonotosassa Project	Basic Stormwater Management Program Implementation	SWFWMD / Hillsborough County, FDOT	Completed (1999)			\$1,380,000
SBF-18	Valrico Forest Subdivision Pond	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -		Planned (2010)		\$607,000 / CIP/CIT funds
SBF-24	Bacterial Contamination Complaint Response to Hillsborough County Health Dept.	Basic Stormwater Management Program Implementation	EPCHC / -	Ongoing			- / -
SBF-30	Plant City Stormwater Inlet Marking Program	Basic Stormwater Management Program Implementation	City of Plant City / -	Ongoing			\$1,000 / -
LHR-11	North Tampa Pond Enlargements – Orchid Sink Retention Pond	Basic Stormwater Management Program Implementation	City of Tampa / -	Completed (2002)			\$1,300,000 / City of Tampa general fund
LHR-12	Lowry Park Zoo Stormwater Rehabilitation	Basic Stormwater Management Program Implementation	City of Tampa / -	Completed (2002)			\$345,000 / City of Tampa General Fund
LHR-13	Stormwater Research Facility at 132 <sup>nd</sup> and Taliaferro	Basic Stormwater Management Program Implementation	Hillsborough County / -	Ongoing			\$1,400,000
LHR-22	Claonia-May Stormwater Pond	Basic Stormwater Management Program	Hillsborough County Public Works Dept. / -	Completed (2000)			\$160,000 / CIT/CIP monies

**Hillsborough River Basin BMAP – March 5, 2009**

**TABLE 10.5. BASIC STORMWATER MANAGEMENT PROGRAM IMPLEMENTATION**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
		Implementation					
LHR-23	Curiosity Creek Phase III	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2004)			\$567,000 / -
LHR-25	58 <sup>th</sup> St. and 122 <sup>nd</sup> Ave. Retention Pond	Basic Stormwater Management Program Implementation	Hillsborough County Public Works Dept. / -	Completed (2002)			\$456,000 / -
LHR-33	Bacterial Contamination Complaint Response to Hillsborough County Health Department	Basic Stormwater Management Program Implementation	EPCHC / -	Ongoing			- / -
LHR-34	Robels Park – SWMM Project	Basic Stormwater Management Program Implementation	City of Tampa / SWFWMD, FDOT			Possible but funding not yet obtained	- / -
LHR-36	Street Sweeping Curb and Bridge Roadway Sections	Basic Stormwater Management Program Implementation	FDOT / City of Tampa	Ongoing			- / -
LHR-45	City of Tampa Street Sweeping Maintenance	Basic Stormwater Management Program Implementation	City of Tampa / FDOT (for FDOT road segments within City of Tampa limits)	Routine and ongoing			Funding amount varies annually / City of Tampa Stormwater Utility, FDOT
LHR-46	Broadway Outfall CDS Unit	Basic Stormwater Management Program Implementation	City of Plant City / -	Completed 2001			- / -

Notes: BWC – Blackwater Creek  
 NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

Hillsborough River Basin BMAP – March 5, 2009

**TABLE 10.6. WASTEWATER INFRASTRUCTURE MANAGEMENT, MAINTENANCE, REPAIR, AND UPGRADE**

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding
BWC-12	2 Adopt-a-Ponds in Blackwater Creek Watershed	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Hillsborough County Public Works Dept., Stormwater Management Section / SWFWMD	Completed (1995 and 1997)			\$138,000 annually for countywide Adopt-a Pond Program / Stormwater Operations Budget
BWC-19	Plant City Spill Response Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Water Resource Management Division / -	Ongoing/ annual			FY2006–07 \$50,000 for citywide program / Utilities revenues
BWC-20	Plant City Sewer Line Maintenance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division / -	Ongoing/ annual			FY2006–07 \$742,000 for citywide program / Utilities revenues
BWC-21	Plant City Lift Station Security Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division / -	Ongoing/ annual			FY2006–07 \$10,000 for citywide program / Utilities revenues
BWC-22	Plant City Lift Station Auxiliary Power Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division / -	Ongoing/ annual			\$80,000 for FY2006–07; \$94,000 grant for 6 units / Utilities revenues; FDCA grant
BWC-23	Plant City Lift Station Maintenance	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division / -	Ongoing/ annual			\$14,000 for annual maintenance program / Utilities revenues; FDCA grant
BWC-24	Plant City Inflow and Infiltration (I&I) Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City Utilities Maintenance Division / -	Ongoing/ annual			FY2006–07 \$1,484,000 / Utilities revenues
BWC-26	Septic System Complaint Response	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	HCHD / EPCHC Water Management Division	Ongoing			\$1,250 / EPCHC budget
BWC-28	Private Pump Station Identification and Compliance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -			Possible (2009)	One full-time employee funded at Environmental Scientist II level / -
BWC-30	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			- / Project absorbed in annual personnel and operating costs

Hillsborough River Basin BMAP – March 5, 2009

**TABLE 10.6. WASTEWATER INFRASTRUCTURE MANAGEMENT, MAINTENANCE, REPAIR, AND UPGRADE**

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding
		Upgrade					
BWC-41	Illicit Discharge Complaint Investigation	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Polk County / -	Ongoing			\$100 / -
BWC-43	Routine Maintenance Erosion Control	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Polk County / -	Ongoing			- / -
BWC-46	Plant City WWTP Fecal Coliform Bacteria Reduction Plan	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City / -	Ongoing			\$125,200 / -
NR-12	Septic System Complaint Response	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC / HCHD	Ongoing			EPCHC budget / Absorbed within existing EPCHC budget
NR-13	Private Pump Station Identification and Compliance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -		Planned (2009)		One full-time employee funded at Environmental Scientist II level / -
NR-16	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			No additional funding; project absorbed in annual personnel and operating costs / EPCHC budget
SBF-19	Septic System Complaint Response	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	HCHD / EPCHC Water Management Division / -	Ongoing			\$1,250 / EPCHC budget
SBF-20	Private Pump Station Identification and Compliance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -			Possible but funding not yet obtained (2009)	One full-time employee funded at Environmental Scientist II level / -
SBF-22	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			No additional funding, project absorbed in annual personnel and operating costs / EPCHC budget
SBF-28	Plant City Inflow & Infiltration (I&I) Program	Wastewater Infrastructure Management, Maintenance, Repair, and	City of Plant City / -	Ongoing			\$1,500,000 / -

Hillsborough River Basin BMAP – March 5, 2009

**TABLE 10.6. WASTEWATER INFRASTRUCTURE MANAGEMENT, MAINTENANCE, REPAIR, AND UPGRADE**

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding
SBF-29	Plant City WWTP/Lift Station Maintenance	Upgrade Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$1,500,000 / -
SBF-31	Plant City Spill Prevention/Response Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$50,000 / -
SBF-32	Plant City Sewer Line Maintenance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$1,500,000 / -
SBF-33	Plant City Lift Station Security Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$10,000 / -
SBF-34	Plant City Lift Station Auxiliary Power Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$80,000 for purchase of generators & \$14,000 Annual Maintenance Program
SBF-35	Plant City WWTP Fecal Coliform Bacteria Reduction Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Plant City/ -	Ongoing			\$50,000/ -
LHR-16	Nebraska SR 69 to Hillsborough Ave. Pipeline Improvements	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -		Planned (2007)		Variable / City of Tampa Wastewater Enterprise Fund
LHR-17	Tampa–Emergency Generators at Hanna Pump Station	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -	Completed (2007)			\$265,000 / City of Tampa Wastewater Enterprise Fund
LHR-19	12 <sup>th</sup> Street Forcemain Replacement	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -	Ongoing (December 2007)			\$17,000,000 / City of Tampa
LHR-24	Sharon Drive Stormceptor	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	Hillsborough County Public Works Dept. / -	Completed (2002)			\$112,000 / -
LHR-26	Septic System	Wastewater	HCHD /	Ongoing			\$1.250 (absorbed)

Hillsborough River Basin BMAP – March 5, 2009

**TABLE 10.6. WASTEWATER INFRASTRUCTURE MANAGEMENT, MAINTENANCE, REPAIR, AND UPGRADE**

Project Number	Project Name	Management Category	Lead Entity / Project Partner	Completed or Ongoing (Date)	Planned (Date)	Possible (Date)	Estimated Cost / Source of Funding
	Complaint Response	Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division				in existing EPCHC budget) / EPCHC budget
LHR-27	Private Pump Station Identification and Compliance Program	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing (since 2005)		Possible but funding not yet obtained (2009)	<b>Ongoing:</b> \$22,200 total costs annually since 2005; no additional funding; project absorbed in annual personnel and operating costs. <b>Possible:</b> One full-time employee funded at Environmental Scientist II level / -
LHR-29	Tracking of City of Tampa Consent Order	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / FDEP, City of Tampa	Ongoing (until 2012)			\$1,750 annually, absorbed within existing EPCHC budget / EPCHC budget
LHR-30	Sanitary Sewer Overflow Database	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	EPCHC Water Management Division / -	Ongoing			\$3,600 total cost for expenditure of \$1,200 annually for WBID, 2006–08; no additional funding / Project absorbed in annual personnel and operating costs.
LHR-39	North Boulevard Siphon Rehabilitation Project	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa / -	Ongoing (2008)			Approximately \$350,000 / City of Tampa
LHR-40	Manhole Rehabilitation Project	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa Wastewater Dept. / -	Ongoing (December 2007)			Approximately \$750,000 annually / -
LHR-41	Urban Lake Rescue– Lake Roberta	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	City of Tampa / SWFWMD	Completed (2008)			\$272,000 / SWFWMD cooperative funding (City 50% match)
LHR-46	Broadway Outfall Continuous Deflective Separation Unit	Wastewater Infrastructure Management, Maintenance, Repair, and Upgrade	TBEP	Completed 2001			\$5000 / -

Notes: BWC – Blackwater Creek, NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

**DRAFT Hillsborough River Basin BMAP – February 19, 2009**

**TABLE 10.7. SPECIAL STUDIES, PLANNING, MONITORING, AND ASSESSMENT**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
BWC-1	Microbial Source Tracking	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Phase I Completed (2008)			\$42,528 for 6 WBIDs (Phase 1) / FDEP
BWC-2	DNA Source Identification	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -			Possible but funding not yet obtained (November 2007)	Estimated amount needed: \$100,000 / Pasco County
BWC-3	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget
BWC-4	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 for each of 6 WBIDs / -
BWC-5	Bacteriological Source Tracking Study	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept., USF / SWFWMD, Ayres Associates	Completed (2002)			\$100,000 for Blackwater and Flint Creeks / \$50,000 Hillsborough County, \$50,000 SWFWMD
BWC-6	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			- / Absorbed within existing EPCHC budget
BWC-11	LakeWatch and Hillsborough County Stream Water Watch	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Ongoing (since 2001)			\$116,000 annually for 125 sites throughout county / Stormwater operating budget, SWFWMD cooperative funding
BWC-29	Fecal Coliform Monthly Monitoring– Hillsborough County	Special Studies, Planning, Monitoring, and Assessment	EPCHC / Hillsborough County Public Works Dept.; SWFWMD	Ongoing (since 1980s)			\$1,521 for Blackwater Creek WBID / Annual countywide water quality monitoring program
BWC-31	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -
BWC-35	Fecal Coliform Quarterly Monitoring	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -	Ongoing			\$6,000 / -
BWC-40	Water Quality Ambient Monitoring for Blackwater Creek	Special Studies, Planning, Monitoring, and Assessment	Polk County / -	Ongoing			\$5,200 / -
NR-1	Microbial Source	Special Studies,	FDEP, PBS&J	Completed			\$42,528 for Phase

**DRAFT Hillsborough River Basin BMAP – February 19, 2009**

**TABLE 10.7. SPECIAL STUDIES, PLANNING, MONITORING, AND ASSESSMENT**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
	Tracking- Phase 1	Planning, Monitoring, and Assessment	/ USF, HSW, BMAP Steering Committee	(2008)			1 / FDEP
NR-2	DNA Source Identification	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -			Possible but funding not yet obtained (November 2007)	Estimated funding needed: \$100,000 / Pasco County
NR-3	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 for each of 6 WBIDs / -
NR-4	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept., Stormwater Management Section / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget
NR-5	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			\$30,090 total program costs / Absorbed in existing EPCHC budget
NR-14	Fecal Coliform Quarterly Monitoring—Hillsborough County	Special Studies, Planning, Monitoring, and Assessment	EPCHC / Hillsborough County Public Works Dept.; SWFWMD	Ongoing (since 1980s)			Hillsborough County / \$190 annual cost for this WBID
NR-15	Fecal Coliform Quarterly Monitoring—Pasco County	Special Studies, Planning, Monitoring, and Assessment	Pasco County / -	Ongoing			\$6,000 (annual funding for 3 years) / -
NR-17	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -
SBF-1	Microbial Source Tracking—Phase 1+2	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Completed (2008)			\$42,528 for Phase 1 for 6 WBIDs / FDEP
SBF-2	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept., Stormwater Management Section / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget
SBF-3	High-Probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 / -
SBF-4	Bacteriological Source Tracking Study	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County, USF / SWFWMD, Ayres Associates	Completed (2002)			\$100,000 for Blackwater and Flint Creeks / \$50,000 Hillsborough County, \$50,000 SWFWMD
SBF-5	Survey of Stormwater Associated with	Special Studies, Planning,	EPCHC Water Management	Completed (2006)			\$30,080 (total countywide costs)

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**TABLE 10.7. SPECIAL STUDIES, PLANNING, MONITORING, AND ASSESSMENT**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
	Industrial Facilities	Monitoring, and Assessment	Division / -				/ Absorbed in existing EPCHC budget
SBF-10	LakeWatch and Hillsborough County Stream Water Watch	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Ongoing (since 2001)			\$116,000 (covers about 125 active sites throughout county) / Stormwater operating budget and SWFWMD cooperative funding
SBF-12	Lake Thonotosassa Diagnostic Assessment and Water Quality Treatment Project	Special Studies, Planning, Monitoring, and Assessment	City of Plant City Resource Management Division / SWFWMD (SWIM Section, Resource Management Dept.)	Ongoing			FY 2006–07, City of Plant City, \$50,000; SWFMD, \$50,000 / Utilities revenues, Grant (SWFWMD Cooperative Funding)
SBF-21	Fecal Coliform Monitoring–Hillsborough County	Special Studies, Planning, Monitoring, and Assessment	EPCHC / Hillsborough County Public Works Dept., SWFWMD	Ongoing (since 1980s)			\$4,563 for this WBID / Hillsborough County
SBF-23	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -	Completed (2007)			- / -
LHR-1	Microbial Source Tracking–Phase 1	Special Studies, Planning, Monitoring, and Assessment	FDEP, PBS&J / USF, HSW, BMAP Steering Committee	Ongoing (2007)			\$42,528 for Phase 1, for 6 WBIDs
LHR-2	Septic Tank Mapping and Hot Spot Analysis	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Completed (2008)			\$28,000 for annual countywide program / Specialized Services Unit Operating Budget
LHR-3	High-probability Areas Map for Septic System Failure	Special Studies, Planning, Monitoring, and Assessment	HCHD / -	Completed (2007)			\$1,250 / -
LHR-4	Survey of Stormwater Associated with Industrial Facilities	Special Studies, Planning, Monitoring, and Assessment	EPCHC Water Management Division / -	Completed (2006)			\$30,080 countywide, absorbed within existing EPCHC budget / EPCHC budget
LHR-8	LakeWatch and Hillsborough County Stream Water Watch	Special Studies, Planning, Monitoring, and Assessment	Hillsborough County Public Works Dept. / -	Ongoing (since 2001)			\$116,000 (covers about 125 active sites throughout county) / Stormwater operating budget and SWFWMD cooperative funding

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**TABLE 10.7. SPECIAL STUDIES, PLANNING, MONITORING, AND ASSESSMENT**

<b>Project Number</b>	<b>Project Name</b>	<b>Management Category</b>	<b>Lead Entity / Project Partner</b>	<b>Completed or Ongoing (Date)</b>	<b>Planned (Date)</b>	<b>Possible (Date)</b>	<b>Estimated Cost / Source of Funding</b>
LHR-15	Tampa–Wastewater Collection System Study	Special Studies, Planning, Monitoring, and Assessment	City of Tampa Wastewater Dept. / -	Completed (2007)			Variable, but ongoing / City of Tampa
LHR-28	Fecal Coliform Monthly Monitoring– Hillsborough County	Special Studies, Planning, Monitoring, and Assessment	EPCHC / Hillsborough County Public Works Dept., SWFWMD	Ongoing (since 1974)			\$3, 232 annually for this WBID / Hillsborough County
LHR-31	Surface Water Temporal Variability Network Monitoring Site	Special Studies, Planning, Monitoring, and Assessment	FDEP– Integrated Water Resource Watershed Monitoring Program / Contracted with SWFWMD from 1999– 2004; all monitoring now conducted by FDEP	Ongoing (since 1999)			\$ 385,000 statewide (funding varies from year to year, and has been reduced in recent years) / EPA 694 funds
LHR-32	Development and Application of Decision Matrix To Track Progress Towards Water Quality Criteria	Special Studies, Planning, Monitoring, and Assessment	EPCHC / -		Planned (2007)		- / -

Notes: BWC – Blackwater Creek  
 NR – New River  
 SBF – Spartman, Baker, & Flint Creeks  
 LHR – Lower Hillsborough River

## APPENDIX A. GLOSSARY OF TERMS

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**Antibiotic resistance analysis (ARA):** A type of microbial source tracking in which fecal samples from known sources—such as humans, pets, livestock, and wildlife—are tested for antibiotic resistance.

**Background:** The condition of waters in the absence of human-induced alterations.

**Baffle box:** An underground stormwater management device that uses barriers (or baffles) to slow the flow of untreated stormwater, allowing particulates to settle out in the box before the stormwater is released into the environment.

**Basin management action plan (BMAP):** The document that describes how a specific TMDL will be implemented; the plan describes the specific load and wasteload allocations as well as the stakeholder efforts that will be undertaken to achieve an adopted TMDL.

**Best management practices (BMPs):** Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

**Continuous deflective separation (CDS) unit:** A patented stormwater management device that uses the available energy of the storm flow to create a vortex to separate solids from fluids. Pollutants are captured inside the separation chamber, while the water passes out through the separation screen.

**Designated use:** Uses specified in water quality standards for each waterbody or waterbody segment (such as drinking water, swimming, or fishing).

**Detention pond:** A stormwater system that delays the downstream progress of stormwater runoff in a controlled manner, typically by using temporary storage areas and a metered outlet device.

**Dissolved oxygen (DO):** The amount of oxygen gas dissolved in a given volume of water at a particular temperature and pressure, often expressed as a concentration in parts of oxygen per million parts of water.

**Effluent:** Wastewater that flows into a receiving stream by way of a domestic or industrial discharge point.

**Exfiltration:** The loss of water from a drainage system as the result of percolation or absorption into the surrounding soil.

**External loading:** Pollutants originating from outside a waterbody that contribute to its pollutant load.

**Hydrodynamic separator:** Any device used to slow the flow of untreated stormwater, allowing particulates to settle out before the stormwater is released into the environment. Examples include the baffle box and CDS devices described above.

**Impairment:** The condition of a waterbody that does not achieve water quality standards (designated use) due to pollutants or an unknown cause.

**Infiltration & Inflow (I&I):** Stormwater or ground water that enters municipal wastewater systems through cracked pipes, leaking manholes, residential sump pumps, downspouts, and other sources.

**Littoral:** The banks of a river, lake, or estuary.

**Loading:** The total quantity of pollutants in stormwater runoff that contributes to water quality.

**Load Allocations (LAs):** The portions of a receiving water's loading capacity that are allocated to one of its existing or future nonpoint sources of pollution.

**Low-Impact Development (LID):** An approach to land development that uses various land planning and design practices and technologies to simultaneously conserve and protect natural resource systems and reduce infrastructure costs. LID facilitates land development in a cost-effective manner that helps mitigate potential environmental impacts.

**Margin of safety (MOS):** An explicit or implicit assumption used in the calculation of a TMDL that takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. An explicit MOS is typically a percentage of the assimilative capacity or some other specific amount of pollutant loading (e.g., the loading from an out-of-state source). Most FDEP-adopted TMDLs include an implicit MOS based on the fact that the predictive model runs incorporate a variety of conservative assumptions (they examine worst-case ambient flow conditions, worst-case temperature, and assume that all permitted point sources discharge at their maximum permissible amount).

**Microbial source tracking (MST):** Also called bacterial source tracking, MST is a group of scientific methods used for determining the source of fecal contamination (i.e., human, wildlife, agricultural, or pet wastes).

**Municipal separate storm sewer system (MS4):** A publicly owned conveyance or system of conveyances (i.e., ditches, curbs, catch basins, underground pipes, etc.) that is designed or used for collecting or conveying stormwater and that discharges to surface waters of the state. An MS4 can be operated by municipalities, counties, drainage districts, colleges, military bases, or prisons, to name a few examples.

**National Pollutant Discharge Elimination System (NPDES):** The permitting process by which technology-based and water quality-based controls are implemented.

**Nonpoint source (NPS):** Diffuse runoff without a single point of origin that flows over the surface of the ground by stormwater and is then introduced to surface or ground water. NPSs include atmospheric deposition and runoff or leaching from agricultural lands, urban areas, unvegetated lands, on-site sewage treatment and disposal systems, and construction sites.

**Notice of intent (NOI):** A formal notice of an action to be taken, usually the filing of a permit or the enrollment into a particular program (in this document the referenced program is the FDACS BMP program).

**On-site sewage treatment and disposal system (OSTDS):** A septic system.

**Outfall:** The place where a sewer, drain, or stream discharges.

**Particulate:** A minute separate particle, as of a granular substance or powder.

**Pollutant load reduction goals (PLRGs):** The estimated numeric reductions in pollutant loadings needed to preserve or restore the designated uses of receiving bodies of water and maintain water quality consistent with applicable state water quality standards. PLRGs are developed by the water management districts.

**Point source:** An identifiable and confined discharge point for one or more water pollutants, such as a pipe, channel, vessel, or ditch.

**Pollutant:** Generally any substance, such as a chemical or waste product, introduced into the environment that adversely affects the usefulness of a resource.

**Pollution:** An undesirable change in the physical, chemical, or biological characteristics of air, water, soil, or food that can adversely affect the health, survival, or activities of humans or other living organisms.

**Quality assurance (QA):** An integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, product, or service meets defined standards of quality.

**Retention pond:** A stormwater management structure whose primary purpose is to permanently store a given volume of stormwater runoff, releasing it by infiltration and /or evaporation.

**Reuse:** The deliberate application of reclaimed water for a beneficial purpose. Criteria used to classify projects as “reuse” or “effluent disposal” are contained in Section 62-610.810, F.A.C.

**Septic tank:** A watertight receptacle constructed to promote the separation of solid and liquid components of wastewater, to provide the limited digestion of organic matter, to store solids, and to allow clarified liquid to discharge for further treatment and disposal in a soil absorption system.

**Silviculture:** The science of controlling the establishment, growth, composition, health, and quality of forests to meet the diverse needs and values of landowners and society on a sustainable basis.

**Stormceptor:** A type of hydrodynamic separator manufactured by the Stormceptor Corporation.

**Stormwater:** Water that results from a rainfall event.

**Stormwater runoff:** The portion of rainfall that hits the ground and is not evaporated, percolated or transpired into vegetation, but rather flows over the ground surface seeking a receiving waterbody.

**Sub-basin:** Hydrologic units in a watershed that function as a miniwatershed, the boundaries of which are defined by topography and drainage patterns.

**Surface Water Improvement and Management (SWIM) Waterbody:** A waterbody designated by statute or by a water management district for priority management to restore and maintain water quality, habitat, and other natural features.

**Tertiary treatment:** The final stage of wastewater treatment to improve effluent quality before it is discharged to the environment.

**Total maximum daily loads (TMDLs):** The sum of the individual wasteload allocations for point sources and the load allocations for nonpoint sources and natural background. Before determining individual wasteload allocations and load allocations, the maximum amount of a pollutant that a waterbody or waterbody segment can assimilate from all sources while still maintaining its designated use must first be calculated. TMDLs are based on the relationship between pollutants and in-stream water quality conditions.

**Total suspended solids (TSS):** The measurement of TSS consists of determining the dry weight of particulates in the water column. Both organic and inorganic materials contribute to TSS in water.

**Turbidity:** The presence of suspended material such as clay, silt, finely divided organic material, plankton, and other inorganic material in the water.

**Wasteload allocations (WLAs):** Pollutant loads allotted to existing and future point sources, such as discharges from industry and sewage facilities.

**Wastewater:** The combination of liquid and pollutants from residences, commercial buildings, industrial plants, and institutions, together with any ground water, surface runoff, or leachate that may be present.

**Waterbody identification (WBID) numbers:** WBIDs are numbers assigned to hydrologically based drainage areas in a river basin.

**Water column:** The water in a waterbody between the surface and sediments.

**Water quality standards:** (1) Standards comprising designated most beneficial uses (classification of water), the numeric and narrative criteria applied to the specific water use or classification, the Florida Anti-degradation Policy, and the moderating provisions contained in Rules 62-302 and 62-4, F.A.C. (2) State-adopted and EPA-approved ambient standards for waterbodies. The standards prescribe the use of the waterbody (e.g., drinking, fishing and swimming, and shellfish harvesting) and establish the water quality criteria that must be met to protect designated uses.

**Watershed:** A topographic area that contributes or may contribute runoff to specific surface waters or an area of recharge.

**Watershed management approach:** The process of addressing water quality concerns within their natural boundaries, rather than political or regulatory boundaries. The process draws together all the participants and stakeholders in each basin to decide what problems affect water quality in the basin, which are most important, and how they will be addressed.

## Appendix B: Monitoring Plan

### 1.1. Background

This appendix outlines the steps stakeholders will take to track levels of fecal coliform bacteria and other water quality parameters, and to track changes in the sources of fecal contamination that appear likely to pose human health risks, within the BMAP WBIDs. It also describes the process that will be used to communicate this information among stakeholders and to the public.

Maintaining an ambient surface water monitoring network is a critical element for resource management programs involved in the assessment, protection and restoration of stream water quality. The Hillsborough River BMAP partners have developed a strategy for monitoring water quality that builds on existing programs conducted by the Environmental Protection Commission of Hillsborough County, the Pasco County Stormwater Management Division, the Southwest Florida Water Management District, and others. Elements of the strategy include monitoring objectives, identification of participating entities, information on station locations and parameters monitored, quality assurance/quality control (QA/QC) objectives, and procedures to be used for data management, analysis, and reporting. Using an adaptive management approach, the BMAP partners will continue to evaluate and, if necessary, refine the details of the strategy based on monitoring results and other available information.

While regular monitoring of fecal coliform bacteria or other microbial indicator organisms (IOs) is a key component of the management process, monitoring data must be augmented with other types of information to provide a comprehensive framework for managing microbial water quality and protecting human health. Health risks associated with exposure to pathogens in recreational waters have been investigated under a variety of environmental conditions in a number of geographic areas (summarized by NRC 2004, WHO 2003, 2005, EPA 2007). However, it is difficult to detect human pathogens, particularly viral and protozoan pathogens, in water samples collected from recreational waterbodies. Methods for detecting and identifying many infectious viruses or parasites are often expensive and difficult to perform, when they exist at all. Tests for bacterial pathogens are more readily available, but these organisms typically have specialized nutritional requirements and susceptibilities to environmental stresses that make this task difficult as well (WHO 2003, NRC 2004).

As a result, water quality monitoring programs have traditionally relied on the detection of fecal (or “thermotolerant”) coliform bacteria, or other easily-monitored IOs, to indicate the potential presence of fecal contamination and its associated human health risks (e.g., Alonso et al. 1999). However, many questions exist concerning the effectiveness of these IOs as indicators of human health risk, and a number of environmental and physical factors are known to affect their usefulness for this purpose (WHO 2003, NRC 2004). **Table 1** provides an overview of several currently-used IOs, describing some of the strengths and limitations of each.

In response to the known limitations of the existing IOs, the U.S. EPA recently convened a “state of the science” workshop of technical and regulatory experts to evaluate the future use of indicator bacteria and other IOs in recreational water quality criteria (EPA 2007). The purpose of the workshop was to provide information to EPA concerning the “critical path research and science needs for developing scientifically defensible new or revised... recreational ambient water quality criteria (AWQC) in the near-term.” Near-term activities were defined as those that could be accomplished in 2 to 3 years, so that results would be available to EPA in time to support the development of updated criteria. The new criteria, which EPA hopes to develop by 2012, “must be scientifically sound, protective of the designated use, implementable for broad Clean Water Act purposes, and when implemented, provide for improved public health protection” (EPA 2007).

**Table 1. Benefits and limitations of some commonly-used microbial water quality indicators (Source: WHO 1999)**

Indicator	Benefits	Limitations
Fecal (or 'thermo-tolerant') coliform bacteria	Detection often indicates recent fecal contamination	Possibly not suitable as an indicator of fecal contamination in tropical/subtropical areas due to growth in soils and water  May provide false positive results in waters containing paper or pulp mill effluents  Less persistent than many pathogens in estuarine or marine waters
Fecal Streptococci/ Enterococci	Marine and potentially freshwater human health indicator, particularly in non-tropical regions  More persistent in water than fecal coliforms	Possibly not suitable as an indicator of fecal contamination in tropical/subtropical areas due to growth in soils
<i>E. coli</i>	Potentially a freshwater human health indicator, particularly in non-tropical regions  Presence often indicates recent fecal contamination  Potential for typing <i>E. coli</i> to aid in identifying source(s) of fecal contamination	Possibly not suitable for tropical/subtropical areas due to growth in soils and water
Sulphite-reducing clostridia / <i>Clostridium perfringens</i>	Always present in sewage-impacted waters  Possibly correlated with enteric viruses and parasitic protozoa  Inexpensive to assay with H <sub>2</sub> S production	May also arise from non-human (e.g., dog) fecal sources  May be overly-conservative indicators of human health risk  Enumeration requires anaerobic culture
Somatic coliphages	Analytical method well-established  Similar physical behavior to human enteric viruses	Not specific to human fecal contamination  May not be as persistent as human enteric viruses  May survive and grow in the environment
F-specific RNA phages	Standard analytical method available  More persistent than some coliphages  Host does not grow in environmental waters below 30° C	Not specific to human fecal contamination  Not as persistent in marine waters

Given the limitations of the existing IO-based water quality criteria, and the fact that the U.S. EPA is currently working to revise and strengthen them, it is clear a water quality management strategy that relied solely on compliance with the existing criteria as a means to minimize human health risks in recreational waters would have a number of drawbacks. Several of those drawbacks have been summarized by the WHO (1999, 2003) and the NRC (2004):

- If management actions are implemented only in response to IO exceedances, the responses will frequently be reactive (implemented *following* human exposure to potential health hazards) rather than proactive or preventive;
- In terms of the human health risks posed by fecal contamination of recreational waters, the highest risks are usually associated with human fecal material. Due to the “species barrier” (the reduced ability of a pathogen from one host species to infect a different host species), which affects the transmission of many pathogens, the density of pathogens of public health importance is generally assumed to be lower in non-human than in human excreta. Waters that have come into contact with non-human fecal material (e.g., from sources such as livestock, birds and wildlife) are thus thought to pose a lower risk to human health;
- Nevertheless, there are human health risks associated with pollution of recreational waters from animal sources, and some pathogens, such as *Cryptosporidium parvum*, *Campylobacter* spp. and *E. coli* O157:H7 can be transmitted through this route. Local knowledge of possible sources and environmental pathways of animal pathogens to humans should therefore be a component of the management effort;
- In addition to human and non-human fecal sources, coliform bacteria and several other currently-used IOs can arise from a number of non-fecal sources (e.g., soils, vegetation), particularly in sub-tropical and tropical waters (e.g., **Table 1**), reducing their reliability as indicators of human health risk;
- Health risks posed by recreational waters typically show gradients of severity, correlated with the types and densities of pathogens present at different locations. Given the limitations of the existing IOs, in many circumstances these risks may not be adequately characterized by IO monitoring data alone.

To help address these drawbacks, the World Health Organization and the U.S. EPA co-sponsored an international workshop, which was held in Annapolis, Maryland, to develop improved strategies for managing the microbial quality of recreational waters (WHO 1999, 2003). The workshop produced an innovative information assessment framework, designated the “Annapolis protocol”, which combines quantitative IO counts (provided by water quality monitoring programs) with site-specific evaluations of the potential health risks posed by local IO sources (provided by “sanitary inspections” or “contaminant source surveys”) to classify recreational waters based on their estimated suitability for whole-body contact. Overviews of the site assessment framework used in the “Annapolis protocol” are provided in **Figure 1** and **Table 2**.

The Annapolis protocol provides a technically sound conceptual approach for managing human health risks among recreational water users (NRC 2004, U.S. EPA 2007), but some modifications are needed to make it applicable to Florida waters. For example, the protocol uses enterococci as the IOs on which the microbial water quality assessment is based (**Table 2**), while fecal coliforms are the IOs that are currently used to assess the microbial quality of Florida’s recreational waters. Also, the protocol uses the 95<sup>th</sup> percentile IO value observed at a monitoring site to determine IO exceedances, while monitoring

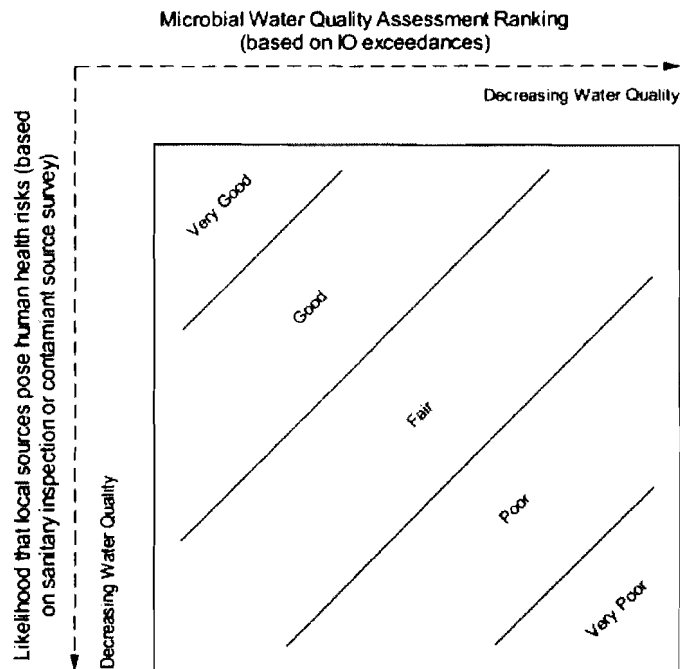


Figure 1. Conceptual overview of “Annapolis protocol” assessment framework, which combines information on IO exceedances (from water quality monitoring data) and the likely health risks posed by local sources (from “sanitary inspections” or “contaminant source surveys”) to classify recreational waters based on their estimated suitability for whole-body contact. (Source: modified from WHO 2003).

Table 2. “Annapolis protocol” classification matrix, which integrates microbial water quality data (IO counts) with contaminant source information provided by “sanitary inspections”. (Source: WHO 2003)

		Microbial water quality assessment category (95 <sup>th</sup> percentile enterococci/100 mL)				Exceptional circumstances <sup>3</sup>
		A ≤40	B 41-200	C 201-500	D >500	
Sanitary Inspection Category (likelihood of human health risk)	Very low	Very good	Very good	Follow up <sup>1</sup>	Follow up <sup>1</sup>	Action
	Low	Very good	Good	Fair	Follow up <sup>1</sup>	
	Moderate	Good <sup>2</sup>	Good	Fair	Poor	
	High	Good <sup>2</sup>	Fair <sup>2</sup>	Poor	Very Poor	
	Very High	Follow up <sup>2</sup>	Fair <sup>2</sup>	Poor	Very Poor	
Exceptional circumstances <sup>3</sup>		Action				

Notes:

- 1 Implies non-sewage (e.g., livestock) sources of fecal indicators, which should be verified
- 2 Indicates possible episodic contamination (e.g., rainfall- and runoff-driven), which should be investigated further, including sampling during and following storm events
- 3 “Exceptional circumstances” relate to known periods of higher risk, such as sanitary sewer overflows (SSOs) in the vicinity of recreational water bodies. Under such circumstances the matrix may not represent risk/safety accurately

sites in Florida are evaluated by FDEP based on the percentage of samples that exceed the state's 400 CFU/100 mL fecal coliform criterion (Chap. 62-303, Florida Administrative Code). In addition, the "sanitary inspection" categories outlined in the protocol, while conceptually useful, de-emphasize management responses to situations in which non-human fecal sources may pose health risks in recreational waters. Adjustments need to be made to these categories to address situations in which non-human fecal sources (e.g., livestock, which are potential sources of *Giardia* and *Cryptosporidium* infections) are also an issue of concern for local resource managers.

In order to address these issues, the Hillsborough River BMAP participants have developed a modified version of the "Annapolis protocol" assessment matrix (TCC 2008), which has been applied to the six impaired WBIDs in the Hillsborough River basin (PBS&J 2008). The modified assessment matrix is shown in **Table 3**. Cells within the modified matrix are color-coded (green, yellow, orange, red or magenta) to provide a visual indication of the gradient of potential human health risks associated with different matrix outcomes. The "sanitary inspection" component of the matrix—which is used to rank sites based on the types and magnitudes of potential fecal contaminant sources observed in their hydrological catchments—has been revised to incorporate non-human fecal sources and has been renamed the "contaminant source survey" (CSS) component in the modified matrix. The CSS categories developed for the Hillsborough River WBIDs have been defined as follows (PBS&J 2008) to provide a qualitative assessment of the likelihood that fecal contamination posing human health risks would be encountered by recreational users at a given site:

1. **Very Low:** No visual evidence of potential sources of human pathogens; natural environment; no or minimal anthropogenic land uses; wildlife present (any density)
2. **Low:** Low density agricultural and residential sources, including pets, livestock (without direct access to surface waters), or poultry operations; residences on septic systems
3. **Moderate:** Urban stormwater sources (including pet waste) present; well-functioning wastewater infrastructure (both sewer and septic); episodic/low volume sanitary sewer overflows (SSOs) reaching surface waters; moderate-density livestock with little direct access to surface waters; Class A residual and/or septage spreading areas may be present
4. **High:** Major stormwater outfalls present; history of failing wastewater infrastructure (central sewer or onsite systems); episodic or chronic/high volume SSOs reaching surface waters; concentrated livestock without direct access to surface waters; residual/septage spreading (Class B)
5. **Very High:** Current failing wastewater infrastructure; chronic/high volume SSOs reaching surface waters; concentrated livestock with direct access to surface waters; evidence of direct sewage inputs (e.g., confirmed illicit discharges)

The monitoring plan described in this appendix includes both components of the assessment framework shown in **Table 2**:

- a water quality monitoring program to provide quantitative measurements of IO concentrations and exceedances of the state's existing IO-based criteria; and
- a contaminant source survey (CSS) component to provide information on the numbers and types of potential fecal sources observed in the vicinity of a given monitoring location.

**Table 3. Site assessment matrix, based on the WHO (2003) “Annapolis protocol”, using a combination of fecal coliform measurements (represented by the MWQA group) and contaminant source survey (CSS) information to rank recreational sites based on the apparent likelihood of human health risk. Color codes are intended to correspond with the WHO categories (from green = “very good” to magenta = “very poor”) shown in Table 2. See text for explanation of CSS assessment categories. (Sources: TCC 2008, PBS&J 2008)**

		Microbial Water Quality Assessment (MWQA) category (percentage of samples with fecal coliform count > 400 CFU/100 mL)					Exceptional Circumstances (e.g., sewer line break) <sup>c</sup>
		A (≤ 10%)	B (>10% - 30%)	C (>30% - 50%)	D (>50% - 75%)	E (>75%)	
Contaminant source survey (CSS) assessment category (likelihood of fecal contamination posing human health risks)	1. Very Low	A1	B1	C1 <sup>a</sup>	D1 <sup>a</sup>	E1 <sup>a</sup>	Immediate Action
	2. Low	A2 <sup>b</sup>	B2	C2	D2 <sup>a</sup>	E2 <sup>a</sup>	
	3. Moderate	A3 <sup>b</sup>	B3	C3		E3	
	4. High	A4 <sup>b</sup>	B4 <sup>b</sup>	C4		E4	
	5. Very High	A5 <sup>b</sup>	B5 <sup>b</sup>	C5 <sup>b</sup>		E5	
Exceptional Circumstances (e.g., sewer line break) <sup>c</sup>		Immediate Action					

**Notes:**

- a) These outcomes imply that the CSS may be providing an overly optimistic rating of water quality, or the fecal coliform sources in the area may be relatively low-risk or primarily environmental (e.g., wildlife, sediments, soils, vegetation), and the cause(s) of the discrepancy should be verified.
- b) These outcomes imply that the fecal coliform indicator may be providing an overly optimistic MWQA rating, or the CSS may be providing an overly negative assessment, and the cause(s) of the discrepancy should be verified.
- c) As explained by WHO (2003), exceptional circumstances involve acute situations known to be associated with higher public health risks, such as sewer line breaks and other SSOs that contaminate surface waters, which require immediate remedial action.

## 1.2. Monitoring objectives

The overall purpose of the monitoring strategy is to support the implementation of the BMAP by providing water quality data and other information that can be used to document status and track trends in fecal coliform levels and other microbial water quality conditions within the six BMAP WBIDs. The objectives listed below reflect the stakeholder's priorities and provide additional detail on the types of information that will be collected to support the BMAP effort.

**1.2.1. Primary objective:** to quantify and track trends in fecal coliform levels at monitoring stations within the BMAP waterbodies, to determine if the state's existing IO-based water quality standards are being met;

**1.2.2. Secondary objective:** to document and track changes in the contaminant source survey (CSS) ranking of each monitoring site, to provide information on the types of IO sources present in the vicinity of each site and a qualitative characterization of the potential health risks posed by those sources;

**1.2.3. Tertiary objective:** to measure the site-specific effectiveness of BMPs or other management actions in reducing levels of IOs or selected microbial source tracking (MST) markers, at locations and in situations in which such measurements would be meaningful, feasible and affordable.

**1.2.4. Uses of Monitoring Activities and Data:** The information collected through the monitoring program will be used to:

- *Evaluate progress toward achieving BMAP objectives;*
- *Demonstrate stakeholders' progress toward meeting their TMDL obligations and BMAP commitments;*
- *Facilitate comparisons of water quality before and after BMP implementation; and*
- *Provide information to help guide the selection of future BMPs.*

## 1.3. Water quality monitoring

### 1.3.5. WQ indicators monitored

**1.3.5.1. Primary indicator:** fecal coliform bacteria (CFU/100 mL)

**1.3.5.2. Secondary indicators:** other parameters typically included in ambient water quality monitoring programs (e.g., water temperature, specific conductance, pH, DO, nitrogen and phosphorus forms, chlorophyll-a, turbidity, TSS, color, Secchi disk depth, selected major ions).

**1.3.6. Monitoring stations:** station locations are listed in **Table 4**. Currently, only the Environmental Protection Commission of Hillsborough County (EPCHC) and the Pasco County Stormwater Management Division (Pasco County) conduct regular water quality monitoring in the WBIDs of interest. If other entities (e.g., FDEP, SWFWMD, City of Tampa) initiate sampling in these WBIDs in the future, the monitoring plan will be revised to incorporate their monitoring activities.

**TABLE 4. AMBIENT WATER QUALITY MONITORING STATIONS IN THE WBIDS OF INTEREST**

WBID Name	WBID No.	Monitoring Entity	Station ID No.	Station Location	Lat.	Long.	Sampling Frequency
Blackwater Creek	1482	EPCHC	143	Blackwater Creek at S.R. 39	28.1393	-82.1496	Monthly
Spartman Branch	1561	EPCHC	533	Spartman Branch at Beauchamp Road	28.02502	-82.18603	Quarterly
Baker Creek	1522C	EPCHC	107	Baker Creek at Thonotosassa / Plant City Road	28.04810	-82.2676	Monthly
Flint Creek	1522A	EPCHC	148	Flint Creek at U.S. 301	28.0864	-82.2710	Monthly
New River	1442	EPCHC Pasco Co.	523 15	New River at: Morris Bridge Road Creek Road	28.1655 28.17937	-82.26523 -82.26616	Quarterly Quarterly
Lower Hillsborough River	1443E	EPCHC	152 137 2	Lower Hillsborough River at: Sligh Avenue Columbus Drive Platt Street	28.0105 27.9670 27.9408	-82.4650 -82.4751 -82.4579	Monthly Monthly Monthly

**1.3.7. Sampling frequency:** sampling frequency at each water quality monitoring station is listed in Table 4.

**1.3.8. Rainfall and streamflow data:** Although they do not provide water quality information *per se*, long-term rainfall and streamflow records are often helpful for interpreting the spatial patterns and temporal trends observed in water quality data. The primary providers of rainfall and streamflow data from the Hillsborough River watershed include the National Weather Service, the U.S. Geological Survey (USGS), and the Southwest Florida Water Management District (SWFWMD). Real-time and historical data collected by the monitoring organizations can be downloaded from a number of agency-maintained websites, two of which are listed below (in Sect. 1.3.10.2).

**1.3.9. Quality assurance / quality control:** The collection, handling and analysis of all water quality samples will be conducted in a manner consistent with FDEP's SOPs for QA/QC. The most current version of these procedures can be downloaded from the FDEP website, at [www.dep.state.fl.us/labs/qa/sops.htm](http://www.dep.state.fl.us/labs/qa/sops.htm). All stakeholders contributing data in support of the BMAP agree to follow these SOPs.

The primary laboratories used by each monitoring entity, with their National Environmental Laboratory Accreditation Conference (NELAC) certification numbers, are:

- EPCHC -- E44057 (EPCHC laboratory)
- Pasco County – E86240 (Genapure Analytical Services, Inc.)

Entities are free to use other laboratories for BMAP-related data analyses, provided they meet the certification and other requirements outlined in the SOPs. Other labs may also be used for analyses that are not covered under the NELAC Program (e.g., MST analyses for which standard methods have not yet been adopted).

#### **1.3.10. Data management:**

**1.3.10.1. Water Quality Data:** Data collected through the above activities must be stored, compiled and analyzed in order to be useful to support the BMAP effort. The Florida STORET database will serve as the primary repository for storing data and providing access for all stakeholders. EPCHC and Pasco County currently upload their ambient water quality monitoring data to the Florida STORET database. They have agreed to continue uploading their data to the database in a timely manner, after the appropriate QA/QC checks have been completed. All applicable data will be uploaded to database on a regular basis, at least two times per year.

STORET uploads are only appropriate for data that are representative of ambient environmental conditions. Samples collected for a targeted, site-specific purpose — such as microbial source tracking (MST) analysis at a site where fecal contamination has been detected, or an investigation of the site-specific effectiveness of an implemented BMP or other management action — are not intended to be representative of ambient water quality conditions. Such data will therefore not be uploaded to the Florida STORET database, but will be maintained by the monitoring entity. Stakeholders agree to provide data collected for these purposes to other BMAP partners upon request and when appropriate for inclusion in BMAP data analyses or adaptive management evaluations of BMPs and other management actions.

**1.3.10.2. Rainfall and streamflow data:** Rainfall and streamflow data from a number of sites in the Hillsborough River watershed are maintained by the SWFWMD and made available to the public on the District website, at <http://www.swfwmd.state.fl.us/data/>. Real-time and historical streamflow data from a number of continuous stream gauging stations in the watershed are also available from the USGS website, at <http://fl.water.usgs.gov/>.

**1.3.11. Assessment of water quality status and trends:** The entities responsible for water quality monitoring in the basin will meet periodically to review water quality data and evaluate the monitoring strategy's effectiveness. These meetings will be held concurrently with the annual BMAP progress assessment meetings. Water quality data analyses will be conducted before each annual meeting. The purpose of these analyses will be to assess status and trends in water quality conditions at the stations listed in Table 4, and at other sites within the WBIDs of interest which may have been selected for monitoring during the previous year. If site-specific MST monitoring, or targeted sampling to evaluate the effectiveness of BMPs or other management actions, has been carried out during the previous year, the results of those monitoring projects will also be reported.

A large number of statistical methods are available for characterizing water quality conditions and their spatial and temporal trends. The selection of appropriate data analysis methods depends on the sampling frequency, period of record, and distribution characteristics (e.g., normality or non-normality) of the available data. For the purposes of this monitoring plan, the stakeholders will use commonly accepted methods of data analysis that are appropriate for the period of record available for each BMAP WBID.

In the case of fecal coliform data, analysis will focus on the percentage of samples that exceed the current state criterion of 400 CFU/100 mL at each sampling location. The binomial test procedure outlined in the state's Impaired Waters Rule (Chap. 62-303, Florida Administrative Code) will be used to determine the statistical significance of observed exceedances. Standard correlation and regression analyses will be used to evaluate statistical relationships between fecal coliform counts and other measured water quality parameters.

The party or parties responsible for conducting and summarizing these analyses have not yet been determined.

#### **1.4. Contaminant Source Survey (CSS) information**

For each of the monitoring sites listed in Table 4, initial CSS rankings were developed as part of a pilot watershed assessment project that was conducted during 2007 – 2008 (PBS&J 2008). A summary of these rankings is shown in Table 5. As part of this monitoring plan they will be updated every five years, coinciding with the FDEP five-year rotating basin assessment process. In addition to a GIS-based land use summary, they will include information on the frequency of septic system failures within each WBID that will be provided by the Hillsborough County Health Department (based on septic system repair records), and the frequencies and magnitudes of SSOs and other sewage-related discharges that will be provided by Hillsborough County, the Environmental Protection Commission of Hillsborough County, Pasco County, and FDEP (based on records summarizing SSOs and other information obtained by the agencies involving sewage-related water quality issues).

The party or parties responsible for collating these analyses and developing the updated CSS rankings have not yet been determined.

**TABLE 5. CSS RANKINGS AND POTENTIAL SOURCES OF FECAL CONTAMINATION IDENTIFIED DURING INITIAL WBID ASSESSMENT PROJECT. (SOURCE: PBS&J 2008)**

WBID Name	WBID No.	Monitoring Entity	Station ID No.	Station Location	Initial CSS ranking (likelihood that local fecal sources represent human health risk)	MWQA category (based on 2001 – 2007 data)	Local fecal sources
Blackwater Creek	1482	EPCHC	143	Blackwater Creek at S.R. 39	3 (moderate)	B	Cattle / Human
Spartman Branch	1561	EPCHC	533	Spartman Branch at Beauchamp Road	3 (moderate)	N/A <sup>1</sup>	Cattle / Human
Baker Creek	1522C	EPCHC	107	Baker Creek at Thonotosassa / Plant City Road	3 (moderate)	B	Cattle / Human
Flint Creek	1522A	EPCHC	148	Flint Creek at U.S. 301	2 (low)	B	Human / Wildlife
New River	1442	EPCHC	523	New River at: Morris Bridge Road	3 (moderate)	N/A <sup>1</sup>	Cattle / Wildlife
		Pasco Co.	15	Creek Road	N/A <sup>1</sup>	N/A <sup>1</sup>	N/A
Lower Hillsborough River	1443E	EPCHC	152	Lower Hillsborough River at: Sligh Avenue	4 (high)	B	Human
			137	Columbus Drive	3 (moderate)	B	Human
			2	Platt Street	3 (moderate)	N/A <sup>1</sup>	Human

<sup>1</sup> The applicable data were not provided for this site through the PBS&J (2008) study

**1.5. Targeted monitoring to evaluate the effectiveness of BMPs and other management actions**

Providing information that can be used to evaluate the site-specific effectiveness of BMPs and other management actions in improving water quality (e.g., by reducing IO exceedances or the levels of selected MST markers) is a tertiary objective of this monitoring strategy. As part of the BMAP process, entities that implement BMPs or other management actions will seek to identify opportunities to conduct such targeted monitoring. Although it may not be feasible for each entity, when targeted monitoring can be performed it provides valuable information that is a key component of the adaptive management process. Targeted monitoring will therefore be done, on a voluntary basis and as resources allow, at the discretion of each project sponsor. Targeted monitoring that involves the collection of water quality samples will be carried out in accordance with FDEP SOPs for water quality sampling and analysis.

**1.6. Reporting monitoring results and tracking changes in water quality and CSS rankings**

The stakeholders will meet annually to review water quality monitoring results and assess status and trends in IO levels and exceedances of IO-based criteria within each WBID. In every fifth year the BMAP partners will also update the CSS rankings for the monitoring sites present within each WBID.

The party or parties responsible for conducting the water quality status and trend analyses and developing updated CSS rankings have not yet been determined.

**1.7. Funding:** The monitoring strategy outlined above will involve significant investment of resources by involved stakeholders. All stakeholders understand that resources are limited, and that extenuating circumstances can arise (e.g., extreme weather events) that may cause short-term interruptions in monitoring efforts. The stakeholders carrying out the monitoring plan intend to fund their activities through annual budget appropriations, with the legal caveat that none of the existing governing bodies can bind future officeholders to this funding commitment.

**1.8. References cited:**

Alonso, J.L., A. Soriano, O. Carbajo, I. Amoros, and H. Garelick. 1999. Comparison and recovery of *Escherichia coli* and thermotolerant coliforms in water with a chromogenic medium incubated at 41 and 44.5°C. *Applied and Environmental Microbiology* 65:3746-3749.

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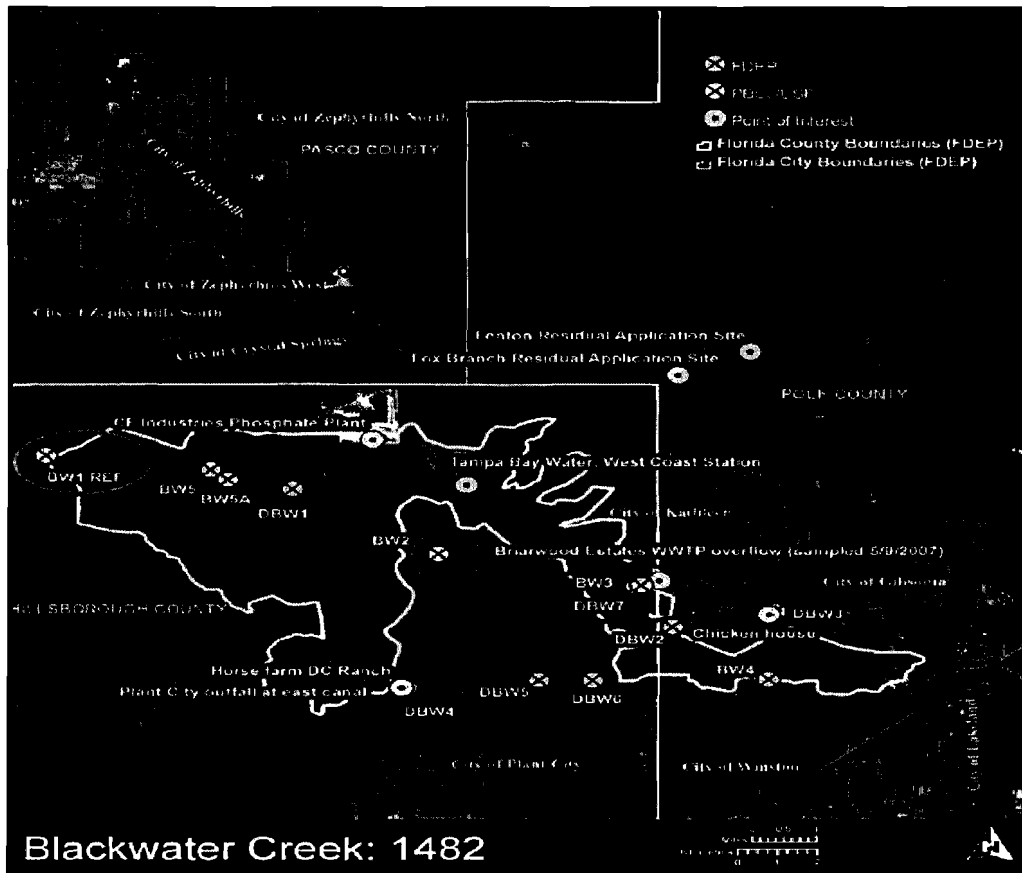
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## Appendix C: Summary of Microbial Source Tracking

The figures below identify suspected fecal coliform hotspots within the Blackwater Creek, New River, Spartman Branch, Flint Creek and Baker Creek, and Lower Hillsborough River WBIDs as identified by microbial source tracking (PBSJ 2008). The tables below each figure list which BMAP management actions address suspected MST source hotspots within each of the WBIDs.



**Figure 1. Blackwater Creek MST Hotspots (PBSJ 2008)**

- The hotspot color coding for these figures is as follows (PBSJ 2008):
- Red = Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs
  - Pink = Wildlife
  - Orange = Septic Systems
  - Grey = Horses
  - Green = Illicit Discharges
  - Blue = Stormwater
  - Purple = Cattle

**Table 1. Blackwater Creek Management Actions Addressing MST Hotspots (PBSJ 2008)**

WBID	Most Likely Sources (See Figure 1)	Hotspot Map Location (Sampling Site/ Point of Interest)	Management Actions Addressing Hotspots (See Table 6.4 for descriptions)
Blackwater Creek (1482)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs & Cattle & Septic Systems & Wildlife	All*	BWC-3, BWC-4, BWC-5, BWC-6, BWC-7, BWC-8, BWC-9, BWC-10, BWC-11, BWC-12, BWC-16, BWC-26, BWC-29, BWC-30, BWC-31, BWC-32, BWC-33, BWC-34, BWC-36, BWC-37, BWC-38, BWC-40, BWC-41
Blackwater Creek (1482)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs	BW3 and DBW7	
Blackwater Creek (1482)	Cattle	BW2	BWC-14, BWC-19, BWC-20, BWC-21, BWC-22, BWC-23, BWC-24, BWC-25, BWC-28, BWX-46
Blackwater Creek (1482)	Septic Systems & Wildlife	BW1REF	BWC-2, BWC-14, BWC-15, BWC-17, BWC-19, BWC-20, BWC-21, BWC-22, BWC-23, BWC-24, BWC-25, BWC-27, BWC-28, BWC-35, BWX-46

\*\* All – assumed that projects with WBID-wide effects have the potential to affect all the hotspots in that WBID

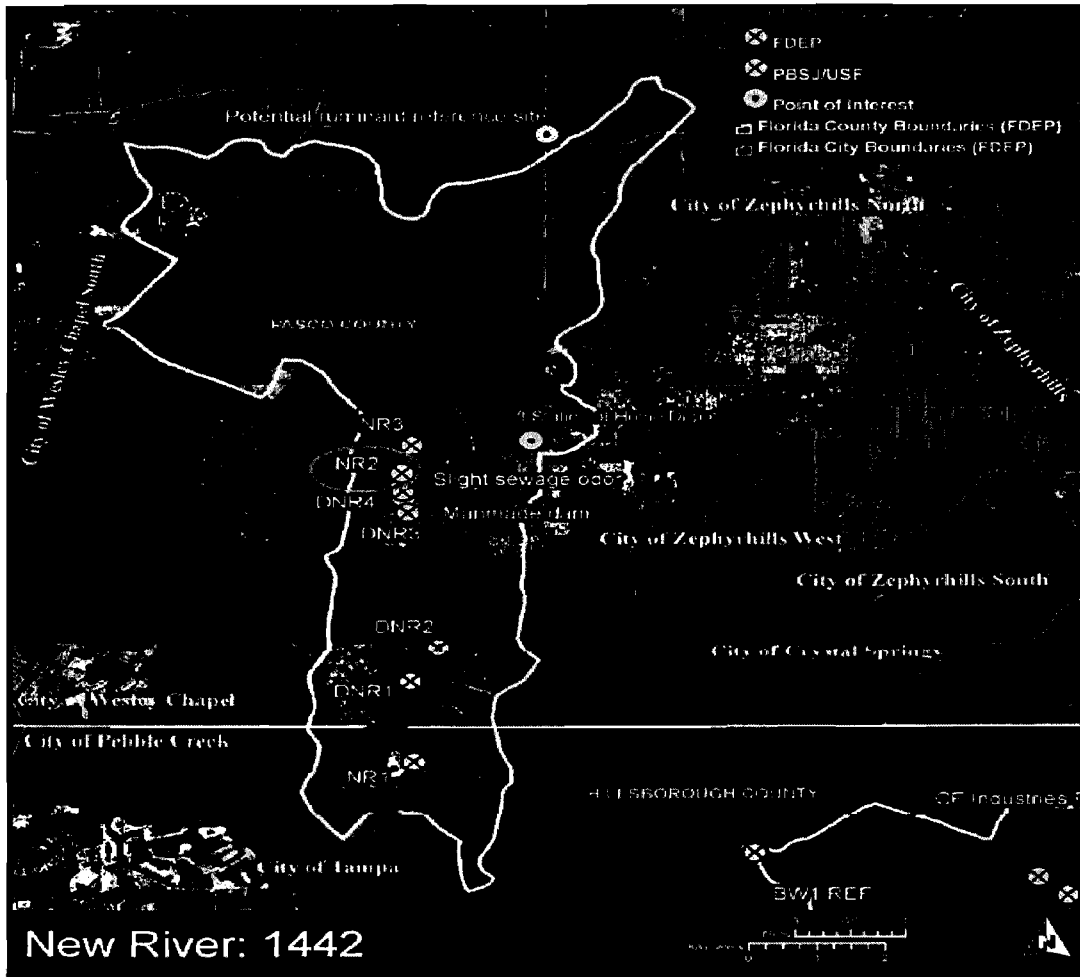


Figure 2. New River MST Hotspots (PBSJ 2008)

Table 2. New River Management Actions Addressing MST Hotspots (PBSJ 2008)

WBID	Most Likely Sources (See Figure 2)	Hotspot Map Location (Sampling Site/ Point of Interest)	Management Actions Addressing Hotspots (See Table 6.5 for descriptions)
New River (1442)	Septic Systems & Cattle & Wildlife	All*	NR-10, NR-11, NR-17, NR-18, NR-19,
New River (1442)	Septic Systems & Cattle	NR2 and NR3	NR-15
New River (1442)	Cattle & Wildlife	NR-1	NR-3, NR-4, NR-5, NR-6, NR-7, NR-8, NR-9, NR-12, NR-13, NR-14, NR-16

\*\* All – assumed that projects with WBID-wide effects have the potential to affect all the hotspots in that WBID

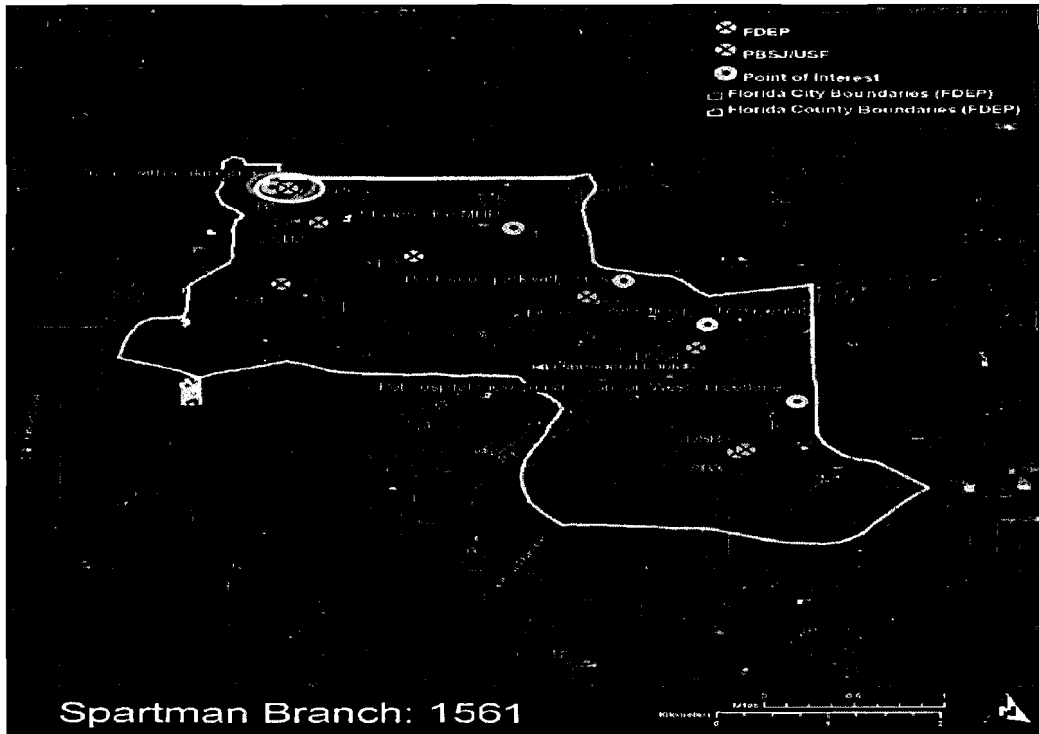


Figure 3. Spartman Branch MST Hotspots (PBSJ 2008)

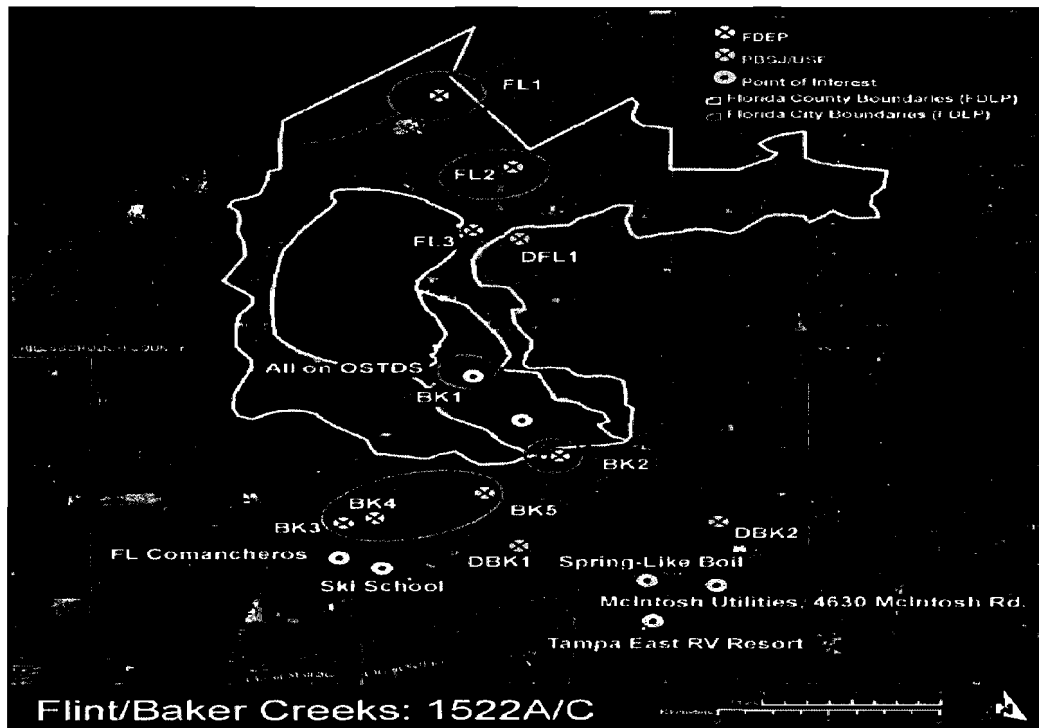


Figure 4. Flint and Baker Creeks MST Hotspots (PBSJ 2008)

**Table 3. Spartman Branch, Flint Creek, Baker Creek Management Actions Addressing MST Hotspots (PBSJ 2008)**

WBID	Most Likely Sources (See Figures 3 & 4)	Hotspot Map Location (Sampling Site/ Point of Interest)	Management Actions Addressing Hotspots (See Table 6.6 for descriptions)
Spartman Branch (1561)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs & Septic Systems & Wildlife & Horses & Illicit Discharges	All*	SBF-2, SBF-3, SBF-5, SBF-6, SBF-7, SBF-8, SBF-9, SBF-10, SBF-5, SBF-6, SBF-13, SBF-14, SBF-19, SBF-20, SBF-21, SBF-22, SBF-23, SBF- 25, SBF-26, SBF-27, SBF-28, SBF-29, SBF-30, SBF-31, SBF-32, SBF-33, SBF-34, SBF-35
Spartman Branch (1561)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs	SB3 and DSB5	
Spartman Branch (1561)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs & Septic Systems & Wildlife	SB2	
Spartman Branch (1561)	Illicit Discharges & Horses	SB1 and SB1A	
Spartman Branch (1561)	Wildlife	DSB3	
Baker (1522C) and Flint (1522A) Creeks	Septic Systems & Cattle & Wildlife	All*	SBF-2, SBF-3, SBF-4, SBF-5, SBF-10, SBF-12, SBF-13, SBF-15, SBF-23, SBF-25, SBF-26
Baker (1522C) and Flint (1522A) Creeks	Septic Systems (Hotspot outside of WBID)	BK3, BK4 and BK5	
Baker (1522C) and Flint (1522A) Creeks	Septic Systems & Cattle	BK2	
Baker (1522C) and Flint (1522A) Creeks	Septic Systems & Wildlife	FL2 and FL1	SBF-17
Baker (1522C) and Flint (1522A) Creeks	Septic Systems & Cattle	BK1	

\*\* All – assumed that projects with WBID-wide effects have the potential to affect all the hotspots in that WBID

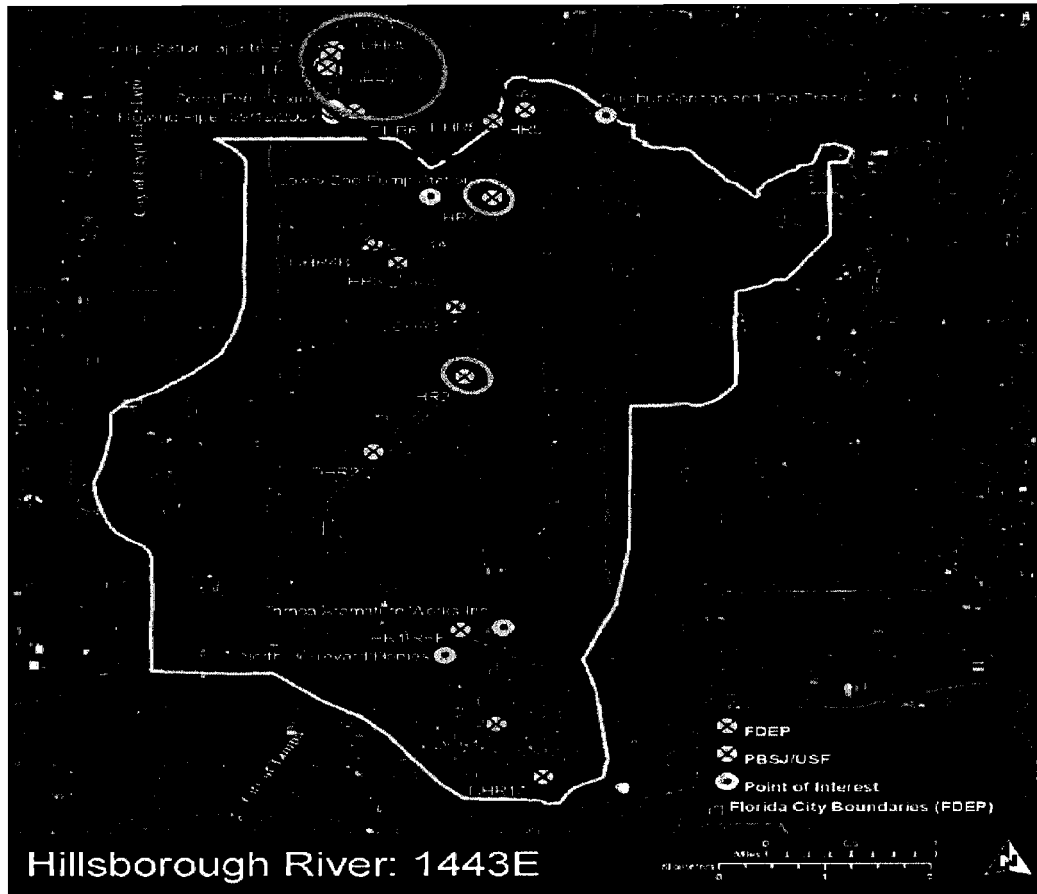


Figure 5. Lower Hillsborough River MST Hotspots (PBSJ 2008)

Table 4. Lower Hillsborough River Management Actions Addressing MST Hotspots (PBSJ 2008)

WBID	Most Likely Sources (See Figure 5)	Hotspot Map Location (Sampling Site/ Point of Interest)	Management Actions Addressing Hotspots (See Table 6.7 for descriptions)
Lower Hillsborough River (1443E)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs & Septic Systems & Illicit Discharges & Stormwater	All*	LHR-2, LHR-3, LHR-4, LHR-5, LHR-6, LHR-7, LHR-8, LHR-9, LHR-10, LHR-11, LHR-14, LHR-15, LHR-18, LHR-22, LHR-26, LHR-27, LHR-28, LHR-29, LHR-30, LHR-31, LHR-32, LHR-36, LHR-37, LHR-38, LHR-40, LHR-45, LHR-47, LHR-48
Lower Hillsborough River (1443E)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs & Septic Systems & Illicit Discharges (Hotspot outside of	DHR6 through DHR10	

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	<b>WBID)</b>		
Lower Hillsborough River (1443E)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs	DHR5	LHR-12, LHR-16, LHR-17, LHR-20, LHR-21, LHR-39, LHR-42, LHR-43, LHR-44
Lower Hillsborough River (1443E)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs & Stormwater	HR4	LHR-12, LHR-16, LHR-17, LHR-20, LHR-21, LHR-39, LHR-42, LHR-43, LHR-44
Lower Hillsborough River (1443E)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs & Septic Systems	DHR4, DHR4A, & DHR4B	LHR-12, LHR-16, LHR-17, LHR-20, LHR-21, LHR-39, LHR-42, LHR-43, LHR-44
Lower Hillsborough River (1443E)	Sanitary Sewer/Mobile Home Park Wastewater Facilities/SSOs & Stormwater	HR2	LHR-12, LHR-16, LHR-17, LHR-19, LHR-20, LHR-21, LHR-39, LHR-42, LHR-43, LHR-44

\*\* All – assumed that projects with WBID-wide effects have the potential to affect all the hotspots in that WBID; and since the Lower Hillsborough River is tidally-influenced, any project affecting the river's main stem has the potential to affect any hotspot located on the main stem.

**References Cited:**

Post, Buckley, Schuh & Jernigan (PBSJ). 2008. Fecal BMAP implementation: source identification. Hillsborough River watershed summary report. Prepared for the Florida Department of Environmental Protection, Tallahassee, FL.