

5-Year Review of the St. Lucie River and Estuary Basin Management Action Plan

**Division of Environmental Assessment and Restoration
Water Quality Restoration Program
Florida Department of Environmental Protection**

with participation from the
St. Lucie River and Estuary Stakeholders

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Acknowledgments

The *St. Lucie River and Estuary Basin Management Action Plan*, adopted in June 2013, was prepared as part of a statewide watershed management approach to restore and protect Florida's water quality. This *2018 5-Year Review of the St. Lucie River and Estuary Basin Management Action Plan* was prepared in partial fulfillment of Paragraph 373.4595(4)(d), Florida Statutes. Both documents were prepared by the Florida Department of Environmental Protection with participation from the St. Lucie River and Estuary stakeholders identified below.



North St. Lucie River Water Control District

Hobe St. Lucie Conservancy District

Pal Mar Water Control District

Troup-Indiantown Water Control District

Copper Creek Community Development District

Tradition Community Development District

Verano Community Development District

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List of Acronyms and Abbreviations

ACF	Autocorrelation Function
ac-ft	Acre-Feet
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
CDD	Community Development District
CDS	Continuous Deflective Separation
CEPP	Central Everglades Planning Project
CERP	Comprehensive Everglades Restoration Plan
CR	County Road
CWA	Clean Water Act
DEP	Florida Department of Environmental Protection
DO	Dissolved Oxygen
DWM	Dispersed Water Management
EAA	Everglades Agricultural Area
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FCT	Florida Communities Trust
FDACS	Florida Department of Agriculture and Consumer Services
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FIND	Florida Inland Navigation District
FPL	Florida Power and Light
F.S.	Florida Statutes
FSAID	Florida Statewide Agriculture Irrigation Demand (Database)
FWC	Florida Fish and Wildlife Conservation Commission
FWM	Flow Weighted Mean
FWRA	Florida Watershed Restoration Act
FY	Fiscal Year
FYN	Florida Yards and Neighborhoods (Program)
GIS	Geographic Information System
HWTT	Hybrid Wetland Treatment Technology
Hwy.	Highway
IA	Implementation Assurance
IRL	Indian River Lagoon
IRL-S	Indian River Lagoon-South
LA	Load Allocation
lbs/yr	Pounds Per Year
LF	Linear Feet
LID	Low-Impact Development
mg/L	Milligrams Per Liter

MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NEEPP	Northern Everglades and Estuaries Protection Program
NFSLR	North Fork of the St. Lucie River
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSLRWCD	North St. Lucie River Water Control District
OAWP	Office of Agricultural Water Policy
O&M	Operations and Maintenance
POR	Period of Record
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
SFER	South Florida Environmental Report
SFWMD	South Florida Water Management District
SLC	St. Lucie County
SLREW	St. Lucie River and Estuary Watershed
SLRIT	St. Lucie River Issues Team
SLRWPP	St. Lucie River Watershed Protection Plan
SLWSD	St. Lucie West Services District
SR	State Road
STA	Stormwater Treatment Area
STORET	STOrage and RETrieval (Database)
TBD	To Be Determined
TIWCD	Troup-Indiantown Water Control District
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TOSP	Town of Sewall's Point
TP	Total Phosphorus
TSS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
WaSh	Watershed Water Quality Simulation (Model)
WBID	Waterbody Identification (Number)
WCD	Water Control District
WCS	Water Control Structure
WIN	Watershed Information Network (Database)
WLA	Wasteload Allocation
WPA	Water Preserve Area
WWTF	Wastewater Treatment Facility
WY	Water Year
yr	Year

Executive Summary

Background

The Florida Department of Environmental Protection (DEP) identified the St. Lucie River and Estuary as impaired by nutrients (chlorophyll *a*) in 2004. In March 2009, DEP adopted total maximum daily loads (TMDLs) for nitrogen and phosphorus in the St. Lucie Basin as targets for the restoration of the river and estuary.

DEP adopted the St. Lucie River and Estuary Basin Management Action Plan (BMAP) in June 2013 to implement the total nitrogen (TN) and total phosphorus (TP) TMDLs in the watershed. The BMAP is implemented in a phased approach to allow for adaptive management. At the end of each 5-year phase, a review is completed. This first 5-Year Review was prepared to update the status of implementation at the end of the first phase and provide recommendations for future phases of the BMAP.

Summary of Load Reductions

Management actions, including projects, programs, and activities, were required by the original BMAP to address nutrient loads and had to meet several criteria to be considered eligible for credit. Through December 31, 2017, 221 projects were completed and an additional 26 underway or planned projects were added to the BMAP. The activities completed to date, including those finished and credited since 2000, are estimated to achieve total reductions of 532,312 pounds per year (lbs/yr) of TN and 139,736 lbs/yr of TP, or 51 % and 35 %, respectively, of the reductions needed to meet the TMDLs. **Figure ES-1** shows progress towards the TN TMDL load reductions, and **Figure ES-2** shows progress towards the TP TMDL load reductions.

Water Quality and Biological Monitoring

The existing St. Lucie River and Estuary BMAP monitoring network consists of 44 stations monitored by local entities, 4 stations monitored by the U.S. Geological Survey (USGS), and 46 stations monitored by the South Florida Water Management District (SFWMD). The SFWMD monitors water quality (TN and TP) data at Roosevelt Bridge (Station SE 03), which is the compliance point for the TMDLs. The monitoring stations are not specifically BMAP stations—i.e., they are designed for other purposes—but some of the data collected at these sites are used to monitor the effectiveness of the BMAP projects.

As part of the 5-Year Review, a water quality evaluation was completed using data available as of December 31, 2017. Trend analyses were conducted with a subset of stations from the available data to track changes at freshwater structures and estuarine stations in the watershed. The results offer a preliminary look at the status of water quality in the BMAP since its adoption. More work will be carried out in the future to evaluate these changes over a longer period and with more data.

In addition to water quality monitoring, the SFWMD conducts biological sampling for oysters and seagrass. As trend analyses indicate that the water quality restoration targets are close to being met, these biological data will be evaluated to help assess the overall health of the St. Lucie River and Estuary.

Recommendations for Future Implementation

The BMAP implements phased TN and TP reductions, according to Subparagraph 403.067(7)(a)1., Florida Statutes (F.S.), for the portion of loading generated in the St. Lucie River and Estuary Watershed. The purpose of this 5-Year Review is to evaluate implementation activities that have taken place during the first 5-year phase and make recommendations for future implementation activities that may be incorporated into a revised BMAP.

This first phase included significant restoration efforts by stakeholders, and the implementation process will continue to help achieve the TMDLs. This 5-Year Review recommends implementation milestones as required in Subparagraph 403.067(7)(a)6., F.S., and describes progress towards the first 5-year milestone. The milestones are established in 5-year increments in collaboration with stakeholders through the submission of project information, and with the goal of achieving the TMDLs in 20 years (Paragraph 373.4595[4][d], F.S.). DEP will adopt the implementation schedule into a revised BMAP and will continue to review the implementation status every 5 years to determine whether progress is being made towards these milestones.

The Comprehensive Everglades Restoration Plan (CERP) is a framework for restoring, preserving, and protecting the greater Everglades ecosystem while providing for other water-related needs of the region, including water supply and flood protection. The Central Everglades Planning Project (CEPP), which is a part of CERP, sets the foundation for restoring the central portion of the Everglades ecosystem and sending additional water south. The implementation of CERP and CEPP continue as projected. Implementation of the current CERP projects under construction (C-44 Reservoir and Stormwater Treatment Area) will provide significant improvements to the water quality of the St. Lucie River and Estuary by cleaning local basin runoff and discharges from Lake Okeechobee. In addition to the projects included in CERP and CEPP, the Everglades Agricultural Area (EAA) Storage Reservoir project will benefit the St. Lucie River and Estuary by redirecting the additional flows from Lake Okeechobee south to the Restoration Strategies complex and ultimately to the Everglades with the completion of CEPP features. The goal of Restoration Strategies is to improve water quality and water flow into the Everglades.

DEP has refined the water quality model and recommends revising the assigned allocations to reflect the updated results. Additionally, the expansion of the model extent allows for the refinement of the BMAP boundary, with the inclusion of the South Coastal Subbasin and other areas found to drain to the St. Lucie Estuary.

Finally, this 5-Year Review recommends revising the BMAP monitoring network to help prioritize monitoring resources, improve how progress is tracked, and reorganize the network into a tiered system.

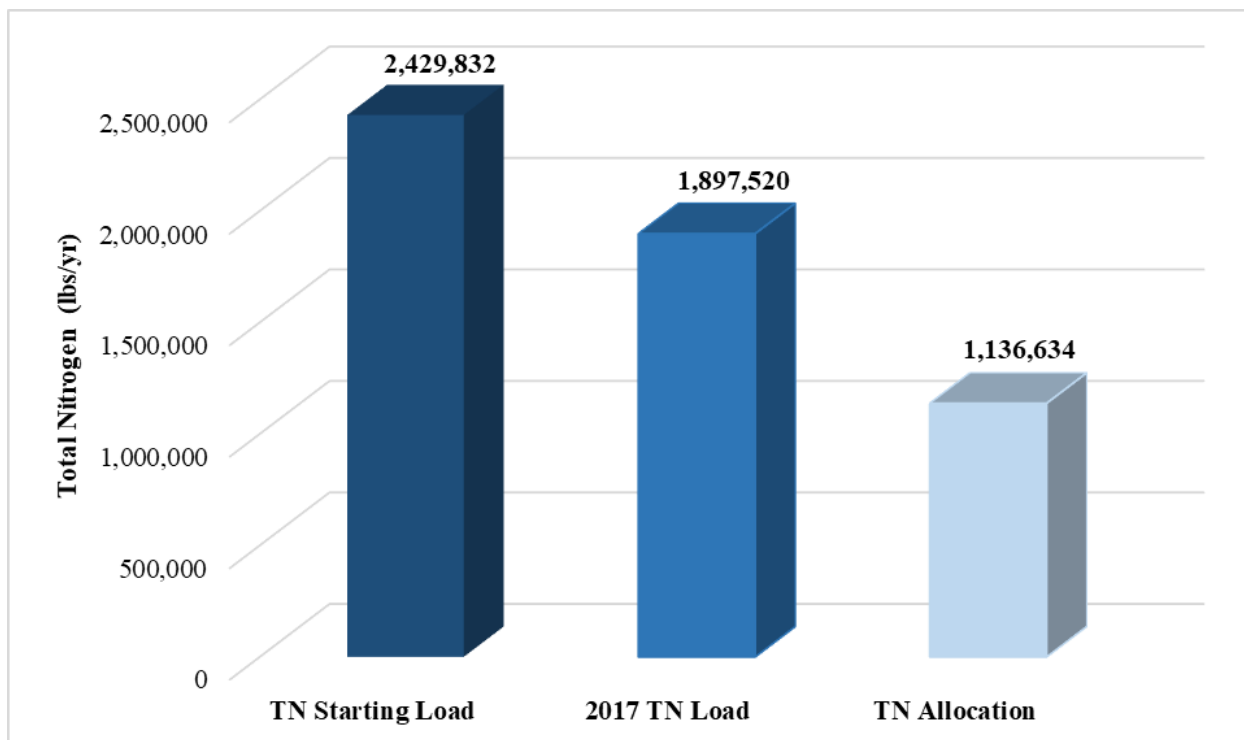


Figure ES-1. Estimated progress towards meeting the TN TMDL allocated to the St. Lucie River and Estuary Basin. Reductions are associated with projects completed through December 31, 2017.

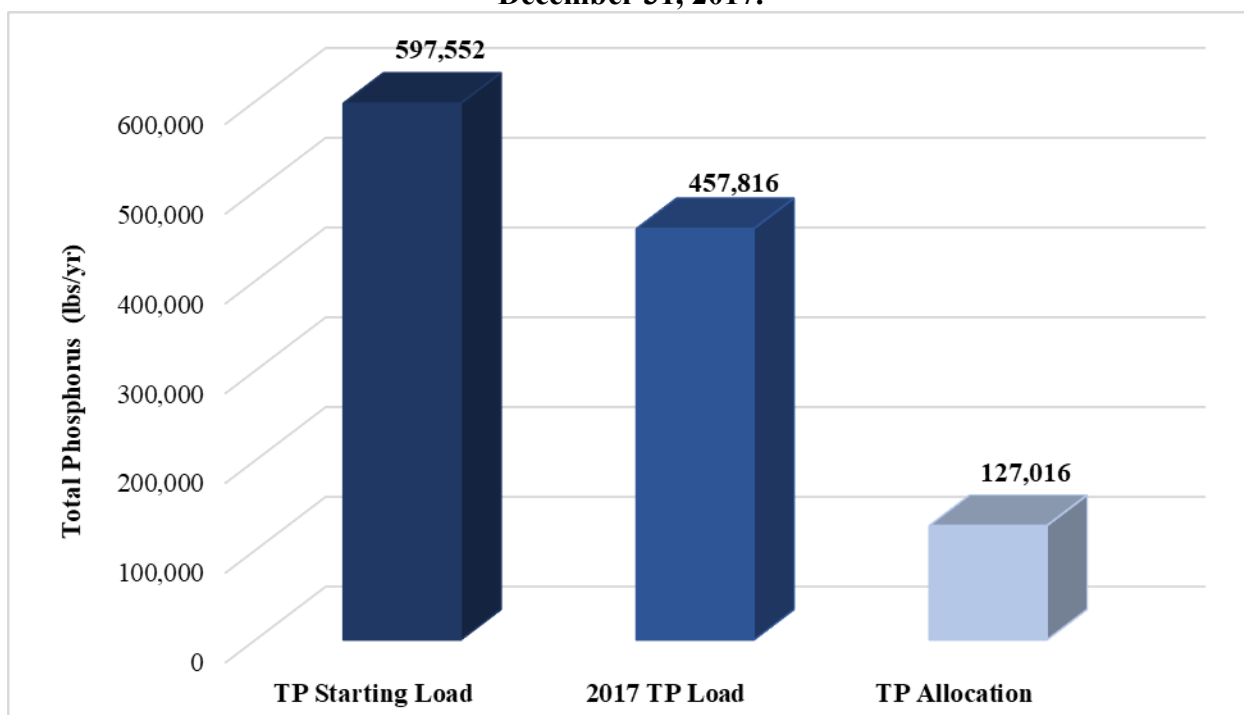


Figure ES-2. Estimated progress towards meeting the TP TMDL allocated to the St. Lucie River and Estuary Basin. Reductions are associated with projects completed through December 31, 2017.

Chapter 1: Background Information

1.1 Water Quality Standards and Total Maximum Daily Loads (TMDLs)

Florida's water quality standards are designed to ensure that surface waters fully support their designated uses, such as drinking water, aquatic life, recreation, and agriculture. Currently, most surface waters in Florida, including those in the St. Lucie River and Estuary, are categorized as Class III waters, meaning they must be suitable for recreation and must support fish consumption and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. **Table 1** lists all designated use classifications for Florida surface waters.

Table 1. Designated use attainment categories for Florida surface waters

¹ Class I, I-Treated, and II waters additionally include all Class III uses.

² The Class I-Treated classification was approved by the Environmental Regulation Commission on July 26, 2016. However, the classification has not yet been approved by the U.S. Environmental Protection Agency (EPA) and is therefore not currently in effect for Clean Water Act (CWA) purposes.

Classification	Description
Class I¹	Potable water supplies
Class I-Treated^{1,2}	Treated potable water supplies
Class II¹	Shellfish propagation or harvesting
Class III	Fish consumption; recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife
Class III-Limited	Fish consumption, recreation or limited recreation, and/or propagation and maintenance of a limited population of fish and wildlife
Class IV	Agricultural water supplies
Class V	Navigation, utility, and industrial use (<i>no current Class V designations</i>)

Section 303(d) of the federal CWA requires that every two years each state must identify its "impaired" waters, including estuaries, lakes, rivers, and streams, that do not meet their designated uses. Florida Department of Environmental Protection (DEP) staff in the Division of Environmental Assessment and Restoration are responsible for assessing Florida's waters for inclusion on the Verified List of Impaired Waters and Study List, which is then provided to the EPA as an annual update to the state "303(d) list." In 2004, DEP identified the St. Lucie River and Estuary as impaired for dissolved oxygen (DO) and nutrients.

1.1.1 St. Lucie River and Estuary TMDLs

DEP develops and adopts TMDLs for the waterbody segments it identifies as impaired. A TMDL is the maximum amount of a specific pollutant that a waterbody can assimilate while maintaining its designated uses. In March 2009, DEP adopted the St. Lucie River and Estuary TMDLs for total nitrogen (TN) and total phosphorus (TP), which are linked to high chlorophyll *a* concentrations in portions of the St. Lucie River and Estuary. The TMDLs include segments with waterbody identification (WBID) numbers 3193 (St. Lucie Estuary), 3194 (North Fork St. Lucie River), 3194B (North Fork St. Lucie Estuary), 3197 (C-24 Canal), 3200 (C-23 Canal), 3210

(South Fork St. Lucie Estuary), 3210A (South Fork St. Lucie River), 3211 (Bessey Creek), and 3218 (C-44 Canal).

TMDLs must establish reasonable and equitable allocations that will alone, or in conjunction with other management and restoration activities, attain the TMDLs. Allocations may be to individual sources, source categories, or basins that discharge to the impaired waterbody. The allocations identify either the amount of pollutant discharge (such as pounds per year [lbs/yr]) or the percent of its loading the source designation must reduce (reduction allocation). The TMDL allocation categories are as follows:

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

The TMDL identified 15 permitted NPDES wastewater facilities in the St. Lucie River and Estuary Basin. These facilities discharged only during a 25-year, 72-hour storm event, and therefore constituted a minimal and highly irregular impact on nutrient discharges. Facilities with permitted discharges above this level have cooling or dewatering processes that effectively discharge ambient water. Since the TMDLs are based on ambient conditions in the watershed, the infrequent discharge from these facilities was not assigned a WLA. If conditions change in the future, an allocation may be assigned.

Table 2 lists the TMDLs and pollutant load allocations implemented by rule (Rule 62-304.705, Florida Administrative Code [F.A.C.], effective March 26, 2009) for the St. Lucie River and Estuary Basin (based on updates to the watershed loading effective May 14, 2012). TMDL loads in upstream WBIDs were calculated based on achieving the same target concentrations (0.72 milligrams per liter [mg/L] for TN and 0.081 mg/L for TP) as in the St. Lucie Estuary. The TMDLs were used as the basis for the basin management action plan (BMAP) targets and allocation calculations. **Figure 1** shows the locations of the WBIDs with TMDLs.

Table 2. St. Lucie River and Estuary TMDLs

BOD = Biochemical oxygen demand.

WBID	Waterbody	Parameter	Annual TMDL Target	NPDES Stormwater (% Reduction)	Load Allocation (% Reduction)
3193	St. Lucie Estuary	TN	0.720 mg/L	21.4	21.4
3193	St. Lucie Estuary	TP	0.081 mg/L	41.3	41.3
3194	North Fork	TN	140,134 lbs	25.0	25.0
3194	North Fork	TP	15,765 lbs	42.2	42.2
3194	North Fork	BOD	2.0 mg/L	74.0	74.0
3194B	North Fork	TN	103,747 lbs	28.8	28.8
3194B	North Fork	TP	11,672 lbs	58.1	58.1
3197	C-24 Canal	TN	348,957 lbs	51.8	51.8
3197	C-24 Canal	TP	39,258 lbs	72.2	72.2
3197	C-24 Canal	BOD	2.0 mg/L	33.3	33.3
3200	C-23 Canal	TN	242,202 lbs	51.7	51.7
3200	C-23 Canal	TP	27,248 lbs	78.6	78.6
3210	South Fork	TN	24,463 lbs	38.4	38.4
3210	South Fork	TP	2,752 lbs	57.2	57.2
3210A	South Fork	TN	90,471 lbs	47.1	47.1
3210A	South Fork	TP	10,178 lbs	61.8	61.8
3211	Bessey Creek	TN	29,981 lbs	23.9	23.9
3211	Bessey Creek	TP	3,373 lbs	51.2	51.2
3218	C-44 Canal	TN	242,929 lbs	51.2	51.2
3218	C-44 Canal	TP	27,330 lbs	55.0	55.0
3218	C-44 Canal	BOD	2.0 mg/L	69.7	69.7

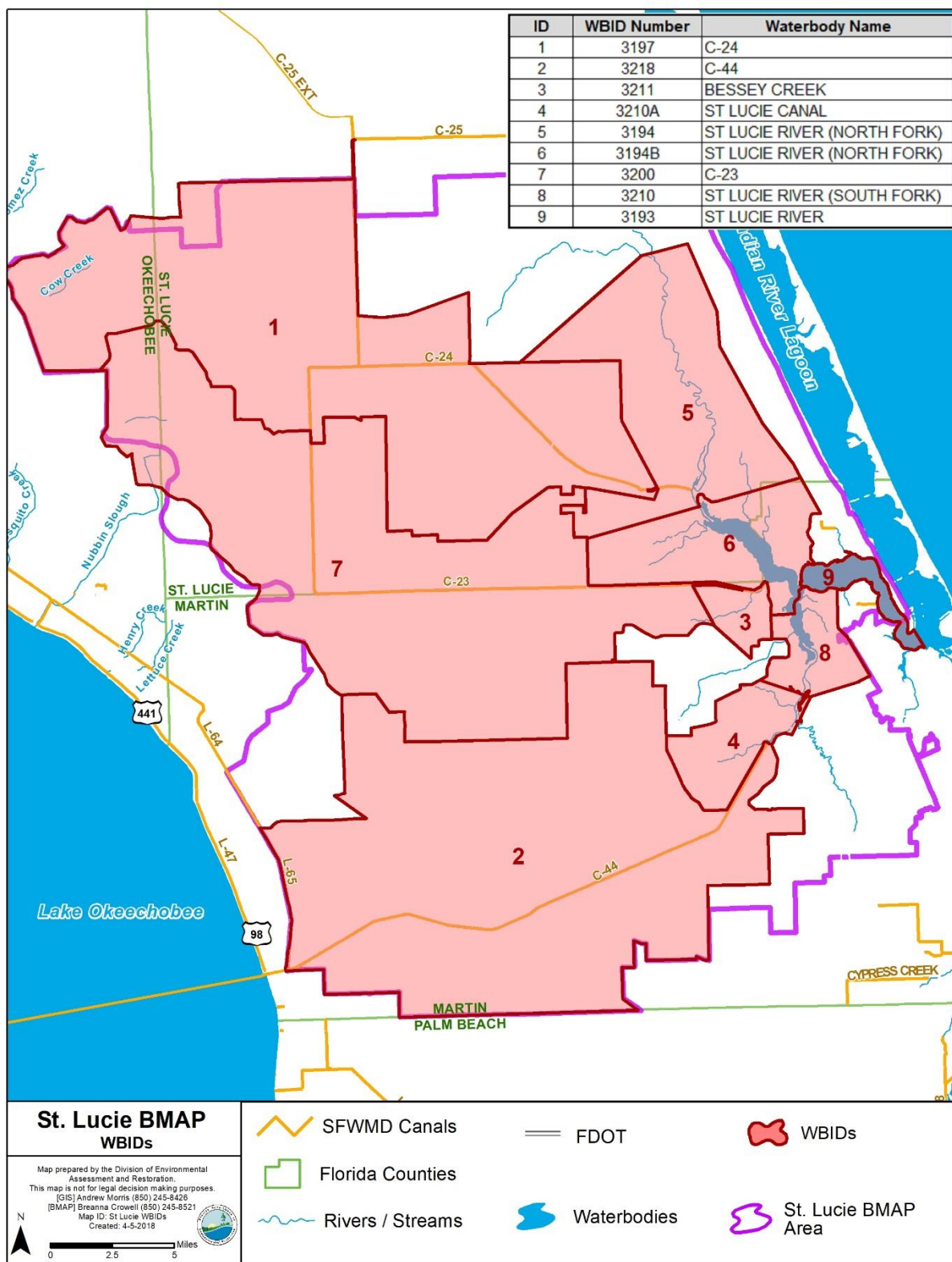


Figure 1. WBIDs with adopted TMDLs in the St. Lucie River and Estuary Basin

1.2 St. Lucie River and Estuary BMAP

DEP implements TMDLs through permits and BMAPs; the latter contain strategies to reduce and prevent pollutant discharges through various cost-effective means. During the TMDL process, DEP and the affected stakeholders jointly develop BMAPs or other implementation approaches. Stakeholder involvement is critical to the success of the TMDL Program and varies with each phase of implementation to achieve different purposes. The BMAP development process is structured to achieve cooperation and consensus among a broad range of interested parties, including the South Florida Water Management District (SFWMD), Florida Department of Agriculture and Consumer Services (FDACS), and stakeholders representing other agencies, governments, and interested parties. The St. Lucie River and Estuary BMAP (**Figure 2**) was adopted in June 2013.

1.2.1 St. Lucie River and Estuary BMAP Pollutant Reduction and Discharge Allocations

Under Section 403.067, F.S. (the Florida Watershed Restoration Act, or FWRA), the TMDL allocation adopted by rule may be an "initial" allocation among point and nonpoint sources. In such cases, the "detailed" allocation to specific point sources and specific categories of nonpoint sources must be established in the BMAP. Both initial and detailed allocations must be determined based on several factors listed in the FWRA, including cost-benefit, technical and environmental feasibility, implementation time frames, and others. The TMDL analysis did not include detailed allocations, i.e., wasteload allocations, for the wastewater treatment facilities (WWTFs) in the basin. These facilities discharged only during infrequent, large storm events and thus had a minimal and highly irregular impact on nutrient discharges. Therefore, the detailed allocations in the BMAP were only focused on the nonpoint sources in the St. Lucie River and Estuary Basin.

During the initial stages of BMAP development, DEP worked with the stakeholders to disaggregate the total TN and TP load by entity. The acreage and loading information for each stakeholder were calculated using output from the Watershed Water Quality Simulation (WaSh) model. Geographic information system (GIS) coverage was then used to help determine detailed allocations (i.e., the portion of the total loads). The load reduction was allocated based on a stakeholder's percentage of the developed load. More information on detailed allocations is available in the 2013 BMAP. **Table 3** lists the allocation of the load reductions for entities in the St. Lucie River and Estuary BMAP area.

The management actions and adaptive management approach described in the BMAP will address TN and TP reductions until the TMDLs are attained. The phased BMAP approach allows for the implementation of projects over multiple years designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand the water quality dynamics (sources and response variables) in the watershed.

Table 3. Required load reductions by entity

Entity	TN Starting Load (lbs/yr)	Total TN Required Reduction (lbs/yr)	TP Starting Load (lbs/yr)	Total TP Required Reduction (lbs/yr)
Agriculture	1,563,122	812,924	390,312	307,059
Florida Department of Transportation (FDOT) District 4	12,514	5,106	2,542	1,709
Fort Pierce MS4	17,041	6,479	3,879	2,693
Hobe St. Lucie Conservancy District	24,193	9,462	5,252	3,520
Martin County MS4	100,813	32,158	22,369	14,590
North St. Lucie River Water Control District (NSLRWCD)	197,403	87,846	45,884	33,634
Port St. Lucie MS4	156,481	53,101	35,016	23,431
St. Lucie County MS4	18,114	6,728	4,127	2,849
St. Lucie County Non-MS4	23,760	9,756	6,072	4,500
Stuart MS4	13,998	3,106	3,106	2,062
Troup-Indiantown Water Control District (TIWCD)	62,219	25,094	2,542	8,119
Entities without Required Reductions	23,993	0	5,272	0
Totals	2,429,832	1,053,414	597,552	404,166

Some entities were not assigned a reduction responsibility because of their relatively low contribution to the overall load, but this does not prevent them from having reduction requirements in future BMAPs. Any actions taken by these entities during the first BMAP iteration that has resulted in TN and/or TP reductions can be used by those entities for credit against any reduction requirements allocated in subsequent BMAP iterations.

During the development of the St. Lucie River and Estuary BMAP, various stakeholders in the basin raised questions about the BMAP model and required reductions. DEP agreed to refine the BMAP model during this first 5-year iteration. Therefore, DEP requested that the stakeholders provide information on activities and projects that would reduce a portion of the nutrient loading identified in the model. In this first BMAP phase, the activities identified were not expected to fully achieve the TMDLs. Rather, the BMAP called for projects and activities necessary to achieve 30 % of the TMDL-required reductions by the end of the first 5-year phase. After the first phase of BMAP implementation, DEP and the stakeholders agreed to evaluate progress and adjust using adaptive management, as needed, to meet the remainder of the reductions to achieve the TMDLs.

Additional details about the sources, modeling development process, and implementation assumptions and considerations are provided in the 2009 TMDL report and 2013 BMAP.

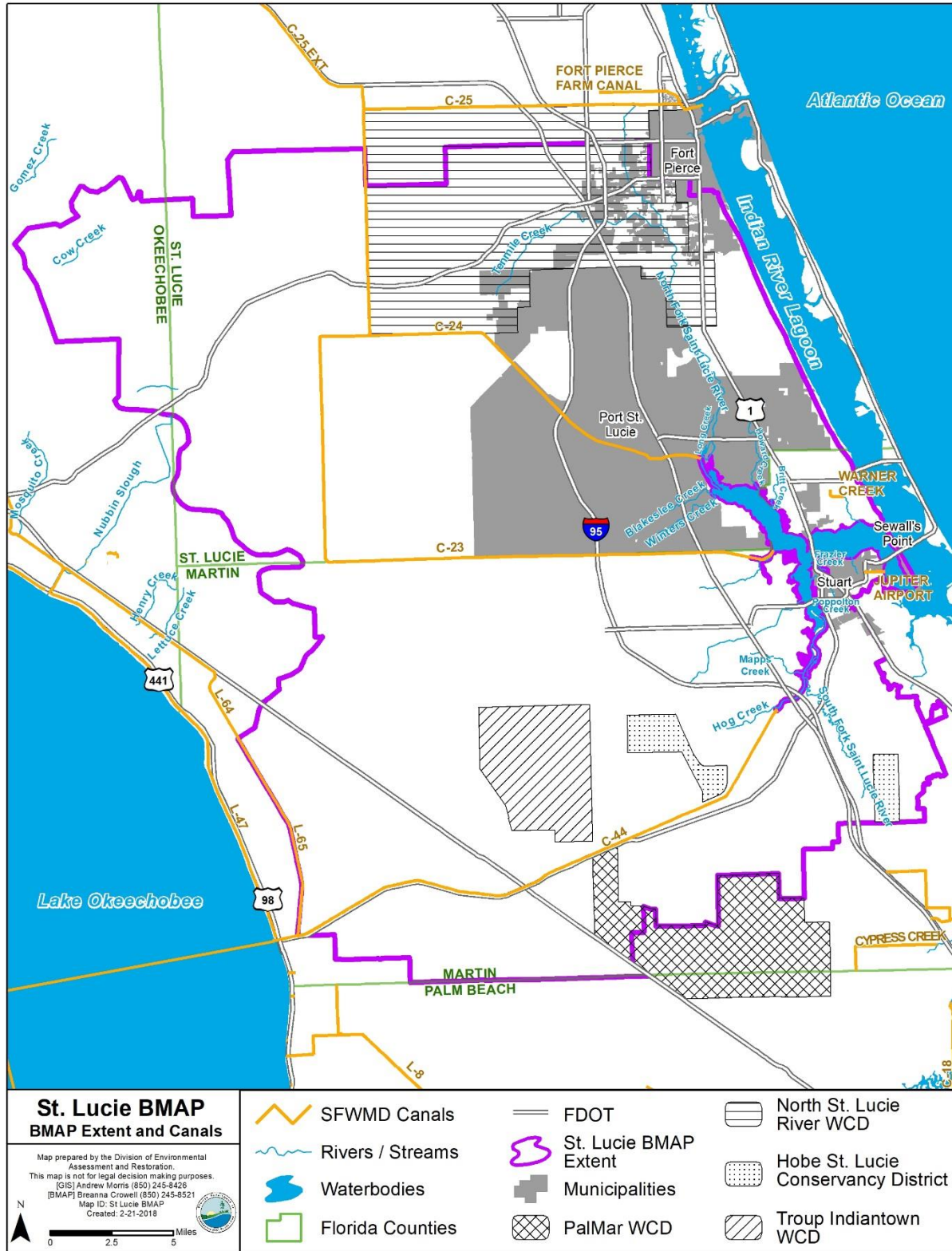


Figure 2. St. Lucie River and Estuary Basin

Chapter 2: Assessing Progress

2.1 Projects to Achieve the TMDLs

DEP annually reviews each entity's progress towards completing projects listed in the BMAP and achieving the assigned allocations based on the details described in the current TMDLs and BMAP. The required reductions for each entity and the reductions associated with completed projects may be refined as part of the modeling that is currently being updated. **Table 4** lists the annual project totals by entity as of December 31, 2017. **Table 5** lists the number of projects that each entity has committed to in the BMAP and annual progress reports, along with the status of those projects as of December 31, 2017. **Table 6** summarizes the allocations and reductions achieved by each entity in the BMAP as of December 31, 2017.

Table 4. Projects submitted by year

* The FDACS projects consist of the Best Management Practice (BMP) Enrollment Program and agricultural land use changes between the 2004 SFWMD land use coverage and land use at the time of BMAP adoption. FDACS identified these differences using aerial imagery and local field staff knowledge; they include acres that are fallow or out of production, or that were converted to urban/nonagricultural use in the basin. FDACS submits enrollment updates to DEP annually.

Lead Entity	2013	2014	2015	2016	2017	Total Projects
Agriculture/FDACS*	2	*	*	*	*	2
City of Fort Pierce	6	0	0	5	2	13
City of Port St. Lucie	26	4	0	3	0	33
City of Stuart	15	5	0	3	1	24
FDOT	40	4	1	12	2	59
Hobe St. Lucie Conservancy District	3	0	0	0	0	3
Martin County	28	2	4	4	4	42
NSLRWCD	8	0	0	0	4	12
Pal Mar WCD	1	0	0	0	0	1
St. Lucie County MS4	8	0	1	0	0	9
St. Lucie County Non-MS4	6	0	1	1	0	8
Town of Sewall's Point	29	1	1	1	0	32
TIWCD	2	0	0	0	3	5
Turnpike Authority	3	0	0	0	2	5
Total	177	16	8	29	18	248

Table 5. Projects to achieve the TMDL

* The FDACS projects consist of the BMP Enrollment Program and agricultural land use changes accounted for in the original adopted BMAP.

Entity	Total Projects	Completed	Underway	Planned	Cancelled
Agriculture/FDACS*	2	2	0	0	0
City of Fort Pierce	13	13	0	0	0
City of Port St. Lucie	33	30	2	0	1
City of Stuart	24	22	2	0	0
FDOT	59	48	11	0	0
Hobe St. Lucie Conservancy District	3	3	0	0	0
Martin County	42	38	2	2	0
NSLRWCD	12	12	0	0	0
Pal Mar WCD	1	1	0	0	0
St. Lucie County MS4	9	9	0	0	0
St. Lucie County Non-MS4	8	6	2	0	0
Town of Sewall's Point	32	29	2	1	0
TIWCD	5	3	2	0	0
Turnpike Authority	5	5	0	0	0
Total	248	221	23	3	1

Table 6. Reductions towards the TMDL

* Reductions to date include TN and TP reductions associated with projects completed as of the end of the reporting period (December 31, 2017).

** The entity was not assigned a reduction in the first phase of the BMAP because of its relatively low contribution to the overall load.

Entity	TN Reduction to Date* (lbs/yr)	% of Total TN Reduction Achieved	TP Reduction to Date* (lbs/yr)	% of Total TP Reduction Achieved
Agriculture/FDACS	303,920	37	83,786	27
City of Fort Pierce	2,300	36	1,384	51
City of Port St. Lucie	60,180	113	9,329	40
City of Stuart	6,735	142	2,038	99
FDOT District 4	2,113	41	1,093	64
Florida Turnpike**	167		13	
Hobe St. Lucie Conservancy District	10,288	109	3,302	94
Martin County	42,532	129	7,927	54
NSLRWCD	69,366	79	19,134	57
Pal Mar WCD**	926		92	
St. Lucie County MS4	5,277	78	2,032	71
St. Lucie County Non-MS4	4,175	43	1,484	33
Town of Sewall's Point**	277		179	
TIWCD	25,055	100	7,943	98
Total	532,312	51	139,736	35

2.2 Other Coordinating Agency Efforts

FDACS and SFWMD have coordinated efforts with DEP to focus on achieving the TMDLs and maintaining compliance with state water quality standards. Those efforts are briefly summarized below.

2.2.1 Agriculture/FDACS

FDACS assists producers throughout Florida with enrollment in the FDACS BMP Program. Beyond enrolling producers and verifying implementation, FDACS is working with DEP to improve the data used to estimate the acreage of agricultural land uses in the watershed. FDACS is also working with producers to identify and implement a suite of agricultural projects and research agricultural technologies on properties where they are deemed technically feasible and where funding can be made available. The implementation of these projects would require funding as well as more detailed design based on site-specific information, such as applicable acreages and willing landowners.

As of December 31, 2017, the FDACS Office of Agricultural Water Policy (OAWP) provided \$1.1 million in cost-share assistance for nutrient management, irrigation management, and water resource protection projects. **Appendix C** contains more detailed information on agricultural enrollment, nutrient reductions, and activities in the basin.

2.2.2 SFWMD

State-appropriated funds coupled with SFWMD resources were used to advance numerous restoration activities in the St. Lucie River and Estuary Watershed (SLREW) during the BMAP reporting period. Highlights of advancements made in key SFWMD-involved projects in the basin during the BMAP reporting period (through December 31, 2017) are summarized below. While these regional projects will provide both water storage and water quality benefits, they have not yet been included in the estimates of TN and TP reductions for this BMAP.

Comprehensive Everglades Restoration Plan (CERP) Indian River Lagoon-South (IRL-S) and Central Everglades Planning Project (CEPP)

The CERP is a framework for restoring, preserving, and protecting the greater Everglades ecosystem while providing for other water-related needs of the region, including water supply and flood protection. CEPP is part of CERP and sets the foundation for restoring the central portion of the Everglades ecosystem and sending additional water south. The CERP IRL-S and CEPP authorized plan includes a variety of features (reservoirs, stormwater treatment areas [STAs], conveyance system improvements, and natural land restoration) intended to capture water from the primary basins (C-23, C-24, C-25, and C-44) that discharge to the St. Lucie River and southern IRL. Additional diversion features and the removal of muck from the estuary are also included. In addition, the implementation of the Everglades Agricultural Area (EAA) Storage Reservoir and the expedited completion of the Herbert Hoover Dike Rehabilitation project will together improve the quantity, quality, timing, and distribution of flows to the river and estuary.

- **C-44 Reservoir and STA.** The construction of the C-44 STA and inflow pump station continued, with completion expected in late 2018. The U.S. Army Corps of Engineers (USACE) is continuing the construction of the reservoir, currently scheduled for completion in 2020. An interim pumping facility will be constructed to inflow water into the STA cells, thus allowing vegetation to grow ahead of the completion of the reservoir component of the project. Additionally, the SFWMD has completed the construction of the communications tower and the system discharge canal and spillway associated with the C-44 project, and the USACE has completed the construction of the project's intake canal (C-400) and external drainage canals (C-133 and C-133N).
- **C-23/24 North and South Reservoirs and STA.** To date, 86 % of the land required for the construction of the C-23/24 components of the IRL-S plan has been acquired. The USACE has initiated preliminary design activities for the C-23/24 North Reservoir. Consistent with the USACE Integrated Delivery Schedule, the design of the South Reservoir will commence in 2020, while the design of the STA is scheduled to start in 2026. Design efforts are expected to be completed after 4 years, with the construction of the first component (North Reservoir) to begin in 2022.
- **Allapattah Complex Natural Storage and Water Quality Area.** The portion of the Allapattah Complex located immediately north of the C-44 Reservoir and STA is being restored by the SFWMD, in cooperation with the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). The restoration of this area will provide additional freshwater storage, contribute to water quality improvements, increase natural wetlands and upland habitat for wildlife, and recharge the surficial aquifer. Restoration construction activities were initiated with the onset of the 2016–17 dry season and are planned to continue in 2018.
- **The Central Everglades Project** encompasses a majority of the remaining natural area of the Everglades and is designed to send an annual average of approximately 210,000 acre-feet of water south from Lake Okeechobee. These projects will capture water lost to tide and re-direct water flow south to the central Everglades, Everglades National Park and Florida Bay, and will significantly reduce the volume of discharges from Lake Okeechobee.
- **Herbert Hoover Dike Rehabilitation.** The state of Florida has committed \$100 million toward the expedited rehabilitation of the federal Herbert Hoover Dike. The completion of this federal project is important for the health of the greater Everglades system and Florida's coastal estuaries.

Ten Mile Creek Project

The purpose of the Ten Mile Creek Water Preserve Area (WPA) Critical Project is to improve the quantity and timing of water deliveries to the North Fork of the St. Lucie River (NFSLR) by capturing and storing stormwater originating in the Ten Mile Creek Subbasin. Additional benefits to the St. Lucie River and Estuary should result from the reductions in sediment load, concentration of suspended solids, and nutrients. The Ten Mile Creek WPA consists of a 2-stage detention system, including a 526-acre reservoir, a 132-acre polishing cell, and an intake pump station (S-382).

During the BMAP reporting period, the design of a remediation project to allow the reservoir to hold up to four feet of water was completed. A construction contract for the remediation project was awarded in July 2016. Substantial completion of that contract was achieved in June 2017, and both the reservoir and STA were put into operation during the 2017 wet season (mid-May through mid-October).

2.3 Water Quality Monitoring and Evaluation

The St. Lucie River and Estuary BMAP monitoring plan was designed to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track water quality trends. The information gathered through the monitoring plan measures progress toward achieving the TMDLs and provides a better understanding of watershed loading. The BMAP monitoring plan consists of ambient water quality sampling, sampling at discharge structures, and biological monitoring.

2.3.1 Ambient Water Quality Monitoring.

Focused objectives are critical for a monitoring strategy to provide the information needed to evaluate implementation success. The primary objective of the monitoring strategy for the St. Lucie River and Estuary, described below, is to evaluate the success of the BMAP, help interpret the data collected, and provide information for potential future refinements of the BMAP.

All BMAP data providers have agreed to upload ambient water quality data at least once every six months upon completion of the appropriate quality assurance/quality control (QA/QC) checks. The STorage and RETrieval (STORET) Database served as the primary repository of ambient water quality data for the state until DEP transitioned to the Watershed Information Network (WIN) in 2017. Data providers have begun uploading data to WIN instead of STORET.

Primary Objective

- Track trends in TN and TP loads in the major canals and tributaries, as well as the St. Lucie River and Estuary.

To achieve the objective above, the monitoring strategy focuses on the following suggested parameters:

- TP.
- Orthophosphate as P.
- Nitrate/nitrite as N.
- N, ammonia.
- Total Kjeldahl nitrogen (TKN).
- DO.
- BOD.
- Chlorophyll *a*.
- pH.
- Temperature.
- Specific conductance.
- Total suspended solids (TSS).
- Turbidity.
- Alkalinity.

During the first phase of BMAP implementation, the SFWMD continued monitoring at 46 stations in the BMAP area, and the monitoring data for the reporting period were uploaded to WIN in June 2017 (the monitoring and associated data results are described in the *2017 South Florida Environmental Report [SFER]* – Volume I, Chapter 8C, available on the SFWMD website). **Table D-1** in **Appendix D** lists the stations in the BMAP monitoring network for reference.

Biological Monitoring

Biological sampling for oysters and seagrass is routinely conducted in the St. Lucie River and Estuary (see **Table D-3**). The stations are not specifically BMAP stations—i.e., they are designed for other purposes—but the data collected at these sites are submitted to DEP and may be used to monitor the effectiveness of the BMAP.

Water Quality Evaluation

A water quality evaluation was completed to assist in tracking progress in the St. Lucie Estuary and tributaries. This evaluation five years into BMAP implementation is being used to establish a

methodology that can be repeated throughout the implementation process and to identify where trends exist. The results provide an initial look at the status of water quality in waterbodies in the BMAP area. Future work will investigate the drivers of these trends to help focus activities and projects and will evaluate a longer period with more available data.

Monitoring stations were evaluated for data availability and sampling frequency. Only stations with the best data availability and sampling frequencies were used in the analyses (**Figure 3**). The remaining stations may be used in future analyses, provided more data become available and they can meet the data quality requirements. The majority of nitrogen and phosphorus data for this analysis was retrieved from STORET, and the most recent data were downloaded from WIN.

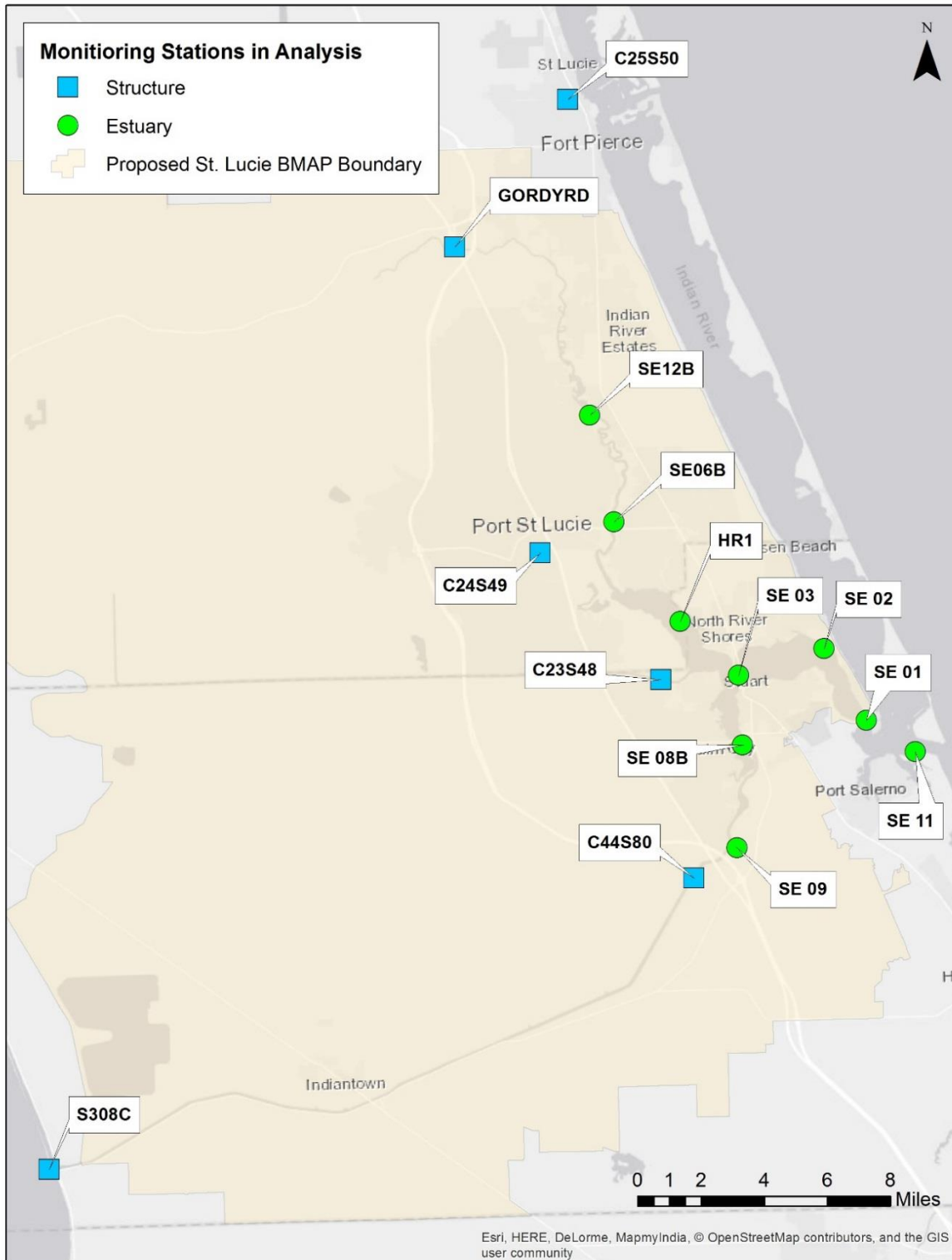


Figure 3. Trends stations used in the water quality evaluation for the St. Lucie 5-Year Review

The period of record (POR) for this analysis was May 1, 2007, to April 30, 2017 (Water Year [WY] 2008 to WY 2017) to ensure a sufficient data period for trend analysis and include a period prior to the BMAP that could be used to track progress in the implementation of a number of load reduction projects. Evaluating data based on WY is a standard practice among other coordinating agencies in the basin and allows for consistent reporting and evaluation. In future reviews at the 10- and 15-year milestones, additional data will be available that may allow for better detection of long-term trends.

To track possible changes in nutrient concentrations in the St. Lucie Estuary, trend analyses were conducted on the individual stations in the estuary and at SFWMD-managed structures. In addition, nutrient flow-weighted mean (FWM) and load data provided by the SFWMD were also assessed for trends at the structure stations, since the estuarine stations do not have the flow and/or volume data necessary to calculate FWMs and loads. The results of the trend analyses are summarized below, and **Appendix E** provides details of the methods used to retrieve, process, and perform the analysis.

Seasonal Kendall Trend Results

The nonparametric Seasonal Kendall test was used to identify monotonic trends in the nutrient data for each station. **Tables 7** and **8** summarize the results for the Seasonal Kendall trend analysis for TN and TP concentrations, respectively. The effects of seasonal patterns and serial correlation in the data series were considered in the analysis to avoid false positive or false negative indications of trend significance.

It should also be noted that while the trends may be statistically significant, they may not be ecologically significant (i.e., pertaining to ecological response variables such as chlorophyll *a*, algal community composition, etc.). A trend slope near 0 likely will not show a measurable effect within a reasonable period (i.e., years to decades). Additionally, where statistically significant trends are not detected, it may be because there was not enough data.

Out of the nine estuarine stations, three (HR1, SE06, and SE12) showed statistically significant decreasing trends for TN concentration, two (SE06 and SE12) showed statistically significant decreasing trends for TP concentration, and one (SE11) showed a statistically significant increasing trend for TP concentration (**Figures 4** and **5**). None of the six structure stations showed statistically significant trends for TN or TP concentrations; this corroborated the FWM results, which showed no statistically significant trends for TN or TP FWMs (**Tables 9** and **10**). However, differences in trend results across the type of unit measured (concentration vs. FWM vs. load) were found when evaluating nutrient loads for structure stations. None of the stations showed statistically significant trends for TN load (**Table 11; Figure 6**). However, the station at the inflow structure from Lake Okeechobee to the St. Lucie Watershed (S308C) showed a statistically significant increasing trend for TP load (**Table 12; Figure 7**).

Table 7: Seasonal Kendall trend analysis results for TN concentrations

Note: P-values listed in **bold** indicate statistical significance ($p < 0.05$).

TN measured in mg/L.

¹ Even if the p-value is determined to be statistically significant, the result may not be ecologically significant. For example, if a trend is statistically significantly declining (negative trend) but the slope is near 0, then it may not be realistic to assume that an improvement in water quality by reductions in TN or TP may positively impact the ecological system in a measurable way.

² Series with serial correlation (per autocorrelation analysis results) used the P-value adjusted for serial correlation.

³ If the p-value is less than 0.05, then a decreasing trend may suggest an improvement in water quality, and an increasing trend may suggest a decline in water quality.

* Stations SE 06 and SE 12 include data from SE06B and SE12B, respectively.

Station	Station Type	Tau	Slope ¹	Selected P-Value ²	Statistical Trend Interpretation ³
C23S48	Structure	-0.017	-0.00133	0.913	No significant trend
C24S49	Structure	-0.125	-0.00825	0.260	No significant trend
C25S50	Structure	0.024	0.00175	0.852	No significant trend
C44S80	Structure	-0.061	-0.00567	0.616	No significant trend
GORDYRD	Structure	-0.141	-0.01486	0.279	No significant trend
S308C	Structure	-0.209	-0.03583	0.114	No significant trend
HR1	Estuary	-0.165	-0.01229	0.043	Significant decreasing trend
SE 01	Estuary	0.046	0.00392	0.658	No significant trend
SE 02	Estuary	-0.014	-0.00088	0.899	No significant trend
SE 03	Estuary	-0.161	-0.01232	0.089	No significant trend
SE 08B	Estuary	-0.050	-0.00525	0.578	No significant trend
SE 09	Estuary	-0.088	-0.00735	0.273	No significant trend
SE 11	Estuary	0.162	0.00917	0.170	No significant trend
*SE 06	Estuary	-0.226	-0.01667	0.017	Significant decreasing trend
*SE 12	Estuary	-0.298	-0.02375	0.021	Significant decreasing trend

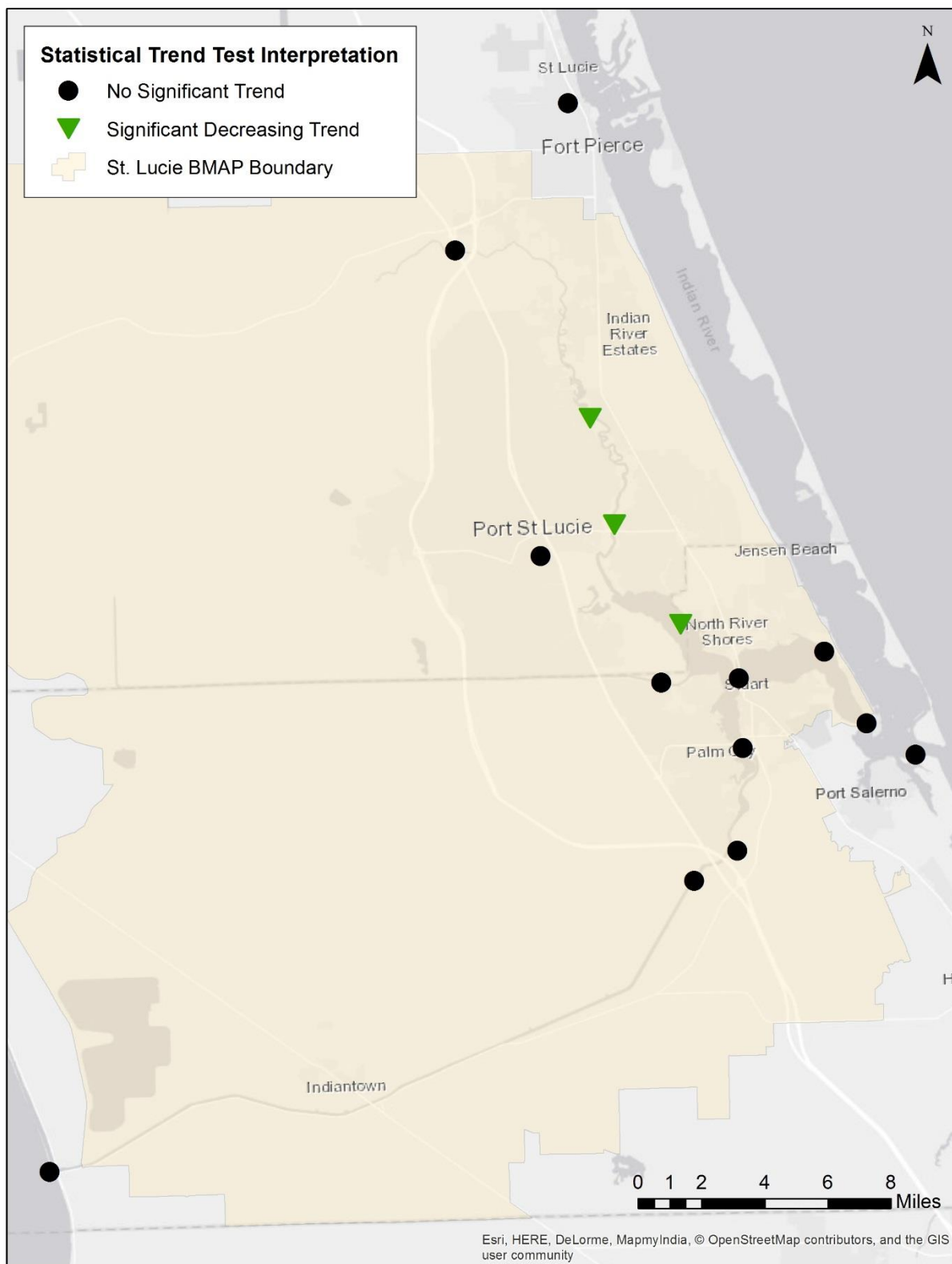


Figure 4. Seasonal Kendall trend analysis results for TN concentrations

Table 8: Seasonal Kendall trend analysis results for TP concentrations

Note: P-values listed in **bold** indicate statistical significance ($p < 0.05$).

TP measured in mg/L.

¹ Even if the p-value is determined to be statistically significant, the result may not be ecologically significant. For example, if a trend is statistically significantly declining (negative trend) but the slope is near 0, then it may not be realistic to assume that an improvement in water quality by reductions in TN or TP may positively impact the ecological system in a measurable way.

² Series with serial correlation (as per autocorrelation analysis results) used the P-value adjusted for serial correlation.

³ If the p-value is less than 0.05, then a decreasing trend may suggest an improvement in water quality, and an increasing trend may suggest a decline in water quality.

* Stations SE 06 and SE 12 include data from SE06B and SE12B, respectively.

Station	Station Type	Tau	Slope ¹	Selected P-Value ²	Statistical Trend Interpretation ³
C23S48	Structure	0.068	0.00200	0.571	No significant trend
C24S49	Structure	0.083	0.00260	0.467	No significant trend
C25S50	Structure	-0.018	-0.00040	0.897	No significant trend
C44S80	Structure	-0.050	-0.00092	0.672	No significant trend
GORDYRD	Structure	-0.066	-0.00200	0.601	No significant trend
S308C	Structure	-0.105	-0.00367	0.151	No significant trend
HR1	Estuary	-0.154	-0.00214	0.194	No significant trend
SE 01	Estuary	0.101	0.00150	0.214	No significant trend
SE 02	Estuary	0.008	0.00020	0.930	No significant trend
SE 03	Estuary	-0.172	-0.00400	0.078	No significant trend
SE 08B	Estuary	-0.119	-0.00217	0.187	No significant trend
SE 09	Estuary	-0.045	-0.00100	0.479	No significant trend
SE 11	Estuary	0.175	0.00175	0.020	Significant increasing trend
*SE 06	Estuary	-0.255	-0.00550	0.024	Significant decreasing trend
*SE 12	Estuary	-0.266	-0.00600	0.031	Significant decreasing trend

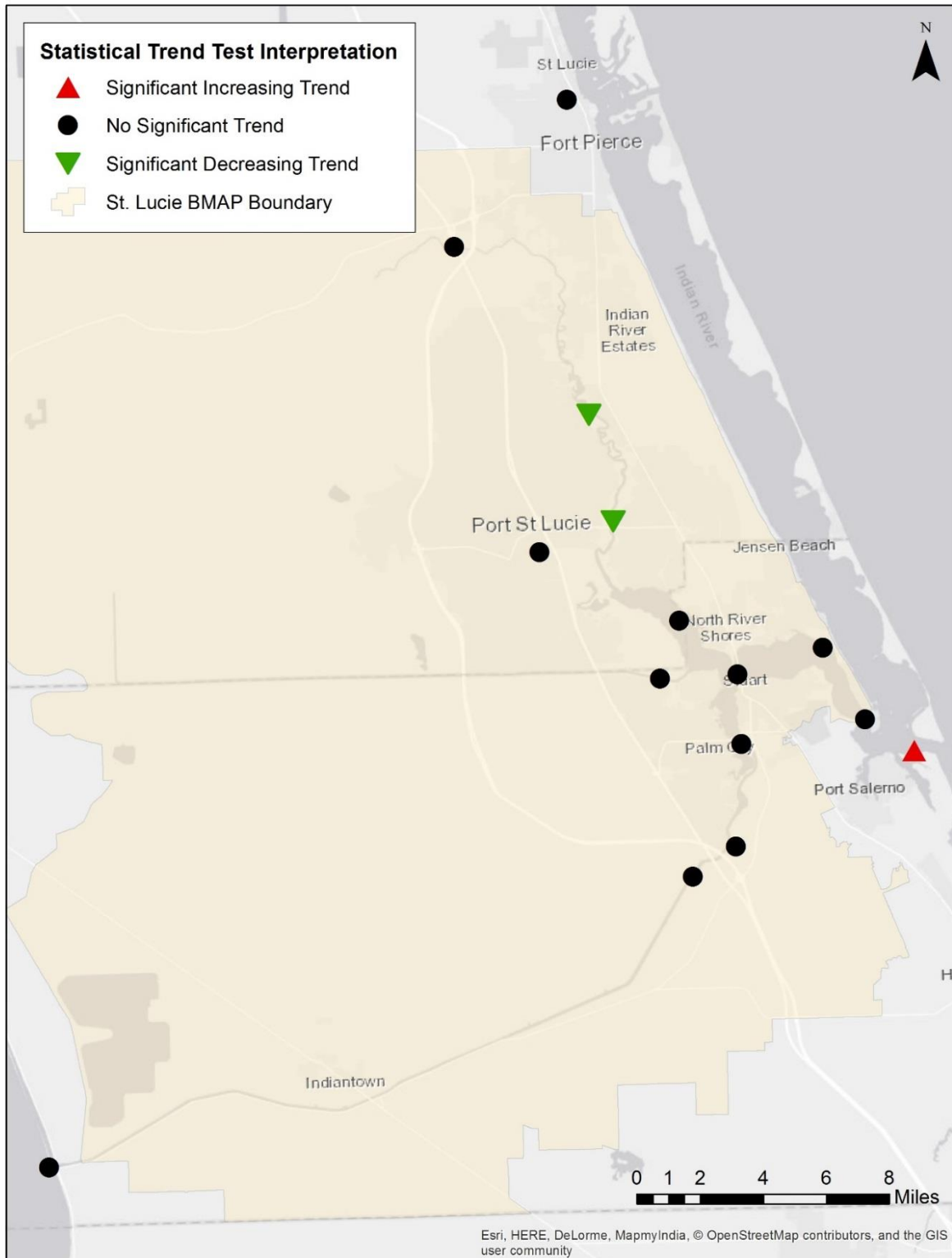


Figure 5. Seasonal Kendall trend analysis results for TP concentrations

Table 9. Seasonal Kendall trend analysis results for TN FWMs**Note:** TN measured in mg/L.¹ Series with serial correlation (as per autocorrelation analysis results) used the P-value adjusted for serial correlation.

Station	Tau	Slope	Selected P-Value ¹	Statistical Trend Interpretation
C23S48	-0.036	-0.00467	0.758	No significant trend
C24S49	-0.235	-0.02258	0.069	No significant trend
C25S50	-0.062	-0.00920	0.493	No significant trend
C44S80	-0.228	-0.02275	0.144	No significant trend
GORDYRD	-0.176	-0.02096	0.191	No significant trend
S308C into SLREW	-0.183	-0.02175	0.200	No significant trend

Table 10. Seasonal Kendall trend analysis results for TP FWMs**Note:** TP measured in mg/L.¹ Series with serial correlation (as per autocorrelation analysis results) used the P-value adjusted for serial correlation.

Station	Tau	Slope	Selected P-Value ¹	Statistical Trend Interpretation
C23S48	0.102	0.00314	0.383	No significant trend
C24S49	-0.003	-0.00013	1.000	No significant trend
C25S50	0.062	0.00150	0.632	No significant trend
C44S80	-0.108	-0.00492	0.344	No significant trend
GORDYRD	-0.092	-0.00334	0.517	No significant trend
S308C into SLREW	-0.008	0.00000	0.933	No significant trend

Table 11. Seasonal Kendall trend analysis results for TN loads**Note:** P-values listed in **bold** indicate statistical significance ($p < 0.05$).

TN load in metric tons/yr.

¹ Series with serial correlation (as per autocorrelation analysis results) used the P-value adjusted for serial correlation.

Station	Tau	Slope	Selected P-Value ¹	Statistical Trend Interpretation
C23S48	-0.013	-0.00920	0.930	No significant trend
C24S49	-0.005	-0.00621	0.973	No significant trend
C25S50	0.035	0.05736	0.789	No significant trend
C44S80	0.000	-0.02250	1.000	No significant trend
GORDYRD	0.023	0.04437	0.771	No significant trend
S308C into SLREW	0.133	0.56120	0.079	No significant trend

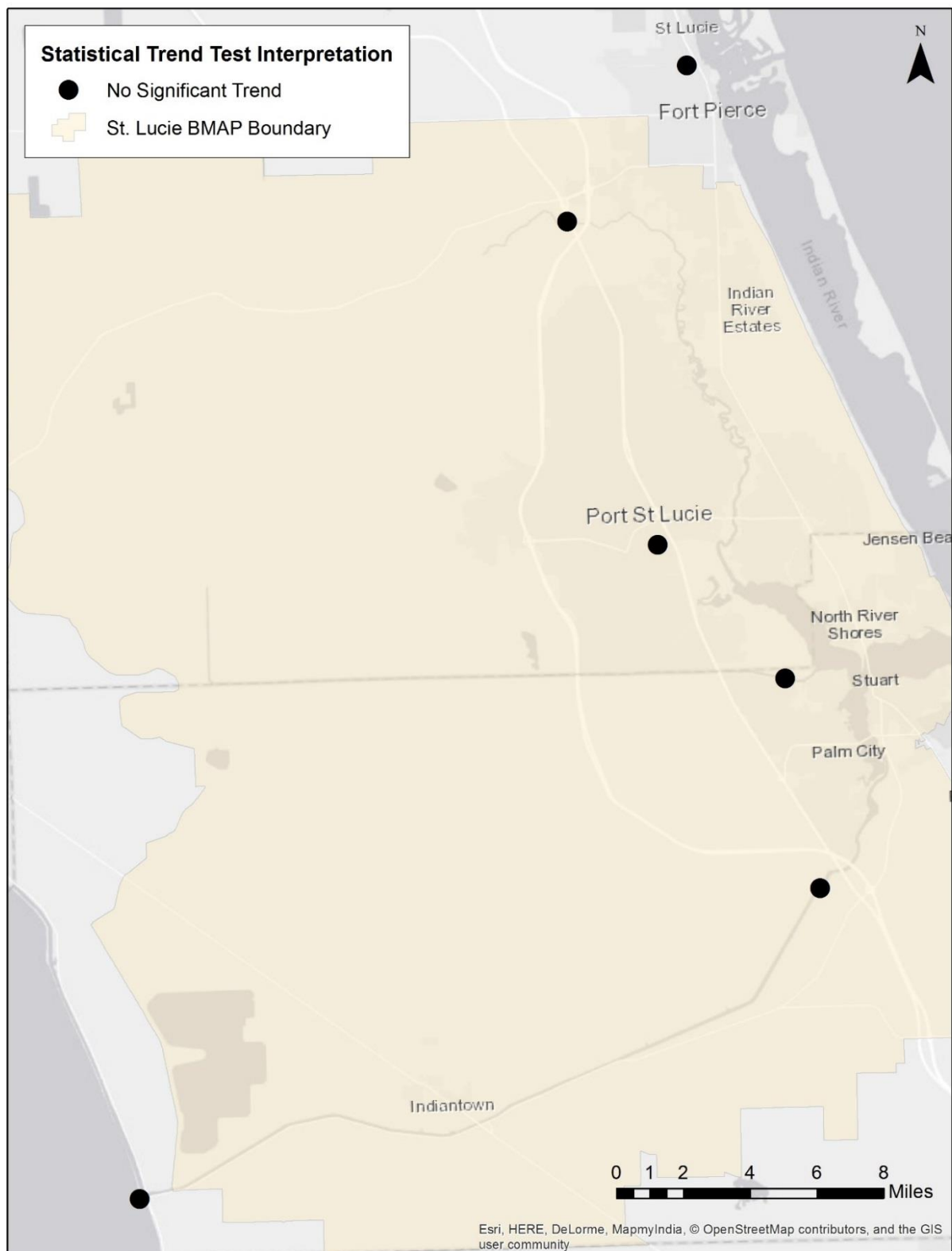


Figure 6. Seasonal Kendall trend analysis results for TN loads

Table 12. Seasonal Kendall trend analysis results for TP loads

Note: P-values listed in **bold** indicate statistical significance ($p < 0.05$).

TP load in metric tons/yr.

¹ Even if the p-value is determined to be statistically significant, the result may not be ecologically significant. For example, if a trend is statistically significantly declining (negative trend) but the slope is near 0, then it may not be realistic to assume that an improvement in water quality by reductions in TN or TP may positively impact the ecological system in a measurable way.

² Series with serial correlation (as per autocorrelation analysis results) used the P-value adjusted for serial correlation.

³ A decreasing trend may suggest an improvement in water quality. An increasing trend may suggest a decline in water quality.

Station	Tau	Slope ¹	Selected P-Value ²	Statistical Trend Interpretation ³
C23S48	-0.006	-0.00125	0.977	No significant trend
C24S49	-0.037	-0.01619	0.688	No significant trend
C25S50	0.063	0.00575	0.608	No significant trend
C44S80	0.013	0.02538	0.955	No significant trend
GORDYRD	0.050	0.01054	0.509	No significant trend
S308C into SLREW	0.171	0.06542	0.024	Significant increasing trend

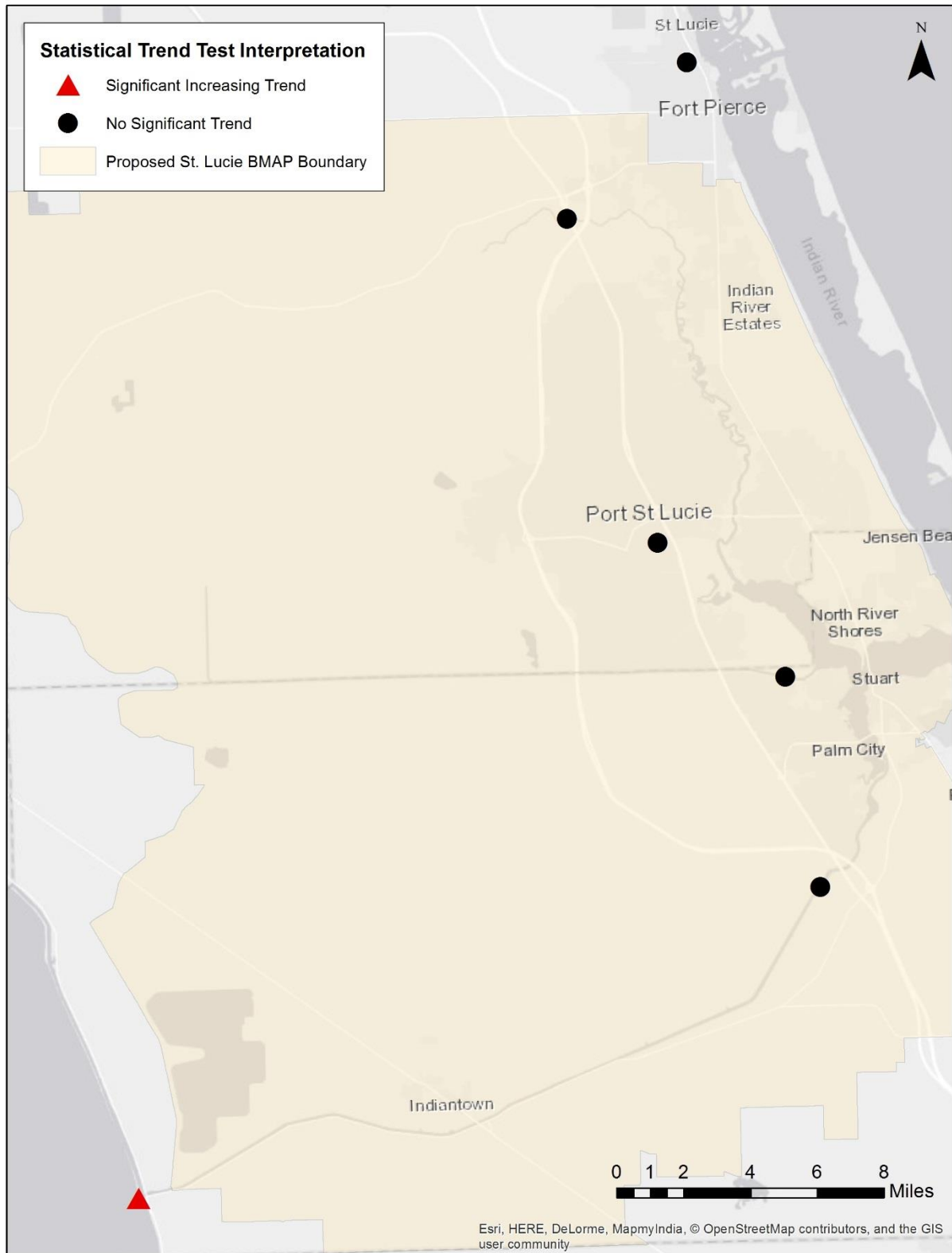


Figure 7. Seasonal Kendall trend analysis results for TP loads

Chapter 3: Recommendations

The BMAP implements phased TN and TP reductions according to Subparagraph 403.067(7)(a)1., F.S., for the loading generated in the St. Lucie River and Estuary Basin. The purpose of this 5-Year Review is to evaluate implementation activities that have taken place during the first 5-year phase. The recommendations included here are for future implementation activities that may be incorporated into a revised BMAP.

This first phase included significant restoration efforts by stakeholders, and the implementation process will continue to help meet the TMDLs. The projects and other activities, collected through stakeholder participation, are estimated to achieve 51 % of the required TN reductions and 35 % of the required TP reductions by the end of this first 5-year phase. Based on project information submitted by stakeholders for future phases, 10- and 15-year measurable milestones were developed.

The WaSh model was determined to be the appropriate tool for refining BMAP allocations in the future and was updated and enhanced as a part of the 5-Year Review process. The expansion of the model extent allows the BMAP boundary to be expanded to include the South Coastal Subbasin, as recommended in the first BMAP iteration, and to reflect updates in the hydrologic patterns of the area. Additionally, this 5-Year Review recommends revising the assigned allocations to reflect the results from updated BMAP modeling.

Finally, this 5-Year Review recommends reorganizing the BMAP monitoring network to help prioritize monitoring resources and improve how progress is tracked. Following the 5-Year Review, DEP proposes that these recommendations be included in a revised BMAP document that can take the place of the existing BMAP once adopted by Secretarial Order.

3.1 Milestones

The St. Lucie River and Estuary BMAP is governed by Section 373.4595, F.S., as a part of the Northern Everglades and Estuaries Protection Program (NEEPP). Paragraph 373.4595(4)(d), F.S., states:

"The department shall develop an implementation schedule establishing 5-year, 10-year, and 15-year measurable milestones and targets to achieve the total maximum daily load no more than 20 years after adoption of the plan. The initial implementation schedule shall be used to provide guidance for planning and funding purposes and is exempt from chapter 120. Upon the first 5-Year Review, the implementation schedule shall be adopted as part of the plans. If achieving the total maximum daily load within 20 years is not practicable, the implementation schedule must contain an explanation of the constraints that prevent achievement of the total maximum daily load within 20 years, an estimate of the time needed to achieve the total maximum daily load, and additional 5-year measurable milestones, as necessary."

The 5-Year Review documents progress and allows for stakeholder involvement in the methods of assessing progress and revising the BMAP as appropriate. The projects and activities in the BMAP are key to reducing TN and TP in the estuary. The estimated benefits of these implemented activities should be tracked to show stakeholder efforts by determining a percentage towards the total required reductions to be achieved at each milestone. Stakeholders in the St. Lucie BMAP area aim to meet 100 % of the required reductions within 15 years of BMAP adoption. The following percent reduction goals are proposed for each milestone:

- 5-year milestone (Years 1 to 5, including projects completed after January 1, 2000): 30 % or 316,024 lbs/yr TN and 121,250 lbs/yr TP.
- 10-year milestone (Years 6 to 10): 75 % or 790,061 lbs/yr TN and 65 % or 277,446 lbs/yr TP.
- 15-year milestone (Years 11 to 15): 100 % or 1,053,414 lbs/yr TN and 404,166 lbs/yr TP.

Of the 248 projects submitted towards the 5-year milestone, 221 have been completed, for a total estimated reduction of 532,312 lbs/yr TN and 139,736 lbs/yr TP. **Figures 8 and 9** show the 5-, 10-, and 15-year milestones in green, blue, and yellow dots as well as black dots that track the cumulative TN and TP reductions, respectively, over time as projects are completed in each reporting period. Twenty-five projects were submitted for completion by the 10-year milestone for the St. Lucie BMAP. Of those submitted projects, 12 were quantified, with reductions totaling 2,990 lbs/yr TN (a cumulative 10-year total of 535,302, or 51 %) and 1,018 lbs/yr TP (a cumulative 10-year total of 140,754, or 35 %). DEP will re-estimate project credits prior to updating the St. Lucie BMAP, but it is likely that more projects will be needed to reach the 10- and 15-year milestones.

Fourteen projects were submitted for completion by the 15-year milestone. Sufficient information regarding the estimated reductions for these projects has not been identified but will be included in future reports. During the annual review of BMAP implementation efforts, project-specific information may be revised and updated, resulting in changes to the reductions for those projects. The revisions may increase or decrease reductions, and DEP will work with stakeholders to address revisions as they are identified. **Appendix B** contains more information on the funding status of these future projects.

Projects included in this review are necessary components for restoration in the basin. **Section 3.3** discusses the efforts made to update the WaSh model and how the application of the model in the basin may lead to future revisions of the detailed stakeholder allocations. Many projects are not far enough along in their development to quantify TN and TP reductions or to have obtained full funding at the time this review was published. DEP anticipates that it is practicable to achieve reductions sufficient to meet the TMDLs within 20 years and, as part of each 5-Year Review, will consider additional projects submitted to confirm whether this is supported.

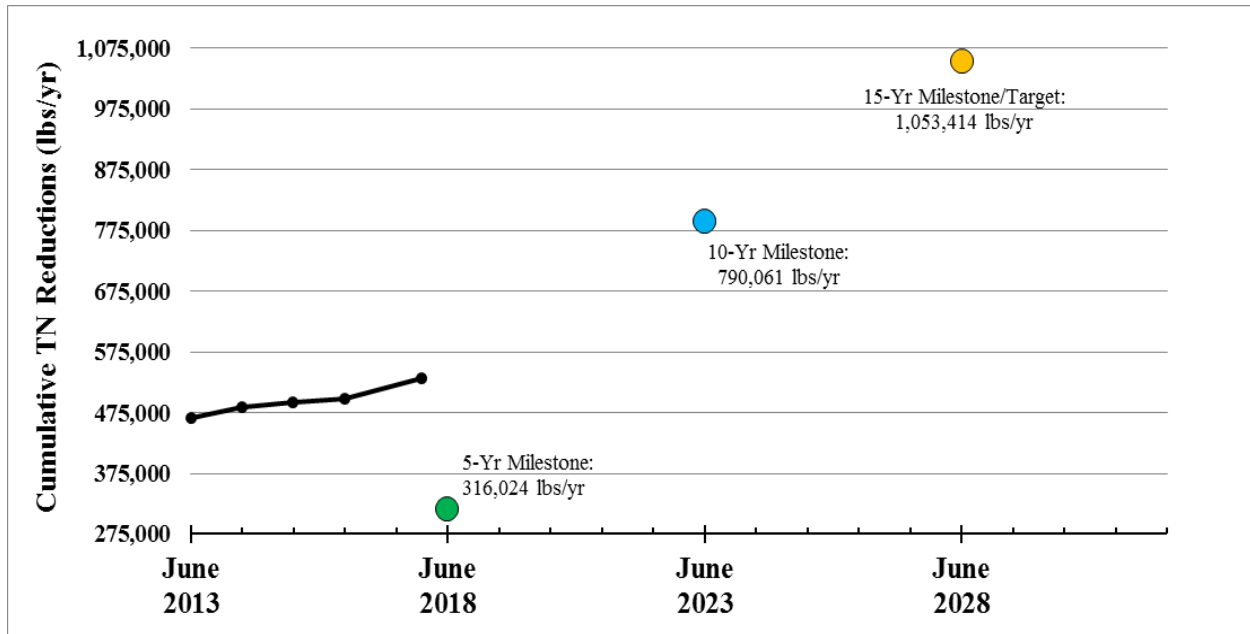


Figure 8. Estimated progress towards the St. Lucie River and Estuary BMAP TN milestones

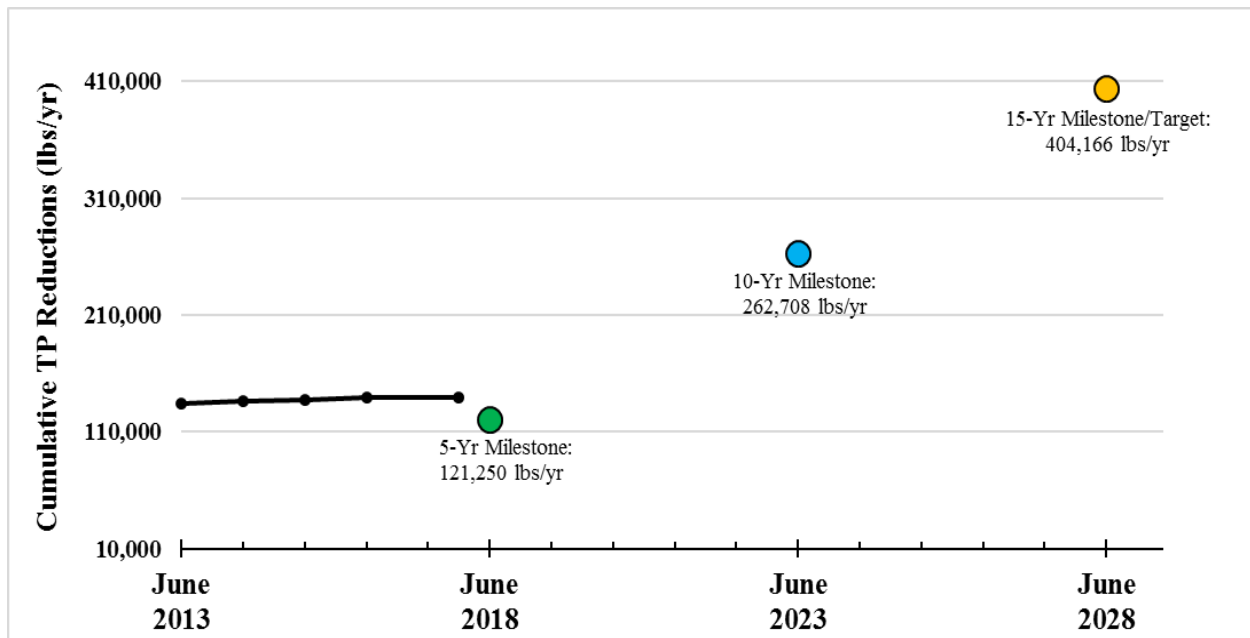


Figure 9. Estimated progress towards the St. Lucie River and Estuary BMAP TP milestones

3.2 BMAP Boundary Change

The BMAP area was originally divided into six subbasins, which were also used in the water quality analysis for the St. Lucie River Watershed Protection Plan (SLRWPP) (SFWMD et al. 2009). As both the SLRWPP and the BMAP are requirements of the NEEPP, the BMAP

boundary was based on the SLRWPP to align the BMAP process with the SLRWPP and take a holistic watershed approach.

Since the adoption of the BMAP in June 2013, the subbasin boundaries have been updated based on the hydrologic evaluation of tributaries in the St. Lucie River Watershed. This evaluation involved conversations with local entities, aerial surveys, and the investigation of areas where discrepancies were noted in the SFWMD's ArcHydro Database. Based on the results, each subbasin boundary was refined to more accurately reflect drainage conditions, and the changes in acreage were documented. **Appendix G** provides a more detailed description of these changes. Subsequent to the information summarized in **Appendix G**, the boundary was also affected by redelineation efforts for the watersheds in the northern part of Palm Beach County as part of the Loxahatchee River Restoration Project and the other changes listed below.

Figure 10 shows the existing and recommended revised boundary. Overall, 22,452 acres would be added to the BMAP area and 3,626 acres removed, resulting in a net addition of 18,826 acres. **Figure 11** displays a comparison of the original subbasin boundaries with the redelineated subbasin boundaries. This recommended change is pending further discussion, and a decision will be made prior to the adoption of the revised BMAP following the 5-Year Review.

3.2.1 Addition of South Coastal Subbasin

The South Coastal Subbasin was not included within the original BMAP boundary because of a lack of nutrient loading data for the area. Tidal stage data have since become available at the St. Lucie Inlet in the northern portion of the South Coastal Subbasin that drains to the lower St. Lucie Estuary. As a result, the WaSh model revisions expanded the model domain to include the remainder of the South Mid-Estuary Subbasin, South Coastal Subbasin, and Lower St. Lucie Estuary.

3.2.2 Fort Pierce Stormwater Master Plan and Boundary Revisions

The northeastern portion of the St. Lucie BMAP boundary was refined based on a stormwater master plan completed by the City of Fort Pierce (Kimley-Horn and Associates, Inc. 2010). Proposed changes to the boundary were made in two of the city's drainage basins: Virginia Avenue Canal East and Virginia Avenue Canal West. The southern portion of the boundary was also refined to follow the northern portion of the city's Cortez NSLRWCD Canal drainage basin.

The boundary changes allowed City of Fort Pierce projects and reductions to be more accurately divided between the St. Lucie BMAP and the Central IRL BMAP, in which the city is also a stakeholder. Citywide projects (street sweeping, catch basin cleanouts, and education) were credited based on the percentage of city area within the BMAP boundary. Additionally, the Indian Hills Recreation Area Stormwater Improvements Phase II (FP-11) Project is located within the updated boundary, and credits will be estimated accordingly in the future.

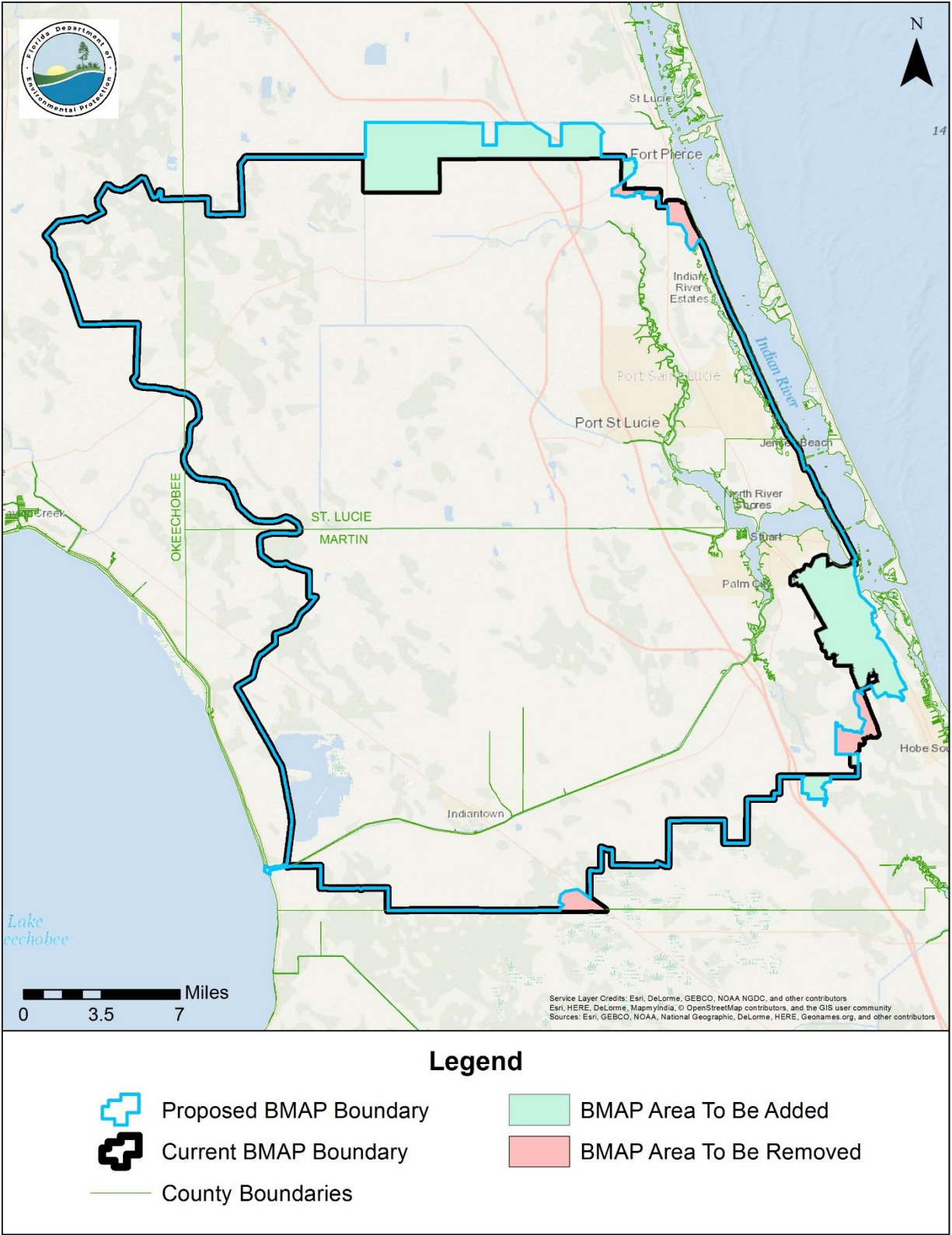


Figure 10. Proposed St. Lucie River and Estuary BMAP boundary changes

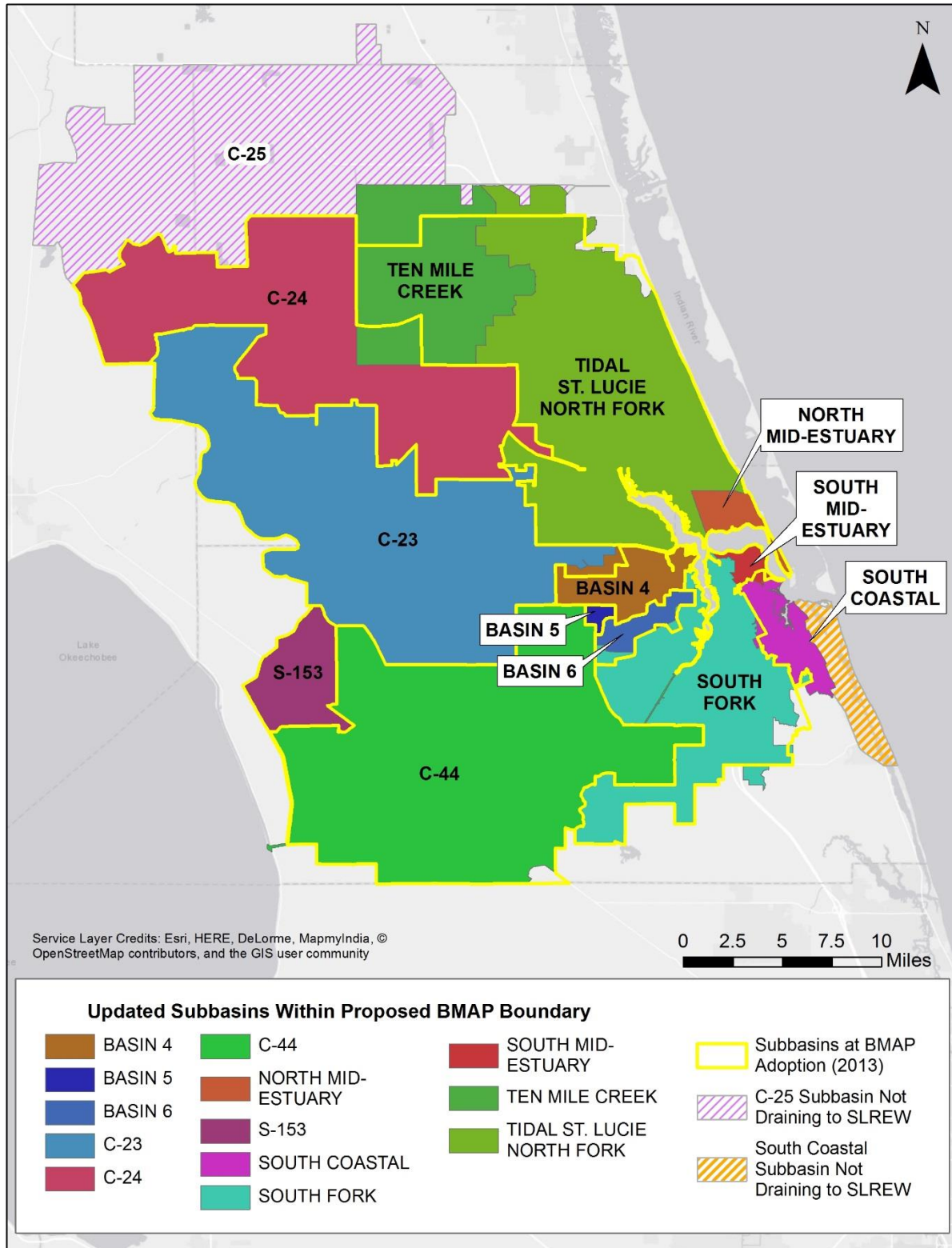


Figure 11. Proposed BMAP subbasin boundary revisions

3.3 BMAP Modeling

The St. Lucie Estuary WaSh model was updated and revised as part of this 5-Year Review. The revisions and scenarios are summarized below, and a separate modeling report provides additional descriptions of model functionality, data sources, calibration and verification results, and alternative scenario outcomes (SFWMD et al. 2018).

Results from the BMAP modeling revisions were used to draft revised allocations and may be used for future BMAP development and planning purposes.

3.3.1 WaSh Modeling Revisions

The WaSh model—a hydrologic, hydrodynamic, and water quality model—was developed for the SLREW. The model domain covers the C-23, C-24, C-44/S-153, Ten Mile Creek, North Fork, South Fork, and South Coastal Subbasins, and Basins 4/5/6. The model was originally developed for the unique hydrologic conditions in South Florida (URS 2008) and was adapted during the first phase of implementation to better suit the planning purposes of the BMAP.

DEP coordinated with the SFWMD to revise, enhance, and update the model, first by simulating the baseline scenario. The baseline scenario POR is 1994 to 2016, and the model uses 2004, 2008, and 2012 land use data. The model was calibrated using available SFWMD data from 2001 to 2006 and verified with available SFWMD data from 1995 to 2000.

The draft report for the WaSh baseline scenario (SFWMD 2017) was made available to stakeholders for review and preliminary modeling results were presented at the BMAP public meeting in January 2018. Stakeholder comments were incorporated into an updated model report (SFWMD et al. 2018), which was further revised based on additional work and made available for stakeholder review in May 2018.

The results of this modeling effort were used as inputs for the revised nutrient load allocation methodology discussed in **Section 3.4**.

3.3.2 Baseline Condition Scenario

The baseline WaSh model was calibrated using the following measured data: flow (cubic feet per second), ammonia nitrogen (mg/L), nitrate nitrogen (mg/L), organic nitrogen (mg/L), chlorophyll *a* (micrograms per liter), inorganic phosphorus (mg/L), organic phosphorus (mg/L), and DO (mg/L). Annual and monthly TN and TP loads (lbs/yr) were calculated based on model output (flows and nutrient concentrations). The locations for model calibration/verification of flow included S-80, S-97, and S-49; and for water quality included S-80, S-48, S-49, HR1, SE 01, SE 02, SE 03 SE 06, SE 08/SE 08B, and SE 11.

Overall, the model was well calibrated and verified within the periods chosen for the baseline scenario. The comparison of simulated and measured time series plots for both flow and water quality data were generally in good agreement. The comparison plots and evaluation statistics indicate that the model can predict annual TN and TP loads well. Generally, the comparison of

simulated and measured data indicates that the model closely reproduces the patterns of flow and captures the variation of nutrient dynamics.

3.3.3 WaSh Alternative Condition Scenarios

Two alternative condition scenarios from 2007 to 2016 were run and are currently being evaluated using the WaSh model: (1) the impact of select large-scale BMAP projects; and (2) the impact of septic system removal. The results of these scenarios are not currently being used to draft new allocations, but the model may be expanded in the future and used to support restoration activities in the BMAP. More detailed information about the set-up, data and assumptions used, and results of these scenarios can be found in the draft modeling report (SFWMD et al. 2018).

3.4 Revised Allocation Methodology

The updates and enhancements to the WaSh model necessitate revising the allocations and required reductions from the original BMAP. DEP has started engaging stakeholders about the process and new allocations. Meetings with stakeholders about the revisions will continue. This 5-Year Review recommends that the enhanced model and new process be used to calculate new allocations when the BMAP is readopted following the 5-Year Review.

3.4.1 Methodology for Determining Starting Loads

The revised WaSh model can produce polygon outputs with loading data included. Through a series of GIS steps, polygons were generated for each stakeholder. GIS data were used to clip the area within the BMAP boundary associated with each entity's jurisdictional boundary or the codes from SFWMD 2012 land use data related to the natural lands and agriculture categories. The clipping was done sequentially, as follows:

1. Water (Florida Power and Light [FPL] Pond, Dispersed Water Management [DWM] and CERP projects [construction or design status]).
2. Roads (FDOT and Florida's Turnpike Enterprise).
3. WCDs and other special districts.
4. Natural lands (land use codes 3000 [not including 3300], 4000, 5000, and 6000).
5. Agriculture (land use codes 2000 and 3300).
6. Community development districts (CDDs), each with its own boundary.
7. Municipalities.
8. Remaining area assigned to each county.

These stakeholder polygons allow the generation of model outputs with loading information from the baseline scenario results covering 2007 through 2016. Allocations can be set based on each stakeholder's portion of the total starting load. **Figure 12** shows the polygons for the stakeholders used to calculate new proposed allocations. If it is determined that any additional entity should be assigned an individual allocation, the entity will be included in the revision process. For additional details on how entities were incorporated into the process, see **Appendix F**.

Assumptions

The following assumptions were used during the allocation process:

- **Natural and Water Management Areas** – The allocations do not include required load reductions from areas identified as natural land use areas in the 2012 SFWMD land use coverage. Water management areas such as large regional projects, dikes and levees, and reservoirs are also excluded from the allocations. These loads are considered uncontrollable, background sources, and the stakeholders are not required to make reductions on these lands.
- **Land Uses** – The loading estimates in the BMAP are based on land uses at a particular point in time, allowing the model to be validated and calibrated. The loading estimates for these allocations were based on 2012 land use data.
- **Basin Boundaries** – The BMAP boundary recommended in **Section 3.2** is used for the allocations. The boundary change will be finalized once it is adopted into a revised BMAP.
- **Subbasins** – The adopted BMAP divided starting loads into six subbasins, while this analysis used nine subbasins. The three additional subbasins used in the revised allocation calculations were the North Mid-Estuary, Ten Mile Creek, and the combined South Mid-Estuary and South Coastal Subbasins.
- **Basins 4, 5, and 6** – Two reach outputs capture the model output from Basins 4, 5, and 6, and thus the modeled results were averaged to obtain a 1 % reduction for the entire basin.

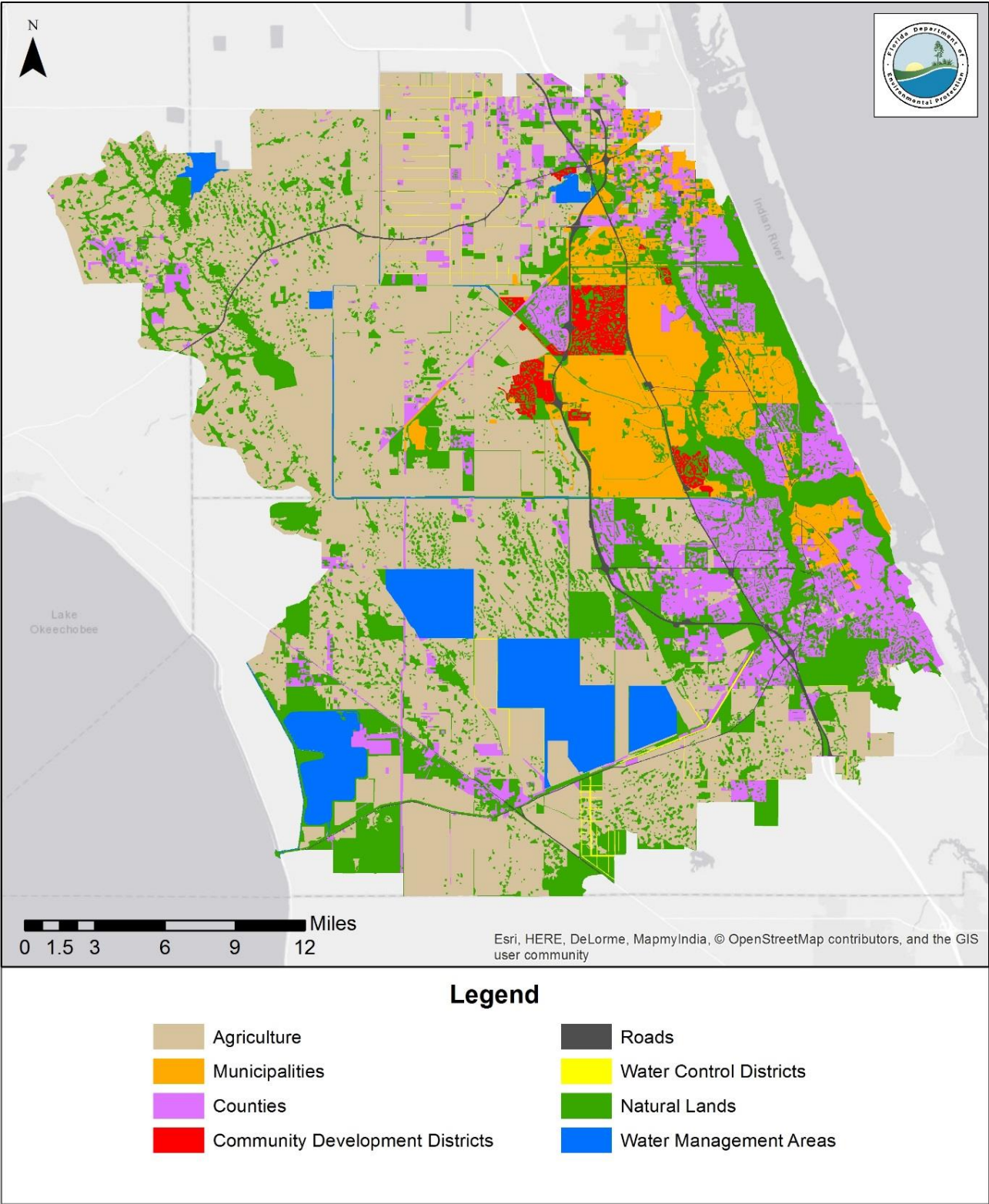


Figure 12. Draft allocation areas associated with entities

3.4.2 Methodology for Calculating Percent Reductions by Subbasin

Percent reductions for TN and TP in each subbasin can be calculated using data at model reach outputs in the updated WaSh model that correspond to subbasin discharge points. The modeled data are output as daily concentrations for TN and TP species that can be summed to obtain daily TN and TP concentrations. The daily concentrations from 2007 to 2016 can then be averaged for each discharge point (**Table 13**). The calculated concentrations are 10-year averages, similar to the period used to generate the starting loads in the recommended methodology.

Following the same process used during initial BMAP development, these average concentrations can be compared with the target concentrations at SE 03 to determine the percent reductions required for TN and TP in each subbasin. The percent reductions can be applied to each entity's starting load by subbasin to determine the required reductions for an entity in a specific subbasin. This approach is being discussed with stakeholders to determine how to best proceed with updating the allocation methodology.

3.4.3 Finalizing and Adopting Revised Allocations

Based on the updated allocation methodology and revised model output, starting loads by entity can be calculated within each subbasin. The percent reductions in **Table 13** can be applied to each entity's starting load by subbasin, and the results for each entity can be summed to obtain the total required reductions for that entity.

Project reduction credits will also be recalculated using the output from the revised WaSh model to correspond with the updated allocations. Once this work is complete, each entity's progress towards meeting the revised reductions can be reevaluated.

The process has been proposed, and conversations are ongoing with stakeholders about the revisions. This 5-Year Review recommends that the enhanced model and new process be used to calculate new allocations and project reduction credits following the 5-Year Review. The final methodology and the resultant allocations will be fully vetted during the BMAP update process and will be included in the revised BMAP document submitted to the DEP Secretary for adoption.

Table 13. Percent reductions for TN and TP load per subbasin based on model outputs

¹ Data averaged between two model reach outputs as a result of all three subbasins being grouped together.

Category	Basins 4,5, and 6 ¹	C-23	C-24	C-44, S-153	North Fork	North Mid- Estuary	South Fork	South Mid- Estuary/ South Coastal	Ten Mile Creek
TN Current Concentration (mg/L)	0.92	1.71	1.69	1.08	1.18	0.95	1.06	0.69	1.00
TN Target Concentration (mg/L)	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
TN Reduction Required (%)	22	58	57	33	39	24	32	0	28
TP Current Concentration (mg/L)	0.192	0.350	0.279	0.153	0.231	0.187	0.195	0.120	0.201
TP Target Concentration (mg/L)	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081	0.081
TP Reduction Required (%)	58	77	71	47	65	57	58	33	60

3.5 Water Quality Monitoring Revisions

The 5-Year Review of the St. Lucie River and Estuary BMAP provides an opportunity to improve key components of the plan and make further progress to achieve the TMDLs. This 5-Year Review recommends revising the BMAP monitoring network to help prioritize monitoring and track BMAP progress. Recommendations for the monitoring network include implementing a new tiered system for the sampling stations and removing some stations from the network. The proposed changes will go into effect after BMAP revision and official adoption by the DEP Secretary.

3.5.1 Recommended Revisions

During the first phase of the BMAP, an initial scientific and statistically based evaluation was conducted to group the stations into tiers. This evaluation was recently refined based on data quality to determine the final list of stations. If the recommended revisions to the BMAP monitoring network are implemented, sampling will be performed at a total of 61 SFWMD, City of Port St. Lucie, and USGS stations.

Port St. Lucie Station Modification

The city worked with DEP to modify the location and frequency of monitoring stations, with the goal of narrowing down sample sites so that certain locations can be sampled more frequently (**Table 14**). Both the Sagamore and Degan wastewater sites were removed because low- or no-flow conditions were frequently observed throughout the year. The Burrow site was also removed, as it did not measure any flows into the Port St. Lucie MS4 system. The farthest southwest subbasin contains Horseshoe Canal, which drains most of the basin and passes through Structure A18; thus, a new station located near the A18 structure will allow that portion of the drainage area to be monitored. The farthest southeast subbasin mostly drains to Structure A22, which will also be sampled as part of the recommended BMAP network. In addition to the city's stations in the monitoring network, Stations A24, B-95-3, and B-33 will be sampled periodically if time and other resources allow. The new sampling plan began in January 2018.

Table 14. City of Port St. Lucie monitoring changes

Methodology	Original	Revised
Sampling Frequency	1 or 2 times/year	Every other month
Number of Monitoring Stations	21	9 core sites; 3 optional sites
Parameters	TN, TP	TKN, TN, TP, DO, pH, conductivity, temperature, turbidity, N (ammonia), TSS, BOD, orthophosphate as P, alkalinity, and chlorophyll <i>a</i>

Stations Recommended for Removal from the Network

Based on the low frequency of sampling and overall need for the BMAP, the following stations are recommended for removal from the BMAP monitoring network:

- **Hobe St. Lucie Conservancy District:** Data at four stations are collected too infrequently to be used as a part of the dataset when conducting trend analysis for BMAP purposes.
- **NSLRWCD:** Because of issues with uploading data to STORET, the district provides data for seven stations by hand at annual meetings. NSLRWCD will continue to submit data directly to the BMAP coordinator until they can be uploaded to WIN.
- **St. Lucie County (SLC):** Data are collected at four stations—inflows and outflows for project areas—and are not needed to monitor inflows into the estuary.
- **St. Lucie West Services District (SLWSD):** Data at eight stations are collected too infrequently to be used as a part of the dataset when conducting trend analyses for BMAP purposes. Additionally, the data are forwarded from the processing lab to the City of Port St. Lucie and are not uploaded into WIN.

3.5.2 New Recommended Tiered Monitoring Network

To help prioritize monitoring and track BMAP progress over the long term, this 5-Year Review recommends a new tiered system for the sampling stations, as follows:

- Tier 1 stations will be the primary/priority stations used in periodic water quality analyses to track BMAP progress and water quality trends over the long term in the basin. Tier 1 stations include both estuary and structure ambient monitoring stations. Several of these stations have autosamplers with more frequent data collection, and the stations at the structures also have flow data. If at any point it is necessary to reduce efforts in the basin, these stations should be the last stations impacted.
- Tier 2 stations will provide secondary information that can be used to help focus and adaptively manage implementation efforts.
- Tier 3 consists of USGS gages where flow and/or stage are monitored.

Table D-2 in Appendix D lists the revised monitoring network.

3.5.3 TMDL Compliance Methodology

The development of an appropriate compliance methodology for the TMDL targets in the BMAP is underway and will be discussed with stakeholders upon the revision and readoption of the BMAP.

References

- Kimley-Horn and Associates, Inc. 2010. *City of Ft. Pierce citywide stormwater master plan*. Prepared for the City of Fort Pierce, FL.
- South Florida Water Management District. 2017. *Draft report: St. Lucie River and Estuary Watershed water quality modeling. Part I: Model calibration and verification of baseline scenario for the St. Lucie River and Estuary Basin Management Action Plan*. West Palm Beach, FL.
- South Florida Water Management District, Florida Department of Environmental Protection, and Florida Department of Agriculture and Consumer Services. 2009. *St. Lucie River watershed protection plan*.
- South Florida Water Management District, Florida Department of Environmental Protection, and Amec Foster Wheeler. 2018. *Draft report: St. Lucie River and Estuary Watershed water quality modeling for the St. Lucie River and Estuary Basin Management Action Plan*.
- Soil and Water Engineering Technology [SWET], Inc. 2008. *Legacy phosphorus abatement plan for project entitled "Technical assistance in review and analysis of existing data for evaluation of legacy phosphorus in the Lake Okeechobee Watershed."* West Palm Beach, FL: South Florida Water Management District.
- URS, Inc. 2008. *WaSh model configuration, calibration, and validation for the St. Lucie Estuary Watershed*. Prepared for the Florida Department of Environmental Protection.

Appendices

Appendix A: BMAP Projects

The tables in this appendix list the implementation status of the BMAP projects as of December 31, 2017. The tables list the nitrogen and phosphorus reduction (in lbs/yr) attributable to each individual project. These projects were submitted to provide reasonable assurance to DEP that each entity has a plan on how to meet its allocation. However, the list of projects is meant to be flexible enough to allow for changes that may occur over time. During the annual review of BMAP implementation efforts, project-specific information may be revised and updated, resulting in changes to the estimated reductions for those projects. The revisions may increase or decrease estimated reductions, and DEP will work with stakeholders to address revisions as they are identified.

The project status column is standardized into the following four categories:

- **Canceled:** Project or activity that was planned but will no longer take place. This includes the cessation of ongoing activities.
- **Completed:** Project, activity, or task that is finished. This includes fully implemented activities (i.e., ongoing activities) that must continue indefinitely to maintain assigned credits (such as street sweeping, BMP cleanout, catch basin cleanout, public education, fertilizer cessation/reduction, and vegetation harvesting).
- **Planned:** Project or activity that is conceptual or proposed.
- **Underway:** Project or activity that has commenced or initiated but is not completed and is not yet reducing nutrient loads from the treated area.

Prior to reporting project information, DEP contacts each lead entity to gather new information on projects and confirm previously reported information. The terms used throughout the project tables are defined as follows:

- **Not provided:** Denotes that information was requested by DEP but was not provided by the lead entity.
- **TBD:** To be determined. Denotes that information is not currently available but will be provided by the stakeholder when it is available.
- **N/A:** Not applicable. Denotes that information for that category is not relevant to that project.
- **0:** Zero. Denotes the numeric value for that category as zero.
- **O&M:** Operations and maintenance.

These project tables are based on current information, and project details may be updated as further information becomes available.

Table A-1. City of Fort Pierce projects

¹The City of Fort Pierce worked with DEP to determine how to best represent its projects in the St. Lucie BMAP because the city boundary also includes the Central IRL BMAP and a portion of land outside any BMAP boundary. The changes resulting from that conversation are reflected in this project table.
O&M = Operations and maintenance

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Fort Pierce	DEP	FP-01	Indian Hills Recreation Area Stormwater Improvements Phase I (also known as Heathcote Botanical Gardens Treatment Train)	Treatment train of 6 different BMPs are joined together to improve water quality of stormwater runoff discharging into IRL.	BMP Treatment Train	Completed	2015	N/A	N/A	Outside BMAP Boundary	1,242	\$3,000,000	\$113,000	DEP	\$1,410,000	SO579
City of Fort Pierce	N/A	FP-02	Moore's Creek Retrofit – Phases 3 and 4	Not provided	Wet Detention Pond	Completed	2008	N/A	N/A	Outside BMAP Boundary	72	\$825,000	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	N/A	FP-03	Street Sweeping	City removed 6,599 cubic yards of debris.	Street Sweeping	Completed	2013	2,020	1,295	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	N/A	FP-04	Inlet Cleaning	City cleans storm inlets citywide and disposes of waste (194 cubic yards).	Catch Basin Inserts/Inlet Filter Cleanout	Completed	2013	65	40	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	N/A	FP-05	Education Program	City delivers educational programs to public through trade associations, homeowner associations, or other means. City educates on hazards associated with illicit discharge, fertilizer use, importance of water quality, and stormwater pollution protection. City has web page devoted to NPDES permits, DEP, and stormwater education.	Education Efforts	Completed	2013	215	49	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	N/A	FP-06	Virginia Avenue Outfall Canal	Stabilization of eroded canal banks as result of 2008 Tropical Storm Fay using rock rip-rap and gabion basket wall construction.	Shoreline Stabilization	Completed	2008	N/A	N/A	Outside BMAP Boundary	161	\$3,462,572	\$1,500	Not provided	Not provided	N/A
City of Fort Pierce	N/A	FP-07	Moore's Creek Retrofit Phase 2	Not provided	Baffle Boxes – 1st Generation (hydrodynamic separator)	Completed	2008	N/A	N/A	Outside BMAP Boundary	1,680	\$1,480,437	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	N/A	FP-08	South Beach Baffle Boxes	Not provided	Baffle Boxes – 1st Generation (hydrodynamic separator)	Completed	2005	N/A	N/A	Outside BMAP Boundary	128	\$557,003	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	DEP	FP-09	Veterans Park Stormwater Improvements	Improvements to existing stormwater facility to incorporate BMPs along with pervious parking, lake construction, and bioswales.	BMP Treatment Train	Completed	2016	N/A	N/A	Outside BMAP Boundary	44	\$2,367,000	Not provided	DEP	\$807,500	SO696 G0417

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Fort Pierce	N/A	FP-10	North 2nd St. (Seaway Dr. north to Taylor Creek Marina)	Project entails complete reconstruction of 2nd St., including drainage conveyance/storage, utility upgrades and replacement, roadway widening and reconstruction, sidewalk on west side, and landscaping and lighting improvements.	Wet Detention Pond	Completed	2017	N/A	N/A	Outside BMAP Boundary	Not provided	\$1,909,176	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	DEP	FP-11	Indian Hills Recreation Area Stormwater Improvements Phase II	Reestablishment of wetlands and pervious paver parking areas.	Wetland Restoration	Completed	2016	TBD	TBD	Primary BMAP Area	61	\$2,337,485	Not provided	DEP	\$1,410,000	S0579
City of Fort Pierce	N/A	FP-12	Avenue F (US Hwy. 1 to 6th St.)	Drainage improvements along Ave. F will include curb inlets, 100 linear feet (LF) of exfiltration trench, complete curb replacement, and roadway resurfacing.	Exfiltration Trench	Completed	2017	N/A	N/A	Outside BMAP Boundary	Not provided	\$186,327	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	N/A	FP-13	Mechanical removal of water lettuce at Moore's Creek between N 10th St. and N 13th St.	One-time mechanical removal of water lettuce at Moore's Creek between N 10th St. and N 13th St.	Aquatic Vegetation Harvesting	Completed	2016	N/A	N/A	Outside BMAP Boundary	0.04	\$10,740	N/A	Not provided	Not provided	N/A

Total TN Project Reduction = 2,300 lbs/yr

Total TN Reduction Required = 6,479 lbs/yr

Total TP Project Reduction = 1,384 lbs/yr

Total TP Reduction Required = 2,693 lbs/yr

Table A-2. City of Port St. Lucie projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Port St. Lucie	DEP/ SFWMD/ SLC/ American Greenways/ Tax-increment financing	PSL-01	Woodstork Trail Design Districts 7, 8, and 9	4.6 acres of new filter marsh, 7.21 acres of new uplands, and installation of baffle box.	BMP Treatment Train	Completed	2007	4	4	Primary BMAP Area	229	\$3,300,000	\$386,000 (Annual budget to maintain drainage rights-of-way) \$736,000 (Annual budget for aquatic spraying)	DEP/ SFWMD/ SLC / American Greenways/ Tax-increment financing	Not provided	G0140
City of Port St. Lucie	DEP/ City Center Special Assessments	PSL-02	Wood Stork Trail Design District 6	7.74-acre wet detention area, .62-acres STA, and 3 baffle boxes.	BMP Treatment Train	Completed	2008	3	2	Primary BMAP Area	81	\$825,500	See PSL-01 and PSL-14	DEP/ City Center Special Assessments	Not provided	G0178
City of Port St. Lucie	DEP/SFWMD	PSL-03	Howard Creek STA	Construction of weir, 45-acre STA, littoral shelves, and new plantings.	BMP Treatment Train	Completed	2010	523	212	Primary BMAP Area	436	Included in PSL-4	See PSL-01 and PSL-05	DEP/ SFWMD	Not provided	S0507
City of Port St. Lucie	N/A	PSL-04	Eastern Watershed Improvement Project	Flood control, water quality, environmental restoration project consisting of 27 acres of wet detention ponds, littoral shelves, and created wetlands.	BMP Treatment Train	Completed	2011	618	361	Primary BMAP Area	850	\$36,000,000	See PSL-01 (aquatic spraying) and PSL-05	City	Not provided	N/A
City of Port St. Lucie	NRCS/ SFWMD	PSL-05	B-1 and B-2 Water Control Structures (WCS)	WCS B-1, B-2, and B-3 protected NFSLR from receiving uncontrolled E-8 Canal discharges. System will stage appropriate discharge levels based on volume, retaining maximum flows.	Control Structure	Completed	2007	2,527	994	Primary BMAP Area	1,748	\$1,800,000	\$621,000 (Annual right-of-way, bridge, and WCS maintenance)	City/ NRCS/ SFWMD	Not provided	N/A
City of Port St. Lucie	NRCS/ SFWMD	PSL-06	B-3 WCS	Not provided	Control Structure	Completed	2007	2,372	932	Primary BMAP Area	1,641	Included in PSL-5	See PSL-05	City/ NRCS/ SFWMD	Not provided	N/A
City of Port St. Lucie	DEP	PSL-07	E-8 Waterway Phase 1 Water Quality Retrofit	Control structure improvements, weirs, sediment removal, and construction of 2 STAs totaling 24.36 acres. Improvements will enhance stormwater drainage and flood protection capacity, improve water quality, and restore native vegetation and habitat.	BMP Treatment Train	Completed	2010	764	664	Primary BMAP Area	1,610	\$400,000	See PSL-01 and PSL-05	DEP	Not provided	S0239
City of Port St. Lucie	SFWMD	PSL-08	E-17 Canal WCS	New WCS added to retain maximum flows.	Control Structure	Completed	2008	181	0	Primary BMAP Area	984	\$437,000	See PSL-05	City	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Port St. Lucie	N/A	PSL-09	Water and Wastewater Expansion	Multiple phase outs of septic tanks from 2013 through 2017.	Septic Tank Phase Out	Completed	2017	34,198	N/A	Primary BMAP Area	N/A	\$91,075,666	\$3,700,000 Renewal and Replacement Fund (438)	City	N/A	N/A
City of Port St. Lucie	N/A	PSL-10	Street Sweeping	Not provided	Street Sweeping	Completed	Prior to 2013	676	434	Primary BMAP Area	N/A	Not provided	\$448,000 (Annual Street Division budget)	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-11	Swale Maintenance	Not provided	BMP Cleanout	Completed	Prior to 2013	7,649	3,097	Primary BMAP Area	N/A	Not provided	\$780,000	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-12	Catch Basin Cleaning	Not provided	Catch Basin Inserts/Inlet Filter Cleanout	Completed	Prior to 2013	21	13	Primary BMAP Area	N/A	Not provided	See PSL-10	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-13	Education Program	Florida Yards and Neighborhoods (FYN) Program; fertilizer, landscape, irrigation, and pet waste ordinances; public service announcements (PSAs); stormwater educational shows; website; outreach programs; Stencil Program; and stormwater pollution hotline.	Education Efforts	Completed	Prior to 2013	9,389	2,101	Primary BMAP Area	N/A	Not provided	Not provided	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-14	Tiffany Channel	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	33	8	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	\$1,900,000 (Annual Drainage Division budget)	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-15	Patio STA	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	11	3	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-16	Mary STA	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	8	2	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-17	Leithgow STA	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	7	2	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-18	Cane Slough 1/ Elks STA	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	33	7	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-19	Cane Slough 2/ Azzi STA	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	24	6	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	See PSL-14	City	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Port St. Lucie	N/A	PSL-20	Loutus STA	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	23	5	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-21	Howard Creek STA	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	34	7	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-22	Bur St, STA	Landscape irrigation is drawn from stormwater in channel.	Stormwater Reuse	Completed	Prior to 2013	1	0	Primary BMAP Area	N/A	Included in PSL-003 and PSL-004 Costs	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-23	SLWSD Aquatic Harvesting	Not provided	Aquatic Vegetation Harvesting	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Port St. Lucie	SLWSD	PSL-24	SLWSD Catch Basin Cleaning	Not provided	Catch Basin Inserts/Inlet Filter Cleanout	Completed	Prior to 2013	84	52	Primary BMAP Area	N/A	\$185,600	\$10,450	SLWSD	Not provided	N/A
City of Port St. Lucie	N/A	PSL-25	Atlantis Basin	Installation of 2nd-generation baffle box.	Baffle Boxes – 2nd Generation	Completed	2015	91	17	Primary BMAP Area	116	\$628,000	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-26	Evergreen Basin	Installation of 2nd-generation baffle box.	Baffle Boxes – 2nd Generation	Completed	2015	190	35	Primary BMAP Area	241	Included in PSL-25 cost	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-27	Lansdown Basin	Installation of 2nd-generation baffle box.	Baffle Boxes – 2nd Generation	Completed	2015	90	16	Primary BMAP Area	189	Included in PSL-25 cost	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-28	Streamlet/Manth Basin	Installation of 2nd-generation baffle box.	Baffle Boxes – 2nd Generation	Completed	2015	33	6	Primary BMAP Area	89	Included in PSL-25 cost	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	N/A	PSL-29	Walters Basin	Installation of 2nd-generation baffle box.	Baffle Boxes – 2nd Generation	Completed	2015	140	25	Primary BMAP Area	32	Included in PSL-25 cost	See PSL-14	City	Not provided	N/A
City of Port St. Lucie	DEP/ SLWSD	PSL-30	SLWSD Water Management Improvement Project	Increase storage of existing wetland.	Wet Detention Pond	Completed	2016	454	326	Primary BMAP Area	140	\$360,704	\$8,200	DEP/ SLWSD	DEP: \$159,658 SLWSD: \$201,046	S0812
City of Port St. Lucie	DEP/ SFWMD	PSL-31	McCarty Ranch Extension Phases 1 – VI	Water Farming Project – Pumps water from SFWMD C-23 Canal onto property for storage and retains rainfall on multiple phases of project.	Dispersed Water Management	Underway	2023	TBD	TBD	Primary BMAP Area	TBD	\$3,663,383	\$147,640; Covered in final build-out cost (\$180,640)	City/ DEP/ SFWMD	Not provided	NF028
City of Port St. Lucie	N/A	PSL-32	Veterans Memorial Water Quality Retrofit	Installing control structures, digging ponds, and increasing storage.	BMP Treatment Train	Underway	2022	2,961	1,005	Primary BMAP Area	1,065	\$3,834,193	See PSL-01 and PSL-05	City/ SFWMD	SFWMD: \$125,000	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Port St. Lucie	SLWSD	PSL-33	Lake Harvey	Construction of 4.41-acre wetland area and 2.25-acre flow-way to enhance water quality, storage, and hydraulic connectivity in SLWSD Basin 4E.	Hydrologic Restoration	Completed	2017	TBD	TBD	Primary BMAP Area	333	\$534,000	\$15,500	SLWSD	Not provided	N/A

Total TN Project Reduction = 60,180 lbs/yr

Total TN Reduction Required = 53,101 lbs/yr

Total TP Project Reduction = 9,329 lbs/yr

Total TP Reduction Required = 23,431 lbs/yr

Table A-3. City of Stuart projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Stuart	DEP/ SFWMD/ Healthy Rivers/ Florida Communities Trust (FCT)	S-01	Poppleton Creek – Phase II and III	Muck sediment removal, creation of 6.5-acre retention pond and 160-foot weir to stage up groundwater in basin. Habitat reconstruction (removal of exotics and replanting of native vegetation); passive recreational improvements (nature trails, educational signage, public access/trailhead) north of Central Parkway. Additional BMPs include 4 continuous deflective separation (CDS) baffle box units and street sweeping in basin.	BMP Treatment Train, Education Efforts, Muck Removal/ Restoration Dredging, and Exotic Vegetation Removal	Completed	2008	1,299	576	Primary BMAP Area	629	\$4,371,250	Not provided	DEP/ SFWMD/ Healthy Rivers/ FCT	Not provided	S0278, G0083
City of Stuart	SFWMD/ Federal Emergency Management Agency (FEMA)/ Martin County	S-02	Airport Ditch Project	Conversion of 2 uncontrolled drainage ditches to tide into retention/detention facilities controlled by "v" notch weirs.	Online Retention BMPs	Completed	2003	900	532	Primary BMAP Area	894	\$766,756	Not provided	SFWMD/ FEMA/ Martin County	Not provided	N/A
City of Stuart	SFWMD	S-03	Crescent Basin Project	Stormwater retention through 3 1st-generation baffle boxes.	Online Retention BMPs	Completed	2003	198	42	Primary BMAP Area	59	\$180,000	Not provided	City/ SFWMD	Not provided	N/A
City of Stuart	DEP/ SFWMD	S-04	Krueger Creek Project	Removal of "ooze" sediments and installation of 4 baffle boxes plus 2 CDS units in 2010.	Baffle Boxes– 1st Generation (hydrodynamic separator)	Completed	2001	7	7	Primary BMAP Area	310	\$432,000	Not provided	City/ SFWMD/ DEP	Not provided	WAP015, G0083
City of Stuart	N/A	S-05	Street Sweeping	Pavement cleaning by sweeping, vacuum, or washing.	Street Sweeping	Completed	2013	111	71	Primary BMAP Area	N/A	\$33,000	Not provided	City	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Stuart	N/A	S-06	Sediment Removal from Storm Systems	Removal and proper disposal of sediment captured by catch basin inserts.	Catch Basin Inserts/Inlet Filter Cleanout	Completed	2013	97	59	Primary BMAP Area	N/A	N/A	\$75,000	City	Not provided	N/A
City of Stuart	N/A	S-07	Education Program	FYN Program. City ordinances for landscaping, irrigation, fertilizer, and pet waste management. Doggie Pot Stations provided in all city parks. City stormwater website. Stormwater calendars mailed to residents and businesses every odd calendar year. Neighborhood Cleanup Program. Pollution prevention information posted on electronic billboards 365 days/year from 12 PM to 1 PM.	Education Efforts	Completed	2013	840	186	Primary BMAP Area	N/A	Total Cost: \$30,150 (FYN agreement – \$16,550; calendars – \$8,400; dog stations – \$5,200)	Not provided	City	Not provided	N/A
City of Stuart	SFWMD/ Healthy Rivers	S-08	North Point CRA Drainage Basin	There is 1 existing 1st-generation baffle box and street sweeping in basin, existing FDOT swale along basin's east boundary, and 2 FDOT retention/detention ponds near Roosevelt Bridge.	Baffle Boxes – 1st Generation (hydrodynamic separator)	Completed	2002	24	23	Primary BMAP Area	1,084	\$1,339,000	Not provided	City/ SFWMD/ Healthy Rivers	Not provided	N/A
City of Stuart	DEP/ Florida Inland Navigation District (FIND)/ Healthy Rivers	S-09	Anchorage Drainage Basin	There is 1 existing 1st-generation baffle box and 3 FDOT dry detention ponds in basin. Ponds receive runoff from roadways and portion of Roosevelt Bridge. There is also street sweeping in basin.	Baffle Boxes – 1st Generation (hydrodynamic separator)	Completed	2002	1	0	Primary BMAP Area	21	\$766,500	Not provided	City/ DEP/ FIND/ Healthy Rivers	Not provided	Not provided
City of Stuart	DEP	S-10	Downtown Drainage Basin	Drainage basin contains 4 1st-generation baffle boxes and 4 CDS units installed between 2000 and 2012; 3 catch basin filter baskets installed in 2010–11. Streets swept 12 times per month.	Baffle Boxes – 1st Generation (hydrodynamic separator)	Completed	2002	2	2	Primary BMAP Area	117	\$275,000	Not provided	City/DEP	Not provided	G0083
City of Stuart	DEP	S-11	Hildebrad Basin	1 CDS unit and 7 catch basin filter baskets installed in 2010–11; includes street sweeping in basin.	CDS Unit	Completed	2009	0	6	Primary BMAP Area	67	\$388,480	Not provided	City/DEP	Not provided	G0083
City of Stuart	N/A	S-12	Landfill Basin	Landfill closed, ongoing groundwater monitoring, zero discharge. Closed basin with no outfall.	100% Onsite Retention	Completed	2013	167	26	Primary BMAP Area	71	\$29,144	Not provided	City	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Stuart	N/A	S-13	South Fork Drainage Basin	There are 2 1st-generation baffle boxes in northwest portion of basin and 1 unimproved ditch along south side of SE Ruhnke St. that flows to wooded area on west side of basin boundary within city jurisdiction.	Baffle Boxes – 1st Generation (hydrodynamic separator)	Completed	2002	16	16	Primary BMAP Area	663	Not provided	Not provided	City	Not provided	N/A
City of Stuart	DEP	S-14	Neighborhood Initiated Sewer Expansion Program	Sewer expansion program to phase out septic tanks by expanding sewer service into areas of city using low pressure sewer system piping along road rights-of-way and individual residential grinder pump station at each home.	Septic Tank Phase Out	Completed	2013	1,341	N/A	Primary BMAP Area	N/A	\$3,200,000	Not provided	City/DEP	Not provided	S0793, S0821
City of Stuart	N/A	S-15	Eldorado Heights	Area of land within the south-central area of Stuart city limits that does not discharge to surface waterbody or adjacent basin.	Closed Basin	Completed	2012	134	27	Primary BMAP Area	30	\$779,000	Not provided	City	Not provided	N/A
City of Stuart	Martin Memorial Health Systems/ SFWMD	S-16	Amerigo Ave. Drainage Improvements	Construction of dry retention areas to eliminate street flooding, provide water quality treatment and TMDL reductions.	Dry Detention Pond	Completed	2014	37	7	Primary BMAP Area	10	\$679,557	Not provided	City/ Martin Memorial Health Systems/ SFWMD	Not provided	SFWMD No. 4600002954
City of Stuart	Martin County/ Healthy Rivers/ FCT/ DEP	S-17	Haney Creek Project – Phase I – IV	Creation of flow-through marsh and multiple wetlands and control structures to address stormwater quality, environmental restoration and preservation, greenways, passive recreation, and environmental education.	Filter Marsh	Completed	2016	513	207	Primary BMAP Area	626	\$4,831,411	\$9,600	Martin County/ Healthy Rivers/ FCT/ DEP	Not provided	WAP-031
City of Stuart	N/A	S-18	Nondischarge Areas	Area of land within eastern city limits with no stormwater infrastructure and no outfalls discharging to adjacent basin.	Noncontributing Basin	Completed	2014	1,038	233	Primary BMAP Area	218	See S-12	N/A	City	Not provided	N/A
City of Stuart	DEP	S-19	Baffle Boxes (22) Throughout City	Concrete structures containing series of sediment settling chambers separated by baffles. Boxes are vacuum cleaned base on sediment depth inspection by city stormwater staff.	Baffle Boxes – 1st Generation (hydrodynamic separator)	Completed	2014	11	11	Primary BMAP Area	475	Included in Project S-10 cost	Not provided	City/DEP	Not provided	G0083
City of Stuart	DEP	S-20	CDS Units Throughout City	Hydrodynamic separators that capture, sediment, trap debris, and separate floating oils from runoff. CDS units are vacuum cleaned based on sediment depth inspections by city stormwater staff.	CDS Unit	Completed	2014	0	6	Primary BMAP Area	66	Included in Project S-11 cost	Not provided	City/DEP	Not provided	G0083

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Stuart	N/A	S-21	SW South Carolina Dr. Drainage Project	Installation of stormwater conveyance system and 1st-generation baffle box in residential area to eliminate unrestricted sheet flow to St. Lucie River.	Stormwater System Rehabilitation	Completed	2016	TBD	TBD	Primary BMAP Area	3	\$100,936	Not provided	City	Not provided	N/A
City of Stuart	DEP	S-22	Poppleton Creek Tidal Wetlands Creation and Restoration Project	Construct tidal red mangrove wetlands on 4.3 acres of city-owned property south of and adjacent to Poppleton Creek east of Palm City Rd. Project will clear exotic vegetation and create tidal wetlands, then direct tidal flows through created red mangrove wetlands and into existing red mangrove wetlands. Goal is to provide functional treatment of impaired waters with every tidal exchange.	Wetland Restoration	Underway	2018	TBD	TBD	Primary BMAP Area	525	\$270,200	TBD	City/DEP	Not provided	G0363
City of Stuart	DEP	S-23	East Heart of Haney Creek Wetlands Restoration	Restore eastern third of Heart of Haney Creek to wetlands by creating system of berms and weirs within 6 acres of exotic cleared area. Currently, open ditch directs stormwater to tide. Restored wetlands will replace ditch and thus provide stormwater treatment and nutrient removal before discharge to tidal St. Lucie River.	Wetland Restoration	Underway	2019	TBD	TBD	Primary BMAP Area	395	\$220,000	TBD	City/DEP	DEP: \$90,000 City: \$110,000	S0891
City of Stuart	DEP/ Healthy Rivers	S-24	Frazier Creek Pond	Construction of wet detention pond to eliminate unrestricted flow from ditch to tide.	Wet Detention Pond	Completed	2002	TBD	TBD	Primary BMAP Area	379	\$1,702,000	Not provided	City/DEP/ Healthy Rivers	Not provided	WAP016

Total TN Project Reduction = 6,735 lbs/yr

Total TN Reduction Required = 4,760 lbs/yr

Total TP Project Reduction = 2,038 lbs/yr

Total TP Reduction Required = 2,062 lbs/yr

Table A-4. FDOT District 4 projects¹ Projects located in the Special Project BMAP Area' are situated in the South Coastal or Mid-Coastal Subbasins, which are outside the current BMAP boundary. However, they may be considered for credit in the next BMAP iteration.

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT	N/A	FDOT-01	FM# 230108-1 (Ponds 2 and 3)	Widening and new late construction on State Road (SR) 68 from SR 9 to east of County Road (CR) 607A (40 % credit, remaining 60 % to Central IRL).	Wet Detention Pond	Completed	2013	1	0	Primary BMAP Area	18	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-02	FM# 230108-1	Combined with FDOT-01.	Wet Detention Pond	Completed	2013	N/A	N/A	Primary BMAP Area	18	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-03	FM# 230262-4	Road widening of SR 70 from west of Rim Ditch Canal to west of Header Canal.	Dry Detention Pond	Completed	2008	69	18	Primary BMAP Area	102	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-04	FM# 230262-5	Road widening of SR 70 from Turnpike to Berman Rd.	Dry Detention Pond	Completed	2010	60	15	Primary BMAP Area	124	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-05	FM# 230262-3	Road widening of SR 70 from Okeechobee County line, east 10.2 miles.	Dry Detention Pond	Completed	2012	168	38	Primary BMAP Area	195	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-06	FM# 230262-2	Road widening of SR 70 from Okeechobee County line, east 10.2 miles.	Dry Detention Pond	Completed	2015	110	36	Primary BMAP Area	238	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-07	FM# 230295-1	Road widening of SR 716 from Westmoreland Br. to SR 5.	Dry Detention Pond	Completed	2003	9	2	Primary BMAP Area	17	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-08	SPN 99004-1585	Road widening of SR 5 from Jensen Beach Blvd. to Port St. Lucie Blvd.	Dry Detention Pond	Completed	2003	16	3	Primary BMAP Area	31	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-09	SPN 99004-1585 (Lake 3)	Road widening of SR A1A from Sewalls Point Rd. to west of MacArthur Blvd.	Wet Detention Pond	Completed	2003	14	5	Primary BMAP Area	13	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-10	FM# 228819-1 (Basin A and B)	SR A1A Ernest Lyons Bridge Replacement	Wet Detention Pond	Completed	2007	0.2	0.1	Primary BMAP Area	0	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-11	FM# 228821-1 (West 1 A)	SR A1A Evans Crary Senior Bridge Replacement	Exfiltration Trench	Completed	2001	5	1	Primary BMAP Area	2	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-12	FM# 228821-1 (East)	SR A1A Evans Crary Senior Bridge Replacement	Exfiltration Trench	Completed	2001	2	0	Primary BMAP Area	1	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-13	FM# 228831-1	Bridge replacement at SR 714 crossing over Florida's Turnpike.	Dry Detention Pond	Completed	2000	3	1	Primary BMAP Area	9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-14	FM# 228801-1	Road widening of SR 5 from Seabranh Blvd. to north of Salerno Rd.	Dry Detention Pond	Completed	2003	1	0	Primary BMAP Area	2	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-15	FM# 405504-1	SR 9 rest area improvements	Dry Detention Pond	Completed	2005	24	5	Primary BMAP Area	54	Not provided	Not provided	Florida Legislature	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT	N/A	FDOT-16	FM# 230288-2	Road widening of SR 5 from Rio Mar Dr. to Midway Rd.	Wet Detention Pond	Completed	2009	63	22	Primary BMAP Area	44	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	City of Port St. Lucie	FDOT-17	FM# 419890-1	Construction of interchange at SR 9 and Becker Rd.	BMP Treatment Train	Completed	2010	2	2	Primary BMAP Area	42	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-18	Street Sweeping	Not provided	Street Sweeping	Completed	2013	1,419	910	Primary BMAP Area	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-19	Public Education	Pamphlets	Education Efforts	Completed	2013	31	6	Primary BMAP Area	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	Martin County	FDOT-20	FM# 230978-1 Indian St. Bridge (Pond East)	New bridge crossing on CR 714 from west of Mapp Rd. to east of SR 76 on Indian St.	Dry Detention Pond	Completed	2014	2	0	Primary BMAP Area	21	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-21	FM# 230978-1 Indian St. Bridge (Pond West)	New bridge crossing on CR 714 from west of Mapp Rd. to east of SR 76 on Indian St.	Wet Detention Pond	Completed	2014	0.1	0.0	Primary BMAP Area	34	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-22	SR 615 Midway Rd. to Edwards Rd. (Basin B-1)	Not provided	Wet Detention Pond	Completed	2009	5	2	Primary BMAP Area	8	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-23	SR 615 Midway Rd. to Edwards Rd. (Basin E)	Not provided	Wet Detention Pond	Completed	2009	6	2	Primary BMAP Area	9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-24	FM# 410717-1 SR 70 Widening Kings Highway to Jenkins Rd. (West Basin)	Road widening on SR 70 from Kings Highway to Jenkins Rd.	Dry Detention Pond	Completed	2012	3	1	Primary BMAP Area	6	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-25	SR 713 (King's Highway) Turn Lanes	Not provided	Grass swales without swale blocks or raised culverts	Completed	2013	0	0	Primary BMAP Area	1	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-26	Johnson Honda of Stuart Turn Lane (Basin A and B)	Not provided	Exfiltration Trench	Completed	2010	0.1	0.0	Primary BMAP Area	0	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-27	FM# 228852-1 SR 76 Drainage Improvements at Cabana Point (Pond 9A)	SR 76 drainage improvements at Cabana Point.	Wet Detention Pond	Completed	2006	10	3	Primary BMAP Area	5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-28	FM# 228852-1 Osprey Ridge Planned Unit Development – SR 76 Improvements	SR 76 Osprey Ridge Planned Unit Development drainage improvements.	Exfiltration Trench	Completed	2007	0.1	0.0	Primary BMAP Area	0	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-29	FM# 228852-1 SR 76 Improvements – Kanner Professional Center	SR 76 Improvements – Kanner Professional Center	Exfiltration Trench	Completed	2009	0.2	0.0	Primary BMAP Area	0	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-30	FM# 228851-1 (Basin A)	Resurfacing of SR 5 from just north of Bridge Rd. to just north of SE Dharyls St.	Dry Detention Pond	Completed	2004	TBD	TBD	Special Project BMAP Area	14	Not provided	Not provided	Florida Legislature	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT	N/A	FDOT-31	FM# 228851-1	Resurfacing of SR 5 from just north of Bridge Rd. to just north of SE Dharyls St.	Dry Detention Pond	Completed	2004	TBD	TBD	Special Project BMAP Area	26	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-32	FM# 230132-1 (System No. 1)	Road widening of SR 615 between Ave. Q and Industrial Ave.	Dry Detention Pond	Completed	2001	TBD	TBD	Special Project BMAP Area	3	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-33	FM# 228758-1	SR 732 bridge replacement over Intracoastal Waterway.	Dry Detention Pond	Completed	2006	TBD	TBD	Special Project BMAP Area	19	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-34	FM# 228819-1 (Basin C)	Road reconstruction and construction of 2 new bridges on SR A1A from Sewall's Point Rd. to west of MacArthur Blvd.	Dry Detention Pond	Completed	2007	TBD	TBD	Special Project BMAP Area	16	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-35	FM# 228819-1 (Basin D)	Road reconstruction and construction of 2 new bridges on SR A1A from Sewall's Point Rd. to west of MacArthur Blvd.	Exfiltration Trench	Completed	2007	TBD	TBD	Special Project BMAP Area	4	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-36	FM# 228819-1 (Basin E)	Road reconstruction and construction of 2 new bridges on SR A1A from Sewall's Point Rd to west of MacArthur Blvd.	Exfiltration Trench	Completed	2007	TBD	TBD	Special Project BMAP Area	5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-37	FM# 405167-1	Resurfacing of SR A1A from Hutchinson House West North to Martin County.	Online Retention BMPs	Completed	2005	TBD	TBD	Special Project BMAP Area	30	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-38	FM# 230296-1	Shoulder widening and drainage improvements on SR A1A from C-1 Intake Canal to Fort Pierce city limits.	Grass swales without swale blocks or raised culverts	Completed	2009	TBD	TBD	Special Project BMAP Area	89	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-39	FM# 230297-1 SR A1A Roadway Improvements Phase 3	Roadway improvements on SR A1A from Blue Heron Blvd. to Gulfstream Ave.	Exfiltration Trench	Completed	2010	TBD	TBD	Special Project BMAP Area	6	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-40	FM# 228758-1 SR 702 Jensen Beach Causeway	New roadway construction on SR 702 from Indian River Dr. to SR A1A.	Dry Detention Pond	Completed	2008	TBD	TBD	Special Project BMAP Area	34	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-41	FM# 419250-2 SR 710 Bridge Replacement – 100A, 100B, and 200	Big John Monahon Bridge replacement on SR 710 from SW Trail Dr. to east of SR 76 connector ramps.	Dry Detention Pond	Completed	2015	3	0	Primary BMAP Area	17	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-42	FM# 419250-2 SR 710 Bridge Replacement – 300 and 500	Big John Monahon Bridge replacement on SR 710 from SW Trail Dr. to east of SR 76 connector ramps.	Dry Detention Pond	Completed	2015	7	1	Primary BMAP Area	28	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-43	FM# 413046-1 SR 9 Widening	Road widening on SR 9 from Okeechobee Rd. to south of Indrio Rd.	Online Retention BMPs	Completed	2015	75	14	Primary BMAP Area	152	Not provided	Not provided	Florida Legislature	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT	N/A	FDOT-44	FM# 423022-1 CR 68 Orange Ave.	County to provide GIS data for county road; proposed split of 25 % to FDOT and 75 % to St. Lucie County.	Dry Detention Pond	Completed	2015	TBD	TBD	Primary BMAP Area	6	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-45	FM# 230108-1 SR 68 Orange Ave. (40 % credit)	Combined with FDOT-1.	Wet Detention Pond	Completed	2005	N/A	N/A	Primary BMAP Area	18	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	SLC	FDOT-46	231440-2 Midway Rd. Widening, 25th St. to US Hwy. 1 (Ponds 1 and 2)	Road widening on Midway Rd. from SR 68 to SR 5.	Wet Detention Pond	Underway	Not provided	0.2	0.4	Primary BMAP Area	17	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	SLC	FDOT-47	231440-2 Midway Rd. Widening, 25th St to US Hwy. 1 (Ponds 3 and 4)	Road widening on Midway Rd. from SR 68 to SR 5.	Wet Detention Pond	Underway	Not provided	0.2	0.5	Primary BMAP Area	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	SLC	FDOT-48	231440-2 Midway Rd. Widening, 25th St. to US Hwy. 1 (Pond 5)	Road widening on Midway Rd from SR 68 to SR 5.	Wet Detention Pond	Underway	Not provided	0.2	0.6	Primary BMAP Area	11	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-49	230978-2 CR 714 Martin Highway Widening – Danforth Basin	Road widening on CR 714 (Martin Highway) from east of Turnpike to just west of Mapp Rd.	Wet Detention Pond	Completed	2016	3	4	Primary BMAP Area	17	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-50	230978-2 CR 714 Martin Highway Widening – Wetlands Basin	Road widening on CR 714 (Martin Highway) from east of Turnpike to just west of Mapp Rd.	Wet Detention Pond	Completed	2016	2	2	Primary BMAP Area	12	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-51	422641-3 SR 76 Widening from I-95 to Monterey Rd. Pond 1	Road widening on SR 76 from I-95 to Monterey Rd.	Dry Detention Pond	Underway	2018	2	1	Primary BMAP Area	5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-52	422641-3 SR 76 Widening from I-95 to Monterey Rd. Pond 2A	Road widening on SR 76 from I-95 to Monterey Rd.	Wet Detention Pond	Underway	2018	2	1	Primary BMAP Area	7	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-53	422641-3 SR 76 Widening from I-95 to Monterey Rd. Pond 2B	Road widening on SR 76 from I-95 to Monterey Rd.	Wet Detention Pond	Underway	2018	3	1	Primary BMAP Area	15	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-54	422641-3 SR 76 Widening from I-95 to Monterey Rd. Pond 3	Road widening on SR 76 from I-95 to Monterey Rd.	Wet Detention Pond	Underway	2018	5	4	Primary BMAP Area	25	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-55	422641-3 SR 76 Widening from I-95 to Monterey Rd. Pond 4	Road widening on SR 76 from I-95 to Monterey Rd.	Wet Detention Pond	Underway	2018	3	2	Primary BMAP Area	12	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-56	422641-3 SR 76 Widening from I-95 to Monterey Rd. Pond 8	Road widening on SR 76 from I-95 to Monterey Rd.	Wet Detention Pond	Underway	2018	3	2	Primary BMAP Area	11	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-57	Fertilizer Application Cessation	Not provided	Fertilizer Cessation	Completed	2016	TBD	TBD	Primary BMAP Area	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT	N/A	FDOT-58	FM# 432705-1	Road widening of SR 710 from north of Indiantown Rd. to just south of bridge over C-44 Canal.	Grass Swales without Swale Blocks or Raised Culverts	Underway	2020	8	0	Primary BMAP Area	121	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT	N/A	FDOT-59	FM# 432705-1	Road widening of SR 710 from north of Indiantown Rd. to just south of bridge over C-44 Canal.	Grass Swales without Swale Blocks or Raised Culverts	Underway	2020	3	1	Primary BMAP Area	38	Not provided	Not provided	Florida Legislature	Not provided	N/A

Total TN Project Reduction = 2,113 lbs/yr

Total TN Reduction Required = 5,106 lbs/yr

Total TP Project Reduction = 1,093 lbs/yr

Total TP Reduction Required = 1,709 lbs/yr

Table A-5. Hobe St. Lucie Conservancy District projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Hobe St. Lucie Conservancy District	Not provided	HSL-01	Hobe Sound Polo Club	Not provided	BMP Treatment Train	Completed	2013	3,097	1,014	Primary BMAP Area	1,736	Not provided	Not provided	Not provided	Not provided	N/A
Hobe St. Lucie Conservancy District	Not provided	HSL-02	Changes in Agricultural Land Uses	Not provided	Land Use Change	Completed	2013	7,000	2,259	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Hobe St. Lucie Conservancy District	Not provided	HSL-03	90 % Implementation Agricultural BMPs	Not provided	Agricultural BMPs	Completed	2013	191	30	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A

Total TN Project Reduction = 10,288 lbs/yr

Total TP Project Reduction = 3,302 lbs/yr

Total TN Reduction Required = 9,462 lbs/yr

Total TP Reduction Required = 3,520 lbs/yr

Table A-6. Martin County projects

¹ Projects located in the 'Special Project BMAP Area' are projects that are located in the South Coastal sub-basin which is outside of the current BMAP boundary. However, they may be considered for credit in the next BMAP iteration.

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Martin County	SFWMD/ DEP	MC-01	Cedar Point Water Quality Retrofit	1.7 acre-feet (ac-ft) of water quality treatment (0.36 inches).	BMP Treatment Train	Completed	2004	72	34	Primary BMAP Area	31	\$398,027	Not provided	DEP	\$127,000	SO101
Martin County	SFWMD/ DEP	MC-02	Indian River Dr. Baffle Boxes	Not provided	Baffle Boxes – 2nd Generation	Completed	2010	31	6	Primary BMAP Area	39	\$741,827	Not provided	DEP/ SFWMD	SFWMD: \$187,000 DEP: \$208,137	SO363
Martin County	SFWMD/ DEP	MC-03	Warner Creek/Leilani Heights Water Quality Retrofit Phase I	8.0 ac-ft of water quality treatment (0.14 inches).	BMP Treatment Train	Completed	2011	230	49	Primary BMAP Area	70	\$541,854	Not provided	DEP/ SFWMD	DEP: \$558,625 SFWMD: \$825,000 SFWMD: \$704,375	G0264
Martin County	SFWMD/ DEP	MC-04	Warner Creek Phase II	Not provided	Dry Detention Pond	Completed	2012	6	1	Primary BMAP Area	15	\$1,750,338	Not provided	Florida Legislature	Not provided	N/A
Martin County	SFWMD/ DEP	MC-05	Warner Creek Phase III – Beacon 21	Not provided	Wet Detention Pond	Completed	2012	1,291	597	Primary BMAP Area	1,354	\$2,122,935	Not provided	Florida Legislature	Not provided	N/A
Martin County	SFWMD/ DEP	MC-06	Manatee Creek Water Quality Retrofit Phases I, II, and III	30.4 ac-ft of water quality treatment (0.44 inches).	BMP Treatment Train	Completed	2012	6	4	Primary BMAP Area	16	\$7,026,439	Not provided	DEP/ SFWMD	DEP: \$1,833,992 SFWMD: \$2,591,205	OT040740 SO0257

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Martin County	SFWMD/ DEP	MC-07	Rio/St. Lucie – Water Quality Retrofit – Phase 1	3.0 ac-ft of water quality treatment (0.35 inches).	BMP Treatment Train	Completed	2006	41	11	Primary BMAP Area	8	\$354,161	Not provided	DEP	\$300,179	SO100
Martin County	SFWMD/ DEP	MC-08	Rio/St. Lucie – Water Quality Retrofit – Phase 2	Not provided	BMP Treatment Train	Completed	2008	190	74	Primary BMAP Area	120	\$998,170	Not provided	DEP	\$776,170	OT050685
Martin County	SFWMD/ DEP	MC-09	Salerno Creek Water Quality Retrofit	54.5 ac-ft of water quality treatment - 1.03 inches	BMP Treatment Train	Completed	2003	408	134	Primary BMAP Area	208	\$4,715,074	Not provided	DEP	\$1,541,568	OT060149 WAP068 WM800 SP379
Martin County	SFWMD/ DEP	MC-10	Coral Gardens Water Quality Retrofit	8.5 ac-ft of water quality treatment (0.05 inches).	BMP Treatment Train	Completed	2005	1,376	936	Primary BMAP Area	2,008	\$2,321,860	Not provided	DEP	\$2,009,741	OT040741 SO116
Martin County	SFWMD/ DEP	MC-11	Fern Creek Water Quality Retrofit	29.8 ac-ft of water quality treatment (0.81 inches).	BMP Treatment Train	Completed	2005	685	258	Primary BMAP Area	607	\$2,660,200	Not provided	DEP	\$761,141	SO078 WAP027
Martin County	SFWMD/ DEP/ FEMA	MC-12	Old Palm City Water Quality Retrofit Phases I, II, and III	8.1 ac-ft of water quality treatment (0.51 inches).	BMP Treatment Train	Completed	2004	244	96	Primary BMAP Area	141	\$4,576,473	Not provided	DEP/ SFWMD/ FEMA	DEP: \$851,156 SFWMD: \$1,200,000 FEMA: \$593,553	G0034 OT060148
Martin County	SFWMD/ DEP	MC-13	North River Shores Baffle Boxes	Not provided	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2002	4	4	Primary BMAP Area	187	\$1,310,000	Not provided	DEP	\$500,000	SP557
Martin County	SFWMD/ DEP	MC-14	Palm Lake Park Water Quality Retrofit	7.7 ac-ft of water quality treatment (1.16 inches).	BMP Treatment Train	Completed	2003	108	42	Primary BMAP Area	80	\$1,741,098	Not provided	DEP	\$1,480,936	WAP026
Martin County	SFWMD/ DEP	MC-15	Tropical Farms Water Quality Retrofit	43.2 ac-ft of water quality treatment (1.11 inches).	BMP Treatment Train	Completed	2010	945	309	Primary BMAP Area	470	\$4,047,219	Not provided	DEP/ SFWMD	SFWMD: \$1,412,000 DEP: \$1,180,589	OT060152 SO361
Martin County	N/A	MC-16	Septic to Central Sewer Conversions	1,121 single-family and multifamily residential and commercial units in 5 neighborhoods.	Septic Tank Phase-Out	Completed	2014	15,386	N/A	Primary BMAP Area	N/A	\$28,678,946	Not provided	NEEPP – North River Shores neighborhood	Not provided	N/A
Martin County	SFWMD	MC-17	Danforth Creek – Phase 1	Not provided	Wet Detention Pond	Completed	2014	2,435	1,011	Primary BMAP Area	2,459	\$1,869,255	Not provided	SFWMD	\$1,035,515	N/A
Martin County	N/A	MC-18	Street Sweeping	Not provided	Street Sweeping	Completed	2013	108	69	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Martin County	N/A	MC-19	Baffle Box and Structure Cleanout	Not provided	Catch Basin Inserts/Inlet Filter Cleanout	Completed	2013	397	161	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Martin County	N/A	MC-20	Education Program	FYN; landscaping, irrigation, fertilizer, and pet waste ordinances; PSAs, pamphlets, website, illicit discharge program	Education Efforts	Completed	2013	6,049	1,342	Primary BMAP Area	N/A	Not provided	Not provided	County	\$60,000	N/A
Martin County	FDOT	MC-21	FM# 230978-1 Indian St. Bridge (Pond East)	Not provided	Dry Detention Pond	Completed	2014	5	1	Primary BMAP Area	21	Not provided	Not provided	Not provided	Not provided	N/A
Martin County	FDOT	MC-22	FM# 230978-1 Indian St. Bridge (Pond West)	Not provided	Wet Detention Pond	Completed	2014	0	0	Primary BMAP Area	34	Not provided	Not provided	Not provided	Not provided	N/A
Martin County	DEP	MC-23	Golden Gate Water Quality Retrofit Phases I, II	Not provided	Dry Detention Pond	Completed	2003	TBD	TBD	Special Project BMAP Area	202	\$2,046,145	Not provided	DEP	\$1,322,772	WAP030 G0012
Martin County	DEP	MC-24	Golden Gate Water Quality Retrofit Phase III	Not provided	BMP Treatment Train	Completed	2004	TBD	TBD	Special Project BMAP Area	27	\$584,371	Not provided	DEP	\$313,060	SO105
Martin County	DEP	MC-25	Hibiscus Park Water Quality Retrofit Phases I and II	Not provided	Wet Detention Pond	Completed	2007	TBD	TBD	Special Project BMAP Area	5	\$1,390,574	Not provided	DEP	\$687,715	OT050696
Martin County	DEP	MC-26	Poinciana Gardens Water Quality Retrofit Phases I and II	Not provided	Wet Detention Pond	Completed	2003	TBD	TBD	Special Project BMAP Area	188	\$2,960,547	Not provided	DEP	\$2,235,091	WAP025
Martin County	N/A	MC-27	Willoughby Creek Muck Dredging	Not provided	Muck Removal/ Restoration Dredging	Completed	2012	TBD	TBD	Special Project BMAP Area	N/A	\$13,200,000	Not provided	Not provided	Not provided	N/A
Martin County	N/A	MC-28	Manatee Pocket Dredging	Not provided	Muck Removal/ Restoration Dredging	Completed	2012	TBD	TBD	Special Project BMAP Area	N/A	\$1,000,000	Not provided	Not provided	Not provided	N/A
Martin County	DEP/ SFWMD	MC-29	Rio Water Quality Retrofit	Not provided	BMP Treatment Train	Completed	2014	162	36	Primary BMAP Area	45	\$696,800	Not provided	DEP/ SFWMD	DEP: \$240,000 SFWMD: \$310,000	SO642
Martin County	N/A	MC-30	Old Palm City Beemats	Not provided	Floating Islands/Managed Aquatic Plant Systems	Completed	2013	TBD	TBD	Primary BMAP Area	N/A	\$21, 996	Not provided	Not provided	Not provided	N/A
Martin County	FDACS	MC-31	Bessey Creek Hybrid Wetland Treatment Technology (HWTT)	Not provided	HWTT	Completed	2015	6,081	1,473	Primary BMAP Area	2,675	\$3,000,000	Not provided	FDACS	\$3,000,000	N/A
Martin County	FDACS	MC-32	Danforth Creek HWTT	Not provided	HWTT	Completed	2016	5,274	1,281	Primary BMAP Area	2,419	\$3,000,000	Not provided	FDACS	\$3,000,000	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Martin County	N/A	MC-33	Hoke Library Rain Garden	Not provided	Low-Impact Development (LID) – Rain Gardens	Completed	2015	Not provided	Not provided	Primary BMAP Area	Not provided	\$4,372	Not provided	Not provided	Not provided	N/A
Martin County	N/A	MC-34	Halpatiokee Park Rain Garden	Not provided	LID – Rain Gardens	Completed	2015	Not provided	Not provided	Primary BMAP Area	Not provided	\$1,500	Not provided	Not provided	Not provided	N/A
Martin County	DEP	MC-35	Manatee Pocket SW Prong Baffle Box	Not provided	Baffle Boxes – 2nd Generation	Completed	2016	TBD	TBD	Primary BMAP Area	207	\$232,505	Not provided	DEP	\$100,000	S0759
Martin County	DEP	MC-36	Martin County Golf Course Water Quality	Not provided	Wet Detention Pond	Completed	2016	TBD	TBD	Primary BMAP Area	207	\$156,255	Not provided	DEP	\$50,000	S0765
Martin County	DEP	MC-37	All American Ditch	Not provided	Wet Detention Pond	Completed	2016	TBD	TBD	Primary BMAP Area	268	\$5,165,376	Not provided	DEP	\$3,000,000	S0758 G0414
Martin County	SFWMD	MC-38	Hilltop St. Exfiltration Trench	Not provided	BMP Treatment Train	Completed	2016	TBD	TBD	Primary BMAP Area	15	\$264,774	Not provided	SFWMD	\$100,000	N/A
Martin County	N/A	MC-39	Willoughby Creek STA	Not provided	BMP Treatment Train	Underway	2019	TBD	TBD	Primary BMAP Area	TBD	Not provided	Not provided	Not provided	Not provided	N/A
Martin County	N/A	MC-40	Savannah Rd. Exfiltration Trench	Not provided	BMP Treatment Train	Underway	2020	TBD	TBD	Primary BMAP Area	TBD	Not provided	Not provided	Not provided	Not provided	N/A
Martin County	N/A	MC-41	Old Palm City Phase IV	Not provided	BMP Treatment Train	Planned	2021	TBD	TBD	Primary BMAP Area	TBD	TBD	TBD	N/A	N/A	N/A
Martin County	N/A	MC-42	South Savannas Weir	Not provided	Control Structure	Planned	2020	TBD	TBD	Primary BMAP Area	TBD	TBD	TBD	TBD	TBD	N/A

Total TN Project Reduction = 41,532 lbs/yr

Total TP Project Reduction = 7,927 lbs/yr

Total TN Reduction Required = 32,158 lbs/yr

Total TP Reduction Required = 14,590 lbs/yr

Table A-7. North St. Lucie River WCD projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
NSLRWCD	St. Lucie River Issues Team (SLRIT)	NSLRWCD-01	SLRIT Grant 2000–2001: Vegetation Control and Bank Restoration	Installation of C-25 diversion structure, which regulates flow from NSLRWCD C-44/North Emergency Relief Canal to SFWMD C-25. In addition, installation of 3 risers with adjustable gates. These 4 control structures, at different locations, provide better water quality and more efficient management of water levels.	Control Structure	Completed	2003	983	0	Primary BMAP Area	4,173	\$929,000	Not provided	NSLRWCD/SLRIT 50/50 contribution match	Not provided	N/A
NSLRWCD	SLRIT	NSLRWCD-02	SLRIT Grant 2007–2008: Water Control Structure Retrofits	Installation of adjustable gates on water control structures to improve efficiency of water levels and better manage sediment transport downstream.	Control Structure	Completed	2010	1,372	0	Primary BMAP Area	4,701	\$77,000	Not provided	NSLRWCD/SLRIT 50/50 contribution match	Not provided	N/A
NSLRWCD	SLC, FDOT	NSLRWCD-03	Canals 23 and 28 Retrofit for Stormwater Treatment and Attenuation	Construction of ponds and installation of water control structures for area retrofit. Inclusion of district canals into pond footprints.	Control Structure	Completed	2009	11	0	Primary BMAP Area	44	Not provided	Not provided	Primarily funded by FDOT; SLC, NSLRWCD	Not provided	N/A
NSLRWCD	N/A	NSLRWCD-04	Canal Maintenance Program	Maintenance program on over 200 miles of canal.	Aquatic Vegetation Harvesting	Completed	2013	Not provided	Not provided	Primary BMAP Area	66,225	\$4,200,000	Not provided	NSLRWCD	Not provided	N/A
NSLRWCD	N/A	NSLRWCD-05	Changes in Agricultural Land Uses	Not provided	Land Use Change	Completed	2013	45,621	14,445	Primary BMAP Area	1,055	N/A	N/A	N/A	N/A	N/A
NSLRWCD	N/A	NSLRWCD-06	90 % Implementation Agricultural BMPs	Not provided	Agricultural BMPs	Completed	2013	19,972	4,308	Primary BMAP Area	N/A	N/A	N/A	N/A	N/A	N/A
NSLRWCD	N/A	NSLRWCD-07	Change from Agricultural to Urban	Not provided	Land Use Change	Completed	2013	839	208	Primary BMAP Area	N/A	N/A	N/A	N/A	N/A	N/A
NSLRWCD	N/A	NSLRWCD-08	Ideal Grove HWTT	Not provided	HWTT	Completed	2013	330	127	Primary BMAP Area	238	\$217,929	Not provided	Not provided	Not provided	N/A
NSLRWCD	Not provided	NSLRWCD-09	Structure 81-1-2	Installation of new control structure, which was part of Okeechobee Rd. improvements project.	Control Structure	Completed	2010	124	24	Primary BMAP Area	2,582	Not provided	Not provided	Not provided	Not provided	N/A
NSLRWCD	Not provided	NSLRWCD-10	Structure 82-2-2	Installation of new control structure, which was part of Okeechobee Rd. improvements project.	Control Structure	Completed	2010	23	5	Primary BMAP Area	674	Not provided	Not provided	Not provided	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
NSLRWCD	Not provided	NSLRWCD-11	Structure 83-2-2	Installation of new control structure, which was part of Okeechobee Rd. improvements project.	Control Structure	Completed	2010	27	5	Primary BMAP Area	484	Not provided	Not provided	Not provided	Not provided	N/A
NSLRWCD	Not provided	NSLRWCD-12	Structure 85-1-2	Installation of new control structure, which was part of Okeechobee Rd. improvements project.	Control Structure	Completed	2010	64	12	Primary BMAP Area	961	Not provided	Not provided	Not provided	Not provided	N/A

Total TN Project Reduction = 69,366 lbs/yr

Total TN Reduction Required = 87,846 lbs/yr

Total TP Project Reduction = 19,134 lbs/yr

Total TP Reduction Required = 33,634 lbs/yr

Table A-8. Pal Mar WCD projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Pal Mar WCD	Not provided	PM-01	90 % Implementation Agricultural BMPs	Not provided	Agricultural BMPs	Completed	2013	926	92	Primary BMAP Area	N/A	N/A	N/A	N/A	N/A	N/A

Total TN Project Reduction = 926 lbs/yr

Total TN Reduction Required = N/A

Total TP Project Reduction = 92 lbs/yr

Total TP Reduction Required = N/A

Table A-9. St. Lucie County MS4 projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
SLC MS4	N/A	SLC-01	Platt's Creek STA	Wet detention with alum injection.	Wet Detention Pond	Completed	2008	676	306	Primary BMAP Area	311	\$3,539,475	Not provided	County	Not provided	N/A
SLC MS4	N/A	SLC-02	Indian River Estates Stormwater Improvements (Phase I and II)	Wet detention with alum injection.	Wet Detention Pond	Completed	2009	1,841	707	Primary BMAP Area	1,004	\$4,471,114	Not provided	County	Not provided	N/A
SLC MS4	N/A	SLC-03	Prima Vista	Not provided	Baffle Boxes – 2nd Generation	Completed	2006	76	14	Primary BMAP Area	97	\$323,483	Not provided	Not provided	Not provided	N/A
SLC MS4	N/A	SLC-04	Bay Street	Not provided	Baffle Boxes – 2nd Generation	Completed	2006	35	6	Primary BMAP Area	44	Included in SLC-3	Not provided	Not provided	Not provided	N/A
SLC MS4	N/A	SLC-05	Education Program	FYN; pet waste, landscape, irrigation, and fertilizer ordinances; PSAs; website; Illicit Discharge Program, Eco-Center, Clean Stormwater – Clean River Program	Education Efforts	Completed	2013	1,087	248	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
SLC MS4	N/A	SLC-06	Street Sweeping	Not provided	Street Sweeping	Completed	2013	211	135	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
SLC MS4	N/A	SLC-07	Catch Basin Cleanout	Not provided	Catch Basin Inserts/Inlet Filter Cleanout	Completed	2013	170	105	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
SLC MS4	N/A	SLC-08	Platt's Creek Sump Cleanout	Not provided	BMP Cleanout	Completed	2013	1,182	512	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
SLC MS4	City of Port St. Lucie	SLC-14	Platt's Creek Compensatory Mitigation Project	Not provided	Floodplain Restoration	Completed	2015	Not provided	Not provided	Primary BMAP Area	311	\$2,600,000	Not provided	Not provided	Not provided	N/A

Total TN Project Reduction = 5,277 lbs/yr

Total TP Project Reduction = 2,032 lbs/yr

Total TN Reduction Required = 6,728 lbs/yr

Total TP Reduction Required = 2,849 lbs/yr

Table A-10. St. Lucie County Non-MS4 projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
SLC Non-MS4	N/A	SLC-01	Platt's Creek STA	Not provided	Wet Detention Pond	Completed	2008	907	365	Primary BMAP Area	564	Included in SLC-01 MS4 table	Not provided	Not provided	Not provided	N/A
SLC Non-MS4	DEP	SLC-09	White City – Citrus/Seager Stormwater Improvement	Wet detention with polyacrylamide logs.	Wet Detention Pond	Completed	2016	71	26	Primary BMAP Area	39	\$1,862,859	Not provided	DEP/ County	Not provided	G0382
SLC Non-MS4	N/A	SLC-10	Education Program	FYN; pet waste, landscape, irrigation, and fertilizer ordinances; PSAs; website; Illicit Discharge Program, Eco-Center, Clean Stormwater – Clean River Program	Education Efforts	Completed	2003	1,426	364	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
SLC Non-MS4	N/A	SLC-11	Street Sweeping	Not provided	Street Sweeping	Completed	2003	113	73	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
SLC Non-MS4	N/A	SLC-12	Catch Basin Cleanout	Not provided	BMP Cleanout	Completed	2003	92	56	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
SLC Non-MS4	N/A	SLC-13	Platt's Creek Sump Cleanout	Not provided	BMP Cleanout	Completed	2013	1,566	601	Primary BMAP Area	N/A	Not provided	Not provided	Not provided	Not provided	N/A
SLC Non-MS4	N/A	SLC-15	IRL South C23/C24 CERP Buffer – Teague Preserve Rewatering Project	Not provided	Hydrologic Restoration	Underway	Not provided	TBD	TBD	Primary BMAP Area	TBD	\$400,000	TBD	Not provided	Not provided	N/A
SLC Non-MS4	N/A	SLC-16	Melville Rd. Master Drainage Plan	Not provided	Stormwater System Rehabilitation	Underway	2025	TBD	TBD	Primary BMAP Area	175	\$5,000,000	TBD	County	Not provided	N/A

Total TN Project Reduction = 4,175 lbs/yr

Total TN Reduction Required = 9,756 lbs/yr

Total TP Project Reduction = 1,484 lbs/yr

Total TP Reduction Required = 4,500 lbs/yr

Table A-11. Town of Sewall's Point projects¹ Projects located in the 'Special Project BMAP Area' are projects located in the Mid-Coastal Subbasin, which is outside the current BMAP boundary. However, they may be considered for credit in the next BMAP iteration.

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Town of Sewall's Point (TOSP)	SFWMD	SP-01	Ridgeland Court Retrofit	Installation of exfiltration/baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2002	0	0	Primary BMAP Area	6	Not provided	\$300,000 annual stormwater maintenance budget	Town/SFWMD	Not provided	N/A
TOSP	SFWMD	SP-02	Palm Court/Knowles	Installation of baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2000	0	0	Primary BMAP Area	13	Not provided	See SP-01	Town/SFWMD	Not provided	N/A
TOSP	SFWMD	SP-03	Captain Cove	Installation of baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2000	0	0	Primary BMAP Area	5	Not provided	See SP-02	Town/SFWMD	Not provided	N/A
TOSP	SFWMD	SP-04	Quail Run Park	Installation of direct link to detention area prior to discharge to Indian River.	Dry Detention Pond	Completed	2000	0	0	Primary BMAP Area	0	Not provided	See SP-03	Town/SFWMD	Not provided	N/A
TOSP	N/A	SP-05	Heritage Park	Installation of stormwater retrofit area in developed subdivision.	Stormwater System Rehabilitation	Completed	2000	7	2	Primary BMAP Area	5	Not provided	See SP-04	Town	Not provided	N/A
TOSP	SFWMD	SP-06	Via Lucindia	Installation of exfiltration pipe.	Exfiltration Trench	Completed	2000	8	2	Primary BMAP Area	3	Not provided	See SP-05	Town/SFWMD	Not provided	N/A
TOSP	SFWMD	SP-07	Rio Vista Park	Installation of baffle boxes/erosion control for outfall to Indian River.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2002	1	1	Primary BMAP Area	24	Not provided	See SP-06	Town/SFWMD	Not provided	N/A
TOSP	N/A	SP-08	India Lucie	Installation of retrofit of weir/retention area with 2 baffle boxes in old subdivision without retention to directly discharge to Indian River.	Stormwater System Rehabilitation	Completed	2003	44	18	Primary BMAP Area	31	Not provided	See SP-07	Martin County	Not provided	N/A
TOSP	FEMA	SP-09	India Lucie	Installation of retrofit of weir/retention area with 2 baffle boxes in old subdivision without retention to directly discharge to Indian River.	Stormwater System Rehabilitation	Completed	2006	0	0	Primary BMAP Area	6	Not provided	See SP-08	Town/FEMA	Not provided	N/A
TOSP	SFWMD	SP-10	Periwinkle	Installation of baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2000	0	0	Primary BMAP Area	16	Not provided	See SP-09	Town/SFWMD	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
TOSP	N/A	SP-11	Palm Rd.	Installation of grass swales.	Grass swales without swale blocks or raised culverts	Completed	2008	1	0	Primary BMAP Area	1	Not provided	See SP-10	Town	Not provided	N/A
TOSP	SFWMD	SP-12	Riverview	Installation of baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2002	0	0	Primary BMAP Area	10	Not provided	See SP-11	Town/SFWMD	Not provided	N/A
TOSP	N/A	SP-13	Pineapple Lane	Installation of outfall exfiltration.	Exfiltration Trench	Completed	2002	0	0	Primary BMAP Area	6	Not provided	See SP-12	Town	Not provided	N/A
TOSP	TOSP	SP-14	Copaire	Installation of baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2002	0	0	Primary BMAP Area	2	Not provided	See SP-13	Town/SFWMD	Not provided	N/A
TOSP	TOSP	SP-15	Homewood Park/ South Sewall's Point Rd.	Installation of retention area with pervious Flexi-Pave and exfiltration pipe.	Online Retention BMPs	Completed	2009	46	10	Primary BMAP Area	14	Not provided	See SP-14	Town/SFWMD	Not provided	N/A
TOSP	DEP/SF WMD	SP-16	Pedway/Greenway	Installation of exfiltration/pervious paver sidewalk.	BMP Treatment Train	Completed	2014	6	1	Primary BMAP Area	2	Not provided	See SP-15	Town/ DEP/ SFWMD	Not provided	G0333
TOSP	FDOT	SP-17	SR A1A	Installation of outfall exfiltration.	Exfiltration Trench	Completed	2012	52	10	Primary BMAP Area	12	Not provided	See SP-16	FDOT	Not provided	N/A
TOSP	N/A	SP-18	Education Program	Fertilizer ordinance.	Education Efforts	Completed	2013	9	2	Primary BMAP Area	N/A	N/A	See SP-17	Town	N/A	N/A
TOSP	N/A	SP-19	Street Sweeping	19 cubic yards of debris collected through street sweeping.	Street Sweeping	Completed	2013	25	16	Primary BMAP Area	N/A	Not provided	See SP-18	Town	N/A	N/A
TOSP	N/A	SP-20	Delano Lane	Installation of exfiltration system.	Exfiltration Trench	Completed	2000	TBD	TBD	Special Project BMAP Area	1	Not provided	See SP-19	Town	Not provided	N/A
TOSP	N/A	SP-21	Town Commons Park	Installation of water quality treatment/dry detention.	Dry Detention Pond	Completed	2002	TBD	TBD	Special Project BMAP Area	1	Not provided	See SP-20	Town	Not provided	N/A
TOSP	N/A	SP-22	Island Rd.	Installation of exfiltration pipe with baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2002	TBD	TBD	Special Project BMAP Area	5	Not provided	See SP-21	Town	Not provided	N/A
TOSP	SFWMD	SP-23	Highpoint West	Installation of baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2000	TBD	TBD	Special Project BMAP Area	8	Not provided	See SP-22	Town/SFWMD	Not provided	N/A
TOSP	SFWMD	SP-24	Mandalay (Marguerita)	Installation of baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2000	TBD	TBD	Special Project BMAP Area	15	Not provided	See SP-23	Town/SFWMD	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
TOSP	SFWMD	SP-25	Highpoint East	Installation of baffle box.	Baffle Boxes–1st Generation (hydrodynamic separator)	Completed	2000	TBD	TBD	Special Project BMAP Area	16	Not provided	See SP-24	Town/ SFWMD	Not provided	N/A
TOSP	SFWMD	SP-26	High Point Exfiltration	Installation of exfiltration/swales.	BMP Treatment Train	Completed	2014	TBD	TBD	Special Project BMAP Area	6	Not provided	See SP-25	Town/ SFWMD	Not provided	N/A
TOSP	N/A	SP-27	Extend Pedway/Greenway	Extension of existing pervious pedway by 9,000 LF to include pervious pavers and exfiltration.	BMP Treatment Train	Completed	2016	16	109	Special Project BMAP Area	28	\$201,483	See SP-26	Town	Not provided	N/A
TOSP	DEP/ SFWMD	SP-28	Mandalay (Marguerita)	Installation of exfiltration system/baffle boxes and STA.	Dry Detention Pond	Underway	Not provided	TBD	TBD	Special Project BMAP Area	15	\$1,200,000	See SP-27	Town/ DEP/ SFWMD	Town: \$600,000 DEP: \$600,000	NS029
TOSP	N/A	SP-29	Baffle Boxes	Installation of baffle boxes in various locations.	Baffle Boxes–1st Generation (hydrodynamic separator)	Underway	Not provided	TBD	TBD	Special Project BMAP Area	18	Not provided	See SP-28	Town	Not provided	N/A
TOSP	N/A	SP-30	Indialucie	Installation of exfiltration system in wet retention area.	Exfiltration Trench	Completed	2014	62	8	Primary BMAP Area	31	Not provided	See SP-29	Town	Not provided	N/A
TOSP	N/A	SP-31	Quail Run Subdivision	Installation of exfiltration/swales.	BMP Treatment Train	Completed	2015	Not provided	Not provided	Primary BMAP Area	4	Not provided	See SP-30	Town	Not provided	N/A
TOSP	N/A	SP-32	Septic Tank Elimination - Phase I	Conversion of existing septic tanks to sanitary sewer.	Septic Tank Phase-Out	Planned	TBD	TBD	N/A	Primary BMAP Area	17	\$500,000	See SP-31	Town/ Florida Legislature	Not provided	N/A

Total TN Project Reduction = 277 lbs/yr

Total TP Project Reduction = 179 lbs/yr

Total TN Reduction Required = N/A

Total TP Reduction Required = N/A

Table A-12. Troup-Indiantown WCD projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
TIWCD	N/A	TI-01	C-44 Conservation Area	Not provided	Land Preservation	Completed	2013	23,199	7,497	Primary BMAP Area	9,135	N/A	N/A	Not provided	Not provided	N/A
TIWCD	N/A	TI-02	90 % Implementation Agricultural BMPs	Not provided	Agricultural BMPs	Completed	2013	1,856	446	Primary BMAP Area	N/A	N/A	N/A	Not provided	Not provided	N/A
TIWCD	N/A	TI-03	Removal of Drainage Areas	Minute Maid Rd. drainage improvements.	100 % Onsite Retention	Completed	2013	TBD	TBD	Primary BMAP Area	73	\$124,000	N/A	TIWCD	Not provided	N/A
TIWCD	SFWMD/USACE	TI-04	C-44 Reservoir Area	Converting from conservation area to reservoir.	Land Use Change	Underway	2018	N/A	N/A	Primary BMAP Area	3,485	N/A	N/A	USACE	Not provided	N/A
TIWCD	SFWMD/USACE	TI-05	C-44 STA Area	Converting from conservation area to STA.	Land Use Change	Underway	2018	N/A	N/A	Primary BMAP Area	6,100	N/A	N/A	SFMWD	Not provided	N/A

Total TN Project Reduction = 25,055 lbs/yr

Total TP Project Reduction = 7,943 lbs/yr

Total TN Reduction Required = 25,094 lbs/yr

Total TP Reduction Required = 8,119 lbs/yr

Table A-13. Turnpike projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Turnpike Authority	N/A	T-01	Project 420735-1 Port St. Lucie Interchange Pond A	Not provided	Dry Detention Pond	Completed	2013	2	0	Primary BMAP Area	4	Not provided	N/A	Not provided	Not provided	N/A
Turnpike Authority	N/A	T-02	Project 420735-1 Port St. Lucie Interchange Pond B	Not provided	Wet Detention Pond	Completed	2013	16	2	Primary BMAP Area	21	Not provided	N/A	Not provided	Not provided	N/A
Turnpike Authority	N/A	T-03	Thomas B. Manuel Bridge North Pond	Not provided	Dry Detention Pond	Completed	2013	5	1	Primary BMAP Area	10	Not provided	N/A	Not provided	Not provided	N/A
Turnpike Authority	N/A	T-04	Education Program	No fertilizer on rights-of-way, educational signage, illicit discharge training.	Education Efforts	Completed	N/A	TBD	TBD	Primary BMAP Area	N/A	Not provided	N/A	Not provided	Not provided	N/A
Turnpike Authority	N/A	T-05	Street Sweeping	1,944 lane miles swept and 28,323 lbs (or 12,847 kilograms [kg]) of debris collected.	Street Sweeping	Completed	N/A	144	10	Primary BMAP Area	N/A	Not provided	N/A	Not provided	Not provided	N/A

Total TN Project Reduction = 167 lbs/yr

Total TP Project Reduction = 13 lbs/yr

Total TN Reduction Required = N/A

Total TP Reduction Required = N/A

Table A-14. FDACS projects

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDACS	N/A	FDACS-01	BMP Enrollment	Agricultural BMPs are practical, cost-effective actions that agricultural producers can take to reduce amount of pesticides, fertilizers, animal waste, and other pollutants entering water resources, and to increase water use efficiencies.	Agricultural BMPs	Completed	2013	132,143	29,594	Primary BMAP Area	153,127	N/A	N/A	N/A	N/A	N/A
FDACS	N/A	FDACS-02	Agricultural Land Use Changes	Differences in agricultural land use between 2004 SFWMD land use coverage and land use at time of BMAP adoption. Identified by FDACS using aerial imagery and local field staff knowledge. Includes acres that are fallow or out of production, or that were converted to urban/nonagricultural use.	Land Use Change	Completed	2013	171,776	54,191	Primary BMAP Area	N/A	N/A	N/A	N/A	N/A	N/A

Total TN Project Reduction = 303,919 lbs/yr

Total TN Reduction Required = 812,924 lbs/yr

Total TP Project Reduction = 83,785 lbs/yr

Total TP Reduction Required = 307,059 lbs/yr

Appendix B: Future BMAP Projects

In accordance with Chapter 2016-1, Laws of Florida, every new and revised BMAP is required to include more detailed project information than was previously included in BMAPs and annual progress reports. Chapter 403.067, F.S., directs new and revised BMAPs to include the following:

- A ranked list of projects with a planning-level cost estimate and estimated date of completion for each project.
- The source and amount of financial assistance to be made available by DEP, a water management district, or other entity for each project, if applicable.
- A planning-level estimate of each project's expected load reduction, if applicable.

The BMAP requires stakeholders to implement their projects to achieve reductions as soon as practicable. However, the full implementation of the BMAP will be a long-term process. While some of the projects and activities contained in the BMAP were recently completed or are currently ongoing, several projects (**Table B-1**) require more time to design, secure funding, and construct. Unlike the projects listed in **Appendix A**, these projects are not yet considered commitments of the entities but rather are intended for future BMAP credit, pending funding and other resources.

Since BMAP implementation is a long-term process, the TMDLs established for the basin will not be achieved in the next five years. It is understood that all waterbodies can respond differently to the implementation of reduced loadings to meet applicable water quality standards. Continued coordination and communication by the stakeholders will be essential to ensure that management strategies continue to meet the implementation milestones.

As a first step towards compiling the lists of projects that will be required in a revised St. Lucie River and Estuary BMAP, DEP requested information from stakeholders on future projects that have the potential for additional load reductions in the basin. Funding has not yet been identified for many of these future projects (listed in **Table B-1**), and the continual funding of projects is a key part of meeting reductions required to achieve the TMDLs. This list will be updated as project collection and verification efforts are refined.

The terms used in **Table B-1** are defined as follows:

- **TBD:** To be determined. Denotes that information is not currently available but will be provided by the stakeholder when it is available.
- **O&M:** Operations and maintenance.

Table B-1. Future BMAP projects for planning and funding purposes

Lead Entity	Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost Estimate	Cost Annual O&M	Funding Source	Funding Status
St. Lucie County	F-01	Sunland Gardens Neighborhood Improvement Project	Includes construction of stormwater collection system with roadside swales, dry detention areas, and paved roadways for older, unimproved subdivision currently with direct outfalls to waterways.	Dry Detention Pond	Future	423	TBD	TBD	\$25,000,000	TBD	TBD	Unfunded
City of Stuart	F-02	West Heart of Haney	Wetland restoration to improve water quality of stormwater discharging into St. Lucie River	Wetland Restoration/Filter Marsh	Future	TBD	TBD	TBD	TBD	TBD	TBD	Unfunded
City of Port St. Lucie	F-03	McCarty Ranch Future Phase	Water Farming Project – Pumps water from SFWMD C-23 Canal onto property for storage and retains rainfall in future phases.	Online Retention BMPs	Future	7,641 ac-ft	35,320	7,272	\$1,476,111	See cost above	Utility Operating Budget	Unfunded
City of Port St. Lucie	F-04	Veterans Memorial Water Quality Retrofit Project 6	Digging ponds; increasing storage.	Wet Detention Pond	Designed	1,065 for all 6 projects	See PSL-32	See PSL-32	\$1,600,000	TBD	Stormwater Utility	Proposed for fiscal year (FY) 2024–25 Budget
City of Port St. Lucie	F-05	Sagamore Basin STA East	Design and construct STA with control structure and associated piping.	Wet Detention Pond	60 % Designed	TBD	TBD	TBD	\$1,100,000	TBD	Stormwater Utility	Proposed for FY 2023–24 Budget
City of Port St. Lucie	F-06	Sagamore Basin STA West	Design and construct STA with control structure and associated piping.	Wet Detention Pond	60 % Designed	TBD	TBD	TBD	\$1,200,000	TBD	Stormwater Utility	Proposed for FY 2025–26 Budget
City of Fort Pierce	F-07	Georgia Avenue Basin Water Quality Improvements	Construction of control structure and two nutrient separating baffle boxes are proposed for stormwater outfall, which is currently uncontrolled and discharging directly into IRL.	Baffle Boxes - Second Generation	Future	217	N/A	N/A	\$980,000	TBD	TBD	Unfunded
City of Fort Pierce	F-08	Moore's Creek Linear Park – Phase 2	Continuation of linear park concept from 15th St. west to 29th St. Project includes canal enlargement as continued effort to provide better water quality to IRL.	TBD	Future	TBD	N/A	N/A	\$9,813,800	TBD	TBD	Unfunded
Martin County	F-09	East Fork Creek STA	Design and construct STA with control structure and associated piping.	Wet Detention Pond	Future	TBD	TBD	TBD	\$2,350,000	TBD	TBD	Unfunded
Martin County	F-10	East Hansen Grant Retrofit – Phase III	Design and construct retention/detention facilities to treat water from commercial/industrial area of Stuart.	TBD	Future	TBD	TBD	TBD	\$2,275,000	TBD	TBD	Unfunded

Lead Entity	Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost Estimate	Cost Annual O&M	Funding Source	Funding Status
Martin County	F-11	Horseshoe Point Road Exfiltration	Design and construct exfiltration trenches and roadway swales.	Exfiltration	Future	TBD	TBD	TBD	\$250,000	TBD	TBD	Unfunded
Martin County	F-12	Manatee Pocket SW Prong STA	Design and construct STA with control structure and associated piping.	Wet Detention Pond	Future	TBD	TBD	TBD	\$1,725,000	TBD	TBD	Unfunded
Martin County	F-13	Rocky Point Exfiltration and Baffle Boxes	Design and construct exfiltration trenches, roadway swales, and baffle boxes.	Exfiltration and Baffle Boxes	Future	TBD	TBD	TBD	\$1,000,000	TBD	TBD	Unfunded
Martin County	F-14	Golden Gate Rehabilitation	Design and construct deep-water lake in STA and recontour entire facility.	Wet Detention Pond	Planning	TBD	TBD	TBD	\$1,000,000	TBD	TBD	Unfunded

Appendix C: Agricultural Enrollment and Reductions

All agricultural nonpoint sources in the St. Lucie River and Estuary BMAP area are statutorily required either to implement FDACS-adopted BMPs or to conduct water quality monitoring prescribed by DEP or the applicable water management district that demonstrates compliance with water quality standards (Paragraph 403.067[7][b], F.S.). Under Paragraph 403.067(7)(c), F.S., the implementation of FDACS-adopted, DEP-verified BMPs in accordance with FDACS rules provides a presumption of compliance with state water quality standards.

FDACS OAWP Role in BMP Implementation and Follow-Up

The OAWP works with producers to submit notices of intent (NOIs) to implement the BMPs applicable to their operations, provides technical assistance to growers, and distributes cost-share funds, as available, to eligible producers for selected practices. The OAWP follows up with growers through site visits to evaluate the level of BMP implementation and record keeping, identify areas for improvement, if any, and discuss cost-share opportunities.

When DEP adopts a BMAP that includes agriculture, it is the agricultural producer's responsibility to implement BMPs adopted by FDACS to help achieve load reductions. To date, FDACS has [BMP manuals](#)¹ for cow/calf, citrus, vegetable and agronomic crops, nurseries, equine, sod, dairy, poultry, and specialty fruit and nut operations. In 2017, FDACS began work on a small farms manual.

If land use acreage corrections and BMP implementation do not fully account for the current agricultural load reduction allocation, it may be necessary to develop and implement cost-assisted field- or regional-level treatment options that remove nutrients from farms and other nonpoint sources. In that case, FDACS will work with DEP and the SFWMD to identify appropriate options for achieving further agricultural load reductions. As of December 31, 2017, the OAWP provided \$1.1 million in cost-share assistance for nutrient management, irrigation management, and water resource protection projects.

Section 403.067, F.S. requires that, where water quality problems are demonstrated despite the proper implementation of adopted agricultural BMPs, FDACS must re-evaluate the practices, in consultation with DEP, and modify them if necessary. Continuing water quality problems will be detected through the BMAP monitoring component and other DEP and SFWMD activities. If a re-evaluation of the BMPs is needed, FDACS will also include the SFWMD and other partners in the process.

¹ <http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy/Enroll-in-BMPs/BMP-Rules-Manuals-and-Other-Documents>.

Adopted BMAP Agricultural Land Use and Enrollment

The St. Lucie River and Estuary BMAP adopted in 2013 uses land use data from the 2004 SFWMD coverage, and the land uses listed in **Table C-1** were considered agriculture for the purposes of this BMAP. The table also lists the FDACS commodity associated with each land use. Land use data are helpful as a starting point for estimating agricultural acreage and developing BMP implementation strategies. However, DEP relies on local stakeholder knowledge and coordination with FDACS to verify agricultural activities and achieve BMP implementation.

Table C-1. Agricultural land use acreage in the St. Lucie BMAP area

¹ These acreages were reported in the 2014, 2015, and 2016 Progress Reports and include agricultural acreage in the WCDs.

² FDACS staff-adjusted acreage for the purposes of enrollment was based on a review of more recent aerial imagery in the basin and local staff observations during BMAP development.

³ Conservation Plan Rule, Chapter 5M-12, F.A.C.

⁴ Lake Okeechobee Protection Program, Chapter 5M-3, F.A.C.

2004 SFWMD Land Use	2004 Acres ¹	FDACS-Adjusted Acres ²	Related FDACS BMP Programs
Pasture and Mixed Rangeland	152,299.6	151,232.9	Cow/Calf; Vegetable and Agronomic Crops (Hay)
Row/Field/Mixed Crops	16,368.8	16,219.1	Vegetable/Agronomic Crops
Sod Farms	294.1	294.1	Statewide Sod
Horse Farm	784.4	814.2	Equine
Citrus	113,672.8	43,694.6	Statewide Citrus
Fruit Orchards/Other Groves	60.5	51.3	Specialty Fruit and Nut
Tree Nurseries	480.1	480.1	Statewide Nursery; Specialty Fruit and Nut
Ornamentals	1,252.1	1,251.7	Statewide Nursery
Specialty Farms	132.6	132.6	Conservation Plan Rule ³
Dairies	404.5	404.5	Lake Okeechobee Protection Program ⁴
Cattle Feeding Operations	100.9	100.9	Conservation Plan Rule ³
Poultry Feeding Operations	106.8	106.8	Conservation Plan Rule ³
Total	285,957.2	214,782.8	

FDACS BMP enrollments are done according to parcels and based on NOIs signed by landowners. Agricultural BMPs may or may not be implemented on all these acres because the NOIs may include nonproduction acres, such as buildings, parking lots, and fallow acres. Furthermore, this enrollment acreage includes NOIs on lands not classified as agriculture, because they are part of a larger parcel with some agricultural lands. **Table C-2** lists the acreages enrolled under the various combinations of FDACS BMP Programs as of December 31, 2017, based on the acreage of the enrolled parcels, and **Figure C-1** shows the location of those parcels. As of December 31, 2017, 191,018 acres of the St. Lucie River and Estuary Basin are covered by NOIs issued by the OAWP.

Table C-2. FDACS BMP enrollment as of December 31, 2017, by program

Related FDACS BMP Programs	Acreage Enrolled
Citrus	25,898
Citrus; Cow/Calf	959
Citrus; Cow/Calf; Wildlife	667
Citrus; Nursery	918
Citrus; Row/Field Crops	635
Citrus; Row/Field Crops; Sod	1,206
Conservation Plan Rule	1,316
Cow/Calf	98,839
Cow/Calf; Lake Okeechobee Protection Program	1,082
Cow/Calf; Nursery	1,186
Cow/Calf; Row/Field Crops	973
Cow/Calf; Wildlife	14,489
Dairy	8
Dairy; Lake Okeechobee Protection Program	43
Equine	2
Equine; Row/Field Crops	1
Fruit and Nut	5
Lake Okeechobee Protection Program	9,802
Nursery	1,051
Nursery; Lake Okeechobee Protection Program	551
Nursery; Row/Field Crops	5
Row/Field Crops	28,907
Row/Field Crops; Sod	1,200
Sod	1,275
Total	191,018

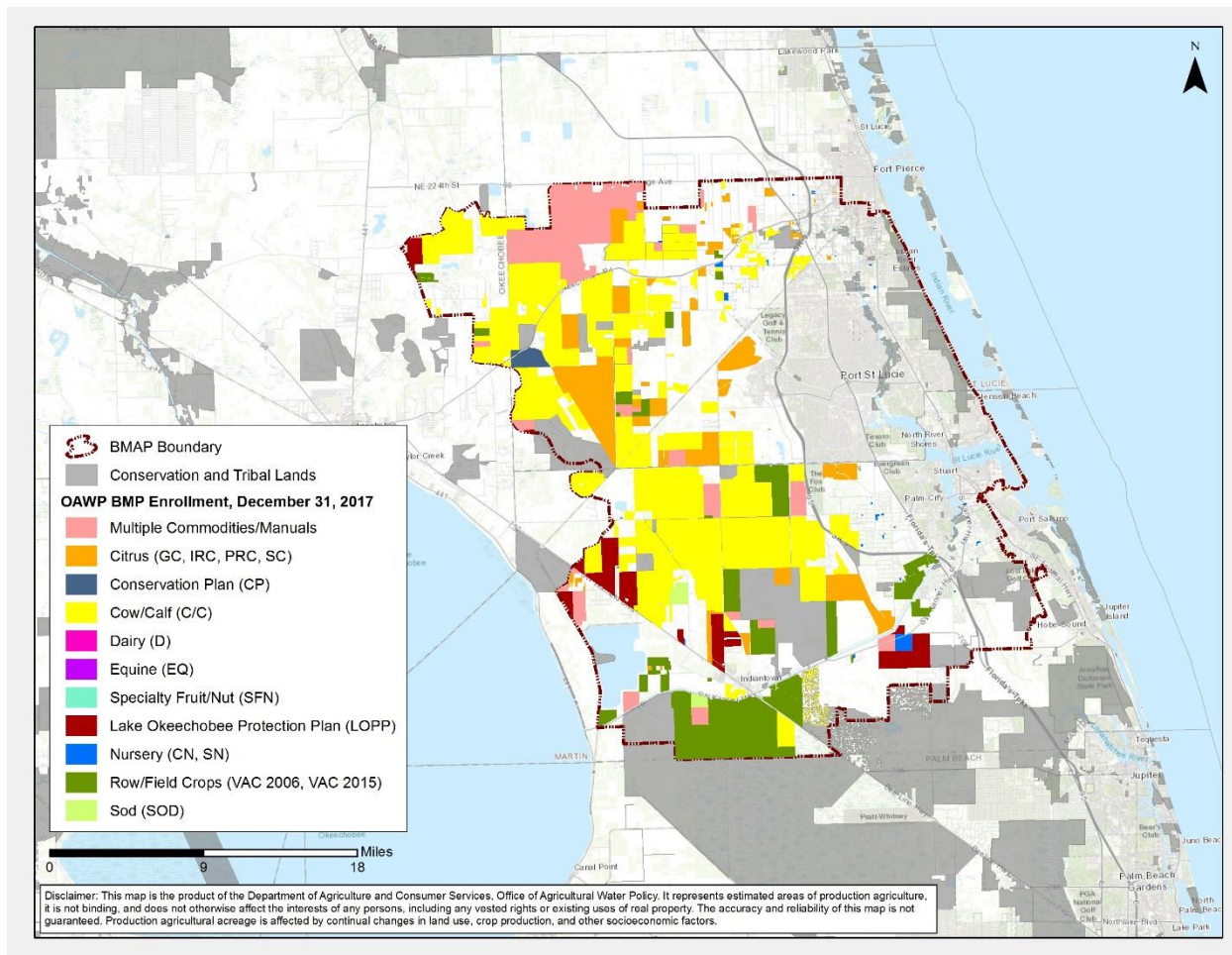


Figure C-1. BMP enrollment in the St. Lucie River BMAP as of December 31, 2017

For the St. Lucie River and Estuary BMAP, agricultural land uses in the 2004 SFWMD land use coverage are considered when estimating TN and TP reductions related to FDACS BMP Program enrollment. Nutrient reduction efficiencies for agricultural BMPs were developed through extensive literature review, modeling projects, and observed data, considering factors such as soil type, land use, rainfall, and commodity-specific management practices (SWET 2008). **Table C-3** lists the enrolled acreages and estimated TN and TP reductions, based on the 2004 SFWMD land uses considered as agriculture in the adopted BMAP. **Figure C-2** shows the location of the enrolled acres used to estimate the reductions. The reductions associated with the enrollment through December 31, 2017, are estimated to be 132,143 lbs-TN/yr and 29,594 lbs-TP/yr.

Table C-3. Enrolled acreage and estimated TN and TP reductions as of December 31, 2017

2004 SFWMD Land Use Description	Land Use Code	Acreage Enrolled	TN Starting Load (lbs/yr)	TN Reduction Estimate (%)	TN Reduction (lbs/yr)	TP Starting Load (lbs/yr)	TP Reduction Estimate (%)	TP Reduction (lbs/yr)
Improved Pasture	2110	63,028.3	461,904	17	78,524	101,878	11	11,207
Unimproved Pasture	2120	6,636.9	20,825	11	2,291	7,715	7	540
Woodland Pasture	2130	13,251.6	40,712	4	1,628	14,165	4	567
Row Crops	2140	8,268.2	61,567	30	18,470	21,999	30	6,600
Field Crops	2150	1,338.0	7,447	15	1,117	2,923	15	438
Sugar Cane	2156	490.2	2,656	10	266	775	10	77
Citrus	2210	59,151.2	287,269	10	28,727	82,648	12	9,918
Other Groves	2230	21.9	107	10	11	37	12	4
Cattle Feeding Op	2310	99.5	546	20	109	239	9	21
Poultry Feeding Op	2320	2.6	15	15	2	6	15	1
Tree Nurseries	2410	47.7	277	25	69	96	32	31
Sod Farms	2420	54.0	293	20	59	85	20	17
Ornamentals	2430	155.6	912	25	228	300	32	96
Specialty Farm	2500	7.7	43	30	13	14	20	3
Horse Farm	2510	29.2	214	30	64	51	20	10
Dairies	2520	387.9	2,785	20	557	707	9	64
Mixed Rangeland	3300	114.2	232	4	9	16	4	1
Total		153,084.5	887,801		132,143	233,654		29,594

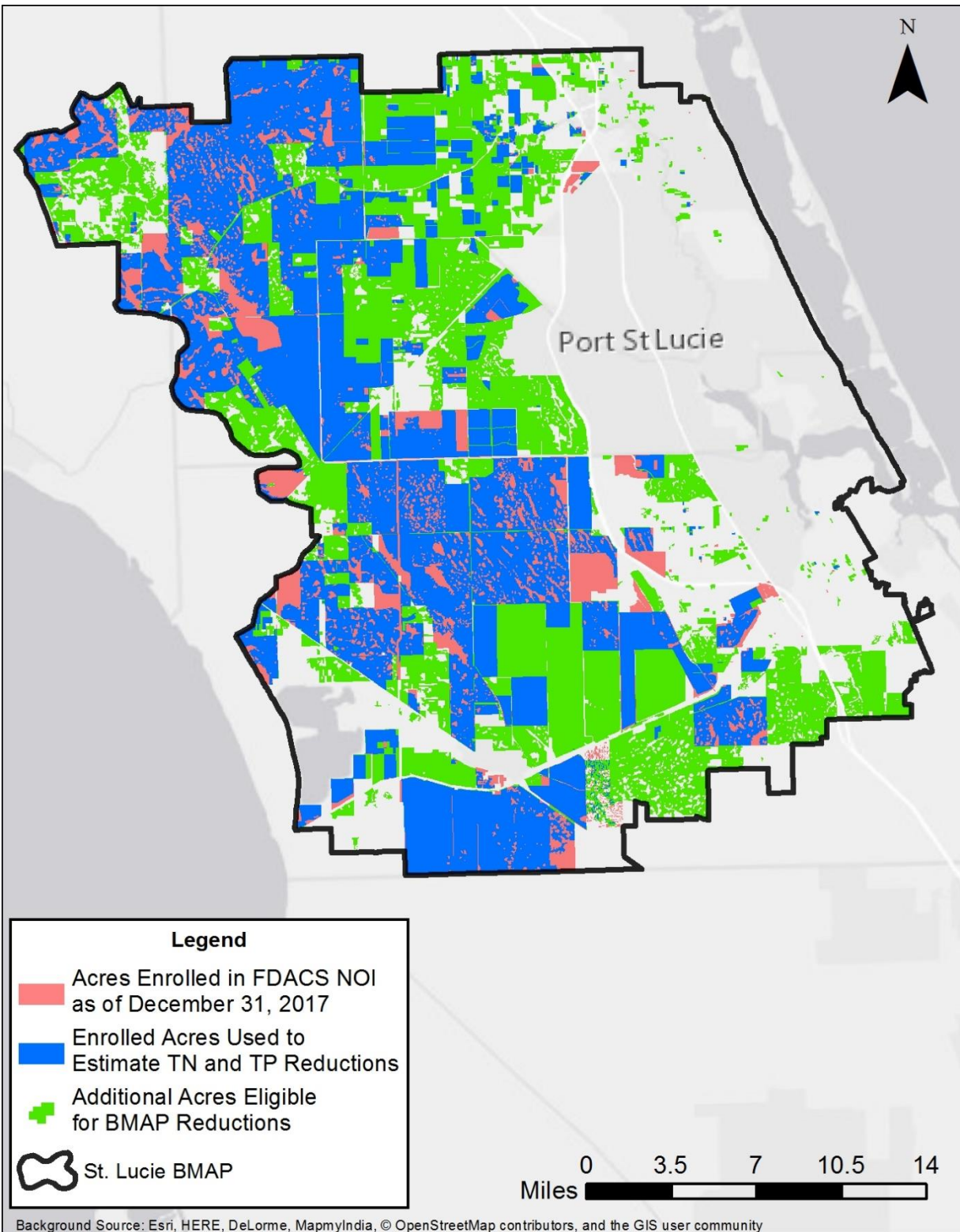


Figure C-2. Enrolled acres used to estimate TN and TP reductions as of December 31, 2017

Recommended Updates to Land Use and Enrollment

As part of the 5-Year Review, the WaSh modeling was updated to include the 2008 and 2012 SFWMD land use coverages, in addition to the 2004 land use that was previously included.

Table C-4 lists the 2012 SFWMD land use acres considered as agriculture in the revised allocations methodology described in **Section 3.4** and **Appendix F**. Furthermore, FDACS uses the Florida Statewide Agriculture Irrigation Demand (FSAID) IV Geodatabase to estimate agricultural acreages throughout the state and has requested that the FSAID acreage in the St. Lucie River and Estuary Basin be considered in the revised BMAP. Conversations are ongoing with stakeholders, and the decision on how to estimate agricultural acreages will be fully vetted during the BMAP update process and included in the revised BMAP document submitted to the DEP Secretary for adoption.

Table C-4 also lists the FDACS-adjusted acres for each agricultural land use type, based on the FSAID IV Geodatabase. FDACS is currently developing a new FSAID version, and DEP and FDACS are discussing approaches for considering this information in BMAPs throughout the state. **Table C-5** lists the BMP programs and the acreage covered by NOIs. Per the FSAID IV land use, there are 179,695 agricultural acres, of which 132,312 are enrolled in the FDACS BMP Program. This equates to 74 % enrollment of the agricultural acreage in the St. Lucie River and Estuary Basin covered by the FDACS BMP Program.

Table C-4. St. Lucie River and Estuary Basin agricultural acreage in the SFWMD 2012 land use coverage

¹ FDACS-adjusted acreage is based on the FSAID IV Geodatabase and included a review of more recent aerial imagery in the basin and local staff observations.

Land Use	2012 SFWMD Acres	FDACS-Adjusted Acres ¹
Pasture and Rangeland	153,435.6	159,282
Row/Field/Mixed Crops	19,765.6	14,905
Fallow Cropland	42,812.3	
Horse Farm	1,022.2	112
Citrus	32,479.0	134
Abandoned Groves	19,379.4	
Fruit Orchards/Other Groves	704.3	10
Tree Nurseries/Nurseries and Vineyards	1,491.0	1,965
Ornamentals	1,193.6	588
Specialty Farms	226.1	85
Dairies	577.8	43
Poultry Feeding Operations	75.1	74
Sod Farms	378.6	1,628
Aquaculture	132.9	611
Hay	0.0	181
Cattle Feed Operations	0.0	2
Other Open Lands (Rural)	0.0	51
Sugar Cane	392.1	16,649
Total	274,065.4	179,695

Table C-5. BMP enrollment for the St. Lucie River and Estuary Basin as of December 31, 2017

Related FDACS BMP Programs	Acreage Enrolled	FSAID IV Agricultural Land Use Acres within Parcels that Have NOIs
Citrus	25,898	12,850
Citrus; Cow/Calf	959	252
Citrus; Cow/Calf; Wildlife	667	656
Citrus; Nursery	918	65
Citrus; Row/Field Crops	635	626
Citrus; Row/Field Crops; Sod	1,206	1,170
Conservation Plan Rule	1,316	1,207
Cow/Calf	98,839	64,644
Cow/Calf; Lake Okeechobee Protection Program	1,082	921
Cow/Calf; Nursery	1,186	104
Cow/Calf; Row/Field Crops	973	469
Cow/Calf; Wildlife	14,489	14,216
Dairy	8	6
Dairy; Lake Okeechobee Protection Program	43	40
Equine	2	1
Equine; Row/Field Crops	1	1
Fruit and Nut	5	
Lake Okeechobee Protection Program	9,802	8,406
Nursery	1,051	872
Nursery; Lake Okeechobee Protection Program	551	456
Nursery; Row/Field Crops	5	
Row/Field Crops	28,907	23,299
Row/Field Crops; Sod	1,200	884
Sod	1,275	1,257
Total	191,018	132,312

FDACS OAWP Implementation Assurance (IA) Program

The OAWP formally established its IA Program in 2005 in the Suwannee River Basin as part of the multiagency/local stakeholder Suwannee River Partnership. In 2007, OAWP initiated the IA Program in the Lake Okeechobee Watershed and launched a standardized follow-up program for the remaining areas of the state in 2013, beginning with the Ridge Citrus and Indian River Citrus BMPs. Because of program-specific needs, the follow-up process for each of these three components was different. In early 2014, OAWP began to streamline the IA Program to ensure consistency statewide and across commodities and BMP manuals.

The IA Program is based on interactions with producers during a site visit by OAWP staff. Site visits are conducted by OAWP field staff and technicians as workload allows. For the visits, field staff and technicians use a standard form (not BMP specific) developed in 2014. This form

focuses on nutrient management, irrigation management, and water resource protection BMPs common to all the BMPs adopted by rule. The paper forms are submitted to OAWP staff and compiled into a spreadsheet, and the data are reported annually.

Additional emphasis was given to verifying the implementation of BMPs by enrolled producers with the enactment of Chapter 2016-1, Laws of Florida. That legislation directed the OAWP to formalize an Implementation Verification Program into rules. The implementation verification rule, effective on November 1, 2017, provides the structure for a statewide uniform implementation verification system, including assessments of the status of implementation, compliance assistance to aid producers in achieving full implementation, and referral to DEP for producers who are not implementing BMPs (Chapter 5M-1, F.A.C.).

Beyond BMPs

Beyond enrolling producers in the FDACS BMP Program and verifying implementation, FDACS will work with DEP to improve the data used to estimate agricultural land uses in the watershed. FDACS will also work with producers to identify and implement a suite of agricultural projects and research agricultural technologies on properties where they are deemed technically feasible and if funding is made available. The implementation of projects would require funding as well as more detailed design based on site-specific information, such as actual applicable acreages and willing landowners.

Appendix D: BMAP Monitoring Network and Recommended Revisions

The St. Lucie River and Estuary BMAP monitoring plan was designed to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track water quality trends. The BMAP monitoring plan currently consists of the ambient water quality sampling described below.

Currently, TN and TP concentrations are monitored at 90 stations and flow is monitored at 4 stations in the adopted BMAP monitoring network. The network of stations is listed in **Table D-1** and shown in **Figures D-1** and **D-2**.

Table D-1. BMAP monitoring network

Sampling Entity	Station ID	Station Name	Station Type	Frequency	Site Established
Hobe St. Lucie Conservancy District	Sample III	III	Grab	Annual	1974
Hobe St. Lucie Conservancy District	Sample 6	6	Grab	Annual	1974
Hobe St. Lucie Conservancy District	Sample 7	7	Grab	Annual	1974
Hobe St. Lucie Conservancy District	Sample 8	8	Grab	Annual	1974
NSLRWCD	1	Structure 23-1 Sager and Oleander	Grab	Quarterly	01/2011
NSLRWCD	2	North Fork St. Lucie River at Midway Rd. – White City Park pier	Grab	Quarterly	01/2011
NSLRWCD	3	Five Mile Creek at Edwards Rd. – Bridge at Kirby Loop Rd.	Grab	Quarterly	01/2011
NSLRWCD	6	South of Riser 40-1-2 NW corner Okeechobee Rd. and Kings Highway	Grab	Quarterly	01/2011
NSLRWCD	7	Structure 71-1-4 Ten Mile Creek and C-96 (bridge on Gordy Rd.)	Grab	Quarterly	01/2011
NSLRWCD	8	McCarty Rd. and Ten Mile Creek	Grab	Quarterly	01/2011
NSLRWCD	9	McCarty Rd. and Stetson Rd.	Grab	Quarterly	01/2011
Port St. Lucie	C-106	C-106	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	C-107	C-107	Grab	1 or 2 times/yr	06/2004
Port St. Lucie	C-108	C-108	Grab	1 or 2 times/yr	02/2004

Sampling Entity	Station ID	Station Name	Station Type	Frequency	Site Established
Port St. Lucie	Sagamore WW	Sagamore WW	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	Degan WW	Degan WW	Grab	1 or 2 times/yr	10/2004
Port St. Lucie	D-14	D-14	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	D-21	D-21	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	Elcam In	Elcam In	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	Elcam Spillway	Elcam Spillway	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	Kingsway WW	Kingsway WW	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	A23	A23	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	A24	A24	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	A25	A25	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	Burrow	Burrow	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	E8	E8	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	Monterrey WW	Monterrey WW	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	U16-D016	U16-D016	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	H-16	H-16	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	Blackwell Pump Station	Blackwell Pump Station	Grab	1 or 2 times/yr	02/2004
Port St. Lucie	B-33	B-33	Grab	1 or 2 times/yr	03/2005
Port St. Lucie	B-95-3	B-95-3	Grab	1 or 2 times/yr	03/2005
SFWMD	C23S48	WQM	Grab	Weekly	01/1979
SFWMD	C23S48	WQM	Autosampler	Weekly	10/1996
SFWMD	C24S49	WQM	Grab	Weekly	01/1979
SFWMD	C24S49	WQM	Autosampler	Weekly	09/1997
SFWMD	C44S80	WQM	Grab	Weekly	01/1979
SFWMD	C44S80	WQM	Autosampler	Weekly	04/1999
SFWMD	G81	WQM	Grab	Biweekly	07/2012
SFWMD	GORDYRD	WQM	Grab	Weekly	08/1999
SFWMD	GORDYRD	WQM	Autosampler	Weekly	08/1999
SFWMD	SLT-1	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-10A	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-10B	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-11	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-17	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-19	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-21	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-22A	SLT	Grab	Biweekly	05/2012
SFWMD	SLT-26	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-29	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-2A	SLT	Grab	Biweekly	05/2013
SFWMD	SLT-3	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-30A	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-31	SLT	Grab	Biweekly	11/2001

Sampling Entity	Station ID	Station Name	Station Type	Frequency	Site Established
SFWMD	SLT-34A	SLT	Grab	Biweekly	05/2007
SFWMD	SLT-35	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-36	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-37A	SLT	Grab	Biweekly	01/2003
SFWMD	SLT-38	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-38A	SLT	Grab	Biweekly	05/2012
SFWMD	SLT-39	SLT	Grab	Biweekly	02/2003
SFWMD	SLT-4	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-40	SLT	Grab	Biweekly	01/2003
SFWMD	SLT-40A	SLT	Grab	Biweekly	05/2012
SFWMD	SLT-42B	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-44	SLT	Grab	Biweekly	05/2007
SFWMD	SLT-45	SLT	Grab	Biweekly	05/2013
SFWMD	SLT-5	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-6	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-7	SLT	Grab	Biweekly	11/2001
SFWMD	SLT-9	SLT	Grab	Biweekly	11/2001
SFWMD	HR1	SE	Grab	Monthly	06/1994
SFWMD	SE 01	SE	Grab	Monthly	10/1990
SFWMD	SE 02	SE	Grab	Monthly	10/1990
SFWMD	SE 03	SE	Grab	Monthly	10/1990
SFWMD	SE 08B	SE	Grab	Monthly	12/2003
SFWMD	SE 09	SE	Grab	Monthly	10/1990
SFWMD	SE 11	SE	Grab	Monthly	06/1997
SFWMD	SE06B	SE	Grab	Monthly	10/1990
SFWMD	SE12B	SE	Grab	Monthly	07/2003
SFWMD	SE13B	SE	Grab	Monthly	07/2003
SLC	Platt's Creek Influent	Platt's Creek Influent	Grab	Triweekly	01/2008
SLC	Platt's Creek Effluent	Platt's Creek Effluent	Grab	Triweekly	01/2008
SLC	Indian River Estates Influent	Indian River Estates Influent	Grab	Triweekly	03/2009
SLC	Indian River Estates Effluent	Indian River Estates Effluent	Grab	Triweekly	03/2009
SLWSD	Gate 7	7B	Outfall structure		08/2011
SLWSD	Gate 8	7A	Outfall structure		08/2011
SLWSD	Gate 6	6B	Outfall structure		08/2011
SLWSD	Gate 4	4E	Outfall structure		08/2011
SLWSD	Gate 3	3B	Outfall structure		08/2011
SLWSD	Gate 2	2C	Outfall structure		08/2011
SLWSD	Gate 1	1E	Outfall structure		08/2011
SLWSD	Gate 5	5	Outfall structure		08/2011

Sampling Entity	Station ID	Station Name	Station Type	Frequency	Site Established
USGS	2277100	St Lucie River at Speedy Point, Stuart, FL	Flow gage	Daily	08/1997
USGS	2277110	St Lucie River at A1A (Steele Point), Stuart, FL	Flow gage	Daily	08/1997
USGS	2276870	St Lucie Canal at Lake Okeechobee	Flow gage	Daily	03/1941
USGS	272524080221800	Five Mile Canal above S-29-1-4 near Ft. Pierce	Flow gage	Daily	12/2002

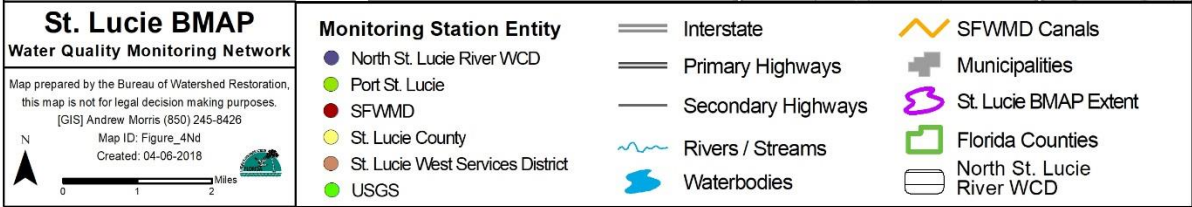
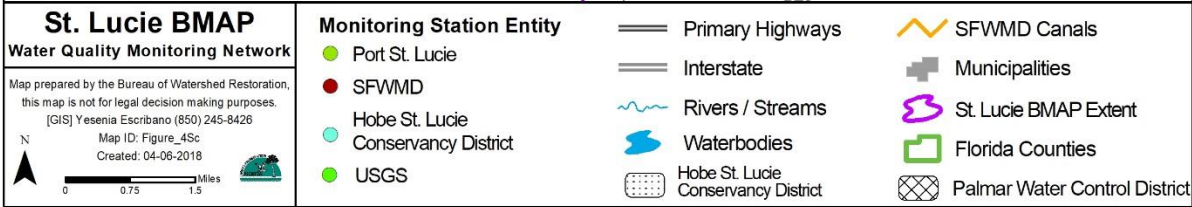


Figure D-1. Water quality monitoring network for the northern part of the St. Lucie River and Estuary



Recommended Revisions

For future implementation phases, one recommendation is to reorganize the ambient water quality monitoring stations into a tiered system, as follows:

- **Tier 1** stations will be the primary/priority stations used in periodic water quality analyses to track BMAP progress and water quality trends over the long term in the basin. Tier 1 stations include both estuary and structure ambient monitoring stations. Several of these stations have autosamplers with more frequent data collection, and the stations at the structures also have flow data. If at any point it is necessary to reduce efforts in the basin, these stations should be the last stations impacted.
- **Tier 2** stations will provide secondary information that can be used to help focus and adaptively manage implementation efforts.
- **Tier 3** consists of USGS gages where flow and/or stage are monitored.

Several additional sites monitored in the basin are not included in the BMAP network, as the ability to sample is resource dependent. Data from these sites may be reviewed when appropriate. If the recommended revisions to the BMAP monitoring network are implemented, TN and TP concentrations will be monitored at 57 stations and flow will be monitored at 4 stations. The revised network of stations is listed in **Table D-2** and shown in **Figures D-3** and **D-4**.

Table D-2. Revised BMAP monitoring network

¹ Previously listed as "B" station, which was active from July 16, 2012, to February 12, 2015. The station was moved back to the original location and no data are available after February 12, 2015.

Notes: N/A = Not applicable. Remove = Recommended that station be excluded from revised network. **Bold** type and shading denote a station that is newly added to the network.

Sampling Entity	Station	Station Type	Tier Recommendation	Structure, Estuary, or Tributary
Hobe St. Lucie Conservancy District	Sample III	Grab	Remove	N/A
Hobe St. Lucie Conservancy District	Sample 6	Grab	Remove	N/A
Hobe St. Lucie Conservancy District	Sample 7	Grab	Remove	N/A
Hobe St. Lucie Conservancy District	Sample 8	Grab	Remove	N/A
NSLRWCD	1 (Structure 23-1 Sager and Oleander)	Grab	Remove	N/A
NSLRWCD	2 (North Fork St. Lucie River at Midway Rd. – White City Park Pier)	Grab	Remove	N/A
NSLRWCD	3 (Five Mile Creek at Edwards Rd. – Bridge at Kirby Loop Rd.)	Grab	Remove	N/A

Sampling Entity	Station	Station Type	Tier Recommendation	Structure, Estuary, or Tributary
NSLRWCD	6 (South of Riser 40-1-2 NW corner Okeechobee Rd. and Kings Highway	Grab	Remove	N/A
NSLRWCD	7 (Structure 71-1-4 Ten Mile Creek and C-96 [bridge on Gordy Rd.])	Grab	Remove	N/A
NSLRWCD	8 (McCarty Rd. and Ten Mile Creek)	Grab	Remove	N/A
NSLRWCD	9 (McCarty Rd. and Stetson Rd.)	Grab	Remove	N/A
Port St. Lucie	C-106	Grab	Remove	N/A
Port St. Lucie	C-107	Grab	2	Tributary
Port St. Lucie	C-108	Grab	Remove	N/A
Port St. Lucie	Sagamore WW	Grab	Remove	N/A
Port St. Lucie	Degan WW	Grab	Remove	N/A
Port St. Lucie	D-14	Grab	Remove	N/A
Port St. Lucie	D-21	Grab	Remove	N/A
Port St. Lucie	Elcam In	Grab	Remove	N/A
Port St. Lucie	Elcam Spillway	Grab	2	Tributary
Port St. Lucie	Kingsway WW	Grab	2	Tributary
Port St. Lucie	A18	Grab	2	Tributary
Port St. Lucie	A22	Grab	2	Tributary
Port St. Lucie	A23	Grab	Remove	N/A
Port St. Lucie	A24	Grab	Remove	Tributary
Port St. Lucie	A25	Grab	Remove	N/A
Port St. Lucie	Burrow	Grab	Remove	N/A
Port St. Lucie	E8	Grab	2	Tributary
Port St. Lucie	Monterrey WW	Grab	2	Tributary
Port St. Lucie	U16-D016	Grab	2	Tributary
Port St. Lucie	H-16	Grab	2	Tributary
Port St. Lucie	Blackwell Pump Station	Grab	Remove	N/A
Port St. Lucie	B-33	Grab	Remove	Tributary
Port St. Lucie	B-95-3	Grab	Remove	Tributary
SFWMD	C23S48	Grab	1	Structure
SFWMD	C23S48	Autosampler	1	Structure
SFWMD	C24S49	Grab	1	Structure
SFWMD	C24S49	Autosampler	1	Structure
SFWMD	C25S50	Grab	1	Structure
SFWMD	C44S80	Grab	1	Structure
SFWMD	C44S80	Autosampler	1	Structure
SFWMD	G81	Grab	2	Structure
SFWMD	GORDYRD	Grab	1	Structure
SFWMD	GORDYRD	Autosampler	1	Structure

Sampling Entity	Station	Station Type	Tier Recommendation	Structure, Estuary, or Tributary
SFWMD	S308C	Grab	1	Structure
SFWMD	SLT-1	Grab	2	Tributary
SFWMD	SLT-10A	Grab	2	Tributary
SFWMD	SLT-10B	Grab	2	Tributary
SFWMD	SLT-11	Grab	2	Tributary
SFWMD	SLT-17	Grab	2	Tributary
SFWMD	SLT-19	Grab	2	Tributary
SFWMD	SLT-21	Grab	2	Tributary
SFWMD	SLT-22A	Grab	2	Tributary
SFWMD	SLT-26	Grab	2	Tributary
SFWMD	SLT-29	Grab	2	Tributary
SFWMD	SLT-2A	Grab	2	Tributary
SFWMD	SLT-3	Grab	2	Tributary
SFWMD	SLT-30A	Grab	2	Tributary
SFWMD	SLT-31	Grab	2	Tributary
SFWMD	SLT-34A	Grab	2	Tributary
SFWMD	SLT-35	Grab	2	Tributary
SFWMD	SLT-36	Grab	2	Tributary
SFWMD	SLT-37A	Grab	2	Tributary
SFWMD	SLT-38	Grab	2	Tributary
SFWMD	SLT-38A	Grab	2	Tributary
SFWMD	SLT-39	Grab	2	Tributary
SFWMD	SLT-4	Grab	2	Tributary
SFWMD	SLT-40	Grab	2	Tributary
SFWMD	SLT-40A	Grab	2	Tributary
SFWMD	SLT-42B	Grab	2	Tributary
SFWMD	SLT-44	Grab	2	Tributary
SFWMD	SLT-45	Grab	2	Tributary
SFWMD	SLT-5	Grab	2	Tributary
SFWMD	SLT-6	Grab	2	Tributary
SFWMD	SLT-7	Grab	2	Tributary
SFWMD	SLT-9	Grab	2	Tributary
SFWMD	HR1	Grab	1	Tributary
SFWMD	SE 01	Grab	1	Estuary
SFWMD	SE 02	Grab	1	Estuary
SFWMD	SE 03	Grab	1	Estuary
SFWMD	SE 08B	Grab	1	Estuary
SFWMD	SE 09	Grab	1	Estuary
SFWMD	SE 11	Grab	1	Estuary
SFWMD	SE06B ¹	Grab	1	Estuary
SFWMD	SE12B ¹	Grab	1	Estuary

Sampling Entity	Station	Station Type	Tier Recommendation	Structure, Estuary, or Tributary
SFWMD	SE13B ¹	Grab	2	Estuary
SLC	Platt's Creek Influent	Grab	Remove	N/A
SLC	Platt's Creek Effluent	Grab	Remove	N/A
SLC	Indian River Estates Influent	Grab	Remove	N/A
SLC	Indian River Estates Effluent	Grab	Remove	N/A
SLWSD	Gate 7	Outfall structure	Remove	N/A
SLWSD	Gate 8	Outfall structure	Remove	N/A
SLWSD	Gate 6	Outfall structure	Remove	N/A
SLWSD	Gate 4	Outfall structure	Remove	N/A
SLWSD	Gate 3	Outfall structure	Remove	N/A
SLWSD	Gate 2	Outfall structure	Remove	N/A
SLWSD	Gate 1	Outfall structure	Remove	N/A
SLWSD	Gate 5	Outfall structure	Remove	N/A
USGS	2277100 (St. Lucie River at Speedy Point, Stuart, FL)	Flow gage	3	Estuary
USGS	2277110 (St. Lucie River at A1A [Steele Point], Stuart, FL)	Flow gage	3	Estuary
USGS	2276870 (St. Lucie Canal at Lake Okeechobee)	Flow gage	3	Structure
USGS	272524080221800 (Five Mile Canal above S-29-1-4 near Ft. Pierce)	Flow gage	3	Tributary

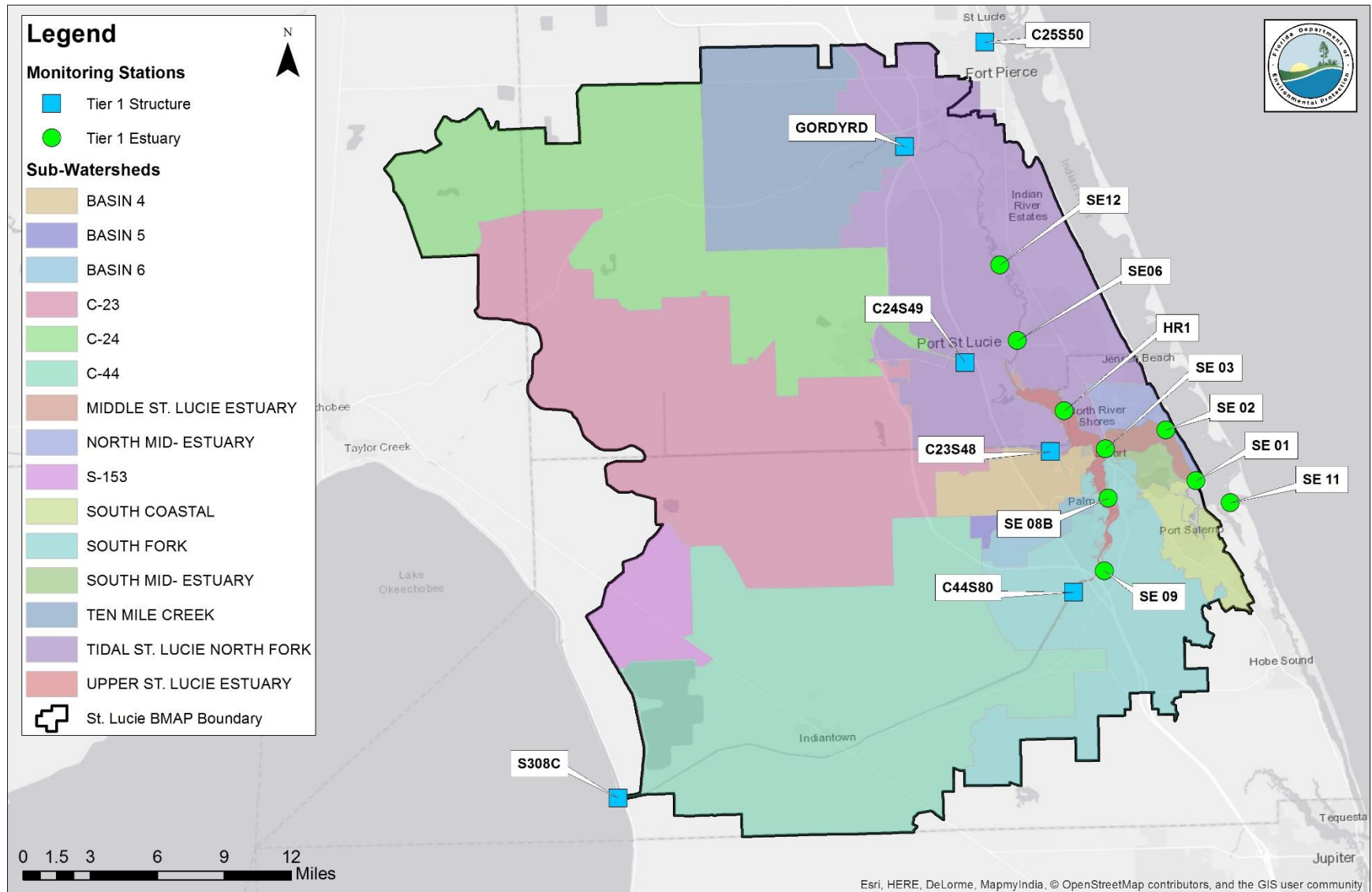


Figure D-3. Revised Tier 1 St. Lucie River and Estuary BMAP stations

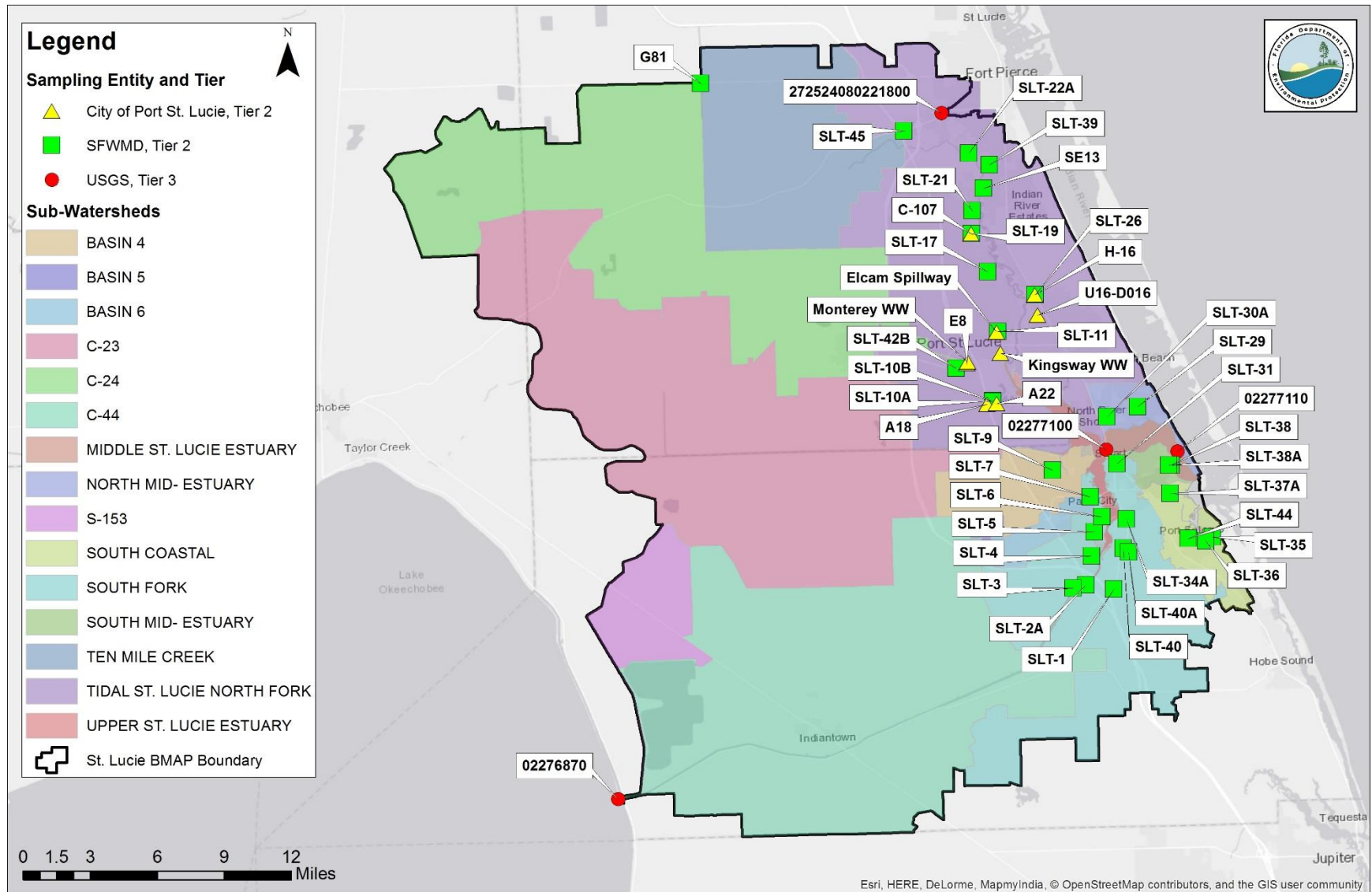


Figure D-4. Revised Tier 2 and 3 St. Lucie River and Estuary BMAP stations

Biological Monitoring

In addition to the monitoring of water quality parameters, biological monitoring is carried out to assess the overall health of the St. Lucie River and Estuary. This monitoring includes the evaluation of seagrass and oysters, as summarized in **Table D-3** and shown in **Figure D-5**. These stations are not specifically BMAP stations—i.e., they are designed for other purposes—but the data collected are submitted to DEP and may be used to monitor the effectiveness of BMAP projects.

Table D-3. St. Lucie River and Estuary biological monitoring

Sampling Entity	Project	Number of Stations	Location	Parameter(s)	Frequency	Project Start Date
SFWMD/DEP	Seagrass Monitoring and Mapping	20	Transects in all lagoon segments	Species-specific percent cover, shoot density, canopy height, length of seagrass bed, epiphyte cover, macroalgae	Semiannually	1994
SFWMD/DEP	Seagrass Monitoring and Mapping	Lagoonwide maps	Entire lagoon from St. Lucie Estuary upstream to Roosevelt Bridge (US Hwy. 1)	Continuous or patchy seagrass cover map	Every 2 to 5 years	1986
SFWMD	Seagrass Monitoring and Mapping	7	IRL-South	Species-specific presence/absence 2008–12; percent cover starting 2012; canopy height of dominant species	Quarterly to bimonthly (2 sites near St. Lucie Estuary monitored monthly during summer)	2008
SFWMD/Florida Fish and Wildlife Conservation Commission (FWC)	Oyster Monitoring and Mapping	9	St. Lucie Estuary	Spat recruitment and disease prevalence (monthly); live/dead density (semiannually)	Monthly; Semiannually	2005

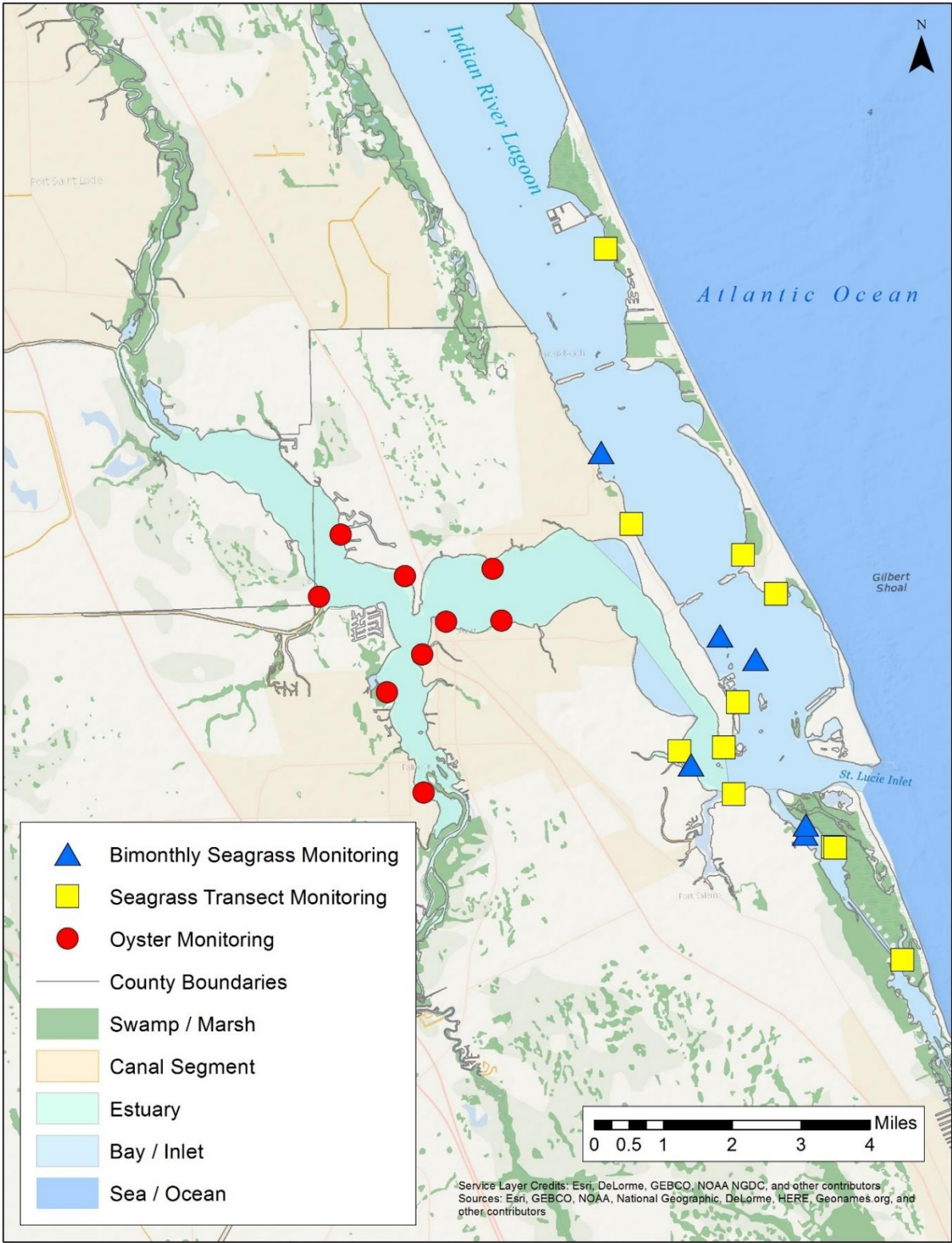


Figure D-5. St. Lucie River and Estuary biological monitoring locations

Appendix E: St. Lucie Water Quality Data Processing and Analysis Methods

For this 5-Year Review of the St. Lucie River and Estuary BMAP, trend analyses were conducted on available data from appropriate estuary and structure stations for the period from May 1, 2007, to April 30, 2017. Data were provided primarily by STORET and WIN and processed according to the procedure outlined in the next section. The nonparametric Seasonal Kendall test was used to identify monotonic trends in the data. This statistical technique was chosen because data are not required to conform to a particular distribution and because nonparametric techniques are robust against outliers and gaps in the data record. The results of the Seasonal Kendall analysis are summarized in **Section 2.3.3** in the report, and details of the techniques are provided below.

Data Management and Processing

The working POR for this analysis was May 1, 2007, to April 30, 2017, to allow a sufficient data record for trend analysis including periods before and after BMAP adoption in May 2013. Additionally, the evaluation will remain consistent with the established WY in the region (May 1 to April 30).

The parameters used in the analysis were TN (including all nitrogen species required to calculate TN) and TP. TN and TP data were retrieved from STORET and WIN for the 15 SFWMD stations determined to be appropriate for the analysis. Data from Stations SE 06 and SE 12 were combined with data from SE06B and SE12B, respectively, as the stations are in the same locations but were renamed. Additionally, STORET and WIN had no data for SE 06 and SE 12 before July 2012; therefore, data were retrieved from the SFWMD DBHYDRO database for the period from May 2007 to July 2012. Following the completion of data analyses and this report, SFWMD uploaded data from these stations to WIN for inclusion in the DEP database.

Table E-1 lists the POR, data availability, and retrieval database for the monthly series of nutrient data for each station. All data were subject to processing with industry standard quality control checks and statistical diagnostics, which addressed the review of sample collection methods, the removal of data flagged with fatal qualifier codes, the assessment of temporal independence, and serial correlation. After QC processing was completed, monthly medians were calculated for each month with more than one sampling date. The monthly median series was the final data series used in statistical and trend analysis. The following sections describe specific data processing steps and methodology.

Statistical Analyses

The Seasonal Kendall test was used to identify monotonic trends in the nutrient concentration data for each station. Nonparametric tests such as Seasonal Kendall are robust against outliers and large data gaps, and data are not required to conform to a particular distribution for nonparametric analyses. The USGS Fortran code for the Seasonal Kendall test was used to compute a tau, raw p-value, and slope for each parameter series using months as "seasons." The program also provides a p-value adjusted for covariance caused by serial correlation.

Autocorrelation function (ACF) analysis was conducted on the monthly TN and TP series for each station to identify seasonality and serial correlation. If a series showed significant autocorrelation at the 12-month lag, it was considered to exhibit serial correlation, and the adjusted p-value was selected as the representative p-value for the series. If no serial correlation was detected, then the raw p-value was reported. Trends in the data series were considered significant if the appropriate p-value was less than 0.05, with a positive Sen slope indicating an increasing trend, and a negative Sen slope indicating a decreasing trend.

Data Download

- TN and TP data from WIN and STORET:
 - Structure stations used in analysis: C44S80, C23S48, C24S49, GORDYRD, C25S50, S308C.
 - Estuary stations used in analysis: HR1, SE 01, SE 02, SE 03, SE 06, SE 08B, SE 09, SE 11, and SE 12:
 - Stations SE06B and SE12B were combined with Stations SE 06 and SE 12 respectively, as they are in the same location, but were renamed.
- Station data were provided by DEP (from STORET and WIN) to assess nutrient concentrations for all stations, and by SFWMD (DBHYDRO) to assess nutrient FWMs and loads at structure stations for the designated POR:
 - Overall POR was May 1, 2007, through April 30, 2017.

Data Processing (in order of operation)

- Data Qualifiers:
 - Data with result qualifiers of "G," "H," "K," "L," "N," "O," "Q," "V," "Y," or "?" were not used in the analysis, as per Table 1, Data Qualifier Codes, in Rule 62-160.700, F.A.C., Quality Assurance, and recent decisions by DEP.
 - Only grab samples were used in the analysis of concentration data.
 - Both grab and automatic composite samples were used in the analysis of FWM and load data (as calculated and provided by SFWMD from flow and concentration data).
 - Comments associated with data with a result qualifier of "J" were reviewed; however, none indicated that the data should be excluded from the analyses.
 - Data with a result qualifier of "U" were reviewed:
 - If not already present, a result qualifier of "U" was assigned to any data with a result value of "*Non-Detect."
 - Data with a result value of "*Not Reported" were deleted unless they also had a value qualifier of "U."
 - Data with a result qualifier of "U" were processed in accordance with Subsection 62-303.320(12), F.A.C., Aquatic Life-Based Water Quality Criteria Assessment. Results reported by a laboratory with the "U" data qualifier code were assessed as half the reported result or half the criterion (whichever was lower).
- Sample Depth:
 - Samples were not filtered by sample depth.
- Nutrient Characteristic Selection:
 - TP: "Phosphorus as P," "Phosphorus - Total."
 - TN (in order of priority):
 - "Nitrogen – Total," or "Nitrogen ion."

- $TKN + (NO_2 + NO_3)$.
- $TKN + NO_2 + NO_3$
- TKN*Adjustment Factor:
 - Adjustment Factor = Median (TN/TKN) for the entire POR.
- Accounting for Duplicate Samples:
 - If samples were found to share the same station, characteristic, date, and time, they were flagged and reviewed.
 - The median of the duplicate samples was used as the reported value.
- Temporal Processing:
 - Monthly Time Series: If multiple data points existed within a month, the monthly median was calculated for each month.
- Processing for Statistical Tests:
 - Data were processed according to the needs of each statistical test (ACF or trend) and formatted for use in the R statistical program or USGS Fortran code.
 - Sampling Frequency:
 - Monthly data series were used for analysis.
 - If a series had at least 5 years of data (without large data gaps), it was used for trend analysis.
 - The STORET/WIN series for Stations SE 06 and SE 12 was missing data from May 1, 2007, to July 1, 2012, and thus the gap was filled using DBHYDRO data. The DBHYDRO data during that period were later submitted to WIN after the completion of this report.

Trend Analysis

- ACF:
 - ACF analysis was conducted to evaluate seasonal patterns or serial correlation (using monthly seasons).
 - For purposes of Seasonal Kendall analysis, statistically significant correlation on the 12th month lag was considered representative of serial correlation.
- Seasonal Kendall Tau Test:
 - Statistical Test Description: A nonparametric statistical test that does not require data to conform to a specific distribution and is not sensitive to outliers or data gaps:
 - Identifies monotonic trends in the datasets.
 - Yields statistical significance value and direction of trend (increasing or decreasing).
 - Accounts for seasonal data patterns (using months as seasons).
 - Use in Trend Analysis:
 - Serial correlation was identified with ACFs prior to trend analysis.
 - USGS Fortran code for Seasonal Kendall Tau Test was used to produce tau, p-value, adjusted p-value, and Sen slope:
 - Raw P-value used for series with no serial correlation detected.
 - Adjusted p-value used if serial correlation was identified.
 - **Tables E-2** and **E-3** provide complete results for trend analysis, including raw and adjusted p-values and selected p-values.

- Tau, p-value, and slope were used to interpret significance and direction of monotonic trend.

Table E-1. POR for monthly nutrient data series

* DBHYDRO data were used to fill gaps in the STORET/WIN dataset from May 2007 to July 2012. All data were processed and reviewed using the same procedures.

Data Source	Station	TP Start Date	TP End Date	TP Count	TN Start Date	TN End Date	TN Count
STORET/WIN	C23S48	May-2007	April-2017	119	May-2007	April-2017	119
STORET/WIN	C24S49	May-2007	April-2017	115	May-2007	April-2017	115
STORET/WIN	C25S50	May-2007	June-2016	110	May-2007	June-2016	110
STORET/WIN	C44S80	May-2007	April-2017	118	May-2007	April-2017	118
STORET/WIN	S308C	May-2007	April-2017	119	May-2007	April-2017	119
STORET/WIN	GORDYRD	May-2007	April-2017	119	May-2007	April-2017	119
STORET/WIN	HR1	May-2007	April-2017	115	May-2007	April-2017	116
STORET/WIN	SE 01	May-2007	April-2017	114	May-2007	April-2017	115
STORET/WIN	SE 02	May-2007	April-2017	113	May-2007	April-2017	113
STORET/WIN	SE 03	May-2007	April-2017	115	May-2007	April-2017	116
STORET/WIN	SE 08B	May-2007	April-2017	115	May-2007	April-2017	116
STORET/WIN	SE 09	May-2007	April-2017	114	May-2007	April-2017	114
STORET/WIN	SE 11	May-2007	April-2017	114	May-2007	April-2017	114
STORET/WIN	*SE 06	July-2012	April-2017	53	July-2012	April-2017	53
STORET/WIN	*SE 12	July-2012	April-2017	54	July-2012	April-2017	54
DBHYDRO	*SE 06	May-2007	July-2012	84	May-2007	July-2012	84
DBHYDRO	*SE 12	May-2007	July-2012	84	May-2007	July-2012	84

Table E-2. Complete Seasonal Kendall trend analysis results for TN concentrations**Note:** P-values listed in **bold** indicate statistical significance ($p < 0.05$).

TN measured in mg/L.

¹ Even if the p-value is determined to be statistically significant, the result may not be ecologically significant. For example, if a trend is statistically significantly declining (negative trend) but the slope is near 0, then it may not be realistic to assume that an improvement in water quality by reductions in TN or TP may have a positive, measurable impact on the ecological system.² Series with serial correlation (marked with X, as per autocorrelation analysis results) used the P-value adjusted for serial correlation.

* Stations SE06 and SE12 include data from SE06B and SE12B, respectively.

Station	Station Type	Tau	Raw P-Value	P-Adjusted	Slope ¹	Serial Correlation	Selected P-Value ²
C23S48	Structure	-0.017	0.835	0.913	-0.00133	X	0.913
C24S49	Structure	-0.125	0.095	0.260	-0.00825	X	0.260
C25S50	Structure	0.024	0.770	0.852	0.00175	X	0.852
C44S80	Structure	-0.061	0.413	0.616	-0.00567	X	0.616
GORDYRD	Structure	-0.141	0.053	0.279	-0.01486	X	0.279
S308C	Structure	-0.209	0.004	0.114	-0.03583	X	0.114
HR1	Estuary	-0.165	0.027	0.043	-0.01229	X	0.043
SE 01	Estuary	0.046	0.556	0.658	0.00392	X	0.658
SE 02	Estuary	-0.014	0.870	0.899	-0.00088	X	0.899
SE 03	Estuary	-0.161	0.031	0.089	-0.01232	X	0.089
SE 08B	Estuary	-0.050	0.516	0.578	-0.00525	X	0.578
SE 09	Estuary	-0.088	0.251	0.273	-0.00735	X	0.273
SE 11	Estuary	0.162	0.030	0.170	0.00917	X	0.170
*SE 06	Estuary	-0.226	0.002	0.017	-0.01667	X	0.017
*SE 12	Estuary	-0.298	0.000	0.021	-0.02375	X	0.021

Table E-3. Complete Seasonal Kendall trend analysis results for TP concentrations**Note:** P-values listed in **bold** indicate statistical significance ($p < 0.05$).

TP measured in mg/L.

¹ Even if the p-value is determined to be statistically significant, the result may not be ecologically significant. For example, if a trend is statistically significantly declining (negative trend) but the slope is near 0, then it may not be realistic to assume that an improvement in water quality by reductions in TN or TP may have a positive, measurable impact on the ecological system.² Series with serial correlation (marked with X, as per autocorrelation analysis results) used the P-value adjusted for serial correlation.

* Stations SE06 and SE12 include data from SE06B and SE12B, respectively.

Station	Station Type	Tau	Raw P-Value	P-Adjusted	Slope ¹	Serial Correlation	Selected P-Value ²
C23S48	Structure	0.068	0.361	0.571	0.00200	X	0.571
C24S49	Structure	0.083	0.274	0.467	0.00260	X	0.467
C25S50	Structure	-0.018	0.838	0.897	-0.00040	X	0.897
C44S80	Structure	-0.050	0.509	0.672	-0.00092	X	0.672
GORDYRD	Structure	-0.066	0.375	0.601	-0.00200	X	0.601
S308C	Structure	-0.105	0.151	0.442	-0.00367		0.151
HR1	Estuary	-0.154	0.040	0.194	-0.00214	X	0.194
SE 01	Estuary	0.101	0.184	0.214	0.00150	X	0.214
SE 02	Estuary	0.008	0.933	0.930	0.00020	X	0.930
SE 03	Estuary	-0.172	0.021	0.078	-0.00400	X	0.078
SE 08B	Estuary	-0.119	0.112	0.187	-0.00217	X	0.187
SE 09	Estuary	-0.045	0.561	0.479	-0.00100	X	0.479
SE 11	Estuary	0.175	0.020	0.130	0.00175		0.020
*SE 06	Estuary	-0.255	0.001	0.024	-0.00550	X	0.024
*SE 12	Estuary	-0.266	0.000	0.031	-0.00600	X	0.031

Appendix F: Revised Allocation Methodology

Certain land uses and types of entities were re-evaluated and incorporated into the allocation methodology in a different manner than the original approach. The changes proposed in the methodology aim to best represent the existing responsibility of each stakeholder and to ensure that any load is allocated as accurately as possible.

Water Management Areas

As in the original BMAP, the acreage and loading associated with the FPL cooling pond were set aside in the allocations. FPL withdraws water from the C-44 Canal for facility cooling processes, and the water is then discharged to the cooling pond for circulation and reuse. The cooling pond is directly discharged to the C-44 Canal only when necessary after excessive rain events and twice per year during the spillway gate tests. Additional nutrient reductions are not required in the cooling pond.

Portions of the St. Lucie BMAP area also contain large-scale DWM projects and projects that are part of CERP that cannot be assigned to any stakeholder. The projects that were removed were selected based on status—either "Construction" or "Design/Permitting"—and, as a result, the acreage and loading of six projects were set aside in the allocations.

WCDs and Other Special Districts

The way in which the WCDs were incorporated into the allocation processing was a change from the previous allocation methodology. Previously, the entire WCD boundary was used to estimate each district's allocation. Since WCDs only have jurisdiction over the canals and rights-of-way within their boundaries, the remainder of WCD lands was removed from the allocation process. Instead of having a set required reduction, each WCD will follow certain canal and right-of-way BMPs. This will also simplify the reporting of agricultural BMP enrollment in the basin. The districts impacted by this change were Hobe St. Lucie Conservancy District, NSLRWCD, Pal Mar WCD, and TIWCD.

CDDs

The CDDs in the St. Lucie BMAP area were reassessed to determine whether each should be included or excluded from the allocation process. The CDDs were included if they met all three of the following criteria: they are developed (i.e., have roads and infrastructure), they discharge to a city or county MS4, and they receive money from stormwater fee collection. These criteria were verified with representatives of each CDD identified in the BMAP area. The draft list of CDDs meeting all three criteria is as follows:

- Copper Creek.
- Creekside.
- Portofino Isles.

- River Place on St. Lucie.
- St. Lucie West Services.
- Tesoro.
- Tradition.
- Veranda.
- Verano/Verano Center.
- Villa Vizcaya.

Appendix G: St. Lucie River Sub-Watershed Boundary Improvements Technical Memorandum

ADA Engineering, Inc. completed a study for the SFWMD in 2012 that led to a revision of watershed boundaries in February 2013. These modifications were not adopted in time to be included in the original BMAP but were subsequently presented in the 2015 St. Lucie Watershed Protection Plan Update and used in other planning and modeling efforts. The Technical Memorandum included in this appendix describes the boundary refinement in detail, in addition to the changes previously discussed in **Section 3.2** and shown in **Figures 10** and **11**.

TECHNICAL MEMORANDUM

To: Archydro Developers, Coordinating Agencies, and Stakeholders
From: Jodie Hansing, Everglades Regulation Bureau, SFWMD
Date: February 06, 2013
Subject: St. Lucie River Sub-watershed Boundary Improvements

Background:

The St. Lucie River Watershed tributary boundaries were documented within the St. Lucie River Watershed Protection Plan (2009), coordinated among agencies, and adopted to the District's Archydro Database. Drainage basin delineations within the watershed are used for multiple purposes including FDEPs Basin Management Action Plan and other planning and modeling efforts. The South Florida Water Management District (District), as part of source control program development in this area, has made further efforts to refine these boundaries.

Under a contract managed by the District's Everglades Regulation Bureau, a study conducted by ADA Engineering, Inc. to evaluate the hydrologic network for tributaries with questionable drainage area was completed in October 2012, (ADA, 2012). Follow-up activities included interviews with local entities, aerial inspections, and investigations of areas where differences were identified in the AHED database. The following items summarize sub-watershed boundary modifications resulting from this study and these activities. These modifications will be presented in the 2015 Protection Plan Update and may be adopted by the coordinating agencies ensuring consistency in project reporting and restoration efforts.

North Fork Sub-Watershed:

Figure 1 depicts the added and removed acreages from the St. Lucie North Fork Sub-watershed as described below.

Areas added:

- 12,619 acres within the NSLRWCD that is in the C25 sub-watershed was found to drain to the North Fork under most conditions.
- 4,415 acres within the NSLRWCD that is in the C24 sub-watershed was found to drain to the North Fork under most conditions.
- 716 acres within the City of Ft. Pierce, Mid-Coastal sub-watershed, was found to drain to the North Fork.

Areas removed:

- 863 acres of the northern savannas were found to drain to the Indian River Lagoon (IRL), therefore removed from the North Fork and from the SLRW.

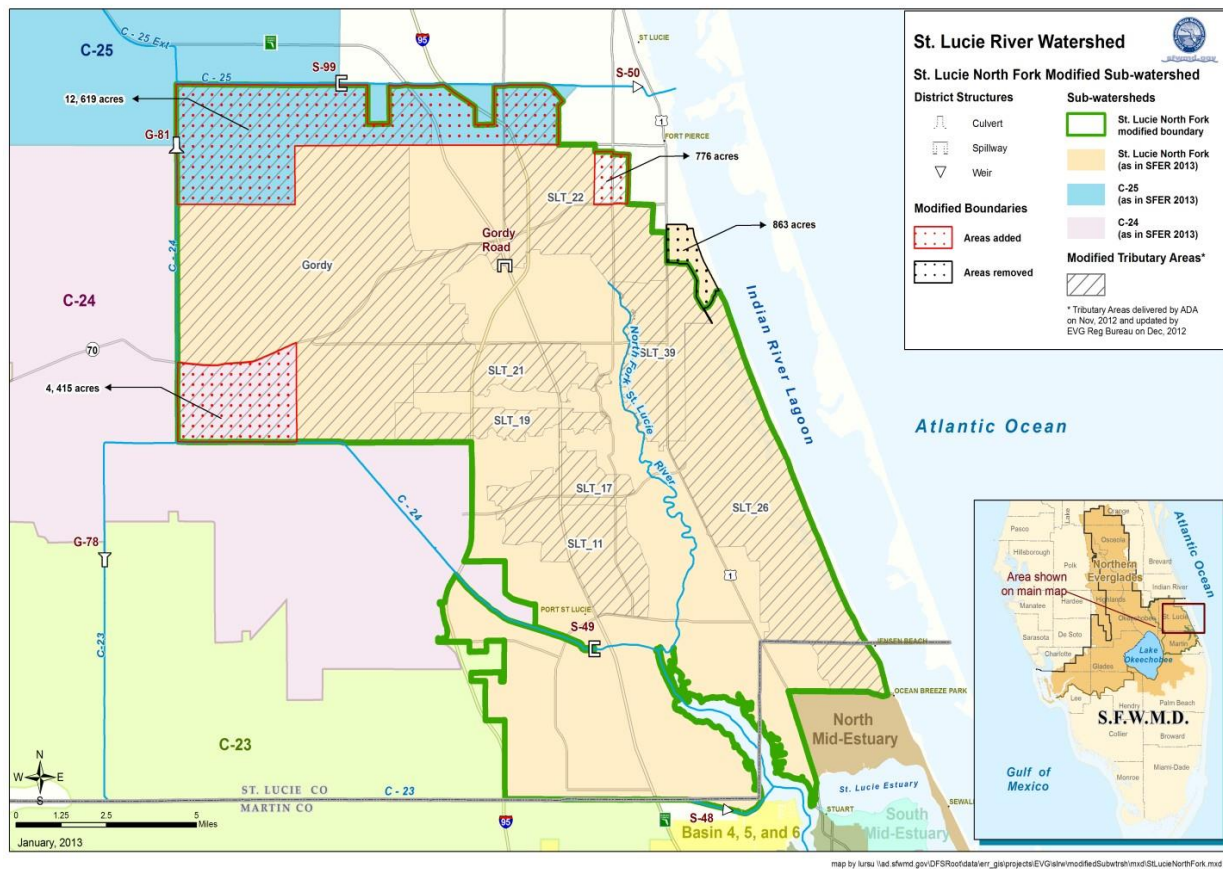


Figure 1. St. Lucie North Fork Modified Sub-watershed

C25/C25E Sub-Watershed:

Figure 2 depicts the added and removed acreages from the C25/C25E Sub-watershed as described below.

Areas added:

- 256 acres was added to include acreage from the C25 conveyance canal up to the sub-watershed monitoring station, S50.
- 476 acres was found to drain to the C-25 as shown by the AHED database. This change is to update the shapefiles produced by the Everglades Regulation Bureau as the AHED database already reflects this area as part of the C-25.

Areas removed:

- 12,619 acres within the NLSRWCD were found to drain to the North Fork under most conditions, therefore removed from the C25/C25E sub-watershed.

- 3,296 acres was found to drain to the SJRWMD C52 Canal per findings from Ken Konyha and SJRWMD staff, therefore removed from the C25 sub-watershed.

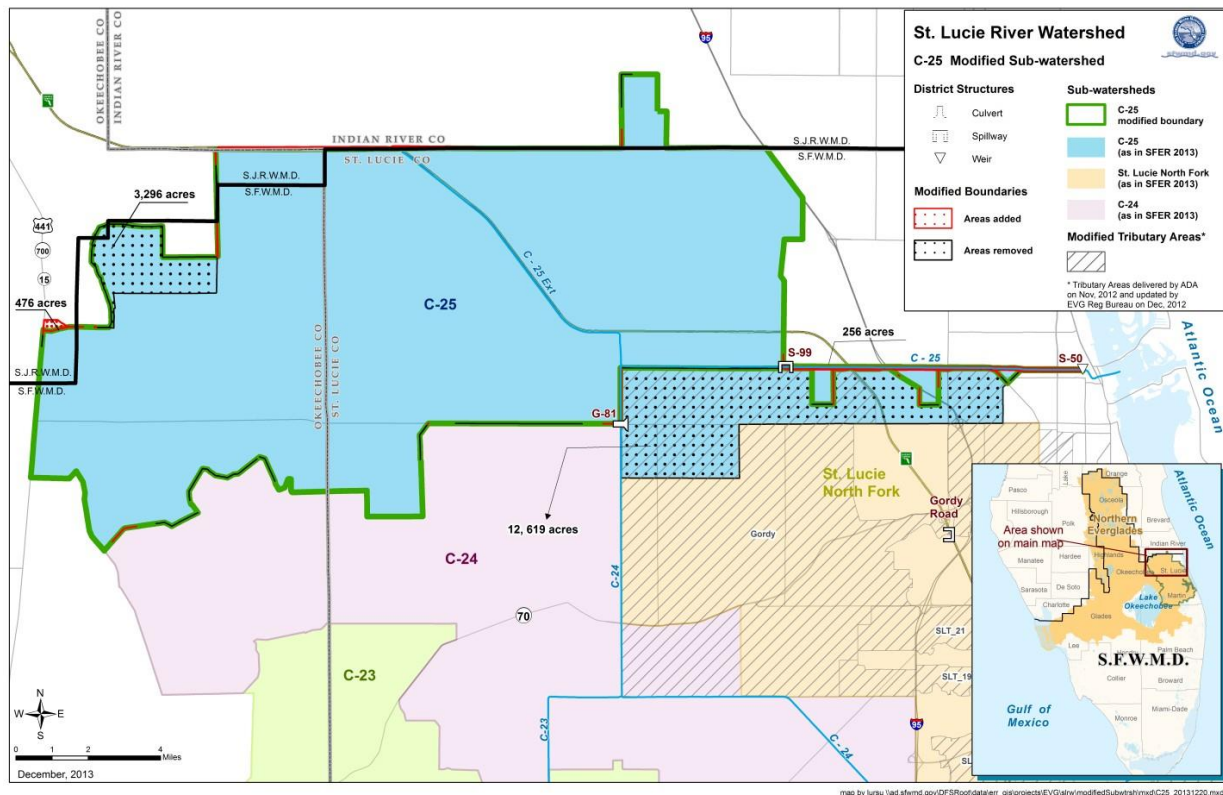


Figure 2. C25/C25E Modified Sub-watershed

C24 Sub-Watershed:

Figure 3 depicts the added and removed acreages from the C24 Sub-watershed as described below.

Areas added:

- None.

Areas removed:

- 4,415 acres within the NLSRWCD were found to drain to the North Fork under most conditions, therefore removed from the C24 sub-watershed.

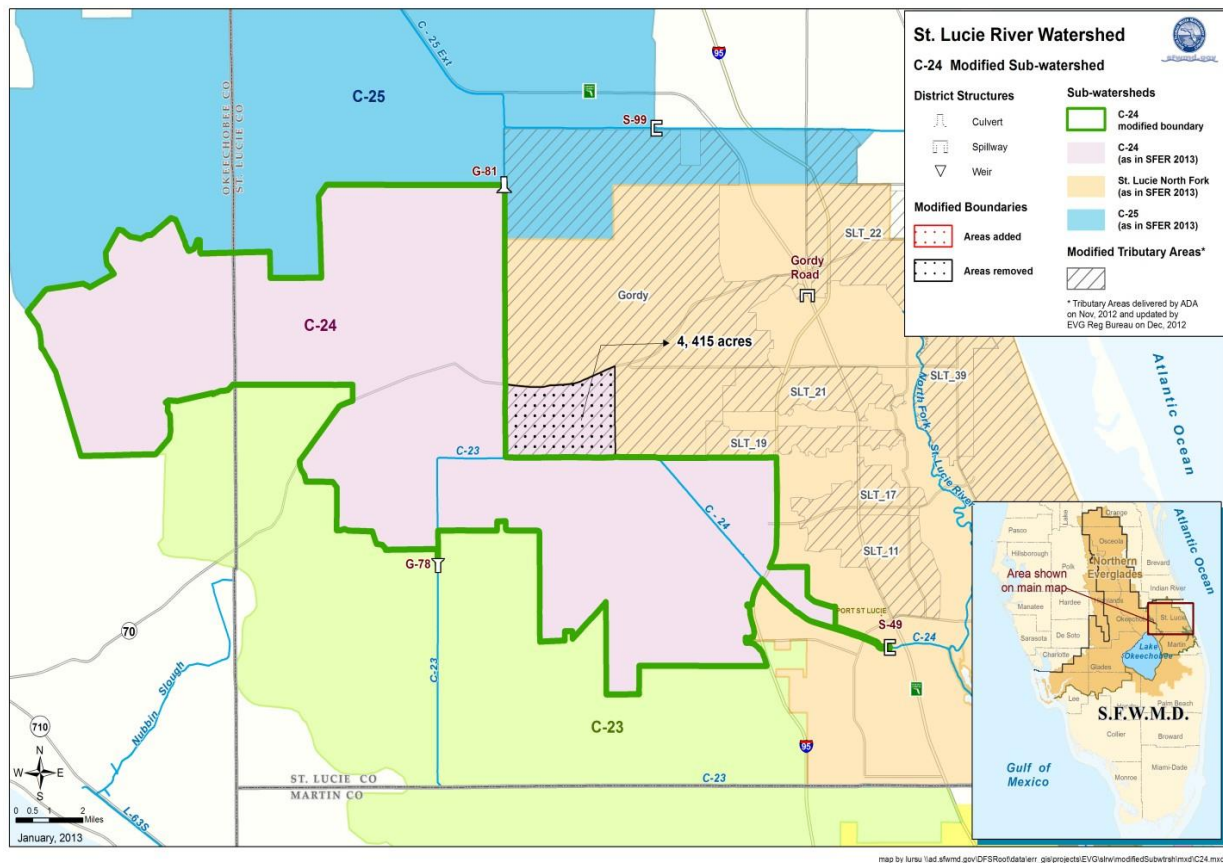


Figure 3. C24 Modified Sub-watershed

C23 Sub-Watershed:

Figure 4 depicts the added and removed acreages from the C23 Sub-watershed as described below.

Areas added:

- 81 acres were added to include acreage from the C23 conveyance canal up to the sub-watershed monitoring station, S48. Currently in the AHED database the C23 sub-watershed stops at station S97.

Areas removed:

- 1,301 acres that are within the C23 sub-watershed were found to drain to Bessey Creek, (monitoring station SLT-09). Because Bessey Creek is in the Basin 4-5-6 sub-watershed, this acreage was removed from the C23 sub-watershed.

Danforth Creek is in the Basin 4-5-6 sub-watershed, this acreage was removed from the South Fork and added to Basin 4-5-6 sub-watershed.

Areas removed:

- 981 acres (724 acres, 238 acres, and 19 acres shown by Figure 5), on the south and eastern boundary of Basin 4-5-6 were found to drain to the South Fork based on the modified boundary of Danforth Creek. Areas were investigated due to remaining acreage in Basin 4-5-6 after the Danforth Creek boundary was modified. Review of available permits showed these areas to drain to the South Fork.

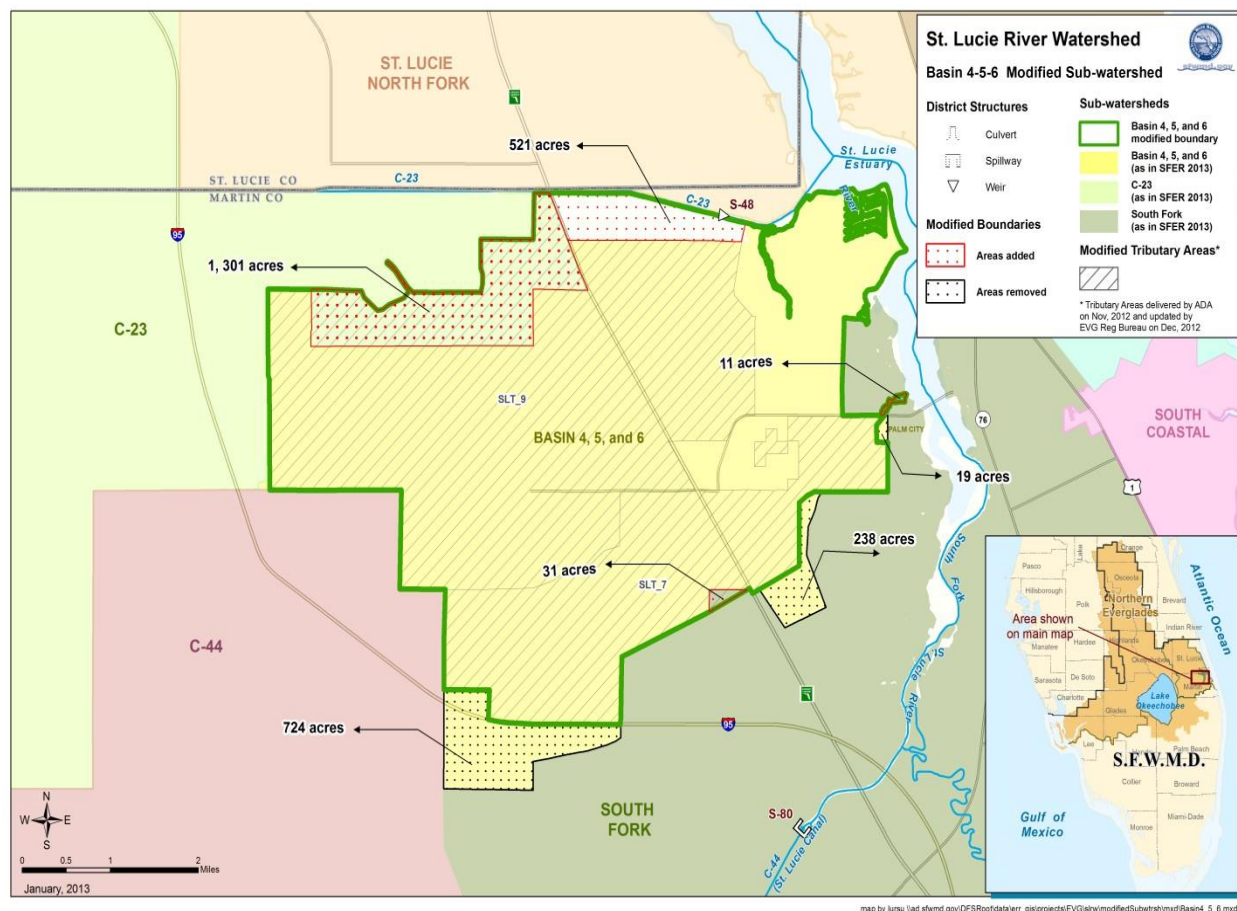


Figure 5. Basin 4-5-6 Modified Sub-watershed

C44 Sub-Watershed:

Figure 6 depicts the added and removed acreages from the C44 Sub-watershed as described below.

Areas added:

- 134 acres was added to include acreage from the C44 conveyance canal up to the sub-watershed monitoring station, S80.

Areas removed:

- None.

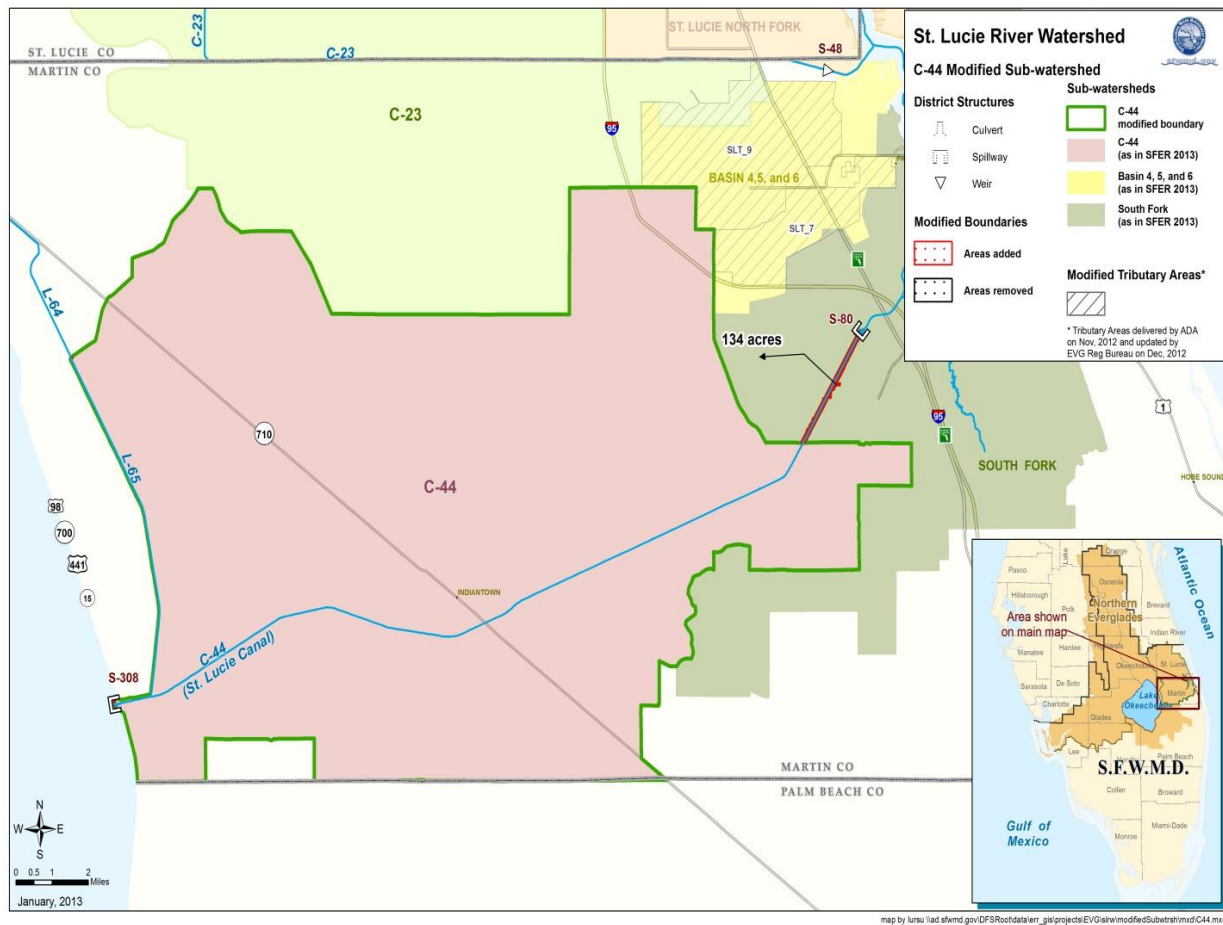


Figure 6. C44 Modified Sub-watershed

North Mid-Estuary Sub-Watershed:

The St. Lucie River Watershed hydrologic evaluation study resulted in no change to the North Mid Estuary Sub-watershed, (Figure 7).

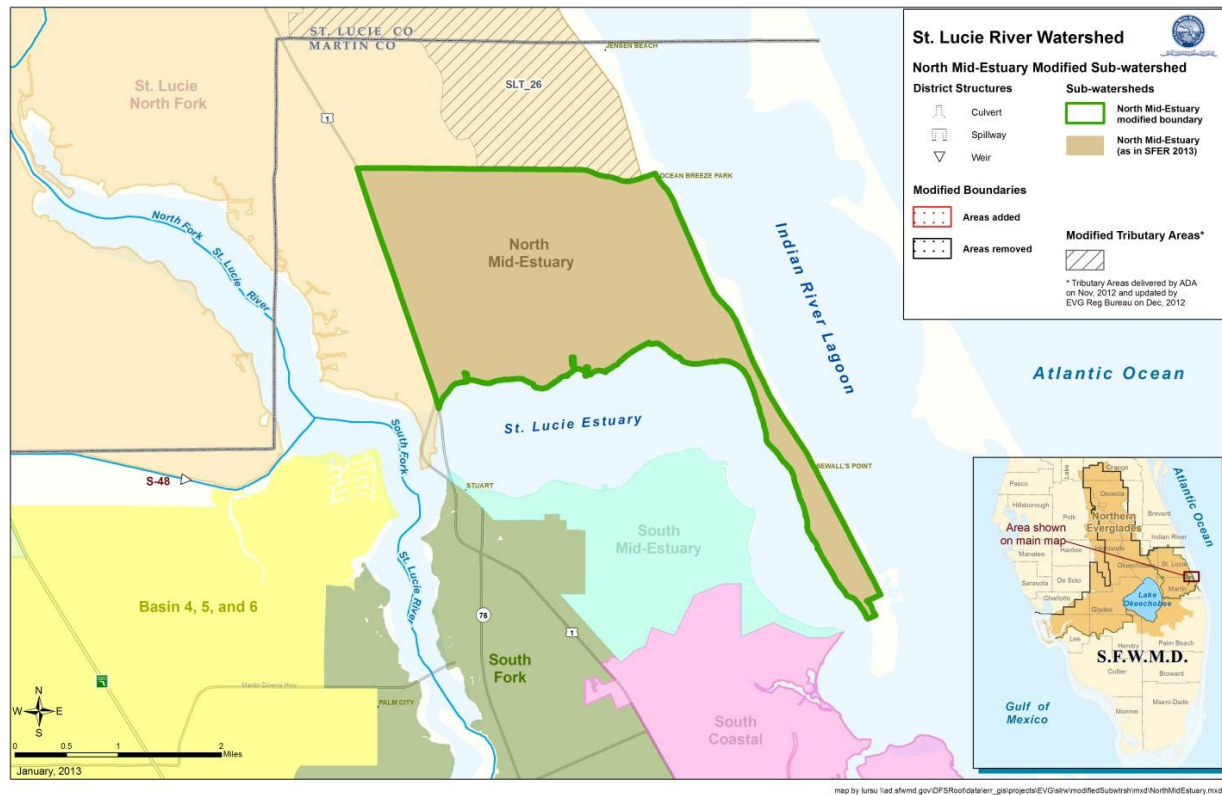


Figure 7. North Mid Estuary Sub-watershed

South Mid-Estuary Sub-Watershed:

Figure 8 depicts the added and removed acreages from the South Mid Estuary Sub-watershed as described below.

Areas added:

- 215 acres that are within the South Coastal sub-watershed were found to drain to North Airport Ditch, (monitoring station SLT-38). Because North Airport Ditch is in the South Mid-Estuary sub-watershed, this acreage was removed from the South Coastal sub-watershed.
- 42 acres that are within the South Fork sub-watershed were found to drain to North Airport Ditch, (monitoring station SLT38). Because North Airport Ditch is in the South Mid-Estuary sub-watershed, this acreage was removed from the South Fork sub-watershed.

Areas removed:

- No removal of acreage

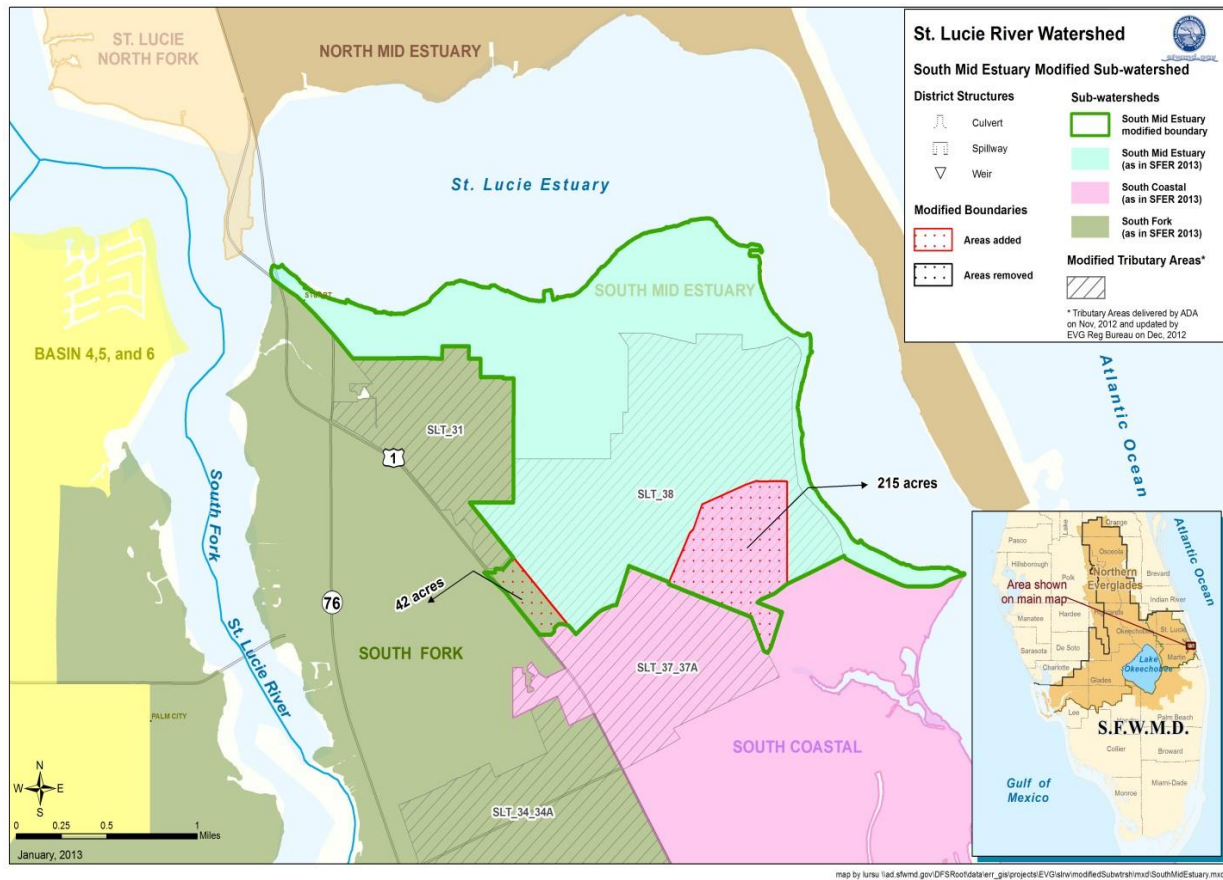


Figure 8. South Mid Estuary Modified Sub-watershed

South Coastal Sub-Watershed:

Figure 9 depicts the added and removed acreages from the South Mid Estuary Sub-watershed as described below.

Areas added:

- 163 acres (82 and 81 acres shown in Figure 9), that are within the South Fork were found to drain to Salerno Creek, (monitoring station SLT-44). Because Salerno Creek is within the South Coastal sub-watershed, this acreage was removed from the South Fork sub-watershed.
- 109 acres located along the eastern boundary of the South Fork sub-watershed were found to be unmonitored by the adjacent modified tributary boundaries, (SLT-34 and SLT-40) in the South Fork. This area is also located along the South Coastal sub-watershed boundary. Because this area was found not to drain to Coral Gardens Ditch SLT-34 nor Fern Creek SLT-40, it was removed from the South Fork and brought into the South Coastal sub-watershed based on review of available permits.

- 1,274 acres south of the South Coastal sub-watershed was found to drain to Manatee Pocket which is within the South Coastal sub-watershed.

Areas removed:

- 215 acres that are within the South Coastal sub-watershed were found to drain to North Airport Ditch, (monitoring station SLT-38). Because North Airport Ditch is in the South Mid-Estuary sub-watershed, this acreage was removed from the South Coastal sub-watershed.
- 1,249 acres located along the eastern boundary of the South Coastal sub-watershed was found to drain directly to the IRL, therefore removed from the South Coastal sub-watershed and from the SLRW.

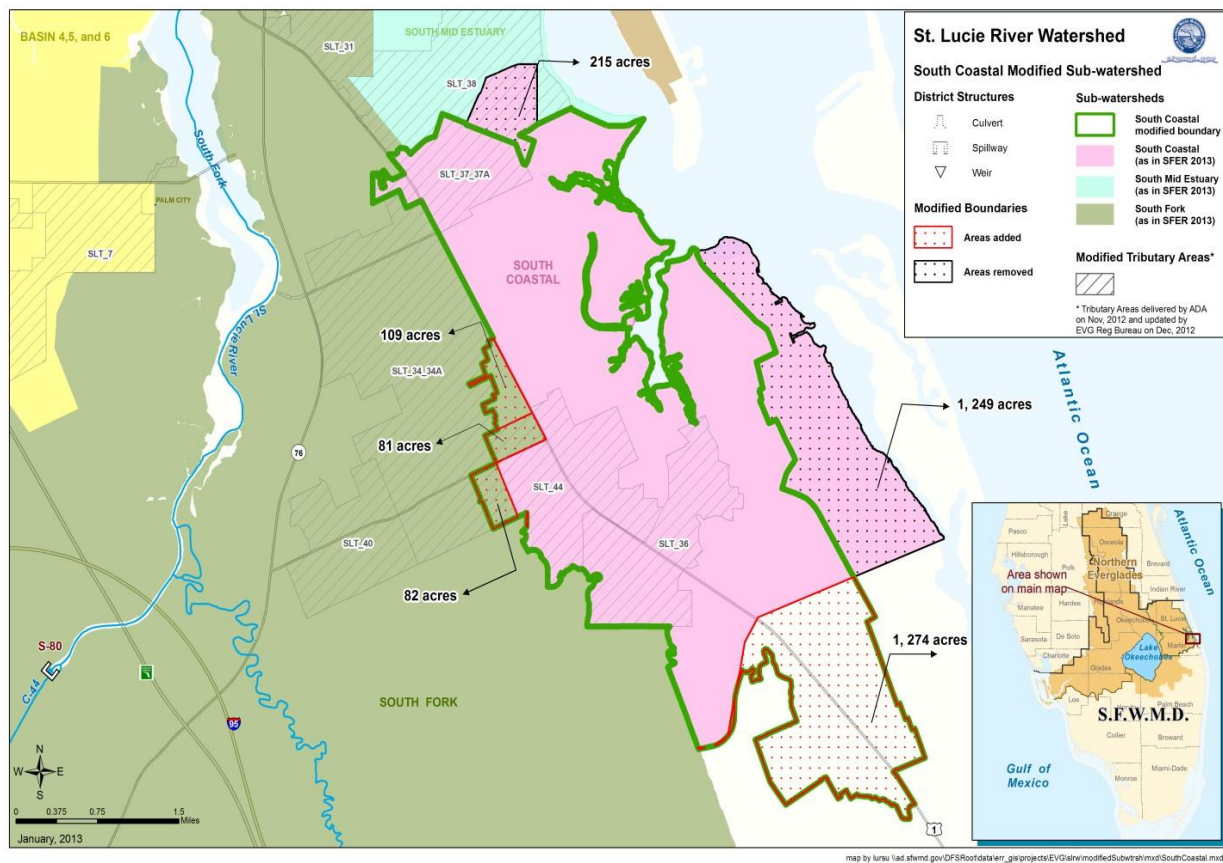


Figure 9. South Coastal Modified Sub-watershed

South Fork Sub-Watershed:

Figure 10 depicts the added and removed acreages from the South Fork Sub-watershed as described below.

Areas added:

- 981 acres (724 acres, 238 acres, and 19 acres shown by Figure 10), on the north western boundary of the South Fork are part of the Basin 4-5-6 sub-watershed, however found to drain to the South Fork based on the modified boundary of Danforth Creek, (monitoring station SLT-07). Areas were investigated due to remaining acreage in Basin 4-5-6 after the Danforth Creek boundary was modified. Review of available permits showed these areas to drain to the South Fork.
- 210 acres was found to drain to the South Fork as shown by the AHED database. This was confirmed based on the SWM permit 43-00355-S-05 for this area. The change described here is to update the shapefiles produced by the Everglades Regulation Bureau as the AHED database already reflects this area as part of the South Fork.

Areas removed:

- 42 acres that are within the South Fork sub-watershed were found to drain to North Airport Ditch, (monitoring station SLT38). Because North Airport Ditch is in the South Mid-Estuary sub-watershed, this acreage was removed from the South Fork sub-watershed.
- 163 acres (82 and 81 acres shown in Figure 10), that are within the South Fork were found to drain to Salerno Creek, (monitoring station SLT-44). Because Salerno Creek is within the South Coastal sub-watershed, this acreage was removed from the South Fork sub-watershed.
- 109 acres located along the eastern boundary of the South Fork sub-watershed were found to be unmonitored by the adjacent modified tributary boundaries, (SLT-34 and SLT-40) in the South Fork. This area is also located along the South Coastal sub-watershed boundary. Because this area was found not to drain to Coral Gardens Ditch SLT-34 nor Fern Creek SLT-40, it was removed from the South Fork and brought into the South Coastal sub-watershed based on review of available permits.
- 42 acres (31 acres and 11 acres shown in Figure 10), that are within the South Fork sub-watershed were found to drain to Danforth Creek, (monitoring station SLT-07). Because Danforth Creek is in the Basin 4-5-6 sub-watershed, this acreage was removed from the South Fork and added to Basin 4-5-6 sub-watershed.
- 134 acres was removed from the South Fork and added to the C44 sub-watershed to include acreage from the C44 conveyance canal up to the C44 sub-watershed monitoring station, S80.

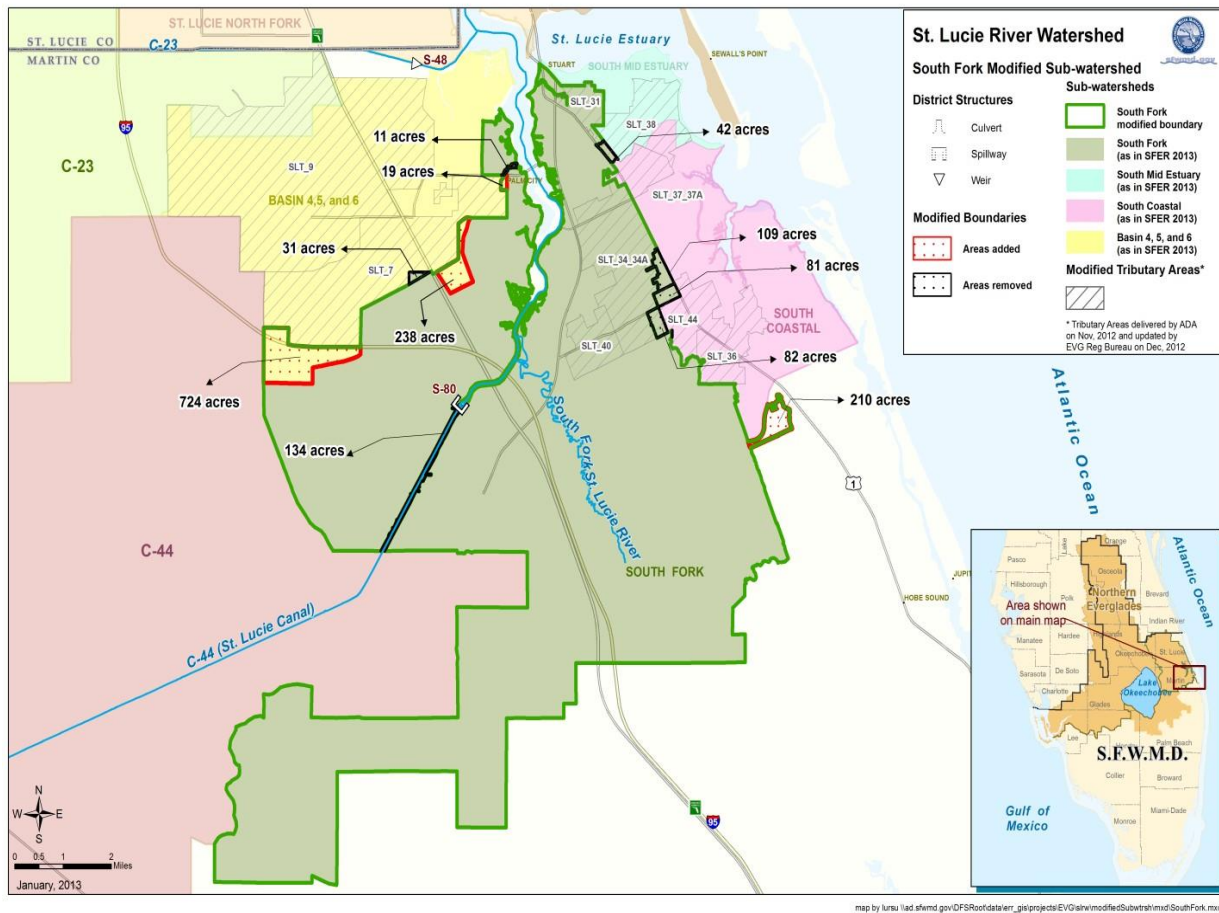


Figure 10. South Fork Modified Sub-watershed

Final Sub-watershed Acreages:

Sub-watershed	Old Acreage, (2013 SFER)	Acres Added	Acres Removed	New Acreage*
North Fork	114,909	17,810	863	131,856
C25/C25E	114,907	732	15,915	99,724
C24	87,770	-	4,415	83,359
C23	112,094	81	1,301	110,872
Basin 4-5-6	15,055	1,864	981	15,935
C44	132,571	134	-	132,705
North Mid-Estuary	4,196	-	-	4,196
South Mid-Estuary	1,823	257	-	2,080
South Coastal	7,914	1,546	1,464	7,991
South Fork	48,089	1,191	490	48,792
SLRW Total	639,328	23,615	25,429	637,514

* Acreage represents the GIS modified sub-watershed polygon. The net change is acreage based on changes described in this document may not match 100 percent due minor modifications not described in this document to align sub-watershed edges to sub-watershed polygons in the AHED database.

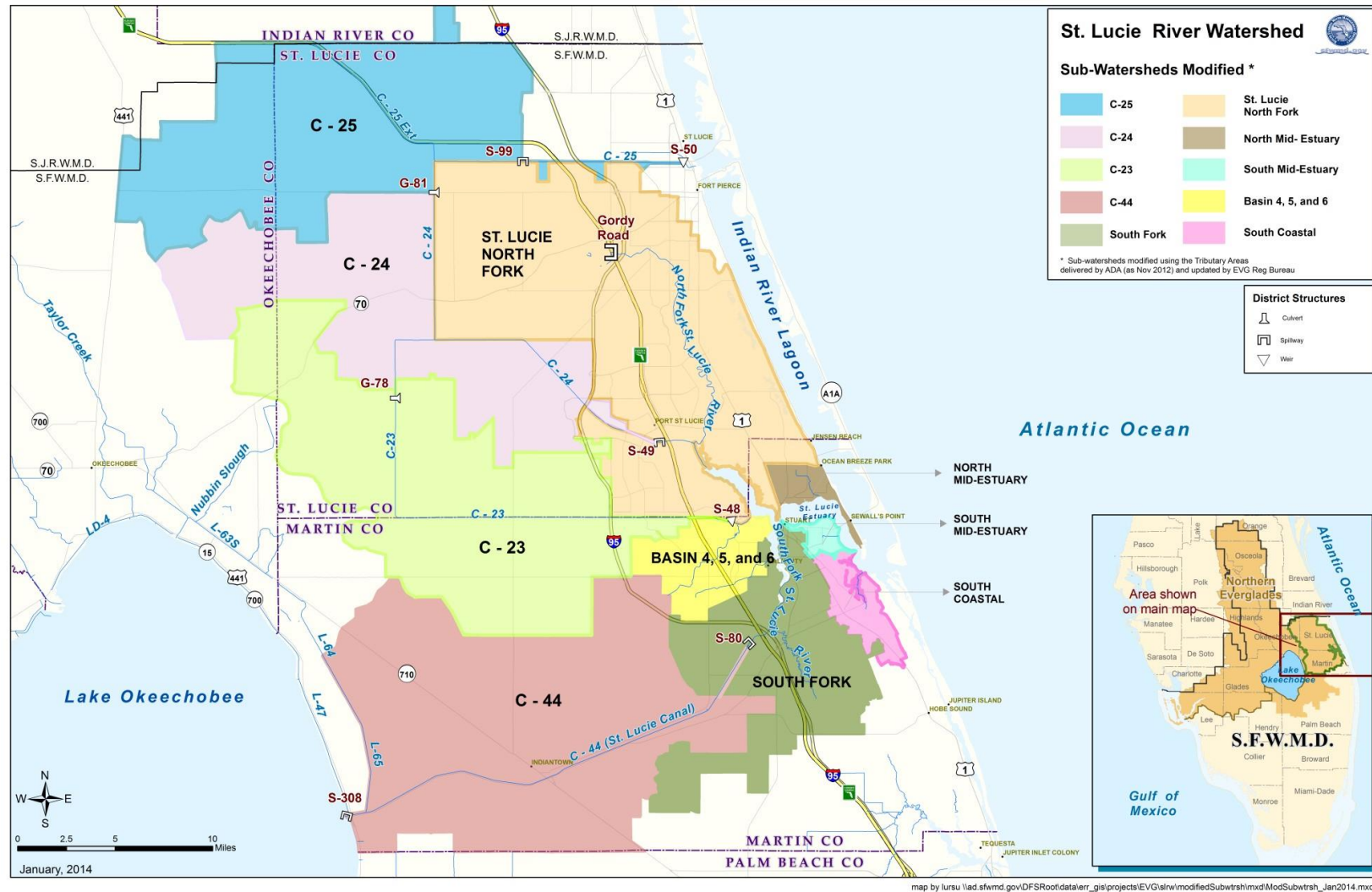


Figure 11. SLRW Modified Sub-watersheds

References:

ADA Engineering, Inc. 2012. *FINAL – St. Lucie River Watershed Source Control Hydrologic Evaluations. Deliverable 4.2b – Final Field Verification Report*. West Palm Beach, FL.

South Florida Water Management District, 2013. *Review of revised watershed boundaries for the Southern St. Lucie River Basin. Response from Ken Konyha, HESM on the proposed boundary changes by Everglades Regulation*.

South Florida Water Management District. 2013. *FINAL – 2013 South Florida Environmental Report*. West Palm Beach, FL.