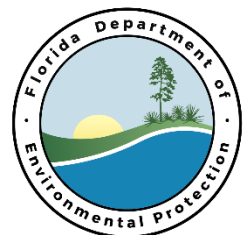


Final
2017 Progress Report
for the Central Indian River Lagoon
Basin Management Action Plan

**Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection**

August 2017

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Tallahassee, FL 32399
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Acknowledgments

This 2017 Progress Report for the Central Indian River Lagoon (IRL) Basin Management Action Plan (BMAP) was prepared as part of a statewide watershed management approach to restore and protect Florida's water quality. It was prepared by the Florida Department of Environmental Protection (DEP) with participation from the Central IRL stakeholders.

Table 1. List of Central IRL BMAP participants

Type of Governmental or Private Entity	Participant
Counties	Brevard County Indian River County
Municipalities	City of Fellsmere City of Melbourne City of Palm Bay City of Sebastian City of Vero Beach City of West Melbourne Town of Grant-Valkaria Town of Indialantic Town of Indian River Shores Town of Malabar Town of Melbourne Beach Town of Melbourne Village Town of Orchid
Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Transportation (FDOT) District 4 FDOT District 5 Turnpike Enterprise South Florida Water Management District St. Johns River Water Management District
Other Interested Parties	Fellsmere Water Control District (WCD) Indian River Farms WCD Melbourne-Tillman WCD

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List of Acronyms and Abbreviations

µg/L	Micrograms Per Liter
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BRL	Banana River Lagoon
CR	County Road
DEP	Florida Department of Environmental Protection
DO	Dissolved Oxygen
EGRET	Eau Gallie River Environment is Threatened
ELA	Environmental Look Around
FDACS	Florida Department of Agriculture and Consumer Services
FDOT	Florida Department of Transportation
FIND	Florida Inland Navigation District
FPF	Fort Pierce Farms
FYN	Florida Yards and Neighborhoods (Program)
GIS	Geographic Information System
GPS	Global Positioning System
IA	Implementation Assurance
IRL	Indian River Lagoon
IRSWCD	Indian River Soil and Water Conservation District
lbs/yr	Pounds Per Year
m	Meter
MAPS	Managed Aquatic Plant System
MDL	Minimum Detection Limit
mg/L	Milligrams Per Liter
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NSL	North St. Lucie
O&M	Operations and Maintenance
OAWP	Office of Agricultural Water Policy (FDACS)
OSTDS	Onsite Sewage Treatment and Disposal System
PD&E	Project Development and Environmental (Manual)
PLSM	Pollutant Load Screening Model
POR	Period of Record
SFWMD	South Florida Water Management District
SJRWMD	St. Johns River Water Management District
SLRIT	St. Lucie River Issues Team
SR	State Road
SRID	Sebastian River Improvement District
STEP	Septic Tank Effluent Pump
STORET	STorage and RETrieval
TBD	To Be Determined
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus

U.S.	United States
WBID	Waterbody Identification
WCD	Water Control District

Section 1: Introduction

1.1 Purpose of the Report

This is the fourth annual Progress Report for the Central Indian River Lagoon (IRL) Basin Management Action Plan (BMAP). **Section 2** describes the activities implemented by stakeholders during the reporting period (March 1, 2016, through February 28, 2017). **Section 3** summarizes stakeholder compliance with the BMAP. **Section 4** summarizes the water quality monitoring, and includes the results of a water quality evaluation conducted in the Central IRL. **Section 5** contains a summary of activities, including monitoring, that occurred during the reporting period in the South IRL Subbasin. The appendices contain supporting materials. **Appendix A** contains a comprehensive list of stakeholder projects and activities that are planned, completed, underway, or cancelled. **Appendix B** discusses the results of the water quality trend analysis performed on data from select tributary monitoring stations.

1.2 Total Maximum Daily Loads (TMDLs) for the Central IRL Basin

The Florida Department of Environmental Protection (DEP) verified the IRL Basin as impaired because of excessive amounts of total nitrogen (TN) and total phosphorus (TP), as evidenced by a decrease in seagrass distribution and by low dissolved oxygen (DO). In March 2009, DEP adopted the IRL Basin TMDLs, with a focus on the water quality conditions necessary for seagrass regrowth at depth limits where seagrass historically grew in the basin, based on a multiyear composite of seagrass coverage. The median depth limits of seagrass coverage in the IRL Basin have decreased over the years because of changes in water quality conditions resulting from anthropogenic (human) influences. **Table 2** and **Table 3** list the TN and TP TMDLs and pollutant load allocations, respectively, adopted by rule for the segments with waterbody identification (WBID) numbers in the Central IRL Subbasin.

Table 2. TN TMDLs in the Central IRL Subbasin

lbs/yr = Pounds per year

WBID Number	WBID Name	Parameter	TMDL (lbs/yr)	Wastewater Facilities Allocation (lbs/yr)	Stormwater Allocation (lbs/yr)	Atmospheric Deposition Allocation (lbs/yr)
5003D and 2963A	South Indian River and Indian River above Sebastian Inlet	TN	684,715	831	577,184	106,700
5003B and 5003C	South Indian River	TN	278,273	25,391	217,876	35,006
Total		TN	962,988	26,222	795,060	141,706

Table 3. TP TMDLs in the Central IRL Subbasin

lbs/yr= Pounds per year

WBID Number	WBID Name	Parameter	TMDL (lbs/yr)	Wastewater Facilities Allocation (lbs/yr)	Stormwater Allocation (lbs/yr)	Atmospheric Deposition Allocation (lbs/yr)
5003D and 2963A	South Indian River and Indian River above Sebastian Inlet	TP	111,594	122	109,055	2,417
5003B and 5003C	South Indian River	TP	53,599	1,949	50,857	793
Total		TP	165,193	2,071	161,044	2,078

1.3 Central IRL Subbasin

Because of the large size of the IRL Basin and its hydrologic diversity, DEP divided the watershed into three subbasins: (1) Central IRL, (2) North IRL, and (3) Banana River Lagoon (BRL). Separate BMAPs were developed for each subbasin; this document focuses solely on the Central IRL subbasin.

The Central IRL was further divided into project zones with boundaries based on the distinct hydrology in different areas of the basin and their corresponding annual residence times. These zones are important because flushing times vary greatly among locations and consequently affect how nutrient reductions will impact these distinct areas of the basin. The project zones identify large areas where projects should be implemented to ensure that the load reductions achieve the desired response for each subbasin. The Central IRL Subbasin was split into three project zones, as follows:

- **Central A** – Melbourne Causeway (U.S. Highway 192) to the north tip of Grant Farm Island.
- **Central SEB** – Grant Farm Island to Wabasso Causeway (County Road [CR] 510).
- **Central B** – Wabasso Causeway to the boundary between Indian River County and St. Lucie County.

Figure 1, Figure 2, and Figure 3 show the stakeholders in each of these project zones.

This BMAP also encompasses a portion of the South IRL Subbasin extending to Fort Pierce Inlet and including the drainage areas for the Fort Pierce Farms Canal and C-25 Canal. **Section 5** provides additional information about this area.

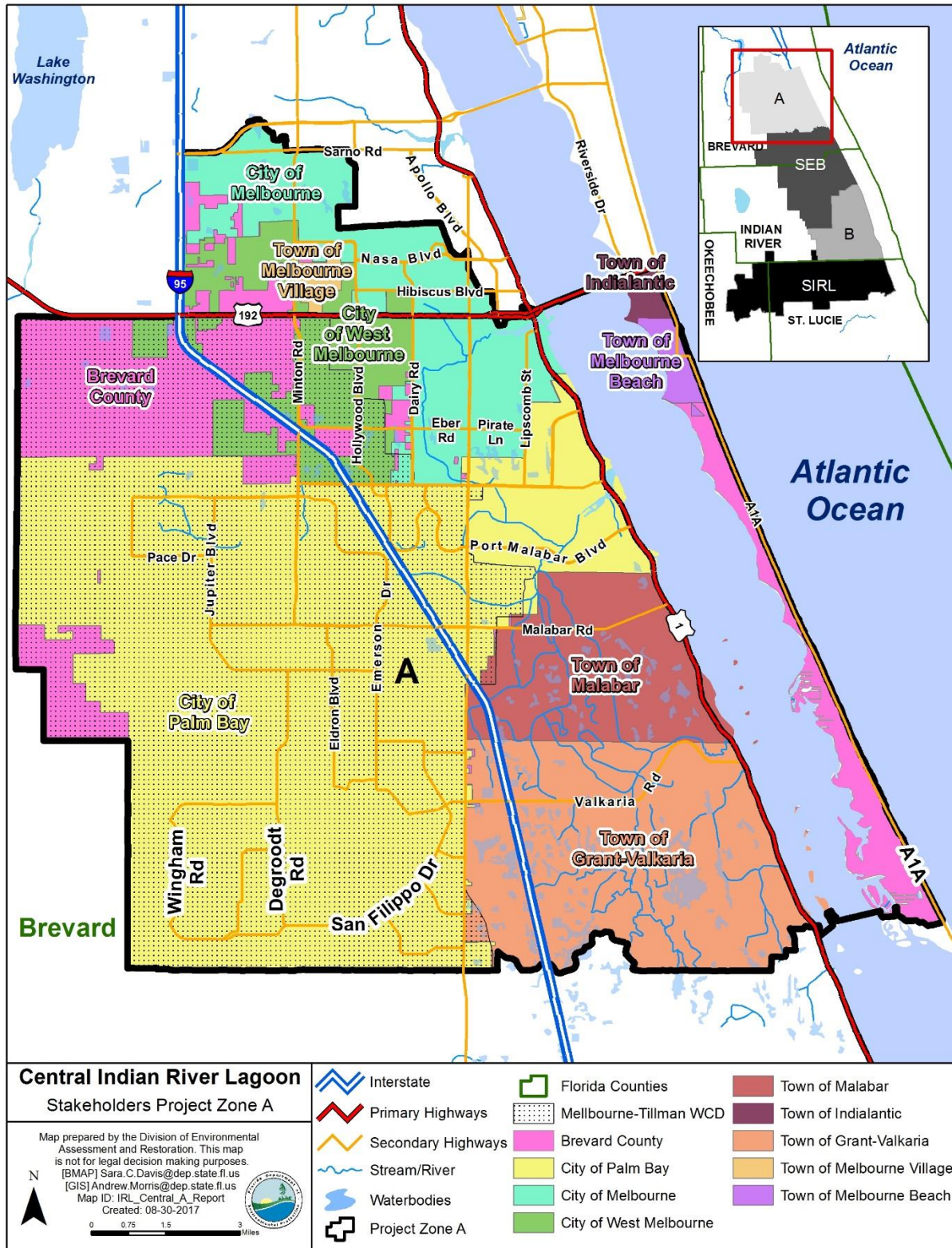


Figure 1. Central IRL Project Zone A stakeholders

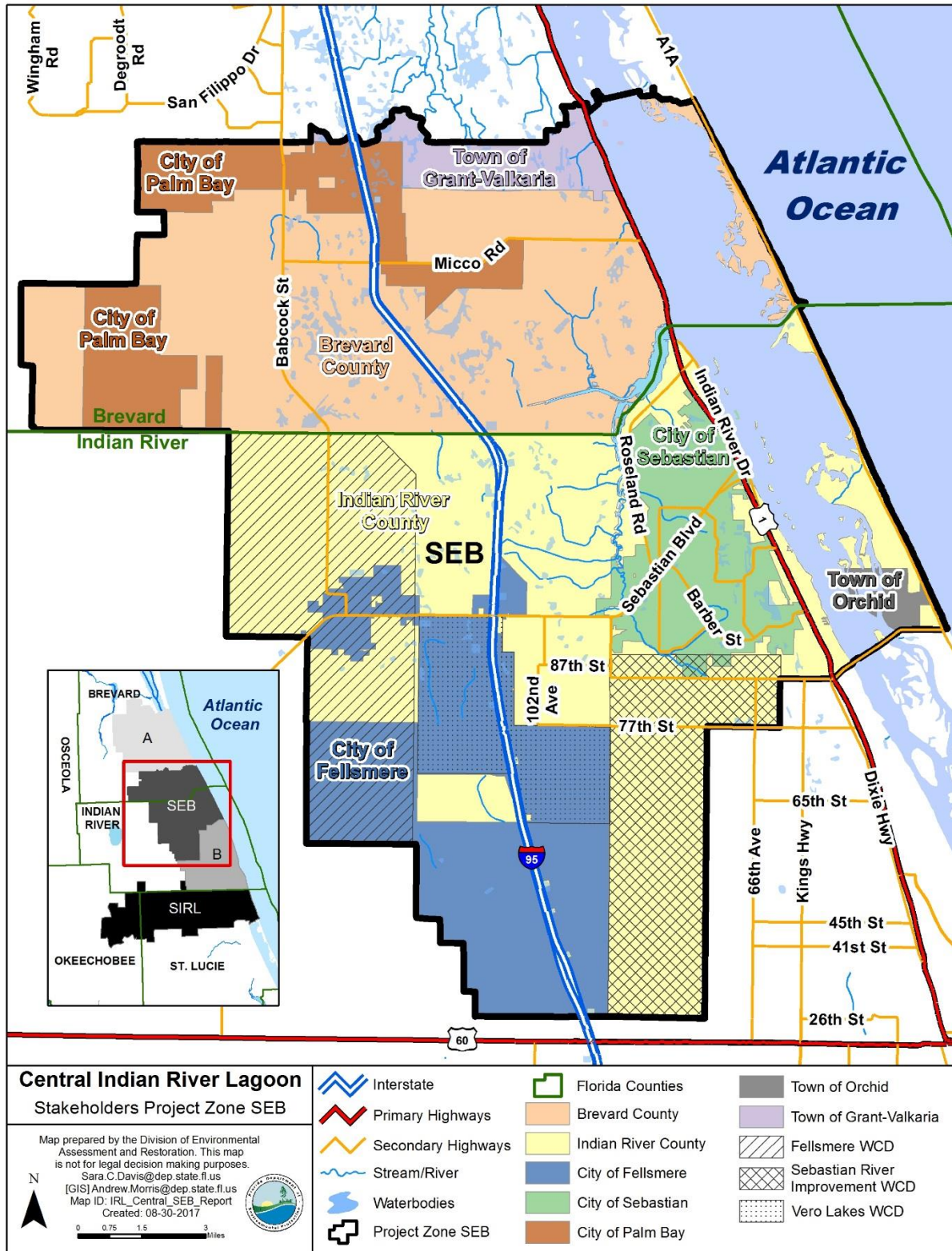


Figure 2. Central IRL Project Zone SEB stakeholders

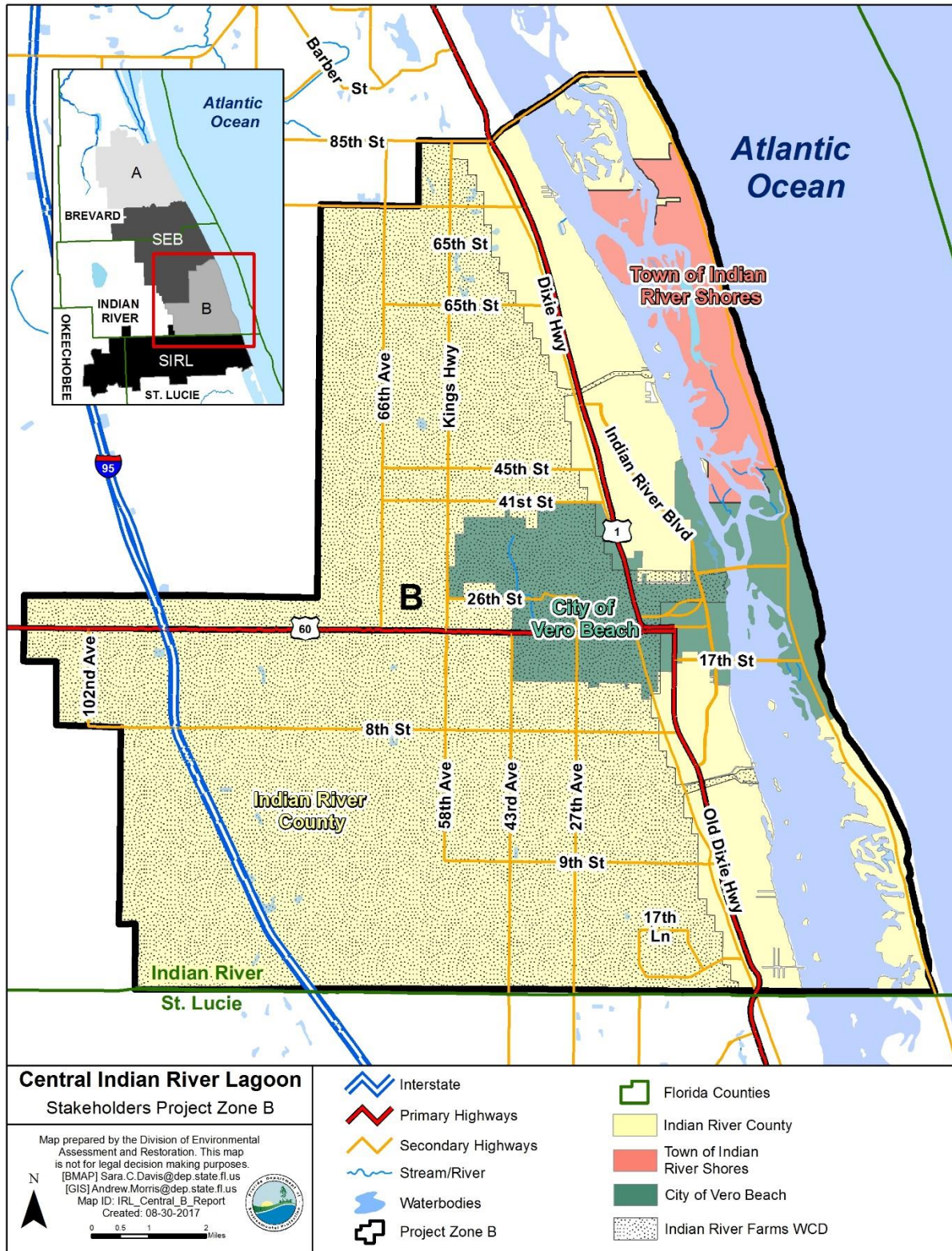


Figure 3. Central IRL Project Zone B stakeholders

Section 2: Activities During the Reporting Period

Section 2.1 and **Section 2.2** describe the accomplishments in the Central IRL during the reporting period (March 1, 2016, through February 28, 2017). New projects added to the individual project tables are described below, as well as individual projects completed during the reporting period. Ongoing efforts such as street sweeping, ordinances, and public education efforts are not specifically described below but must continue each year for the project credit to remain effective. **Appendix A** contains the individual project tables.

2.1 Activities by Entity

2.1.1 Brevard County

In 2016, the county passed a half-cent sales tax to support IRL restoration efforts and implement projects to reduce nutrient loading from stormwater runoff and groundwater discharges to the IRL. The county secured legislative appropriation funding to increase muck dredging projects in five priority areas: Mims boat ramp on Jones Road, Sykes Creek, Cocoa Beach, Grand Canal, and Turkey Creek.

The county completed the Turkey Creek Dredging Project (BC-19) during this reporting period, removing 230,000 cubic yards of material. Estimated reductions are still being verified for the project. The county received a grant (S0714) of \$20 million from DEP to complete all five priority muck-dredging projects.

The county initiated the development of a Shoreline Management Plan. The plan will be used to identify opportunities and implement environmental enhancement and erosion protection along the IRL shoreline within Brevard County. The goals of the shoreline management plan are as follows:

- Stabilize shorelines.
- Prevent erosion.
- Maintain, enhance, and restore estuary habitat along the IRL shoreline.
- Protect water quality.

Brevard County, in partnership with the University of Central Florida, began conducting surveys of IRL shoreline within Brevard County to create geographic information system (GIS) data layers that spatially represent shoreline conditions and features. Grant funding from the Florida Coastal Management Program Coastal Partnership Initiative was used to complete the process.

2.1.2 Indian River County

The county is designing Osprey Acres (IRC-15), a stormwater treatment facility that will further treat Osprey Marsh effluent and untreated canal water. The county will provide additional data to DEP, and verified nutrient reduction credits for this project will be included in future reports.

2.1.3 City of Fellsmere

The city secured funding for the North Regional Lake Project (F-09) and plans to complete construction in 2018. The city will provide additional data to DEP, and verified nutrient reduction credits for this project will be included in future reports.

2.1.4 City of Melbourne

The city completed baffle box upgrades to the Melbourne Avenue sites (MEL-07), contributing to a reduction of 37 pounds per year (lbs/yr) of TN and 8 lbs/yr of TP. The Southwest Park Improvements near Florida Avenue (MEL-06) were also completed during the reporting period and resulted in reductions of 66 and 8 lbs/yr of TN and TP, respectively.

2.1.5 City of Palm Bay

The city began construction on two stormwater treatment projects with secured DEP grant funding —Victoria Pond (PB-29) and Koske Pond (PB-33). The design of improvements for the Palm Bay Treatment Train at the City Marina (PB-34) is still ongoing. Additionally, work is being considered for Norwood baffle box retrofits (PB-38), living shoreline improvements near Turkey Creek (PB-41), and baffle box installations at Goode Park (PB-39) and Florin Pond (PB-40). Estimated reductions are still being determined for these projects.

2.1.6 City of Sebastian

The city completed the working waterfront drainage improvement treatment train/baffle box project (SEB-19) in October 2016. The Tulip Drainage Improvement Retention Basin Project (SEB-20) was completed in December 2016. Sebastian is performing annual water quality inspections and maintenance as well as water quality testing. In addition, the Collier Canal Dredge Project (SEB-15), stormwater park retention ponds (SEB-16), Presidential Streets baffle boxes (SEB-17), and water quality testing (SEB-18) were completed during the reporting period. Estimated reductions are still being verified for these projects.

2.1.7 City of Vero Beach

A project to retrofit stormwater inlets in the Lateral E Basin (Original Town [VB-22] and McAnsh Park [VB-21] Subbasins) was defunded. Vero Beach is studying alternative means to provide filtration at these stormwater inlets; however, the inlet retrofit projects have been postponed.

Vero Beach continues to roll out the Septic Tank Effluent Pump (STEP) Program (VB-05) that will reduce nutrient effluent from residential septic systems flowing into the IRL. In 2016, 56 homes were converted from traditional septic to the STEP Program.

2.1.8 City of West Melbourne

The city completed the Manchester Lakes wet detention pond (WM-24) during the reporting period. Estimated load reductions are still being verified.

2.1.9 Florida Department of Transportation (FDOT) District 4

FDOT District 4 started two new projects (FDOT4-35 and FDOT4-36) during the reporting period, both of which provide treatment beyond permit requirements. Verified nutrient reduction credits for this project will be included in future reports.

FDOT implemented new guidance statewide for evaluating water quality treatment on new projects. The new guidance includes Environmental Look Around (ELA), a process of proactively looking for opportunities for joint stormwater treatment projects with agencies or stakeholders. ELA includes a new form to complete to ensure that current water resource information is reviewed (i.e., indicate whether the project is located in a BMAP area, or has a reasonable assurance plan or site-specific alternative criteria). In addition, FDOT District 4 updated the Statewide Project Development and Environmental (PD&E) Manual to include information on the status of receiving waterbodies.

2.1.10 FDOT District 5

FDOT District 5 continues to implement street sweeping in areas with curbs and gutters, and removed 80 lbs/yr of TN and 51 lbs/yr of TP in the Central IRL.

FDOT implemented new guidance statewide for evaluating water quality treatment on new projects that includes ELA. ELA includes a new form to complete to ensure that current water resource information is reviewed (i.e., indicate whether the project is located in a BMAP area, or has a reasonable assurance plan or site-specific alternative criteria).

2.1.11 Fellsmere Water Control District (WCD)

The WCD completed the design and permitting for the South Regional Lake Project (FWCD-08). Additionally, a 1,600-acre dispersed water storage/nutrient reduction pilot project (FWCD-09) near the Fellsmere Water Management Area, funded by the St. Johns River Water Management District (SJRWMD), is in the design phase. Additional data will be provided to DEP, and verified nutrient reduction credits for this project will be included in future reports.

2.1.12 Melbourne-Tillman WCD

The WCD harvested hydrilla in Canals C-1, C-2R, C-10, and C-9R during summer 2016 (MTT-11). As of spring 2017, no evidence of new hydrilla growth was visible in those canals. Estimated load reductions are still being verified.

2.1.13 Sebastian River Improvement District (SRID)

A 200-acre dispersed water storage/nutrient reduction pilot project (SRID-06) funded by the SJRWMD is in the design phase.

2.1.14 Agriculture

In 2015, the Office of Agricultural Water Policy (OAWP) in the Florida Department of Agriculture and Consumer Services (FDACS) adopted a revised vegetable and agronomic crop manual that includes specific nutrient and irrigation management best management practices (BMPs) for plastic mulch, bare ground, sugar cane, hay/silage, and greenhouse production systems. In early 2016, FDACS adopted a dairy manual targeting dairies that do not have DEP-issued National Pollutant Discharge Elimination System (NPDES) permits. In June 2016, a poultry manual was adopted. To date, FDACS has BMP manuals for cow/calf, citrus, vegetable and agronomic crops, nurseries, equine, sod, dairy, poultry, and specialty fruit and nut operations. Currently the OAWP is working on a small farms manual as well as revisions to the sod and cow/calf manuals.

As of December 31, 2016, there were 121 agricultural BMP notices of intent (NOIs) issued by the FDACS OAWP covering 14,370 acres in the Central IRL (**Figure 4**). Agricultural BMPs may or may not be implemented on all these acres because 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 in the BMAP. However, land use in the BMAP area may not accurately reflect agricultural land uses in the basin today. To estimate the actual agricultural acreage in the Central IRL covered by the FDACS BMPs, FDACS used the Pollutant Load Screening Model (PLSM). Per this land use analysis, 11,833 agricultural acres are enrolled in the FDACS BMP Program. **Table 4** lists the agricultural acreage in the Central IRL, and **Table 5** lists the acreage covered by NOIs and the related BMP programs. **Table 6** provides a BMP enrollment summary.

2.1.14.1 FDACS OAWP Implementation Assurance (IA) Program

The OAWP formally established the IA Program in 2005 in the Suwannee River Basin as part of the multi-agency/local stakeholder Suwannee River Partnership. In 2007, the 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. In early 2014, the OAWP began to streamline the IA Program to ensure consistency statewide and across commodities and BMP manuals. This effort resulted in a single IA site-visit form, which is currently used by OAWP staff.

The IA Program is based on interactions with producers during site visits, which 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) that was developed in 2014. This form focuses on nutrient management, irrigation management, and water resource protection BMPs that are common to all the BMPs that have been adopted by rule. The paper forms are submitted to OAWP staff and compiled into a spreadsheet, and the data are reported annually. From 2007 to 2015, OAWP conducted 1,936 site visits. However, it is difficult to compare data collected prior to the implementation of the single IA site-visit form developed in 2014 because of regional differences (e.g., different forms and information asked) in the administration of the IA Program.

Additional emphasis was given to the verification of implementation of BMPs by enrolled producers with the enactment of Chapter 2016-1, Laws of Florida, which directed the OAWP to formalize the Implementation Verification Program into rules. In December 2016, the OAWP published a notice of rule development. As of February 2017, draft rule language has been distributed and presented at a public workshop. It 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 of producers who are not implementing BMPs to DEP.

2.1.14.2 FDACS Cost-Share and Outreach

During the reporting period, FDACS established a new cost-share contract with the Indian River Soil and Water Conservation District (IRSWCD) to provide producers in the IRL BMAP and surrounding areas with financial assistance in the implementation of BMPs. Two new cost-share projects were initiated in the IRL BMAP area using funding from the new contract with the IRSWCD at a total cost of \$36,380. Of this amount, \$2,385 was expended on a fertigation system for a citrus grove in Fellsmere. Fertigation allows citrus producers to fertilize via liquid fertilizer injection. Precision application equipment for a vegetable agronomic crop operation was funded in South Brevard County for \$33,994. This type of precision application equipment uses geographic position system (GPS) technology on tractors/implements to ensure the exact placement/dispersal of nutrients and water.

Multiple outreach events were completed during the reporting period, including events in Fellsmere and Ft. Pierce. At these events, FDACS staff gave formal presentations about the FDACS BMP Program and the Citrus Renovation Program to approximately 150 attendees. These events included the October 2016 Sunbelt Agriculture Expo in Moultrie, Georgia, the January 2017 Florida Citrus Show in Ft. Pierce, and the March 2017 Small Farmers Workshop in Fellsmere.

2.1.14.3 FDACS Citrus Renovation

While there are now vacant citrus operations in the IRL Basin and citrus operations are shifting to row crop production, FDACS has initiated 9 citrus renovation projects in the Central IRL BMAP area. These projects, which cover 728 acres, consist of new and upgraded irrigation systems that include automation and fertigation systems. Two of these projects are located in Indian River County, and 7 are in St. Lucie County.

Table 4. Agricultural acreage in the Central IRL as of December 31, 2016

¹ FDACS staff-adjusted acreage for purposes of enrollment is based on a review of more recent aerial imagery in the basin and local staff observations.

N/A= Not applicable

2000 SJRWMD Land Use	2000 Acres	FDACS-Adjusted Acres ¹
Pasture	27,410.2	26,494.6
Row/Field/Mixed Crops	724.7	642.8
Fallow Cropland	2,429.4	N/A
Horse Farm	62.7	57.9
Citrus	43,747.7	18,699.1
Abandoned Citrus	1,153.0	N/A
Tree Crops	5.3	0.0
Nurseries and Vineyards	2.9	2.9
Ornamentals	238.3	200.9
Specialty Farms	93.4	79.2
Cattle Feeding Operations	4.5	4.5
Other Open Lands – Rural	94.2	N/A
Aquaculture	11.56	N/A
Total	75,978	46,182

Table 5. BMP enrollment for the Central IRL as of December 31, 2016

Related FDACS BMP Programs	Acreage Enrolled	Related NOIs	PLSM Agricultural Land Use Acres with NOIs
Citrus	8,768.15	95	8,477.23
Cow/Calf Operations	1,217.06	7	1,007.50
Equine	29.00	1	21.18
Specialty Fruit and Nut	0.0	0	
Nurseries	221.81	13	181.15
Vegetable and Agronomic Crops	4,125.10	4	2,145.85
Total	14,370	121	11,833

Table 6. BMP enrollment summary for the Central IRL

Category	Acres
Total Acreage Remaining in Basin for Enrollment	31,812
Five-Year Enrollment Goal (50 %)	23,091
Acreage Enrolled as of December 31, 2016	14,370
Remaining Acres To Enroll in Phase I	8,721

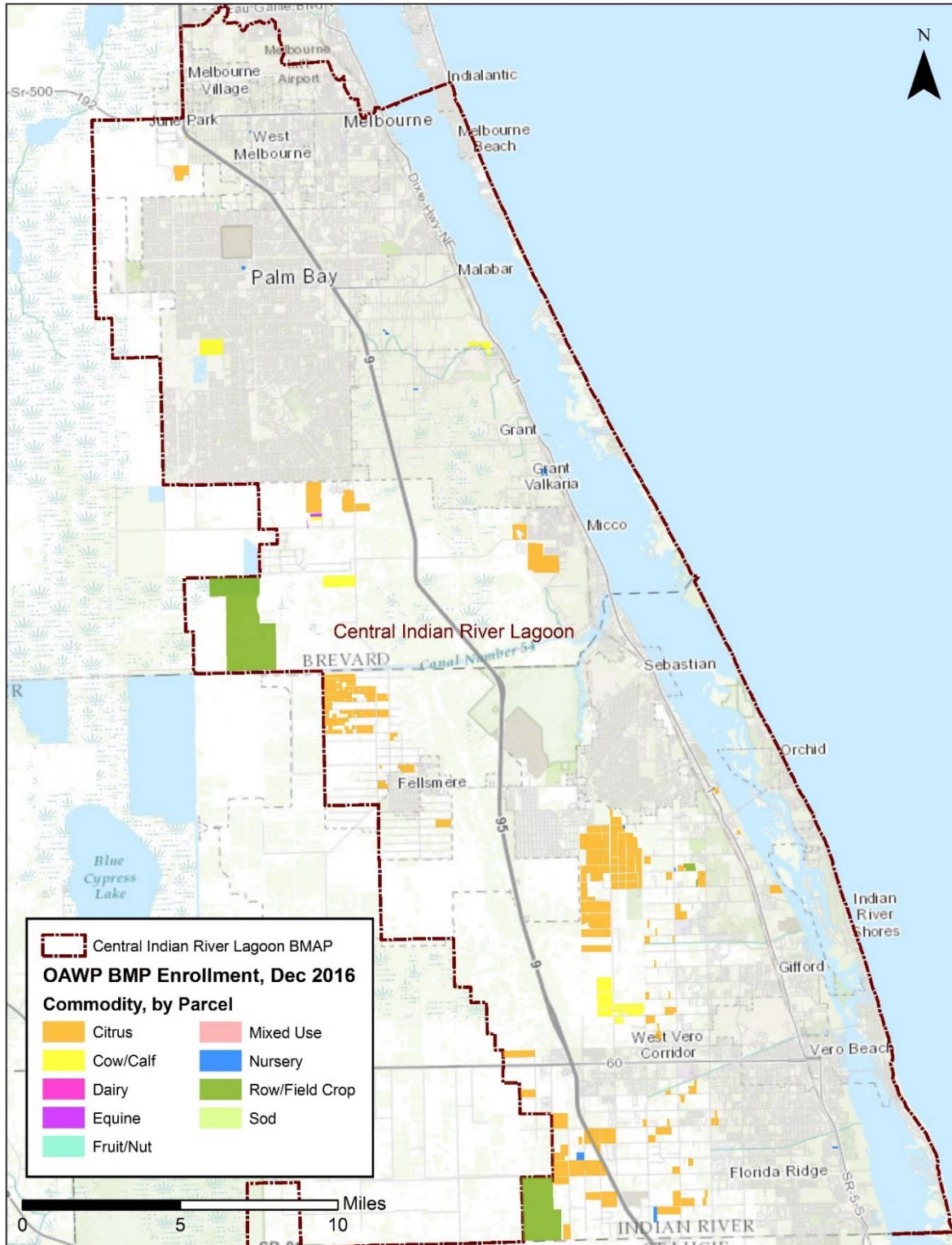


Figure 4. FDACS BMP Program enrollment progress in Central IRL Project Zone A as of December 31, 2016

2.2 Regional Projects

2.2.1 C-1 Rediversion Project

Phase I of the C-1 Project was completed. Upgraded pumps at Sawgrass Lake restore up to 39 % of the average annual flow that went to the St. Johns River before canals were constructed. The Melbourne-Tillman WCD modified its stormwater permit, and the lake will hold sufficient water to support year-round pumping. The design of Phase II, the C-10 Reservoir, is 60 % complete. Upon completion, the project will restore approximately 50 % of the historical, average annual flow to the St. Johns River.

2.2.2 Upper St. Johns River Project and C-54

The Fellsmere Water Management Area is operational and nearing completion. When completed, it will eliminate discharges to the lagoon for any storm up to a 1-in-100-year event. In addition, planning is underway for a pilot project that will reduce flows further by creating dispersed water storage. Water released from the dispersed storage will flow through the Fellsmere Water Management Area.

2.2.3 Eau Gallie River Dredging

The first project to remove muck from the Eau Gallie River began pumping in January 2017. The project involves a partnership between the SJRWMD, DEP, the Florida Inland Navigation District (FIND), Brevard County, and Melbourne. This restoration yields a win to stakeholders, particularly residents along the river who garnered local, state, and federal support for responsible stewardship of this resource through a group called the Eau Gallie River Environment is Threatened (EGRET). Between now and fall 2018, 632,000 cubic yards of muck will be removed from the mainstem of the 3.9-mile-long Eau Gallie River and Elbow Creek.

2.3 Summary of Accomplishments

In the Central IRL, the projects completed during the reporting period are shown in **Table 7**. The projects that could be quantified resulted in a total reduction of 1,006 lbs/yr of TN and 353 lbs/yr of TP. These reductions are in addition to those projects given credit at BMAP adoption and in previous annual reports. Therefore, the total reductions to date are 134,487 lbs/yr of TN and 27,449 lbs/yr of TP.

Table 7. Summary of projects completed during the reporting period in the Central IRL Subbasin

TBD = To be determined

Stakeholders	Project Zone	Project Number	Project Name	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
City of Sebastian	SEB	SEB-18	Water quality testing	TBD	TBD
City of Sebastian	SEB	SEB-19	Wastewater Drainage Imp.	TBD	TBD
City of Sebastian	SEB	SEB-20	Tulip Drainage	TBD	TBD
City of Melbourne	A	MEL-06	Southwest Park Improvements near Florida Avenue	66	8
City of Melbourne	A	MEL-07	Melbourne Avenue Existing Baffle Box Upgrade	37	8
City of West Melbourne	A	WM-24	Manchester Lakes	TBD	TBD
Mellbourne-Tillman WCD	A	MTT-11	Harvesting	TBD	TBD
Brevard County	SEB	BC-09	Micco I	131	17
Brevard County	SEB	BC-11	Mockingbird Pond	27	3
Brevard County	A	BC-19	Turkey Creek Dredging	TBD	TBD
Brevard County	SEB	BC-13	Wheeler Flemming Grant	745	317
Total			Total Reductions in Reporting Period	1,006	353

Section 3: Compliance

DEP annually reviews each entity's progress towards completing projects in the BMAP and achieving the assigned allocations. **Table 8** lists the number of projects that each entity has committed to in the BMAP and annual reports, along with the status of those projects.

Table 8. Projects to achieve the TMDL

Entity	Projects	Completed	Underway	Cancelled
Brevard County	21	18	2	1
City of Fellsmere	12	6	6	0
City of Fort Pierce	8	7	1	0
City of Melbourne	10	6	3	1
City of Palm Bay	41	32	9	0
City of Sebastian	20	16	2	2
City of Vero Beach	23	19	4	0
City of West Melbourne	24	24	0	0
Fellsmere WCD	9	6	3	0
Fort Pierce Farms WCD	3	3	0	0
Indian River County	15	9	6	0
Indian River Farms WCD	3	3	0	0
Melbourne-Tillman WCD	11	11	0	0
North St. Lucie River WCD	3	3	0	0
Sebastian River Improvement District (SRID)	7	4	3	0
St. Lucie County	10	4	6	0
St. Lucie Village	1	1	0	0
Town of Indialantic	5	3	2	0
Town of Indian River Shores	5	2	3	0
Town of Melbourne Beach	17	17	0	0
Town of Melbourne Village	1	1	0	0
Town of Orchid	1	1	0	0
Turnpike	1	1	0	0
FDOT District 4	36	34	2	0
FDOT District 5	16	16	0	0
Total	298	247	46	5

Section 4: Water Quality

4.1 Water Quality Monitoring

The Central IRL 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 will measure progress toward achieving the TMDLs and provide a better understanding of watershed loading. The BMAP monitoring plan consists of ambient water quality sampling and biological monitoring.

The SJRWMD continued monthly sampling of 18 water quality stations in the Central IRL. The Indian River Farms WCD continued to monitor 3 quarterly water quality stations in the basin, and data were provided to DEP.

4.2 SJRWMD Water Quality Analysis

Data from 6 stations illustrated water quality between January 2016 and April 2017 (**Figure 5**). These stations provide information on conditions in the BRL (IRLB04), North IRL Project Zone A (IRLI06), North IRL Project Zone B (IRLI13), and Central IRL Project Zone A (IRLI23). Concentrations of 4 forms of nitrogen, 3 forms of phosphorus, and chlorophyll *a* varied in space and through time (**Figure 6**, **Figure 7**, and **Figure 8**). Concentrations of chlorophyll *a* were high at all stations from IRLI23 north in early 2016, with particularly elevated concentrations evident in the BRL (IRLB04, 126 micrograms per liter [$\mu\text{g/L}$]). *Aureoumbra lagunensis*, or brown tide, was dominant in many of these samples, and the "crash" of the bloom in March 2016 led to a massive fish kill in the BRL. Other peaks in chlorophyll *a* tended to follow or coincide with increases in nitrogen or phosphorus. In early 2017, chlorophyll *a* concentrations fell below 10 micrograms per liter ($\mu\text{g/L}$) at all stations except IRLI06 and IRLI23, where concentrations fell between 10 and 15 $\mu\text{g/L}$.

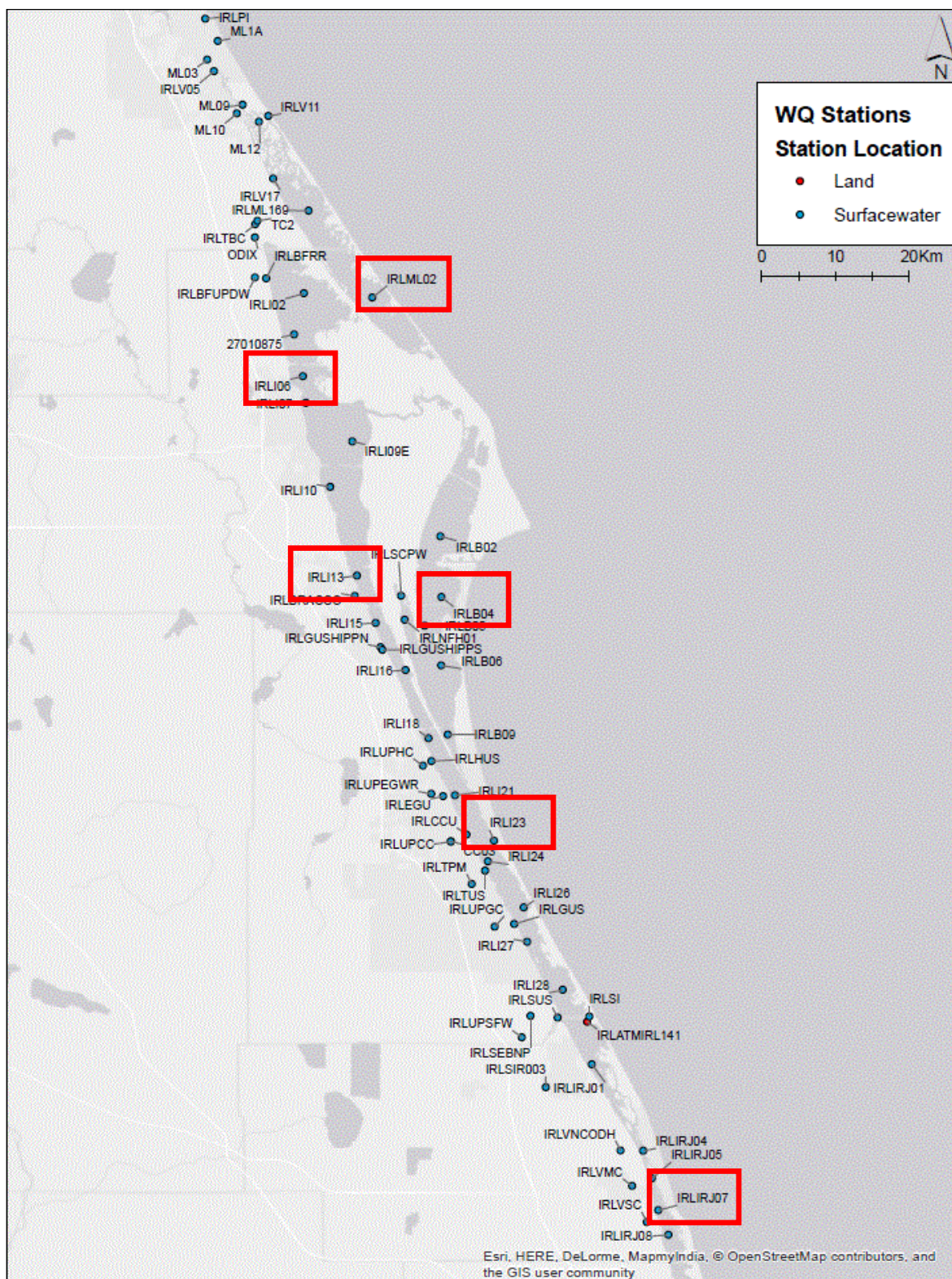


Figure 5. Water quality sampling stations with highlighted representative stations

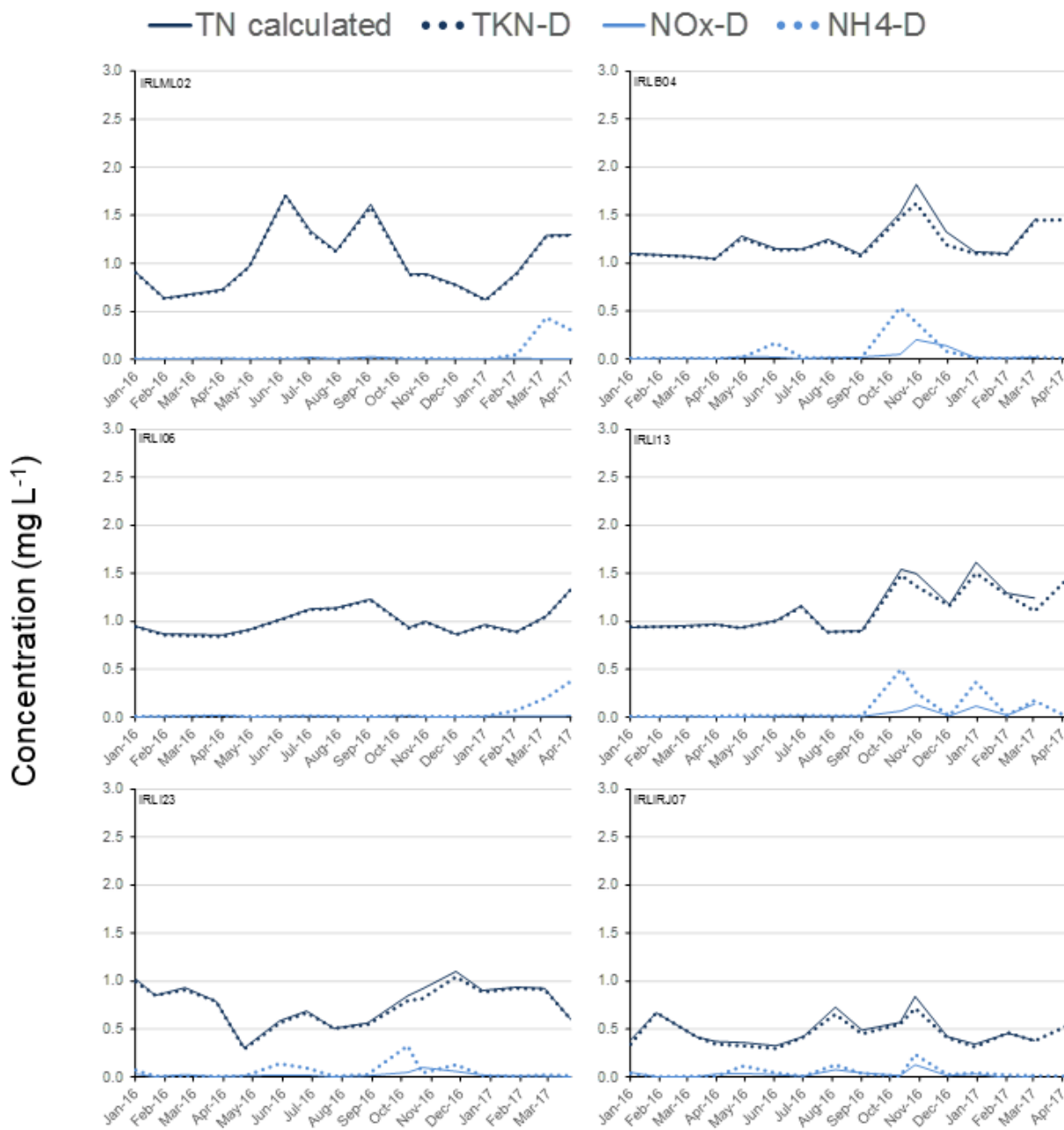


Figure 6. Concentrations of various forms of nitrogen. TN calculated = Total nitrogen calculated from other forms, TKN-D = Total dissolved Kjeldahl nitrogen, NOx-D = dissolved nitrate and nitrite, NH4-D = Dissolved ammonium



Figure 7. Concentrations of various forms of phosphorus. TP-T = Total phosphorus, TP-D = Total dissolved phosphorus, PO4-D = Dissolved orthophosphate

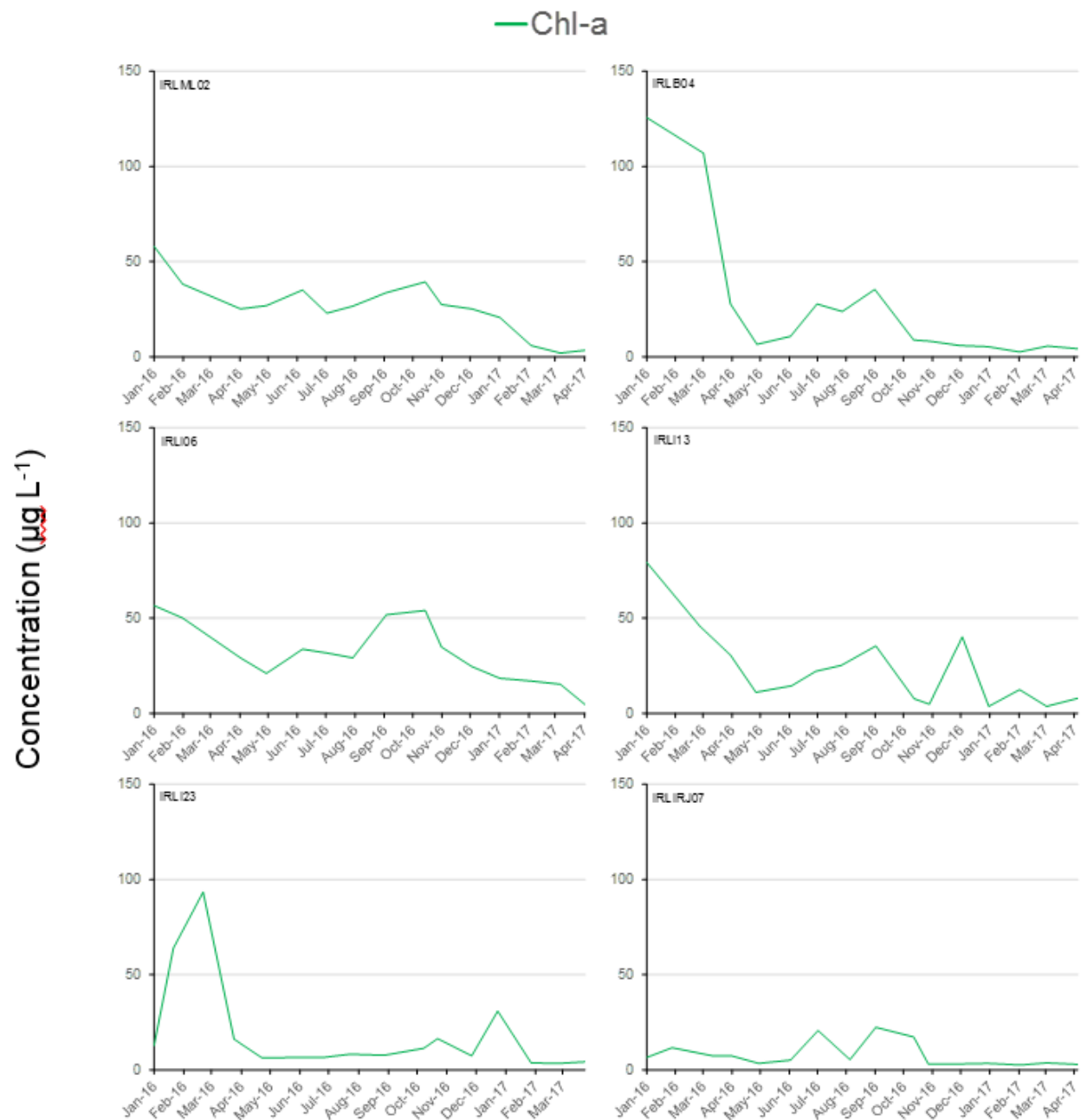


Figure 8. Chlorophyll concentrations. Chl-a = Chlorophyll a

Section 5: South IRL Subbasin

While developing the Central IRL BMAP, DEP identified a potential connection with the portion of the IRL located immediately south of the Central IRL Subbasin. It appeared that there was a hydrologic connection between WBID 3190 (South IRL) and WBID 5003B (the southern-most WBID in the Central IRL Subbasin). Based on this connection, DEP and the stakeholders in the South IRL agreed to include South IRL projects in the BMAP, as they are expected to benefit the Central IRL Subbasin. However, any projects provided by the South IRL stakeholders are not a BMAP requirement and the project schedule does not represent a compliance plan.

5.1 Activities by Entity

This section describes the accomplishments in the South IRL during the reporting period. New projects added to the individual project tables are described below, as well as individual projects completed during the reporting period. Ongoing efforts such as street sweeping, ordinances, and public education efforts are not specifically described below but must continue each year for the project credit to remain effective. **Appendix A** contains the individual project tables.

5.1.1 FDOT District 4

FDOT District 4 started two new projects in the South IRL: Lateral Ditch restoration (FDOT4-35) to include trash and sediment basins, and Wet Detention Ponds and Dry Detention Swales (FDOT4-36) along the Indrio Road widening effort.

5.1.2 St. Lucie County

The county began construction on the Paradise Park (SLC-03) and Harmony Heights (SLC-04) stormwater improvement projects. The county also identified two new projects: Queens Cove Septic to Sewer (SLC-09) and Port of Fort Pierce Stormwater Management System (SLC-10). Additional data will be provided to DEP, and verified nutrient reduction credits for this project will be included in future reports.

5.1.3 Agriculture

As of December 31, 2016, 81,178 acres of the South IRL were covered by 135 agricultural BMP NOIs issued by the FDACS OAWP (**Figure 9**). **Table 9** lists the agricultural acreage in the South IRL, and **Table 10** lists the BMP enrollment and the acreage covered by NOIs.

Table 9. Agricultural acreage in the South IRL as of December 31, 2016

¹ FDACS staff-adjusted acreage for purposes of enrollment is based on a review of more recent aerial imagery in the basin and local staff observations.

N/A= Not applicable

2000 SJRWMD Land Use	2000 Acres	FDACS-Adjusted Acres ¹
Pasture	28,353.56	28,353.56
Row/Field/Mixed Crops	3,758.83	3,758.83
Horse Farm	86.69	86.69
Citrus	63,409.23	40,742.32
Abandoned Citrus	4,003.67	N/A
Other Groves	223.74	223.74
Tree Nurseries	224.71	224.71
Ornamentals	299.62	299.62
Dairies	685.24	685.24
Specialty Farms	14.80	14.80
Aquaculture	19.21	N/A
Total	101,079	74,390

Table 10. BMP enrollment for the South IRL as of December 31, 2016

Related FDACS BMP Programs	Acreage Enrolled	Related NOIs
Citrus	42,663.74	105
Conservation Plan	2,827.55	2
Cow/Calf Operations	25,579.15	17
Dairies	1,561.54	1
Specialty Fruit and Nut	2,197.63	2
Nurseries	457.53	7
Vegetable and Agronomic Crops	5,890.87	1
Total	81,178	135

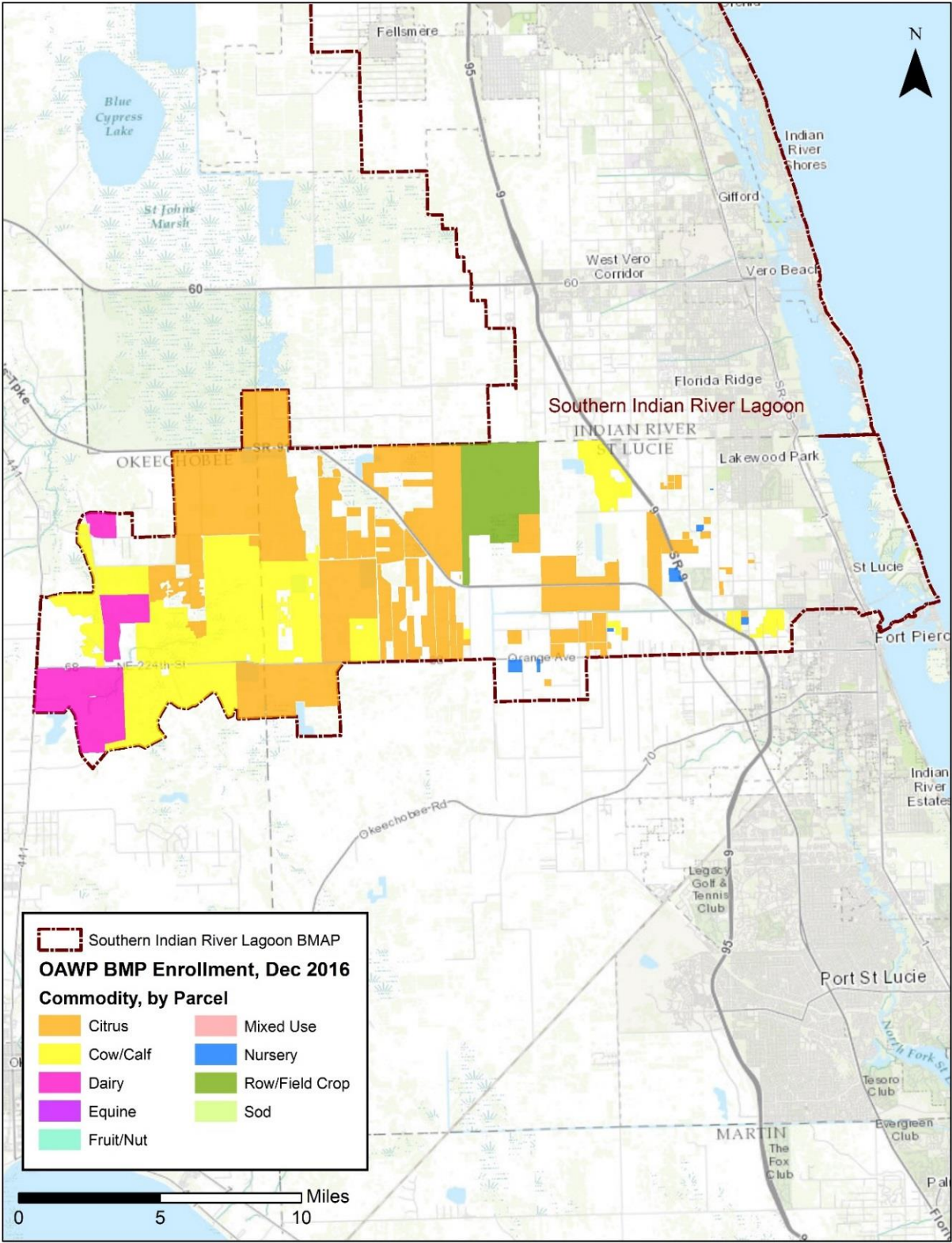


Figure 9. FDACS BMP Program enrollment progress in the South IRL as of December 31, 2016

5.2 Water Quality in the South IRL

The Fort Pierce Farms WCD continued monthly sampling of 5 water quality stations in the South IRL. The North St. Lucie River WCD continued to monitor 9 water quality stations in the subbasin. The South Florida Water Management District (SFWMD) continued monitoring at one water quality station (C25S50) and resumed monitoring at three water quality stations (IRL34B, IRL36, and IRL39B) as of July 2016. The SFWMD continued summer and winter seagrass transect monitoring in the South IRL to collect data about seagrass, macroalgae, and epiphytes, and environmental parameters such as temperature, salinity, and light at each transect.

Table 11 summarizes the parameters being monitored at the four SFWMD water quality monitoring stations, **Figure 10** shows the location of the SFWMD water quality monitoring stations, and **Figure 11** shows the location of the water quality stations monitored by the WCDs.

Table 11. SFWMD water quality monitoring parameter list

¹ Collected at IRL monitoring stations only.

² Collected at Monitoring Station C25S50 only.

Parameter Status	Parameter Name
Current	Ammonia
	Chlorophyll
	Color
	Conductivity
	Dissolved Oxygen
	Nitrate + Nitrite
	Orthophosphate
	pH
	Photosynthetically Active Radiation ¹
	Salinity
	Secchi depth ¹
	Silica ²
	Temperature
	Total Nitrogen
	Total Organic Carbon ²
	Total Phosphorus
	Total Suspended Solids
	Turbidity
	Volatile Suspended Solids ¹

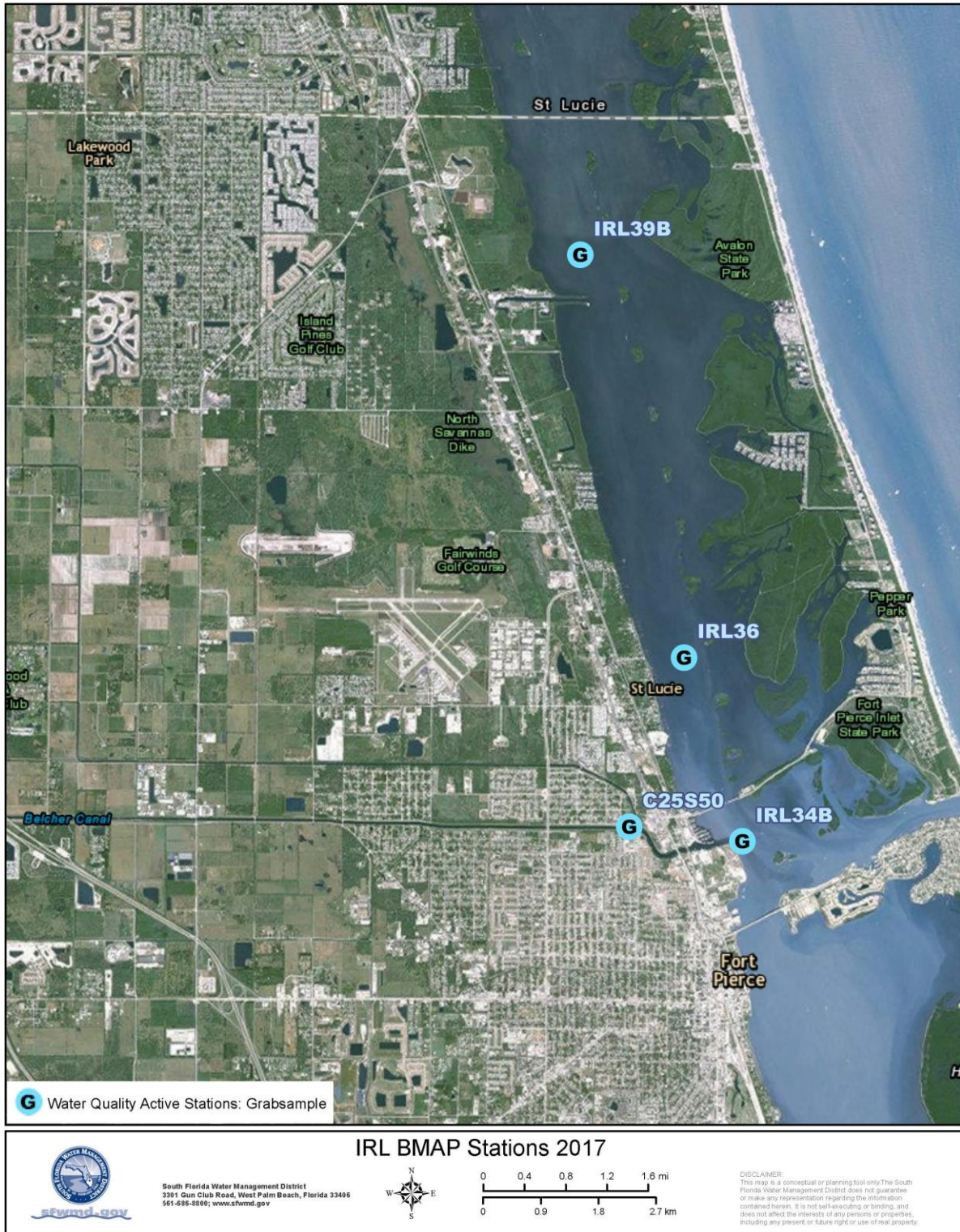


Figure 10. SFWMD monitoring stations in the South IRL

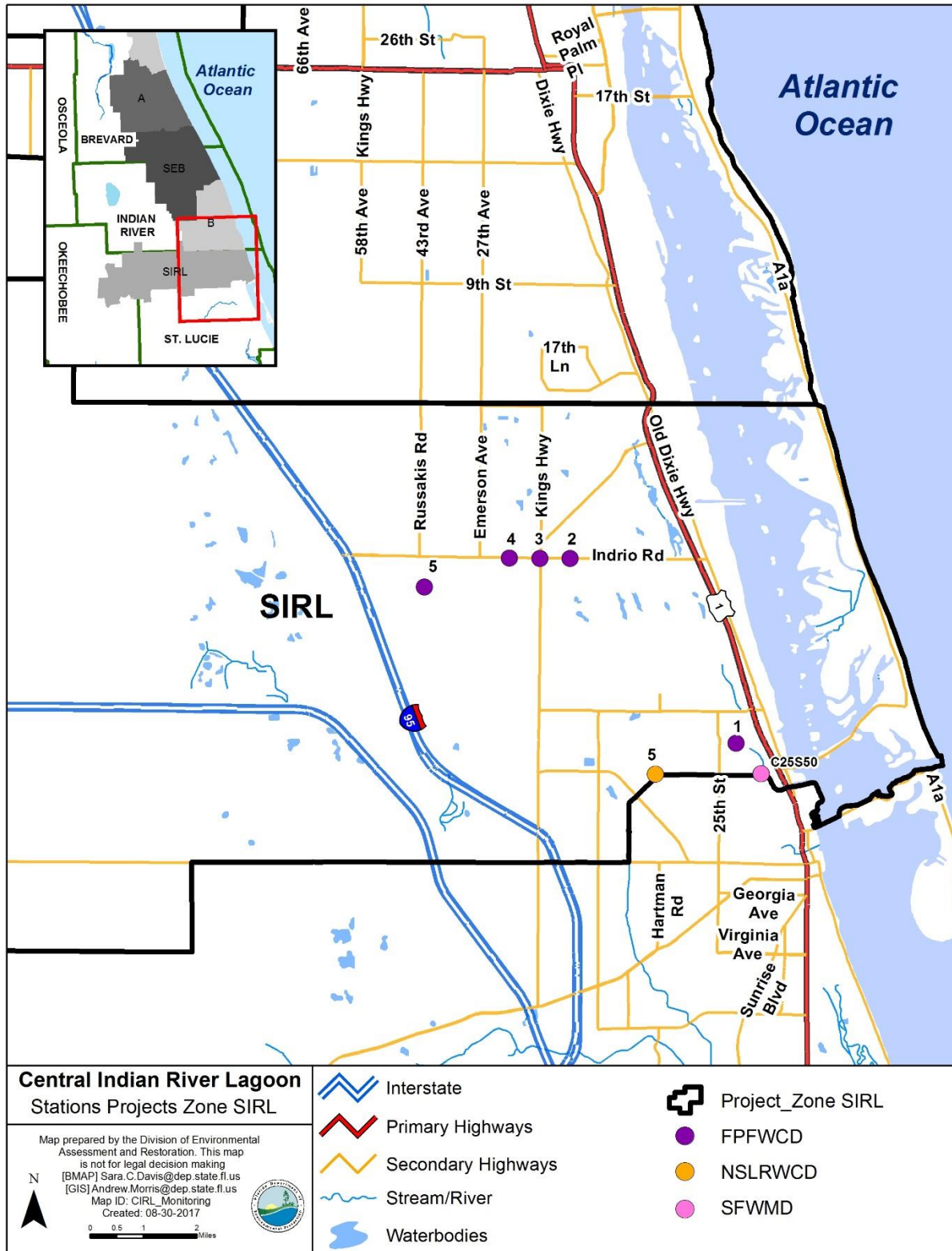


Figure 11. Water quality monitoring stations in the South IRL

5.2.1 Water Quality Trend Analysis

The most current STOrage and RETrieval (STORET) data for Stations C25S50, FPF-SITES 1-5, and, NSL-SITE 5 were processed using the methods described in **Appendix B**. Only data that met quality control objectives were used in the analysis. Nonparametric statistical techniques were used to identify monotonic trend analyses in a statistically rigorous way with the Seasonal Mann-Kendall trend test. Nonparametric tests such as the Mann-Kendall trend tests are robust against outliers and large data gaps, and data are not required to conform to a particular distribution for nonparametric analyses. Seasons for the Seasonal Kendall trend test were ascribed to quarters or months, depending on the data collection frequency and availability.

The assumption of independence was met for all station datasets. This requires the time between samples to be large enough so that there is no correlation between measurements collected at different times. The sample size for most of the stations was less than the ideal rule of thumb, which is a minimum of 30 samples, but the number of samples during the POR was greater than the absolute minimum of 10 samples to run the test. Therefore, the test method selected was appropriate. However, the results from the stations with fewer than 30 samples should be used with caution and for informational purposes only. The lack of a significant trend for stations with fewer than 30 samples could be attributed to not having enough data during the POR, possibly leading to an unreliable result. **Table 12** summarizes the results from the Seasonal Mann-Kendall trend tests, and **Appendix B** provides additional details and graphs.

Table 12. Summary of results for water quality analyses

N/A = Not applicable.

Significance level (P-value) for the determination of a significant trend result of P-value <0.05 was designated for these analyses.

¹ Sufficient data exist to perform the Seasonal Mann-Kendall trend analysis, but data do not span five years and are for discussion only.

WBID	Station	Zone	Parameter	POR Start	POR End	N (# of Samples)	Tau	P-Value	Slope	Trend Test Interpretation
3163B	C25S50	CIRL-SIRL	TN	2000	2016	590	-0.050	0.085	<-0.0001	No significant trend
3163B	C25S50	CIRL-SIRL	TP	2000	2016	590	-0.003	0.928	<-0.0001	No significant trend
3163	FPF-SITE 1	CIRL-SIRL	TN	2013	2017	17 ¹	0.500	0.047	<0.0004	Significant increasing trend
3163	FPF-SITE 1	CIRL-SIRL	TP	2013	2017	17 ¹	0.464	0.063	<0.0004	No significant trend
3163	FPF-SITE 2	CIRL-SIRL	TN	2013	2017	17 ¹	0.321	0.215	<0.0003	No significant trend
3163	FPF-SITE 2	CIRL-SIRL	TN	2013	2017	17 ¹	N/A	N/A	N/A	Insufficient data for trend analysis
3163A	FPF-SITE 3	CIRL-SIRL	TN	2013	2017	17 ¹	0.286	0.284	<0.0003	No significant trend
3163A	FPF-SITE 3	CIRL-SIRL	TP	2013	2017	17 ¹	-0.036	1.000	<-0.0001	No significant trend
3163A	FPF-SITE 4	CIRL-SIRL	TN	2013	2017	17 ¹	0.000	2.000	<-0.0001	No significant trend
3163A	FPF-SITE 4	CIRL-SIRL	TP	2013	2017	17 ¹	0.107	0.757	<0.0001	No significant trend
3163A	FPF-SITE 5	CIRL-SIRL	TN	2013	2017	17 ¹	0.429	0.092	<0.0003	No significant trend
3163A	FPF-SITE 5	CIRL-SIRL	TP	2013	2017	17 ¹	0.107	0.751	<0.0001	No significant trend
3163B	NSL-SITE 5	CIRL-SIRL	TN	2013	2017	17 ¹	0.036	1	<-0.0001	No significant trend
3163B	NSL-SITE 5	CIRL-SIRL	TP	2013	2017	17 ¹	0.321	0.204	<-0.0001	No significant trend

Appendices

Appendix A. BMAP Projects

The BMAP project tables below list the implementation status of the BMAP projects as of February 28, 2017. The tables list (in lbs/yr) the nutrient reduction 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, provided that the reduction is still met within the specified period.

Table A-1. Brevard County projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	BC-01	Tadlock and Goat Creek Baffle Box	Baffle Box – 1st generation	Completed	22.10	1.0	0.4	\$43,811		A
2013	BC-02	Oak Street Drainage Improvements	BMP Treatment Train	Completed	0.30	1.0	0.2	\$660,285		A
2013	BC-03	Melbourne Shores Ponds	Wet Detention Pond	Completed	135.90	156.0	48.4	\$939,543		A
2013	BC-04	Church Street Pond Cleanout	BMP Cleanout	Completed	172.00	137.0	25.5			SEB
2013	BC-05	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			County-wide
2013	BC-06	Street Sweeping	Street Sweeping	Completed	N/A	113.0	72.0			A and SEB
2013	BC-07	Valkaria Lakes	Wet Detention Pond	Completed	457.70	700.0	166.1	\$261,000		A
2013	BC-08	Wheeler Properties (Sebastian River Improvements)	Wet Detention Pond	Completed	16,403.50	28,760.0	9,259.6	\$3,500,000	\$2,000	SEB
2013	BC-09	Micco I	BMP Treatment Train	Completed	52.00	157.0	11.8	\$175,599	\$1,000	SEB
2013	BC-10	Micco B	Dry Detention Pond	Cancelled		TBD	TBD			SEB
2013	BC-11	Mockingbird Pond	Floating Islands/Managed Aquatic Plant System (MAPS)	Completed	26.70	27.0	3.3	\$10,923	\$2,385	SEB
2013	BC-12	Church Street Pond MAPS	Floating Islands/ MAPS	Completed	172.10	217.0	37.1	\$4,212	\$2,106	SEB
2013	BC-13	Wheeler Flemming Grant	Wet Detention Pond	Completed	134.40	745.0	316.5	\$645,073	\$2,000	SEB
2014	BC-14	Fountainhead	Aquatic Vegetation Harvesting	Completed		890.0	273.1	\$39,274		A
2014	BC-15	Corey Road at Hall	Baffle Box – Type 1 retrofit	Completed	51.80	36.0	2.8	\$12,507		A
2014	BC-16	430 Riverview	Baffle Box – Type 1 retrofit	Completed	7.55	7.0	0.7	\$30,508		A
2014	BC-17	C-1 Rediversion	Canal Rediversion	Completed		35,565.0	2,038.0	\$531,051		A
2015	BC-18	Baffle Box/Sediment Trap Cleaning	BMP Cleanout	Completed	County-wide	1.0	1.0			A

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2017	BC-19	Turkey Creek Dredging	Muck Removal/ Restoration Dredging	Completed		TBD	TBD	\$20,000,000.00		A
2017	BC-20	Multiple Ditch Outfall Denitrification D3	Denitrification Walls	Planned		TBD	TBD	\$1,182,858.00		A and SEB
2017	BC-21	Kingsmill Aurora Phase II	Pond	Planned	1,212.80	6,264.0	814.0	\$990,000.00		A and SEB

Total TN Project Reduction = 67,513 lbs/yr

Total TP Project Reduction = 12,256 lbs/yr

Table A-2. City of Fellsmere projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	F-01	State Street Improvements and Stormwater Lake Project	Wet Detention Pond	Completed	49.60	71.5	19.9			SEB
2013	F-02	Senior League Field Park Improvements	Wet Detention Pond	Completed	11.50	1.0	0.1			SEB
2013	F-03	City Hall/Orange Street Project	Wet Detention Pond	Planned	7.60	TBD	TBD			SEB
2013	F-04	Sonrise Apartments Phase 1 & 2	Wet Detention Pond	Completed	36.20	18.0	7.4			SEB
2013	F-05	Grace Meadows Subdivision	Wet Detention Pond	Completed	18.30	4.5	1.5			SEB
2013	F-07	Solid Waste Transfer Station	Wet Detention Pond	Completed	5.10	1.0	0.3			SEB
2014	F-08	Fertilizer Ordinance	Education Efforts	Completed	N/A	TBD	TBD			SEB
2015	F-09	North Regional Lake	Wet Detention Pond	Planned	22.00	TBD	TBD	\$615,000	\$10,000	SEB
2015	F-10	South Regional Lake	BMP Treatment Train	Planned	450.00	TBD	TBD	\$2,000,000	\$5,000	SEB
2017	F-11	Alleyway Grading	Grass swales without swale blocks or raised culverts	Planned	640	TBD	TBD	1,260,000	20,000	SEB
2017	F-12	Stormwater Greenway	Bioswales	Planned	220	TBD	TBD	1,750,000	30,000	SEB

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2017	F-13	Additional Regional Treatment	Wet Detention Ponds	Planned	220	TBD	TBD	2,080,000	50,000	SEB

Total TN Project Reduction = 96 lbs/yr

Total TP Project Reduction = 29 lbs/yr

Table A-3. City of Fort Pierce projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	FP-01	Heathcote Botanical Gardens	BMP Treatment Train	Completed	TBD	TBD	TBD			Outside BMAP boundary
2013	FP-02	Moore's Creek Retrofit Phases 3 and 4	Wet Detention Pond	Completed	TBD	TBD	TBD			Outside BMAP boundary
2013	FP-03	South Beach Baffle Boxes	Baffle Box – 1st generation	Completed	TBD	TBD	TBD			Outside BMAP boundary
2013	FP-04	Moore's Creek Retrofit Phase 2	Baffle Box – 1st generation	Completed	TBD	TBD	TBD			Outside BMAP boundary
2013	FP-05	Street Sweeping	Street Sweeping	Completed		571.0	257.2			SIRL
2013	FP-06	Inlet Cleaning	BMP Cleanout	Completed		340.0	138.0			Outside BMAP boundary
2013	FP-07	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			SIRL
2014	FP-08	Veterans Park Stormwater Improvements	BMP Treatment Train	Underway	TBD	TBD	TBD			Outside BMAP boundary

Total TN Project Reduction = 911 lbs/yr

Total TP Project Reduction = 395 lbs/yr

Table A-4. City of Melbourne projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	MEL-01	Fee and Apollo Drainage Improvements	Wet Detention Pond	Completed	77.00	37.0	92.4	\$525,161		A
2013	MEL-02	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			A
2013	MEL-03	Street Sweeping	Street Sweeping	Completed	N/A	TBD	TBD			A
2013	MEL-04	Participation in Florida Yards and Neighborhoods (FYN) Program	Education Efforts	Completed	N/A	TBD	TBD			A
2015	MEL-05	South Croton Baffle Box	BMP Treatment Train	Cancelled	4.91	TBD	TBD	\$285,000		A
2016	MEL-06	Southwest Park Improvements near Florida Aveune	Baffle Box – 2nd generation with media filter	Completed	48.00	66.0	8.0	\$582,153		A
2016	MEL-07	Melbourne Aveune Existing Baffle Box Upgrade	Baffle Box – 2nd generation with media filter	Completed	12.90	36.8	7.7	\$12,000		A
2017	MEL-08	Penwood Septic to Sewer Conversion	Wastewater Service Area Expansion	Planned		48.0	TBD	\$60,000.00		A
2017	MEL-09	Riverview Park Living Shoreline	Creating/ Enhancing Living Shoreline	Planned		230.0	80.0	\$440,000.00		A
2017	MEL-10	Hoag Septic to Sewer Conversion	Wastewater Service Area Expansion	Planned		101.0	TBD	\$105,000.00		A

Total TN Project Reduction = 140 lbs/yr

Total TP Project Reduction = 108 lbs/yr

Table A-5. City of Palm Bay projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	PB-01	Basin 11	Muck Removal/Restoration Dredging	Completed		TBD	TBD	\$1,866,695		A
2013	PB-02	Chace Lane Pond Modifications	Dry Detention Pond	Completed	91.19	62.0	8.3	\$20,290		A
2013	PB-03	Glenham Drive Sidewalks Improvements	Dry Detention Pond	Completed	12.20	9.0	1.4			A
2013	PB-04	Basin 7 Stormwater Improvements Phase II	Wet Detention Pond	Completed	146.50	387.0	124.0	\$79,109		A
2013	PB-05	Boundary Canal Trail Phase 3	Baffle Box - 1st generation	Completed	365.90	16.0	11.2			A
2013	PB-06	Boundary Canal Phase II, stormwater improvement	On-line Retention BMPs	Completed	632.70	TBD	TBD			A
2013	PB-07	Boundary Canal Phase I Baffle Box Installation	Baffle Box - 1st generation	Completed	632.70	10.0	4.8			A
2013	PB-08	Norwood Street Baffle Box Installation	Baffle Box - 1st generation	Completed	528.80	26.0	22.6			A
2013	PB-09	Basin 1 Drainage Improvements Phase 1 (East of US 1)	Wet Detention Pond	Completed	136.5	33.0	5.9	\$22,247		A
2013	PB-10	Basin 13 Stormwater Improvements	Wet Detention Pond	Completed	42.38	65.0	12.2	\$200,419		A
2013	PB-11	Powell's Subdivision Paving & Drainage Improvements	Wet Detention Pond	Completed	123.56	124.0	53.9	\$147,478		A
2013	PB-12	Port Malabar Unit 40 Drainage Improvements North	Wet Detention Pond	Completed	224.33	468.0	109.6	\$23,778		A
2013	PB-13	Mandarin Ditch (South)	Grass swales without swale blocks or raised culverts	Completed	73.04	285.0	39.6	\$308,797		A
2013	PB-14	Basin 3 Main Street Parking Lot	Pervious Pavement	Completed	346.05	TBD	TBD	\$4,845		A

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	PB-15	Basin 3 Main Street Improvements Channel Alignment	Other Structural BMP	Completed	358.60	1,475.0	192.8	\$403,561		A
2013	PB-16	Street Sweeping	Street Sweeping	Completed	N/A	57.0	36.0	\$8,900		A
2013	PB-17	Turkey Creek Maintenance Dredging	Muck Removal/Restoration Dredging	Completed		TBD	TBD	\$255,241		A
2013	PB-18	Turkey Creek Maintenance Dredging - Sump	Muck Removal/Restoration Dredging	Completed		TBD	TBD			A
2013	PB-19	Anglers Drive	Baffle Box - 1st generation	Completed	12.12	0.5	0.3	\$85,000		A
2013	PB-20	Worth Court	Catch Basin Inserts/Inlet Filter Cleanout	Completed	5.00	0.1	0.1			A
2013	PB-21	Basin 9 (Harris Pond)	Wet Detention Pond	Completed	442.52	TBD	TBD	\$294,519		A
2013	PB-22	Wild Rose BMP	Baffle Box - 1st generation	Completed	4.59	TBD	TBD			A
2013	PB-23	C-1 Canal Rediversion	Canal Rediversion	Completed	TBD	TBD	TBD			A
2013	PB-24	Port Malabar Inlet Inserts	Catch Basin Inserts/Inlet Filter Cleanout	Completed	29.25	TBD	TBD	\$19,518		A
2013	PB-25	Kent Street Baffle Box	Baffle Box - 1st generation	Completed	20.77	1.0	3.4	\$50,000		A
2013	PB-26	PMU1 North (Florin Pond)	Dry Detention Pond	Completed	25.86	26.0	5.9	\$150,000		A
2013	PB-27	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD	\$1,866,695		A
2016	PB-28	Vance Circle-Drainage Improvements	Catch Basin Inserts/Inlet Filter Cleanout	Cancelled	TBD	TBD	TBD			A
2016	PB-29	Basin 1 Drainage Improvements Phase 2 (Victoria Pond)	BMP Treatment Train	Planned	175.0	TBD	TBD	\$250,000		A
2016	PB-30	Troutman/ Clearmond Drainage Pond	Dry Detention Pond	Completed	7.9	TBD	TBD	\$5,400,000		A
2016	PB-31	Port Malabar Drainage Improvements Central	Other Structural BMP	Completed	11.8	TBD	TBD			A

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2016	PB-32	Kingswood Drainage Pond	Dry Detention Pond	Completed	62.4	TBD	TBD			A
2016	PB-33	Basin 3 Bayfront Community SW Impr (Koske Pond)	BMP Treatment Train	Planned		TBD	TBD	\$500,000		A
2017	PB-34	Stormwater Treatment at City Marina	BMP Treatment Train	Planned		TBD	TBD	\$400,000 \$490,050 (33%)		A
2017	PB-35	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			A
2017	PB-36	Street Sweeping	Street Sweeping	Completed	N/A	30.0	25.0			A
2017	PB-37	Norwood Baffle Box Retrofit			507	TBD	TBD	\$300,000		A
2017	PB-38	Victoria Pond	Baffle Box	Planned	122	TBD	TBD	\$200,000		A
2017	PB-39	Goode Park	Baffle Box	Planned	254	TBD	TBD	\$200,000		A
2017	PB-40	Florin Pond	Baffle Box	Planned	18	TBD	TBD	\$150,000		A
2017	PB-41	Turkey Creek Shoreline Restoration	Shoreline Stabilization	Planned		TBD	TBD	\$433,200		A

Total TN Project Reduction = 3,075 lbs/yr

Total TP Project Reduction = 657 lbs/yr

Table A-6. City of Sebastian projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	SEB-01	Main Street/Indian River Drive Improvements	Dry Detention Pond	Completed	5.60	68.0	17.9			SEB
2013	SEB-02	Main Street 4	Dry Detention Pond	Planned	TBD	TBD	TBD			SEB
2013	SEB-03	T-Hangar Development/Access Roads	Dry Detention Pond	Completed	2.20	1.0	0.1			SEB
2013	SEB-04	Louisiana Avenue Improvements Projects	Dry Detention Pond	Completed	2.60	0.0	0.1			SEB
2013	SEB-05	Twin Ditches Stormwater Retrofit	Wet Detention Pond	Completed	176.60	209.0	105.5			SEB
2013	SEB-06	Indian River Drive & Davis Street Baffle Box	Baffle Box - 1st generation	Completed	21.80	1.0	0.8			SEB

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	SEB-07	Periwinkle Drive Stormwater	Wet Detention Pond	Completed	47.50	4.0	0.7			SEB
2013	SEB-08	Collier Canal Stormwater Retrofit	Wet Detention Pond	Completed	531.60	1,529.0	387.8			SEB
2013	SEB-09	Schumann Park Improvements	Dry Detention Pond	Completed	4.10	1.0	0.1			SEB
2013	SEB-10	Fertilizer Ordinance	Education Efforts	Completed	N/A	TBD	TBD			SEB
2014	SEB-11	Airport Drive	Baffle Box - 1st generation	Cancelled		TBD	TBD			SEB
2014	SEB-12	Presidential Street	Baffle Box - 1st generation	Underway	15.00	TBD	TBD			SEB
2014	SEB-13	Powerline Road	Baffle Box - 1st generation	Completed	2.00	TBD	TBD			SEB
2014	SEB-14	STEP Septic System	OSTDS Enhancement	Cancelled		TBD	TBD			SEB
2017	SEB-15	Collier Canal Dredge	Muck Removal/Restoration Dredging	Completed	22.00	TBD	TBD			SEB
2017	SEB-16	Stormwater Park	Wet Detention Pond	Completed	162.00	TBD	TBD			SEB
2017	SEB-17	Presidential Street	Filter Baffle Boxes	Completed	24.00	TBD	TBD			SEB
2017	SEB-18	Water Quality Testing	Monitoring/Data Collection	Completed	24.00	TBD	TBD			SEB
2017	SEB-19	Drainage Improvements	BMP Treatment Train	Completed	0.73	TBD	TBD			SEB
2017	SEB-20	Tulip Drainage	On-line Retention BMPs	Completed	3.51	TBD	TBD			SEB

Total TN Project Reduction = 1,813 lbs/yr

Total TP Project Reduction = 513 lbs/yr

Table A-7. City of Vero Beach projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	VB-01	Date Palm Baffle Box	Baffle Box - 2nd generation	Completed	6.70	9.0	1.0	\$186,396	\$1,000	B
2013	VB-02	10th and 12th Avenue Baffle Boxes	Baffle Box - 2nd generation	Completed	69.90	127.0	17.5	\$97,800	\$1,000	B
2013	VB-03	Greytwig Baffle Box	Baffle Box - 2nd generation	Completed	9.80	21.0	2.4	\$75,000	\$1,000	B
2013	VB-04	Fertilizer Ordinance	Education Efforts	Completed	N/A	TBD	TBD			B
2015	VB-05	STEP Septic System	OSTDS Enhancement	Underway		TBD	TBD	\$500,000		B
2016	VB-06	18th Street Outfall	Baffle Box - 2nd generation	Completed	131.1	TBD	TBD			B
2016	VB-07	Humiston Park Outfall	Exfiltration Trench	Completed	39.8	TBD	TBD			B
2016	VB-08	Bahia Mar Road Outfall	Baffle Box - 2nd generation	Completed	13.3	TBD	TBD			B
2016	VB-09	Bay Drive Bridge	Baffle Box - 2nd generation	Completed	1.9	TBD	TBD			B
2016	VB-10	Indian Bay North and South	Baffle Box - 2nd generation	Completed	20.1	TBD	TBD			B
2016	VB-11	Live Oak Outfall	Baffle Box - 2nd generation	Completed	11.7	TBD	TBD			B
2016	VB-12	Indian River Drive E at Conn Way	Baffle Box - 2nd generation	Completed	68.5	TBD	TBD			B
2016	VB-13	River Drive Bridge	Baffle Box - 2nd generation	Completed	60.8	TBD	TBD			B
2016	VB-14	Lantana Lane	Pervious Pavement	Completed	38.4	TBD	TBD			B
2016	VB-15	Royal Palm Pointe	Baffle Box - 1st generation	Completed	TBD	TBD	TBD			B
2016	VB-16	Deep Injection Well	Deep Injection Well	Completed		TBD	TBD			B
2016	VB-17	Street Sweeping	Street Sweeping	Completed	N/A	683.0	430.0			B
2016	VB-18	Country Club Drive Outfall	Baffle Box - 1st generation	Completed	20.1	TBD	TBD			B
2016	VB-19	Mockingbird Drive / Iris Lane	Baffle Box - 1st generation	Completed	68.5	TBD	TBD			B
2016	VB-20	Vero Isles Inlet Retrofits	Pervious Pavement	Underway	51.21	TBD	TBD			B

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2016	VB-21	McAnsh Park Inlet Retrofits	Pervious Pavement	Underway	169.67	TBD	TBD			B
2016	VB-22	Original Town Inlet Retrofits	Pervious Pavement	Underway	170.63	TBD	TBD			B
2016	VB-23	BMP Maintenance	Catch Basin Inserts/Inlet Filter Cleanout	Completed		190.0	114.0			B

Total TN Project Reduction = 1,030 lbs/yr

Total TP Project Reduction = 565 lbs/yr

Table A-8. City of West Melbourne projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	WM-01	Westbrooke	Wet Detention Pond	Completed	169.00	41.0	4.3			A
2013	WM-02	Saddlebrook	Wet Detention Pond	Completed	40.20	1.0	0.2			A
2013	WM-03	Stratford Point	Wet Detention Pond	Completed	83.70	25.0	3.1			A
2013	WM-04	Oak Grove	Wet Detention Pond	Completed	91.40	22.0	2.2			A
2013	WM-05	Manchester Lakes	Wet Detention Pond	Completed	133.30	16.0	1.1			A
2013	WM-06	Havens at Riviera	Wet Detention Pond	Completed	22.90	6.0	0.6			A
2013	WM-07	Cypress/Creek Imagine Schools	Wet Detention Pond	Completed	72.00	15.0	1.7			A
2013	WM-08	Lynnwood	Wet Detention Pond	Completed	28.30	2.0	0.6			A
2013	WM-09	Coastal Commerce	Wet Detention Pond	Completed	59.90	18.0	2.7			A
2013	WM-10	Hammock Landing	Wet Detention Pond	Completed	76.10	11.0	0.8			A
2013	WM-11	Crystal Lakes	Wet Detention Pond	Completed	91.00	17.0	6.4			A
2013	WM-12	Orange View Drive	Baffle Box – 2nd generation	Completed	49.10	69.0	8.0			A
2013	WM-13	Stephenson Drive	Baffle Box – 2nd generation	Completed	14.10	21.0	2.6			A
2013	WM-14	Parker Road	Baffle Box – 2nd generation	Completed	13.10	17.0	1.9			A

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	WM-15	Laila Drive	Baffle Box – 2nd generation	Completed	21.90	31.0	3.5			A
2013	WM-16	Doherty Drive	Baffle Box – 2nd generation	Completed	66.00	107.0	16.5			A
2013	WM-17	Trend Road	Baffle Box – 2nd generation	Completed	8.80	12.0	1.4			A
2013	WM-18	San Paolo	Baffle Box – 2nd generation	Completed	2.70	8.0	1.5			A
2013	WM-19	San Paolo West	Baffle Box – 2nd generation	Completed	7.70	24.0	4.8			A
2013	WM-20	John Carrol	Baffle Box – 2nd generation	Completed	74.90	109.0	12.3			A
2013	WM-21	Street Sweeping	Street Sweeping	Completed	N/A	316.2	216.0			A
2013	WM-22	Inlet Cleaning	BMP Cleanout	Completed		20.5	2.4			A
2017	WM-23	Sawgrass Lakes Phase I	Wet Detention Pond	Completed	508.44	TBD	TBD			A
2017	WM-24	Manchester Lakes	Wet Detention Pond	Completed	133.02	TBD	TBD			A

Total TN Project Reduction = 909 lbs/yr

Total TP Project Reduction = 295 lbs/yr

Table A-9. FDOT District 4 projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	FDOT4-01	FM# 228595-1 (Basin 4B)	Wet Detention Pond	Completed	57.60	83.0	30.3			SEB
2013	FDOT4-02	FM# 228620-1	100% On-site Retention	Completed	2.20	24.0	3.4			SEB
2013	FDOT4-03	FM# 228615-1	Baffle Box - 2nd generation	Completed	59.80	117.0	33.2			B
2013	FDOT4-04	FDOT4 Street Sweeping	Street Sweeping	Completed	N/A	237.0	151.8			B and SEB
2013	FDOT4-05	FM# 228583-5 (Pond 1)	Wet Detention Pond	Completed	22.40	65.0	41.6			B
2013	FDOT4-06	FM# 228583-5 (Pond 2)	Wet Detention Pond	Completed	11.90	25.0	15.8			B
2013	FDOT4-07	FM# 228627-1 (Pond 1)	Wet Detention Pond	Completed	28.90	83.0	51.7			B
2013	FDOT4-08	FM# 228627-1 (Pond 2)	Wet Detention Pond	Completed	21.60	61.0	38.6			B

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	FDOT4-09	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			B and SEB
2013	FDOT4-10	Fertilizer Cessation	Fertilizer Cessation	Completed		TBD	TBD			B and SEB
2013	FDOT4-11	FM# 230132-1 (system 1)	Dry Detention Pond	Completed	TBD	TBD	TBD			SIRL
2013	FDOT4-12	FM# 230132-1 (system 2)	Dry Detention Pond	Completed	TBD	TBD	TBD			SIRL
2013	FDOT4-13	FM# 230132-1 (system 3)	Dry Detention Pond	Completed	TBD	TBD	TBD			SIRL
2013	FDOT4-14	FM# 230132-1 (system 4)	Dry Detention Pond	Completed	TBD	TBD	TBD			SIRL
2013	FDOT4-15	FM# 230132-1 (system 5)	Wet Detention Pond	Completed	TBD	TBD	TBD			SIRL
2013	FDOT4-16	FM# 230132-1 (system 6)	Wet Detention Pond	Completed	TBD	TBD	TBD			SIRL
2013	FDOT4-17	FM# 230132-1 (system 7)	100% On-site Retention	Completed	TBD	TBD	TBD			SIRL
2014	FDOT4-18	FM# 228583-3 (State Road 5/US-1)	Wet Detention Pond	Completed	17.25	52.6	28.7			B
2014	FDOT4-19	FM#: 230873-1 (27th Avenue Reconstruction)	100% On-site Retention	Completed	10.44	53.5	7.6			B
2014	FDOT4-20	FM#: 229966-1 (State Road A1A at the Moorings)	Grass swales without swale blocks or raised culverts	Completed	1.29	TBD	TBD			B
2014	FDOT4-21	FM#: 413048-1 (Interstate-95 from St. Lucie / Indian River County Line to North of State Road 60)	Dry Retention Pond	Completed	181.75	985.1	377.9			B
2014	FDOT4-22	FM# 411476-1 (Sebastian River Bridge Replacement Project)	Grass swales without swale blocks or raised culverts	Completed	0.48	1.4	0.5			SEB
2014	FDOT4-23	FM# 413049-2	Grass swales without swale blocks or raised culverts	Underway	152.44	TBD	TBD			SEB
2014	FDOT4-24	FM# 230279-1 (Kings Highway)	Dry Detention Pond	Completed	TBD	TBD	TBD			SIRL
2014	FDOT4-25	FM# 413046-1	Grass swales without swale blocks or raised culverts	Completed	TBD	TBD	TBD			SIRL
2014	FDOT4-26	FM# 413047-1	Grass swales without swale blocks or raised culverts	Completed	TBD	TBD	TBD			SIRL
2015	FDOT4-27	FM# 230108-1 (Pond 1)	Wet Detention Pond	Completed	TBD	TBD	TBD			SIRL

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2015	FDOT4-28	FM# 230108-1 (Pond 4)	Wet Detention Pond	Completed	TBD	TBD	TBD			Outside of BMAP Boundary
2015	FDOT4-29	FM# 228583-2 US 1 Widening (Pond 3)	Wet Detention Pond	Completed	39.86	112.5	65.0			SEB
2016	FDOT4-30	FM# 403596-1: SR 60 Resurfacing (20th Street Outfall)	Baffle Box - 2nd generation	Completed	110.50	316.0	60.0			SIRL
2016	FDOT4-31	FM# 403596-1: SR 60 Resurfacing (21st Street Outfall)	Baffle Box - 2nd generation	Completed	23.40	93.0	20.0			SIRL
2016	FDOT4-32	FM# 403596-1: SR 60 Resurfacing (23rd Street Outfall)	Baffle Box - 2nd generation	Completed	144.20	518.0	106.0			SIRL
2016	FDOT4-33	FM# 403596-1: SR 60 Resurfacing (25th and Royal Palm Outfall) - Baffle Box #1	Baffle Box - 2nd generation	Completed	50.97	107.4	17.3			SIRL
2016	FDOT4-34	FM# 403596-1: SR 60 Resurfacing (25th and Royal Palm Outfall) - Baffle Box #2	Baffle Box - 2nd generation	Completed	50.97	107.4	17.3			SIRL
2017	FDOT4-35	FM# 431152-1	Construction of multiple Trash and Sediment Basins	Completed	TBD	TBD	TBD			B and SEB
2017	FDOT4-36	FM# 230338-4	Wet Detention Ponds & Dry Detention Swales	Underway	TBD	TD	TBD			SIRL

Total TN Project Reduction = 3,042 lbs/yr

Total TP Project Reduction = 1,067 lbs/yr

Table A-10. FDOT District 5 projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	FDOTD5-01	D5_70010-3528-01	Wet Detention Pond	Completed	15.60	TBD	TBD			A

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	FDOTD5-02	D5_70010-3528-02	Wet Detention Pond	Completed	8.40	TBD	TBD			A
2013	FDOTD5-03	D5_70012-3503-01 (Missing from model)	Wet Detention Pond	Completed	21.70	TBD	TBD			A
2013	FDOTD5-04	D5_70012-3503-02 (Missing from model)	Wet Detention Pond	Completed	9.10	TBD	TBD			A
2013	FDOTD5-05	D5_70012-3503-03 (Missing from model)	Dry Detention Pond	Completed	7.30	TBD	TBD			A
2013	FDOTD5-06	D5_70050-3544-03	Wet Detention Pond	Completed	5.10	TBD	TBD			A
2013	FDOTD5-07	D5_70100-3517-01 (Missing from model)	100% On-site Retention	Completed	3.40	TBD	TBD			A
2013	FDOTD5-08	D5_70220-3433-01	Wet Detention Pond	Completed	9.30	TBD	TBD			A
2013	FDOTD5-09	D5_70220-3429-01 (Missing from model)	Wet Detention Pond	Completed	20.00	TBD	TBD			A
2013	FDOTD5-10	D5_70220-3429-02 (Missing from model)	Wet Detention Pond	Completed	25.60	TBD	TBD			A
2013	FDOTD5-11	D5_70220-3429-03 (Missing from model)	Wet Detention Pond	Completed	26.10	TBD	TBD			A
2013	FDOTD5-12	D5_70220-3429-04 (Missing from model)	Wet Detention Pond	Completed	21.70	TBD	TBD			A
2013	FDOTD5-13	D5_409034-01	100% On-site Retention	Completed	0.40	TBD	TBD			A
2013	FDOTD5-14	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			A
2013	FDOTD5-15	Fertilizer Cessation	Fertilizer Cessation	Completed		1,586.0	0.0			A
2015	FDOTD5-16	Street Sweeping	Street Sweeping	Completed	N/A	80.0	51.0			A

Total TN Project Reduction = 1,666 lbs/yr

Total TP Project Reduction = 51 lbs/yr

Table A-11. Fellsmere WCD projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	FWCD-01	Sonrise Villas	Wet Detention Pond	Completed	13.60	11.0	4.5			SEB
2013	FWCD-02	St. Johns Land Purchase	Land Use Change	Completed	2,390.60	TBD	TBD			SEB
2013	FWCD-03	Fellsmere Stormwater Lake and State Street Improvements	Wet Detention Pond	Completed	49.60	71.5	19.9			SEB
2013	FWCD-04	Grace Meadows	Wet Detention Pond	Completed	18.30	4.5	1.5			SEB
2013	FWCD-05	2-Inch Limitation Discharges	On-line Retention BMPs	Completed		TBD	TBD			SEB
2013	FWCD-06	Fellsmere WCD Mechanical Canal Maintenance	On-line Retention BMPs	Completed		TBD	TBD			SEB
2014	FWCD-07	Historic Fellsmere Master Drainage Plan	Regional Stormwater Treatment	Planned	1,661.33	TBD	TBD			SEB
2015	FWCD-08	South Regional Lake Project	Regional Stormwater Treatment	Planned	627.40	TBD	TBD			SEB
2016	FWCD-09	North Regional Lake	Regional Stormwater Treatment	Planned	367.36	TBD	TBD			SEB

Total TN Project Reduction = 87 lbs/yr

Total TP Project Reduction = 26 lbs/yr

Table A-12. Fort Pierce Farms WCD projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	FPF-01	Swale Along Canal 1 Top of Bank (St. Lucie River Issues Team [SLRIT] Grant 2006–07)	Swales	Completed	0.19	TBD	TBD			SIRL
2013	FPF-02	Dry Detention Area Along Canal 1 Top of Bank (SLRIT Grants 2006–07 and 2007–08)	Dry Detention Pond	Completed	2.58	TBD	TBD			SIRL
2013	FPF-03	Discharge Criteria Adopted as Part of FPFWCD Permit Application Criteria	Regulations, Ordinances, and Guidelines	Completed		TBD	TBD			SIRL

Total TN Project Reduction = 0 lbs/yr

Total TP Project Reduction = 0 lbs/yr

Table A-13. Indian River County projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	IRC-01	Vero Lake Estates Stormwater Improvements – Phase 1	Wet Detention Pond	Completed	2,407.11	4,935.7	1,022.5	\$1,572,829		SEB
2013	IRC-02	East Roseland Stormwater Improvements	Wet Detention Pond	Completed	73.66	168.2	38.3	\$433,134	\$2,176	SEB
2013	IRC-03	East Gifford Stormwater Improvements	Wet Detention Pond	Completed	44.11	169.2	71.1	\$686,136	\$2,471	B
2013	IRC-04	PC Main (formerly Main Relief Canal Pollution Control Facility)	Other Structural BMP	Completed	22,800.50	2,079.3	528.3	\$5,331,908	\$63,260	B
2013	IRC-05	Egret Marsh Stormwater Park	Other Structural BMP	Completed	10,104.24	19,948.0	4,049.0	\$7,563,274	\$200,189	B
2013	IRC-06	PC South (Osprey Marsh) Algal Nutrient Removal Facility	Other Structural BMP	Completed	9,781.88	12,990.0	2,991.0	\$10,000,000	175,000 (estimated)	B

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	IRC-07	Moorhen Marsh (formerly PC North Aquatic Plant Based Nutrient Removal System)	Other Structural BMP	Planned	6,301.15	20,700.0	4,000.0	\$5,000,000	84,000 (estimated)	B and SEB
2013	IRC-08	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD		\$52,000	B and SEB
2013	IRC-09	Street Sweeping	Street Sweeping	Completed	N/A	365.0	234.0		\$22,050	B and SEB
2013	IRC-10	Storm Drain Cleaning with Vacuum Trucks	Other Structural BMP	Planned		TBD	TBD		\$19,067	B and SEB
2013	IRC-11	Floating Aquatic Plant Islands in County Stormwater Ponds and Lakes	Floating Islands/ MAPS	Planned		TBD	TBD			B and SEB
2013	IRC-12	Spoonbill Marsh Project	Other Structural BMP	Completed	359.45	12,450.5	2,157.7	\$4,200,000	\$93,911	B
2016	IRC-13	North Relief Canal Mechanical Vegetation/ Debris Removal System	Aquatic Vegetation Harvesting	Planned	6,301.15	TBD	TBD	\$1,000,000	\$50,000	SEB
2016	IRC-14	South Relief Canal Mechanical Vegetation/ Debris Removal System	Aquatic Vegetation Harvesting	Underway	7,154.84	TBD	TBD	\$1,000,000 (estimated)	50,000 (estimated)	SEB
2016	IRC-15	Osprey Acres (Coyote Run)	BMP Treatment Train	Planned	9,783.61	TBD	TBD			SEB

Total TN Project Reduction = 53,106 lbs/yr

Total TP Project Reduction = 11,092 lbs/yr

Table A-14. Indian River Farms WCD projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	IRF-01	Tilting Weir Gates	Other Structural BMP	Completed		TBD	TBD			B and SEB
2013	IRF-02	Mechanical Removal of Floating Vegetation	Other Nonstructural BMP	Completed		TBD	TBD			B and SEB
2013	IRF-03	Establishment of 2-Inch Discharge Rule	Other Nonstructural BMP	Completed		TBD	TBD			B and SEB

Total TN Project Reduction = 0 lbs/yr

Total TP Project Reduction = 0 lbs/yr

Table A-15. Melbourne-Tillman WCD projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	MT-01	C-1 Rediversion Project	Canal Rediversion	Completed	TBD	TBD	TBD			A
2016	MT-02	Weir Construction C-69 @ C-1	Control Structure	Completed	3,830.00	TBD	TBD			A
2016	MT-03	Weir Construction C-69 @ C-75	Control Structure	Completed	2,940.00	TBD	TBD			A
2016	MT-04	Weir Construction C-74 @ C-69	Control Structure	Completed	840.00	TBD	TBD			A
2016	MT-05	Windmill Aeration	Other Structural BMP	Completed	516.00	TBD	TBD			A
2016	MT-06	C-9R	Other Nonstructural BMP	Completed	205.00	TBD	TBD			A
2016	MT-07	C-49 Pond	Biological/Bacteria Treatment	Completed	238.00	TBD	TBD			A
2016	MT-08	C-47	Biological/Bacteria Treatment	Completed	480.00	TBD	TBD			A
2016	MT-09	C-62	Other Nonstructural BMP	Completed	120.00	TBD	TBD			A
2016	MT-10	C-84	Biological/Bacteria Treatment	Completed	152.00	TBD	TBD			A
2017	MTT-11	Harvesting	Aquatic Vegetation Harvesting	Completed	79.55	TBD	TBD			A

Total TN Project Reduction = 0 lbs/yr

Total TP Project Reduction = 0 lbs/yr

Table A-16. North St. Lucie River WCD projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	NSLR-01	C-25 Diversion Structure	Control Structure	Completed		TBD	TBD			SIRL
2013	NSLR-02	Invasive Vegetation Removal at Canals 33 and 42	Aquatic Vegetation Harvesting	Completed		TBD	TBD			SIRL
2013	NSLR-03	Canal Maintenance Program	Aquatic Vegetation Harvesting	Completed		TBD	TBD		\$9,400	SIRL

Total TN Project Reduction = 0 lbs/yr

Total TP Project Reduction = 0 lbs/yr

Table A-17. SRID projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	SRID-01	Establishment of 2-Inch Discharge Rule	Other Nonstructural BMP	Completed		TBD	TBD			B and SEB
2013	SRID-02	Radial Arm Control Gates	Other Structural BMP	Planned		TBD	TBD			B and SEB
2013	SRID-03	Vegetation and Sediment/Muck Removal from Canals	Other Nonstructural BMP	Completed		TBD	TBD			B and SEB
2013	SRID-04	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			B and SEB
2013	SRID-05	Large Regional Water Conservation/ Storage Areas	Other Nonstructural BMP	Planned	TBD	TBD	TBD			B and SEB
2014	SRID-06	200-Acre Pilot Project/ Water Farming	Other Nonstructural BMP	Planned	TBD	TBD	TBD			B and SEB
2014	SRID-07	Lateral D System Stormwater Management	Other Nonstructural BMP	Completed	TBD	TBD	TBD			B and SEB

Total TN Project Reduction = 0 lbs/yr

Total TP Project Reduction = 0 lbs/yr

Table A-18. St. Lucie County projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	SLC-01	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			SIRL
2013	SLC-02	Street Sweeping	Street Sweeping	Completed	N/A	664.0	299.1			SIRL
2013	SLC-03	Paradise Park Stormwater Improvement	Dry Detention Pond	Underway	168.10	TBD	TBD	\$1,500,000		SIRL
2013	SLC-04	Harmony Heights Stormwater Improvement	Dry Detention Pond	Underway	238.74	TBD	TBD	\$3,000,000		SIRL
2013	SLC-05	Taylor Creek Dredging	Muck Removal/Restoration Dredging	Completed		TBD	TBD	\$7,500,000		SIRL
2013	SLC-06	Stan Blum Memorial Boat Launch	Wet Detention Pond	Completed	6.13	TBD	TBD			SIRL
2015	SLC-07	San Lucie Plaza Stormwater Master Plan	On-line Retention BMPs	Planned	157.08	TBD	TBD			SIRL
2016	SLC-08	Georgia Ave. Basin WQ Improvement	Baffle Box - 2nd generation	Planned	332.40	TBD	TBD			SIRL
2017	SLC-09	Queens Cove Septic to Sewer	Wastewater Service Area Expansion	Unknown		TBD	TBD			
2017	SLC-10	Port of Fort Pierce	Stormwater Management Systems	Unknown		TBD	TBD			

Total TN Project Reduction = 664 lbs/yr

Total TP Project Reduction = 299 lbs/yr

Table A-19. St. Lucie Village projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	SLV-1	Peninsula Drive	Detention	Completed	TBD	TBD	TBD			SIRL

Total TN Project Reduction = 0 lbs/yr

Total TP Project Reduction = 0 lbs/yr

Table A-20. Town of Indialantic projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	TI-01	Education Efforts	Education Efforts	Completed	N/A	TBD	TBD			A
2014	TI-02	Swale Construction	Grass swales without swale blocks or raised culverts	Underway	TBD	TBD	TBD			A
2014	TI-03	Drainage Inlet Cleaning	BMP Cleanout	Completed		TBD	TBD			A
2014	TI-04	Street Sweeping	Street Sweeping	Completed	N/A	28.0	18.2			A
2016	TI-05	Lily Park	On-line Retention BMPs	Planned	TBD	TBD	9.0			A

Total TN Project Reduction = 28 lbs/yr

Total TP Project Reduction = 18 lbs/yr

Table A-21. Town of Indian River Shores projects in the Central IRL

N/A = Not applicable; O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2017	IRS-01	Public Education	Education Efforts	Completed	N/A	TBD	TBD			B
2017	IRS-02	Hurricane Evacuation Stormwater Improvements	BMP Treatment Train	Planned	12.00	TBD	TBD	\$1,351,505	\$25,000	B
2017	IRS-03	Dredging of Indian/Seminole Lane Stormwater Drainage Canal	Muck Removal/ Restoration Dredging	Planned	53.60	TBD	TBD	\$350,000	\$25,000	B
2017	IRS-04	Pebble Bay Estates Inlet Basket Retrofit	Catch Basin Inserts/Inlet Filter Cleanout	Planned	30.82	TBD	TBD	\$150,000	\$15,000	B
2017	IRS-05	Baffle Box	Baffle Boxes – 2nd Generation	Completed	53.60	TBD	TBD	\$122,103	\$15,000	B

Total TN Project Reduction = 0 lbs/yr

Total TP Project Reduction = 0 lbs/yr

Table A-22. Town of Melbourne Beach projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	MB-01	Basin 9 – Oak Street Pedway	Exfiltration Trench	Completed	13.10	127.0	21.0	\$146,000		A
2013	MB-02	Basin 9 – Oak Street Pedway – Improvement Project	Baffle Box – 2nd generation	Completed	85.70	42.0	4.6	\$146,000		A
2013	MB-03	Basin 8, 9, and 11 Oak Street Pedway – Improvement Project	Swales	Completed	45.10	TBD	TBD	\$146,000		A
2013	MB-04	Basin 1 – HMGP Flood Water Improvements Project	Baffle Box – 2nd generation	Completed	83.70	146.0	16.9	\$500,000		A
2013	MB-05	Basin 1 – HMGP Flood Water Improvements Project	Swales	Completed	0.90	TBD	TBD	\$500,000		A
2013	MB-06	Basin 9 – HMGP Flood Water Improvements Project	Swales	Completed	1.00	TBD	TBD	\$500,000		A
2013	MB-07	Anchor Key Drainage Improvements – Basin 16	Baffle Box – 1st generation	Completed	3.30	0.0	0.1			A
2013	MB-08	Pelican Key Drainage Improvements – Basin 14	Baffle Box – 1st generation	Completed	1.80	0.0	0.0			A
2013	MB-09	Basin 5 – Ocean Ave. Baffle Box	Baffle Box – 1st generation	Completed	58.30	3.0	2.9			A
2013	MB-10	Basin 10 – Cherry Drive Baffle Box	Baffle Box – 1st generation	Completed	87.40	3.0	2.6			A
2013	MB-11	Basin 15 – Neptune Drive Baffle Box	Baffle Box – 1st generation	Completed	5.80	0.0	0.1			A
2013	MB-12	Basin 17 – Riverview Lane Baffle Box	Baffle Box – 1st generation	Completed	1.10	0.0	0.0			A
2013	MB-13	Basin 18 – Riverview Lane Baffle Box	Baffle Box – 1st generation	Completed	5.90	0.0	0.1			A
2013	MB-14	Curb Inlet Baskets – Basins 4, 6, 10, and 15	Curb Inlet Baskets	Completed		5.0	3.5			A
2013	MB-15	Melbourne Beach Chevron	100 % Onsite Retention	Completed	0.60	TBD	TBD			A
2013	MB-16	Melbourne Beach Library	Dry Detention Pond	Completed	1.50	3.0	0.6			A

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	MB-17	Melbourne Beach Town Hall	100 % Onsite Retention	Completed	1.80	TBD	TBD			A

Total TN Project Reduction = 329 lbs/yr

Total TP Project Reduction = 52 lbs/yr

Table A-23. Town of Melbourne Village projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	MV-01	Platt Circle	Baffle Box – 2nd generation	Completed	31.10	48.0	5.5	\$124,000		A

Total TN Project Reduction = 48 lbs/yr

Total TP Project Reduction = 6 lbs/yr

Table A-24. Town of Orchid projects in the Central IRL

O&M = Operations and maintenance; TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	TO-1	Education Efforts	Education Efforts	Ongoing	N/A	TBD	TBD			SEB

Total TN Project Reduction = 0 lbs/yr

Total TP Project Reduction = 0 lbs/yr

Table A-25. Turnpike Authority projects in the Central IRL

O&M = Operations and maintenance; N/A = Not applicable

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	T-01	Street Sweeping	Street Sweeping	Ongoing	N/A	31	20	\$124,000		B

Total TN Project Reduction = 31 lbs/yr

Total TP Project Reduction = 20 lbs/yr

Appendix B. Water Quality Trend Analysis Methodology and Results

Water quality trend analyses were performed on data from select tributary stations in the Central IRL Basin. The most current data for C25S50 were obtained from STORET. Data for the Fort Pierce Farms (FPF) and North St. Lucie (NSL) stations were provided to DEP and were not in STORET format. STORET data were processed using the methods described below, and only data that met quality control objectives were used in the analyses.

Nonparametric statistical techniques were used to identify monotonic trend analyses in a statistically rigorous way with the Seasonal Mann-Kendall trend test. Data are not required to conform to a particular distribution for nonparametric analyses. Nonparametric tests are also robust against outliers and large data gaps.

Methods

STORET data were processed according to the following methods (in order of operation):

Total Nitrogen (TN) calculation

"Total Nitrogen" data were calculated for dates where both "Nitrate + Nitrite" and "Total Kjeldahl Nitrogen" data existed, but "Total Nitrogen" data did not. "Total Nitrogen" was calculated as the summation of "Total Kjeldahl Nitrogen" and "Nitrate + Nitrite." Methodology changes occurred in the POR for analyzing and determining TN. Specifically, the SFWMD changed its TN method from calculating TN as described above, to measuring TN directly. It should be noted that this methodology change could potentially affect the results and conclusions of the trend analyses. The results should be used with caution due to the changes in analytical methodologies.

Sample Depth

If "surface water," "midwater," and "bottom" samples were collected at a station for the same parameter on the same day, then only the "surface water" sample was retained for analysis.

Only surface samples, which included samples collected at depths less than 1 meter (m), were used in the analyses.

Data Qualifiers

Data with result qualifiers of "A," "F," "G," "H," "J," "K," "L," "N," "O," "T," "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 per guidance from Kevin O'Donnell in the DEP Water Assessment Standards program.

Data with a result qualifier of "I" were only used if a corresponding minimum detection level (MDL) was listed.

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 Rule 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 Frequency

Temporal independence was evaluated by assessing the frequency with which samples were collected at the same station within the same day and/or over a period that represents temporal independence. Per Chapter 62-303, F.A.C., if samples were collected on the same day at the same site station, those samples were not considered temporally independent and were averaged by station.

In addition, per Chapter 62-303, F.A.C., to be treated as temporally independent, samples must be collected at least four days apart.

Temporal independence was established by ensuring that samples were collected more than four days apart. If samples were collected within a four-day period at the same station, then a median value was calculated for samples collected within a four-day period at the same station (per Chapter 62-303.320[4][a], F.A.C.).

Field replicate and field blank samples were not used in the analysis.

Results

C25S50 Station

Data for Station C25S50 (upstream of Weir S50 on C-25) were processed for the period between 2000 and 2016. Processed data were analyzed for statistical trends using the Seasonal Mann-Kendall trend analysis. No significant trends for TN or TP ($p > 0.05$) were evident. The median TP concentration was 0.14 mg/L, and the median TN concentration was 1.19 mg/L.

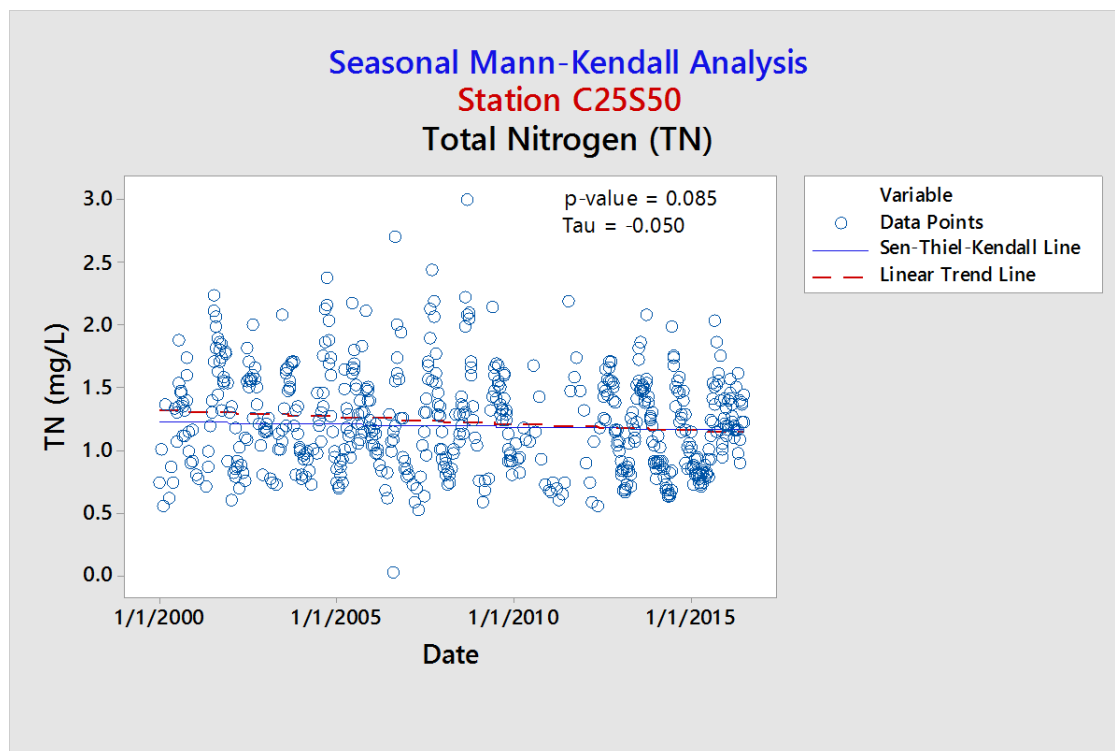


Figure B-1. Station C25S50 TN trend analysis results

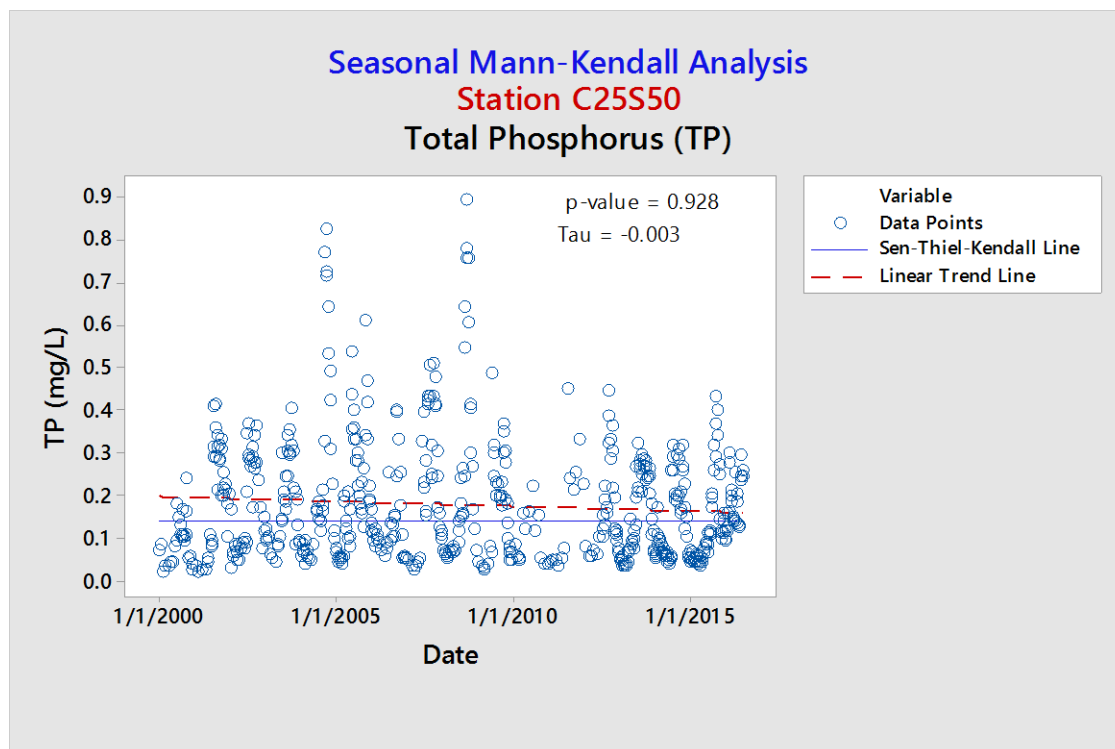


Figure B-2. Station C25S50 TP trend analysis results

FPF – Site 1 through 5 Stations

Five FPF stations have a limited POR spanning just over 4 years from January 2013 through January 2017. Seasonal Mann-Kendall trend analyses for these stations were performed for discussion using a quarterly distribution. Only the Site 1 station exhibited an increasing TN concentration trend ($p < 0.05$). No other significant TN or TP concentration trends were identified. **Table B-1** lists median TN and TP concentrations.

Table B-1. Median TN and TP concentrations at FPF stations

Station Name	Median TN Concentration (mg/L)	Median TP Concentration (mg/L)
FPF – Site 1	0.61	0.17
FPF – Site 2	0.73	0.05
FPF – Site 3	0.81	0.15
FPF – Site 4	0.99	0.13
FPF – Site 5	0.63	0.10

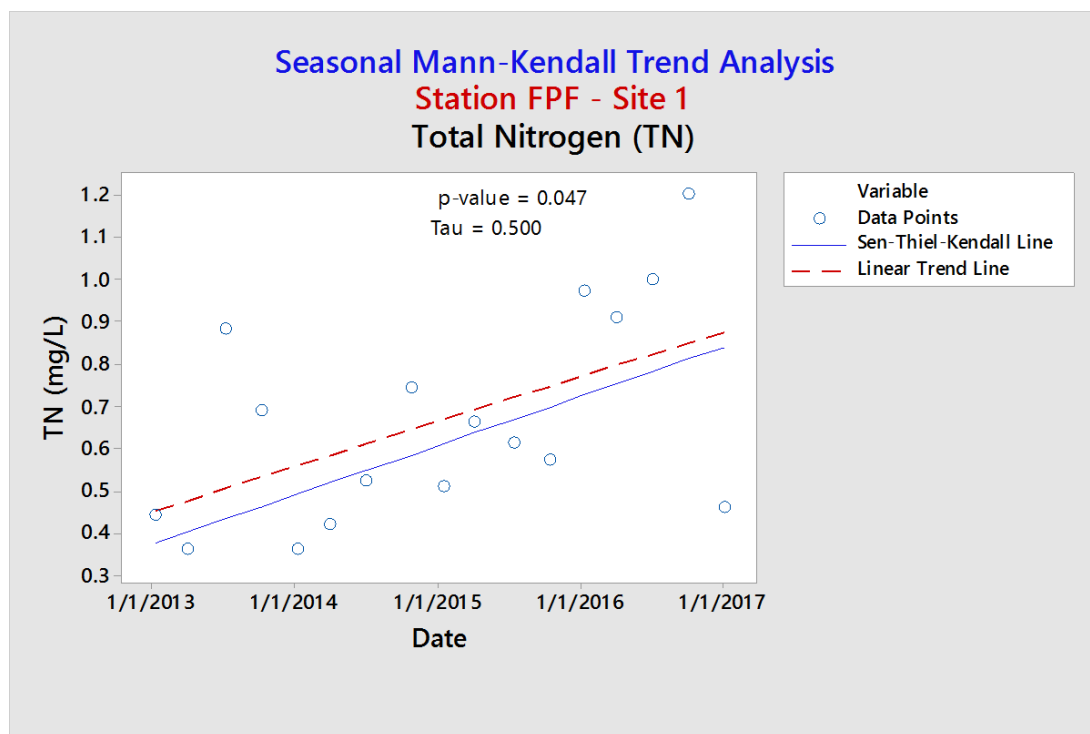


Figure B-3. Station FPF-SITE 1 TN trend analysis results

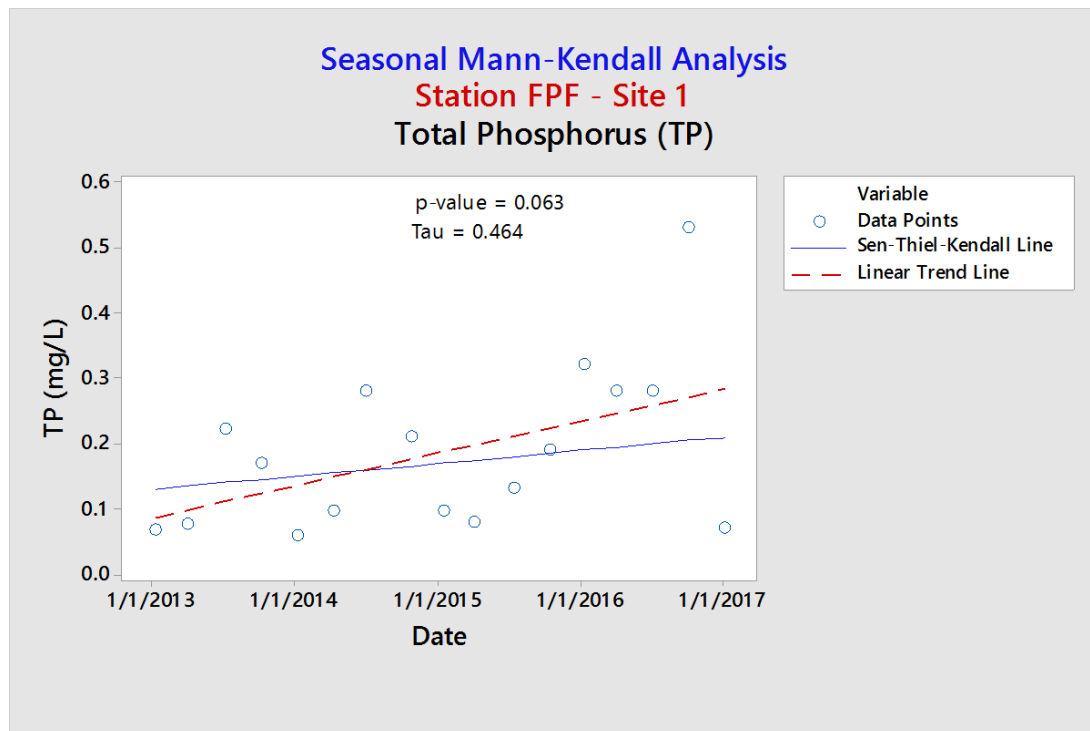


Figure B-4. Station FPF-SITE 1 TP trend analysis results

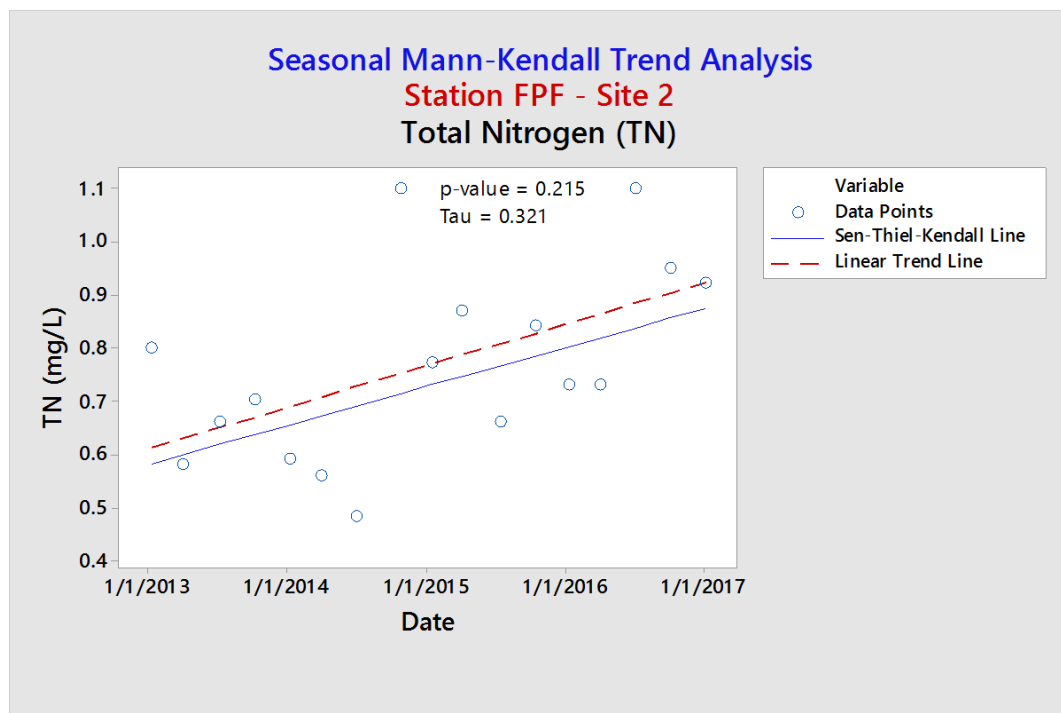


Figure B-5. Station FPF-SITE 2 TN trend analysis results

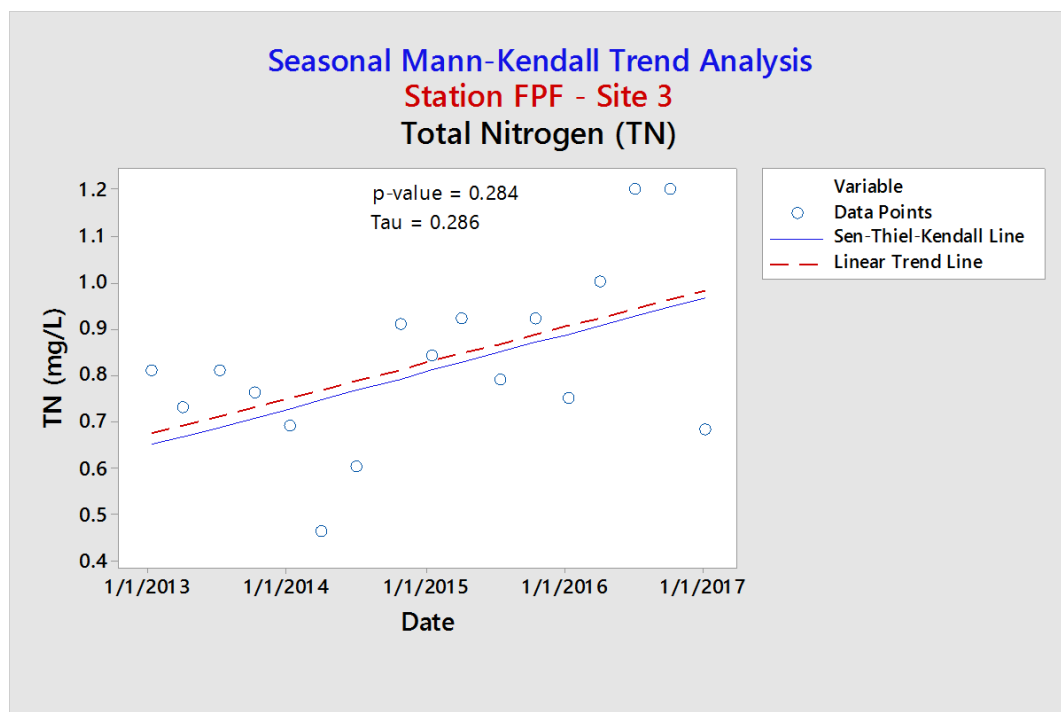


Figure B-6. Station FPF-SITE 3 TN trend analysis results

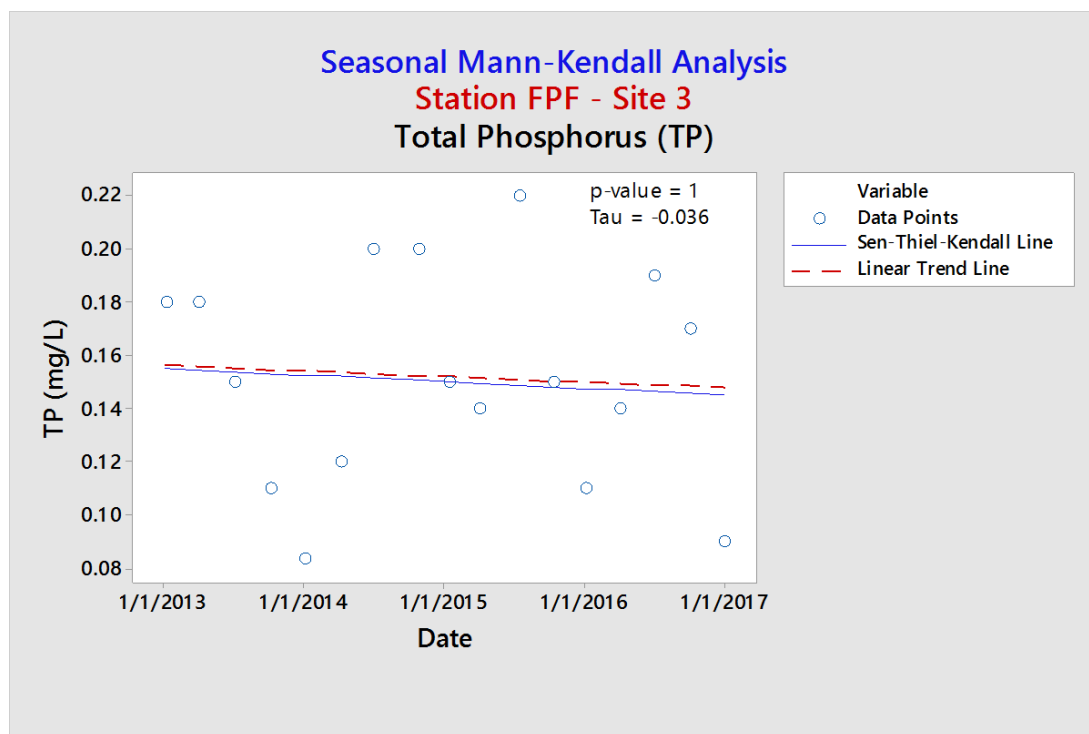


Figure B-7. Station FPF-SITE 3 TP trend analysis results

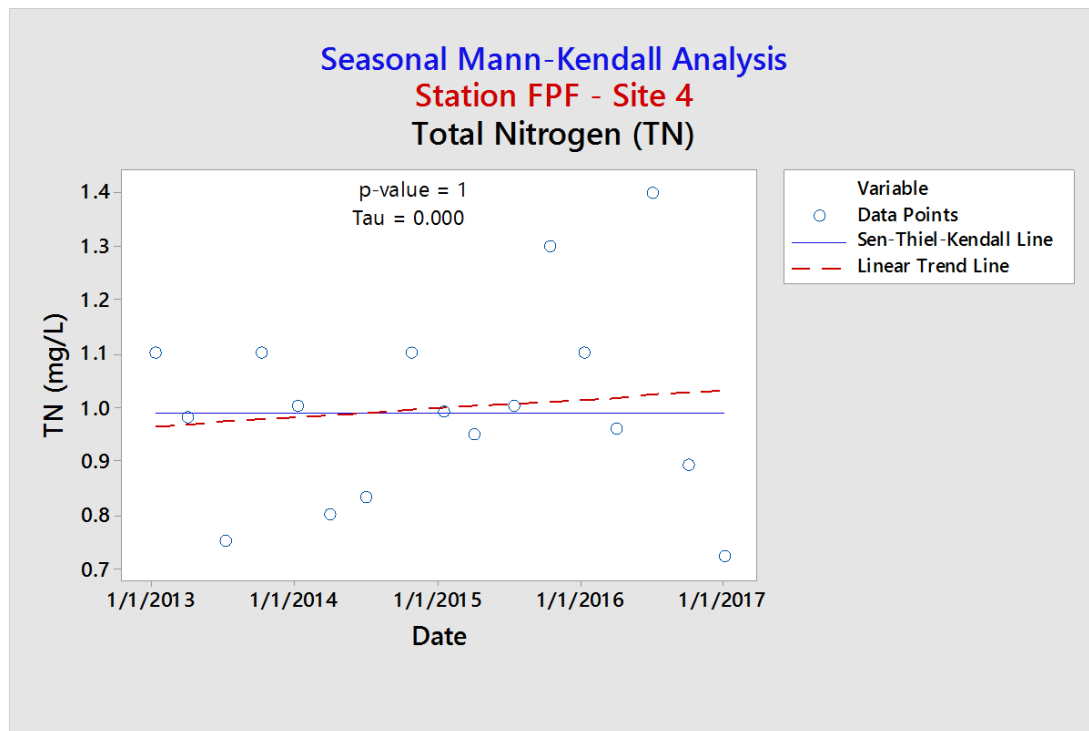


Figure B-8. Station FPF-SITE 4 TN trend analysis results

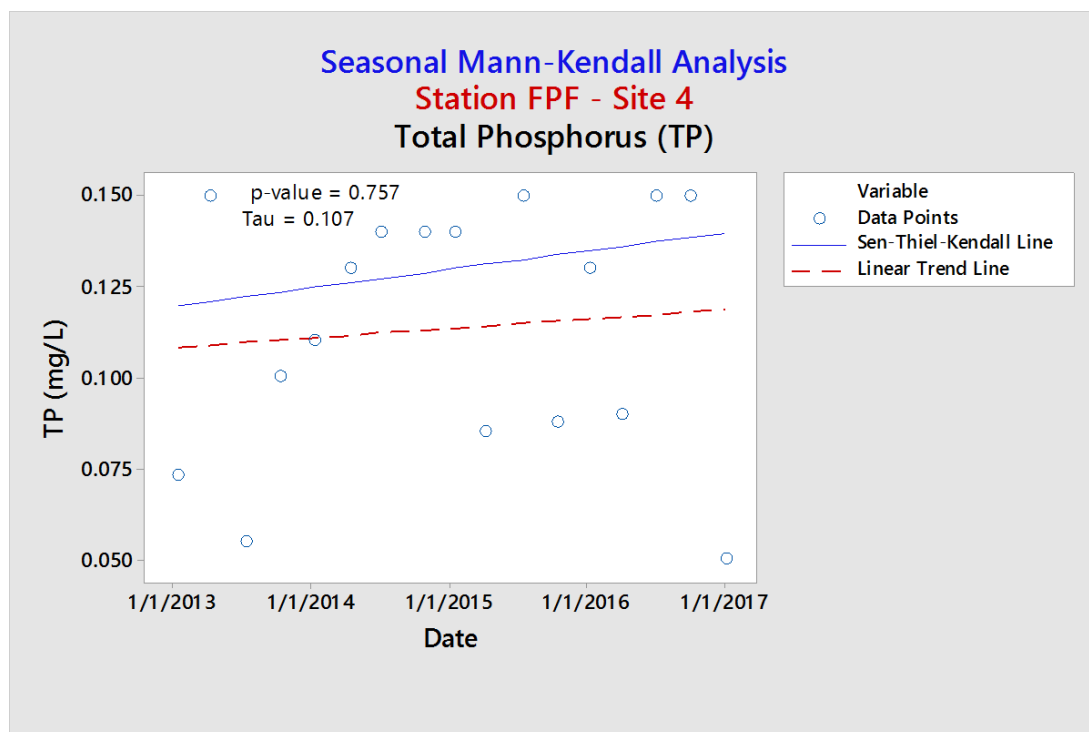


Figure B-9. Station FPF-SITE 4 TP trend analysis results

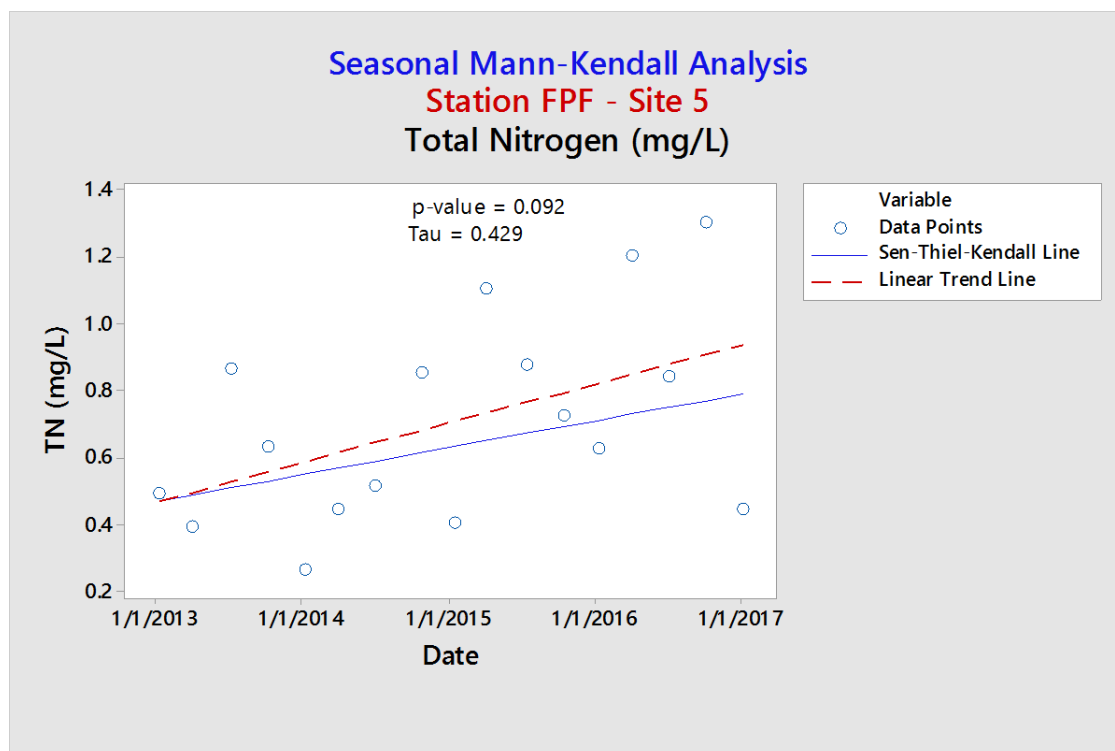


Figure B-10. Station FPF-SITE 5 TN trend analysis results

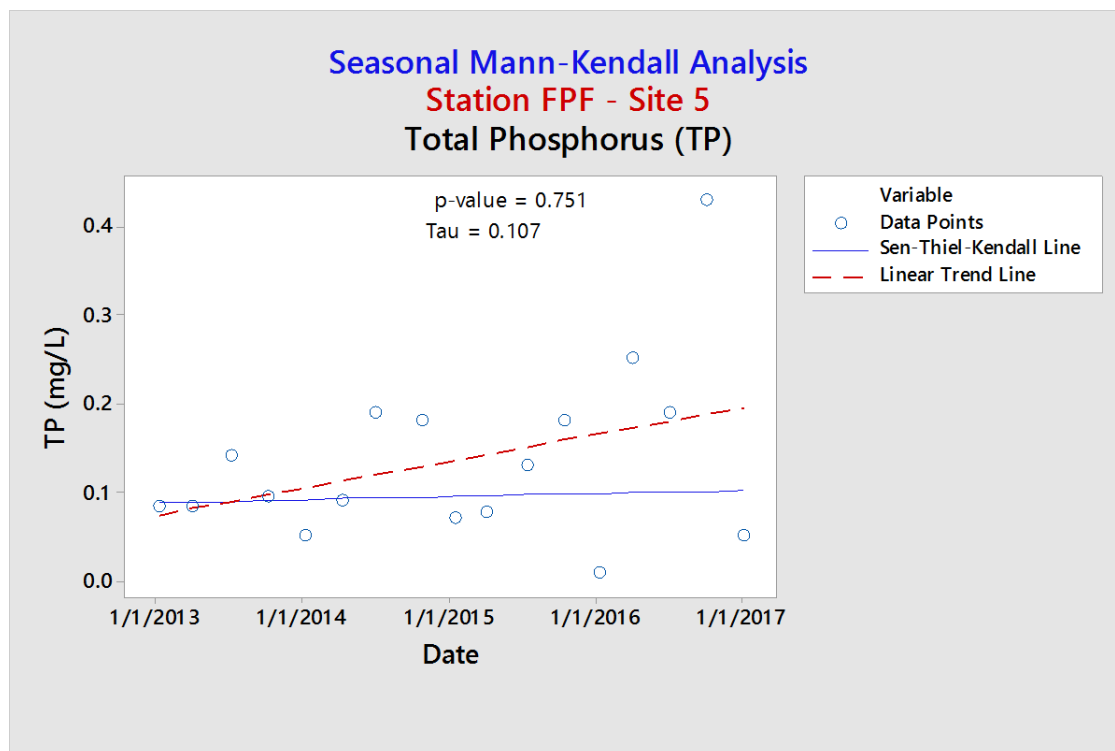


Figure B-11. Station FPF-SITE 5 TP trend analysis results

NSL Site 5 Station

Limited quarterly data exist for this station between 2013 and 2017. For discussion, Seasonal Mann-Kendall trend regression analyses were performed using a quarterly distribution. As mentioned previously, additional data points would be required to confidently support the results for stations that had fewer than 30 samples within a POR. Results from stations with fewer than 30 samples should be used with caution and for informational purposes only. No significant trends were evident for TN or TP ($p > 0.05$). Median TN concentration for the POR was 0.98 mg/L, and median TP concentration was 0.18 mg/L. However, a nonsignificant result could be caused by the lack of data.

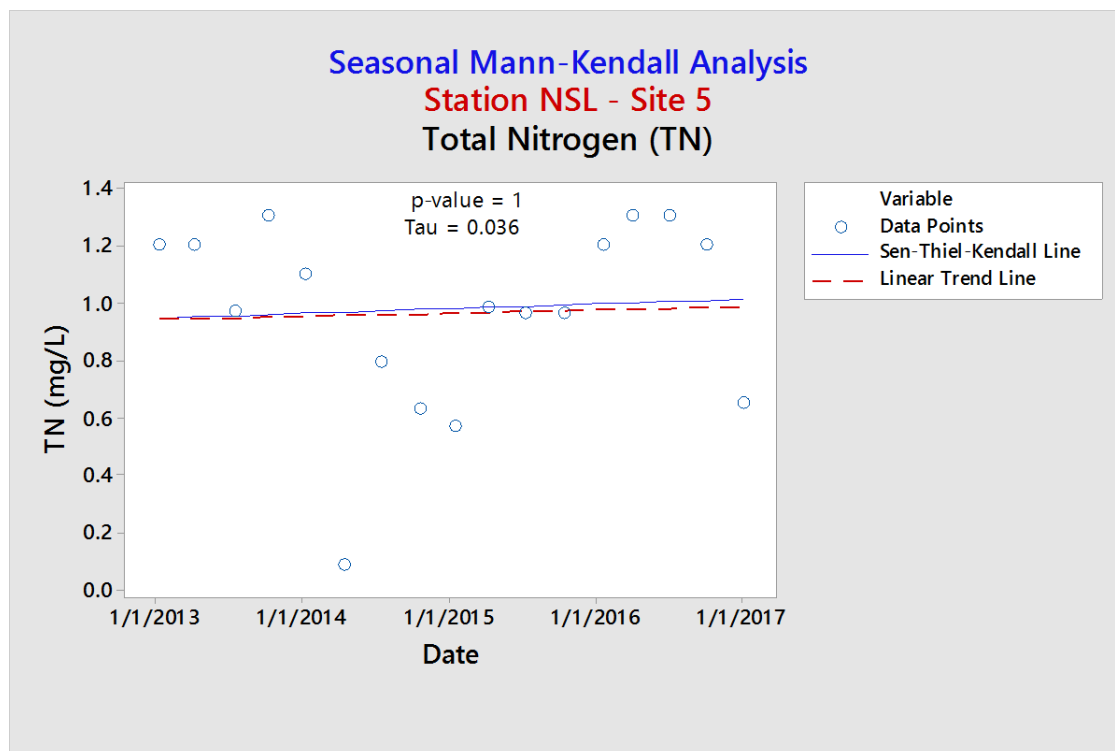


Figure B-12. Station NSL-SITE 5 TN trend analysis results

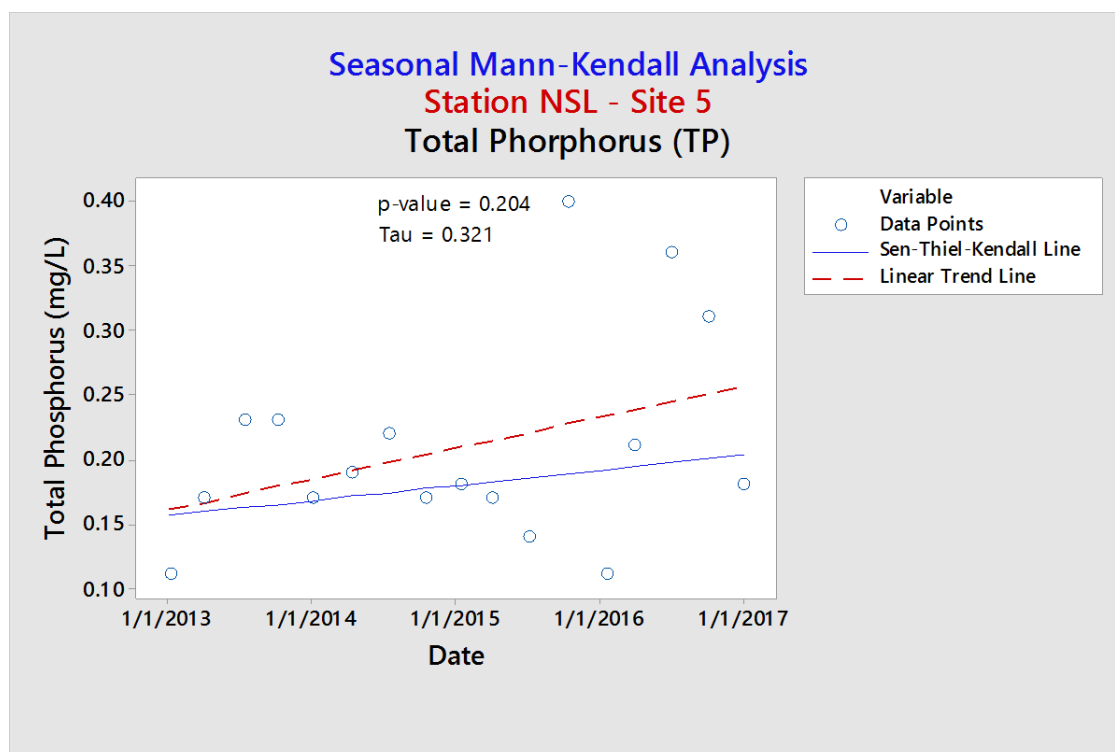


Figure B-13. Station NSL-SITE 5 TP trend analysis results