

2014 PROGRESS REPORT

for the North Indian River Lagoon Basin Management Action Plan

prepared by the
Division of Environmental Assessment and Restoration
Water Quality Restoration Program
Florida Department of Environmental Protection
Tallahassee, FL 32399

in cooperation with the
**North Indian River Lagoon Basin
Technical Stakeholders**

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This 2014 North Indian River Lagoon BMAP Progress Report 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 in cooperation with the North Indian River Lagoon stakeholders.



For additional information on the watershed management approach in the North Indian River Lagoon Basin, contact:

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LIST OF ACRONYMS AND ABBREVIATIONS

BMAP	Basin Management Action Plan
BMP	Best Management Practice
BRL	Banana River Lagoon
Department	Florida Department of Environmental Protection
FDACS	Florida Department of Agriculture and Consumer Services
FDOT	Florida Department of Transportation
FYN	Florida Yards and Neighborhood (Program)
GIS	Geographic Information System
IRL	Indian River Lagoon
lbs/yr	Pounds Per Year
LID	Low Impact Development
MAPS	Managed Aquatic Plant Systems
MS4	Municipal Separate Storm Sewer System
NASA	National Aeronautics and Space Administration
O&M	Operations and Maintenance
PLSM	Pollutant Load Screening Model
PSA	Public Service Announcement
SJRWMD	St. Johns River Water Management District
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
WBID	Waterbody Identification

SUMMARY

TOTAL MAXIMUM DAILY LOADS (TMDLS)

The North Indian River Lagoon (IRL) Basin Management Action Plan (BMAP) was adopted in February 2013 to implement the nutrient TMDLs within the watershed. The BMAP includes management strategies or projects that are to be implemented by the responsible entities. This 2014 Progress Report is the first annual progress report for the North IRL BMAP, and it describes the implementation activities that occurred during the reporting period from February 7, 2013 through February 28, 2014.

The total nitrogen (TN) and total phosphorus (TP) TMDLs for the main stem of the IRL Basin were adopted by the Florida Department of Environmental Protection in March 2009. The TMDLs focus upon the water quality conditions necessary for seagrass re-growth at water depth limits where seagrass historically grew in the basin, based on a multi-year composite of seagrass coverage. The median depth limits of seagrass coverage in the IRL Basin decreased over the years due to changes in water quality conditions resulting from human (anthropogenic) influences.

ACCOMPLISHMENTS DURING THE REPORTING PERIOD

During the reporting period, Brevard County completed one project, the City of Rockledge completed one project, the City of Titusville completed two projects, and Kennedy Space Center completed one project in the North A project zone. In the North B project zone, Brevard County completed two projects, the City of Melbourne completed one project, the City of Titusville completed two projects, and Kennedy Space Center completed one project.

In the North A project zone, these projects resulted in an estimated reduction of 1,849 pounds per year (lbs/yr) of TN and 543.4 lbs/yr of TP. These reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 27,838 lbs/yr of TN and 8,544.2 lbs/yr of TP, which are greater than the required reductions in the first BMAP iteration of 14,802.1 lbs/yr of TN and 2,900.3 lbs/yr of TP. In the North B project zone, these projects resulted in an estimated reduction of 4,911 lbs/yr of TN and 2,716.1 lbs/yr of TP. These reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 36,835 lbs/yr of TN and 13,213 lbs/yr of TP, which are greater than the required reductions in the first BMAP iteration of 18,477.3 lbs/yr of TN and 4,908.3 lbs/yr of TP.

The progress towards the TMDL load reductions in the North A project zone for TN and TP are shown in **Figure ES-1** and **Figure ES-2**, respectively, and for the North B project zone in **Figures ES-3** and **Figure ES-4**.

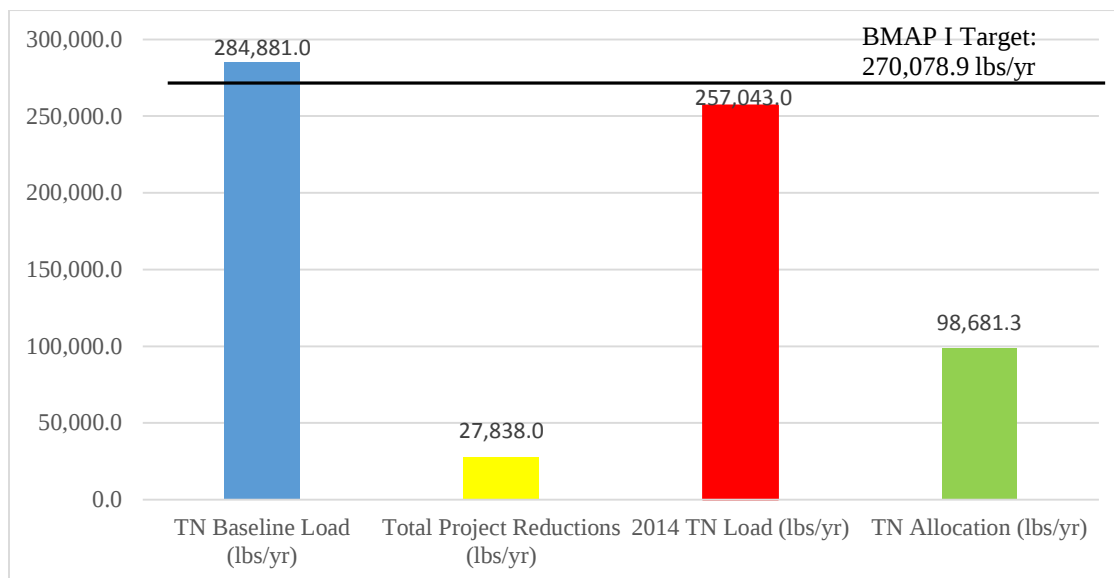


FIGURE ES-1: PROGRESS TOWARDS THE NORTH A PROJECT ZONE TN TMDL THROUGH FEBRUARY 28, 2014

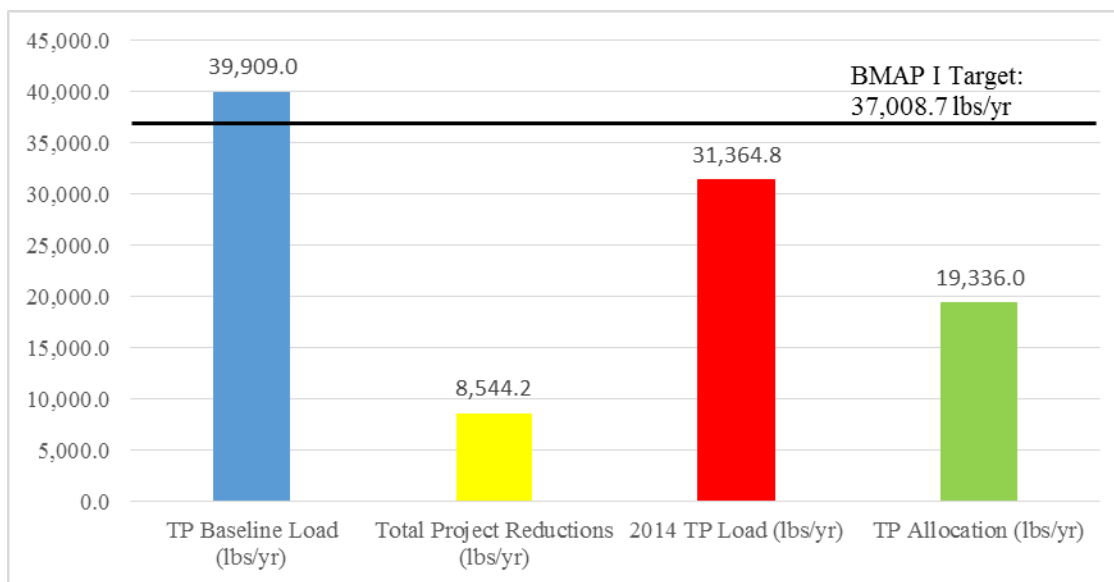


FIGURE ES-2: PROGRESS TOWARDS THE NORTH A PROJECT ZONE TP TMDL THROUGH FEBRUARY 28, 2014

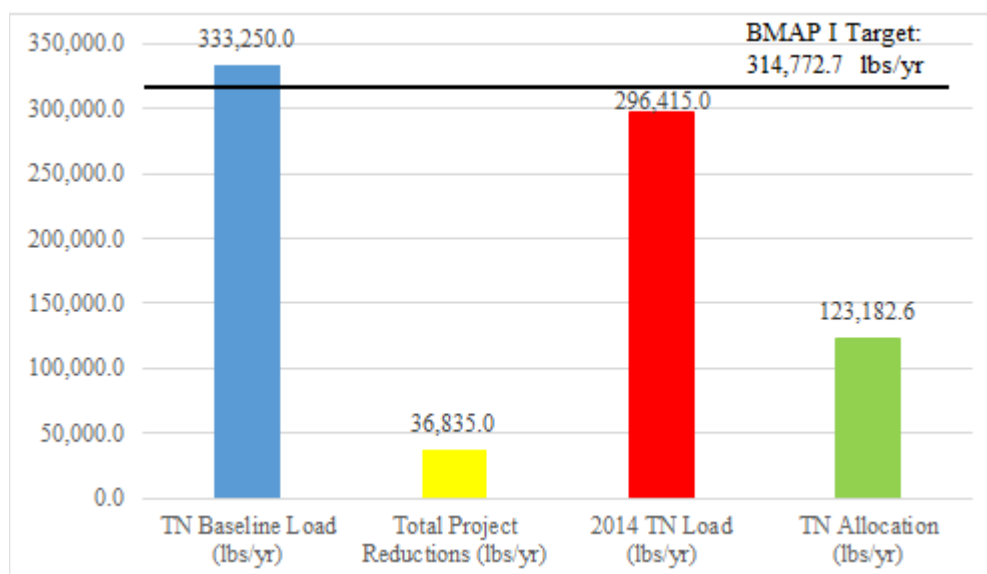


FIGURE ES-3: PROGRESS TOWARDS THE NORTH B PROJECT ZONE TN TMDL THROUGH FEBRUARY 28, 2014

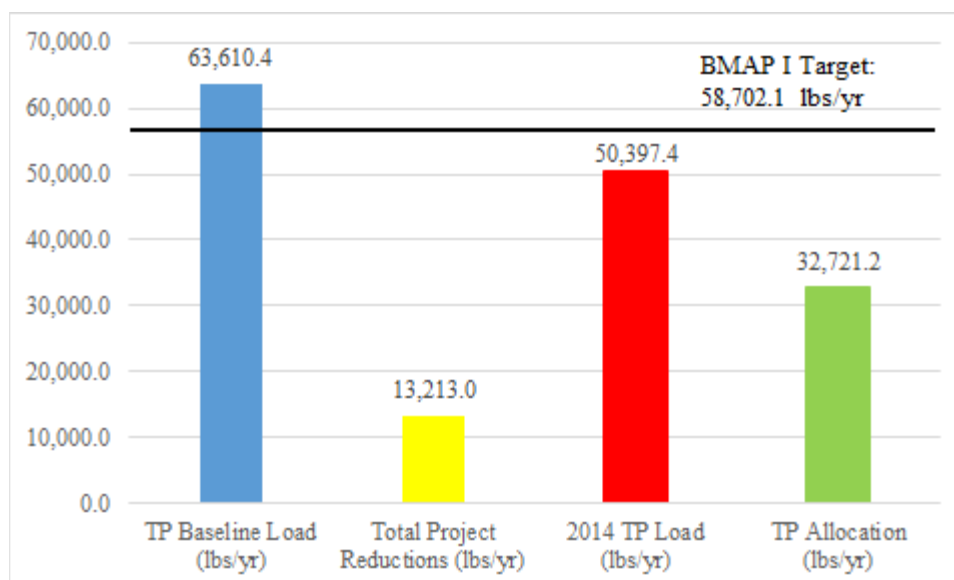


FIGURE ES-4: PROGRESS TOWARDS THE NORTH B PROJECT ZONE TP TMDL THROUGH FEBRUARY 28, 2014

SEAGRASS TARGET EVALUATION

The intent of the IRL Basin TMDLs is to recover the deeper water seagrass habitats, with the biological response of the seagrass being the most important factor in evaluating success in achieving TMDL targets. To assess progress for the IRL Basin towards the median seagrass depth limit target, a two-step process was used. Step 1 is a seagrass frequency distribution analysis and Step 2 is a median seagrass depth evaluation. If seagrass in a project zone passes both evaluation steps, no nutrient reductions are required by the stakeholders in that project zone. The Department recently conducted this two-step evaluation using seagrass data from 2006, 2007, 2009, and 2011, which were the latest datasets available at the time

of the analysis. Based on this time period, neither the North A nor North B project zones were Step 1 compliant nor Step 2 compliant. The seagrass deep edge medians for 2011 did decline from the previous 2009 mapping event with the super bloom of algae appearing at the same time. Therefore, BMAP reductions will continue to work towards achieving the seagrass depth limit targets.

The results of 2013 seagrass mapping are expected to be complete by the end of summer or early fall 2014. The median values for 2013 and composite frequency distribution for 2007, 2009, 2011, and 2013 will then be compared to the TMDL targets to determine the status of seagrass restoration.

Algal blooms have continued to be a problem in the IRL since 2011, and they have resulted in loss of seagrass acreage. The St. Johns River Water Management District began their response to the blooms through the IRL Initiative in spring 2013 with a series of research and data collection investigations into potential causes of the blooms. The understanding gained through the Initiative is expected to aid in defining the future actions of the BMAP.

Section 1: INTRODUCTION

1.1 PURPOSE OF THE REPORT

This is the first annual progress report for the North Indian River Lagoon (IRL) Basin Management Action Plan (BMAP). **Section 2** describes the accomplishments during the period from February 7, 2013 through February 28, 2014. **Section 3** summarizes the evaluation of progress towards the seagrass depth limit targets. A summary of efforts for the upcoming year (March 1, 2014 through February 28, 2015) and management strategies for the second BMAP iteration are included in **Section 4**.

Prior to the adoption of the North IRL BMAP in 2013, extended duration algal super blooms were occurring in the IRL. The blooms resulted in large losses of seagrass acreage, and which are reflected in the 2011 seagrass mapping data. The St. Johns River Water Management District (SJRWMD) began the IRL Initiative in spring 2013 in response to the blooms with a series of research and data collection investigations into the causes of the blooms. The understanding gained through the Initiative is expected to aid in defining the future direction of the BMAP.

1.2 TOTAL MAXIMUM DAILY LOADS FOR THE NORTH IRL SUBBASIN

Due to the large geographical extent of the IRL Basin and the diversity of hydrological characteristics throughout the basin, the Florida Department of Environmental Protection divided the watershed into three subbasins: (1) North IRL, (2) Central IRL, and (3) Banana River Lagoon (BRL). Separate BMAPs were developed for each subbasin; this document focuses solely on the North IRL subbasin. The main stem of the North IRL subbasin extends from Turnbull Creek to the Melbourne Causeway. For assessment purposes, the Department has divided the North IRL subbasin into water assessment polygons with a unique waterbody identification (WBID) number for each watershed or segment.

In addition to dividing the overall IRL Basin into subbasins, the North IRL was further divided into “project zones.” The project zone boundaries are based upon the distinct hydrology in different areas of the basin and their corresponding annual residence times. These zones are important because the 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 North IRL subbasin was split into two project zones as follows:

- North A – Turnbull Creek to National Aeronautics and Space Administration (NASA) Causeway (State Road 405).
- North B – NASA Causeway to Melbourne Causeway (U.S. 192).

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

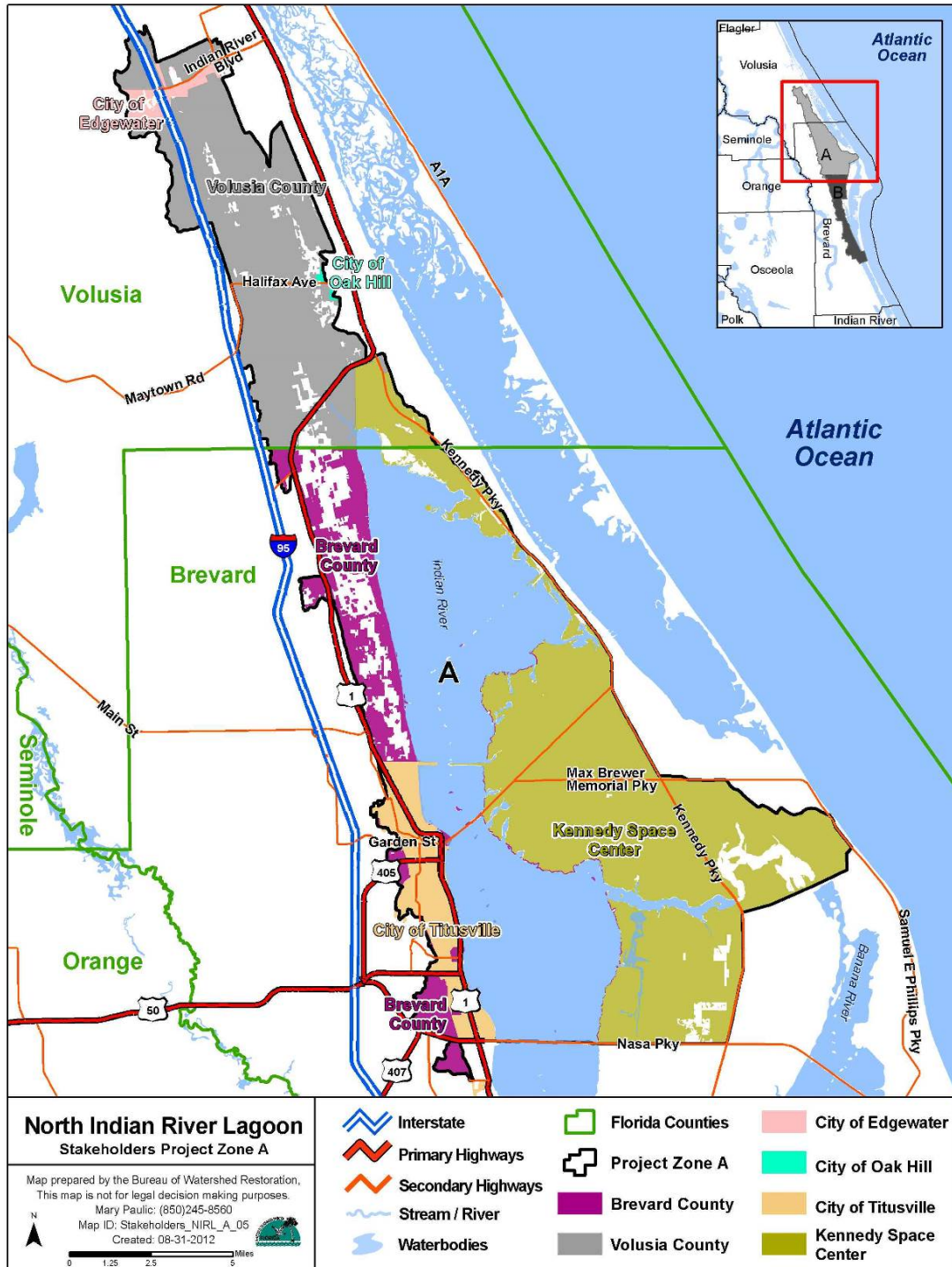


FIGURE 1: ENTITIES IN THE NORTH A PROJECT ZONE

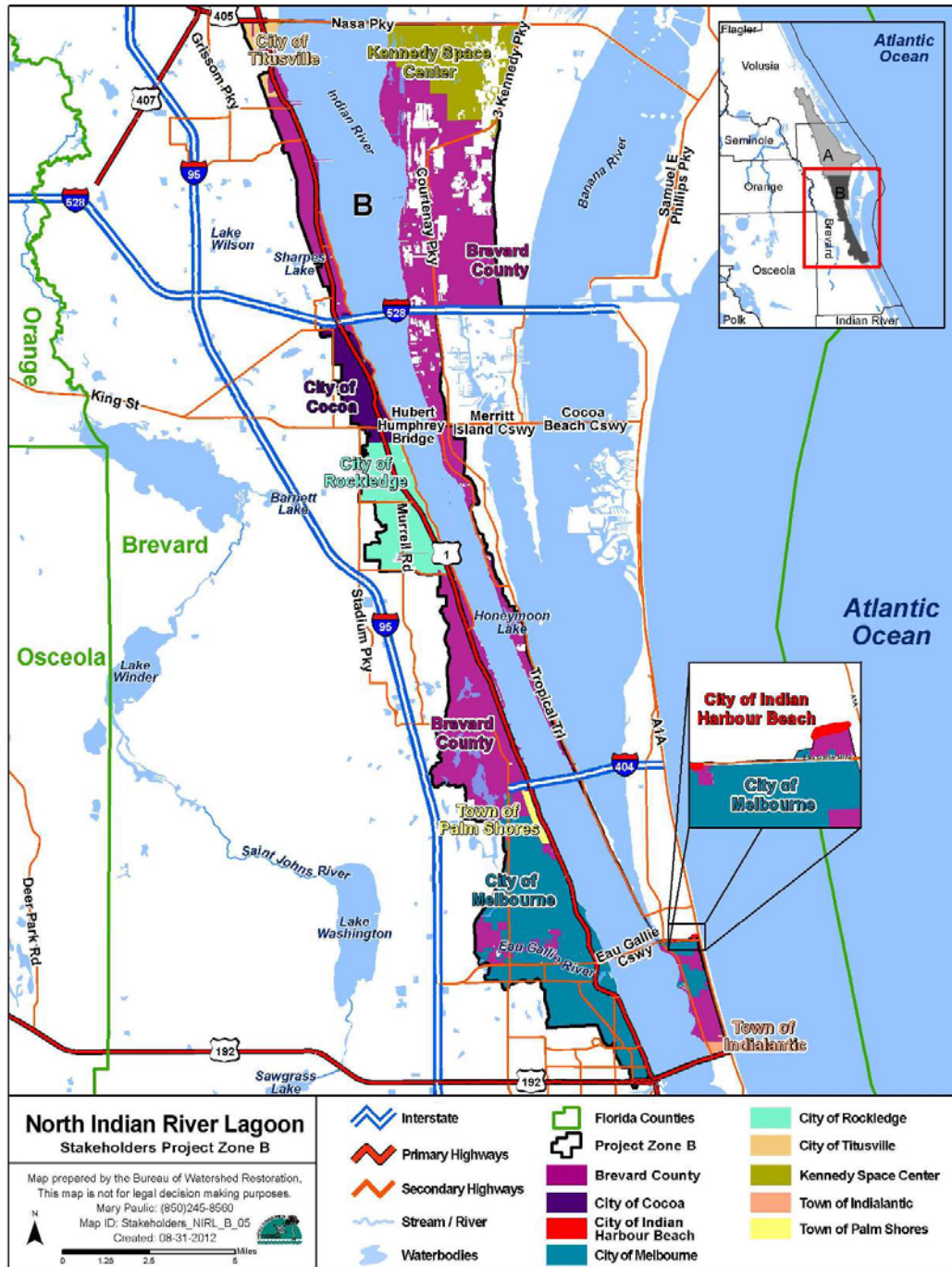


FIGURE 2: ENTITIES IN THE NORTH B PROJECT ZONE

The total nitrogen (TN) and total phosphorus (TP) total maximum daily loads (TMDLs) for the IRL Basin were adopted by the Department in March 2009. The TMDLs focus on the water quality conditions necessary for seagrass re-growth at depth limits that seagrass historically grew in the basin based on a multi-year composite of seagrass coverage. The median depth limits for seagrass coverage in the North

IRL subbasin decreased over the years due to changes in water quality conditions resulting from anthropogenic influences. **Table 1a** and **Table 1b** list the TN and TP TMDLs and pollutant load allocations, respectively, adopted by rule for the North IRL subbasin.

TABLE 1A: TN TMDLs IN THE NORTH IRL SUBBASIN

WBID NUMBER	WBID NAME	PROJECT ZONE	PARAMETER	TMDL (POUNDS PER YEAR [LBS/YR])	WASTEWATER FACILITIES ALLOCATION (LBS/YR)	STORMWATER ALLOCATION (LBS/YR)	ATMOSPHERIC DEPOSITION ALLOCATION (LBS/YR)
2963F	Indian River above Max Brewer	North A	TN	177,220	N/A	88,322	88,898
2963E	Indian River above NASA Causeway	North A	TN	173,232	N/A	95,932	77,300
2963D	Indian River above 520 Causeway	North B	TN	147,524	8,111	73,882	65,531
2963B+2 963C	Indian River above Melbourne Causeway	North B	TN	189,068	9,200	114,458	65,410
TN Total	North IRL TN Total	N/A	TN	687,044	17,311	372,594	297,139

TABLE 2B: TP TMDLs IN THE NORTH IRL SUBBASIN

WBID NUMBER	WBID NAME	PROJECT ZONE	PARAMETER	TMDL (LBS/YR)	WASTEWATER FACILITIES ALLOCATION (LBS/YR)	STORMWATER ALLOCATION (LBS/YR)	ATMOSPHERIC DEPOSITION ALLOCATION (LBS/YR)
2963F	Indian River above Max Brewer	North A	TP	9,320	N/A	7,307	2,013
2963E	Indian River above NASA Causeway	North A	TP	14,793	N/A	13,042	1,751
2963D	Indian River above 520 Causeway	North B	TP	11,845	1,609	8,752	1,484
2963B+2 963C	Indian River above Melbourne Causeway	North B	TP	20,592	225	18,886	1,481
TP Total	North IRL TP Total	N/A	TP	56,550	1,834	47,987	6,729

1.3 RESPONSIBLE PARTIES AND KEY STAKEHOLDERS

The North IRL BMAP identified municipal separate storm sewer systems (MS4s), urban nonpoint, and agricultural sources of TN and TP in the basin. Those entities that are responsible for achieving the load reductions are:

- *Agriculture.*
- *Brevard County.*
- *Volusia County.*
- *City of Cocoa.*

- *City of Edgewater.*
- *City of Indian Harbour Beach.*
- *City of Melbourne.*
- *City of Oak Hill.*
- *City of Rockledge.*
- *City of Titusville.*
- *Florida Department of Transportation (FDOT) District 5.*
- *Kennedy Space Center.*
- *Town of Indian River.*
- *Town of Palm Shores.*
- *Town of Melbourne Village.*

In addition to these entities, the Florida Department of Agriculture and Consumer Services (FDACS), the Department, and SJRWMD are essential to the implementation of the BMAP activities.

1.4 BMAP ALLOCATIONS

The stakeholders determined that assigning detailed allocations was the best approach for achieving the TMDL reductions. The acreage and loading information for each stakeholder was calculated using output from the Pollutant Load Screening Model (PLSM). Each entity's baseline loadings for TN and TP were calculated using information from the PLSM. In the North A project zone, Oak Hill was determined to be *de minimus* because the TN and TP loads were less than 0.1% of the total loads in North. In the North B project zone, Indian Harbour Beach and Palm Shores are *de minimus* because the TN and TP loads are approximately 0.5% of the total loads in North B.

For the stakeholders that received allocations, the allowable loadings were calculated using a target load per acre for TN and TP. These target loads per acre were multiplied by each entity's acreage in the basin to determine the allowable loading. The difference between the baseline loading and the allowable loading resulted in each entity's required reductions.

The BMAP provides for phased implementation, which allows for the implementation of projects designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to

better understand the water quality dynamics in the watershed. The total required reductions from the TMDLs are spread over a 15-year timeframe. The first BMAP iteration addresses 15% of the allocated reductions over a five-year period. The North IRL BMAP identified a list of considerations that could be addressed before the second iteration to help improve allocations. Many of these considerations were improvements to the model, which is why 15% of the required reductions was selected as the target for the first iteration. The required reductions in the North A and North B project zones for the first BMAP iteration are shown in **Table 2** and **Table 3**, respectively.

TABLE 3: TN AND TP REQUIRED REDUCTIONS FOR THE FIRST BMAP ITERATION IN THE NORTH A PROJECT ZONE

PERMITTEE	BMAP I TN REQUIRED REDUCTIONS (LBS/YR)	BMAP I TP REQUIRED REDUCTIONS (LBS/YR)
Agriculture	5,596.6	1,028.8
Brevard County	2,180.0	281.9
City of Edgewater	24.3	0.0
City of Titusville	6,604.6	1,447.6
FDOT District 5	396.6	142.0
Kennedy Space Center	0.0	0.0
Volusia County	0.0	0.0

TABLE 4: TN AND TP REQUIRED REDUCTIONS FOR THE FIRST ITERATION IN THE NORTH B PROJECT ZONE

PERMITTEE	BMAP I TN REQUIRED REDUCTIONS (LBS/YR)	BMAP I TP REQUIRED REDUCTIONS (LBS/YR)
Agriculture	1,096.7	444.7
Brevard County	5,298.7	995.3
City of Cocoa	2,409.5	557.2
City of Melbourne	6,738.5	1,968.4
City of Rockledge	2,095.4	593.6
City of Titusville	46.7	0.0
FDOT District 5	649.4	318.9
Kennedy Space Center	0.0	0.0
Town of Indialantic	142.4	30.1

Section 2: ACCOMPLISHMENTS DURING THE REPORTING PERIOD

During the reporting period, Brevard County completed one project, the City of Rockledge completed one project, the City of Titusville completed two projects, and Kennedy Space Center completed one project in the North A project zone. These projects resulted in an estimated reduction of 1,849 lbs/yr of TN and 543.4 lbs/yr of TP. In the North B project zone, Brevard County completed two projects, the City of Melbourne completed one project, the City of Titusville completed two projects, and Kennedy Space Center completed one project. These projects resulted in an estimated reduction of 4,911 lbs/yr of TN and 2,716.1 lbs/yr of TP.

The accomplishments over the past year are described in **Section 2.1** through **Section 2.5**, and the individual project tables are included in **Appendix A**.

2.1 ACTIVITIES BY ENTITY

2.1.1 BREVARD COUNTY

Brevard County completed the Chain of Lakes Southern Expansion (Project BC-5) during the reporting period. This project expanded an existing system of stormwater ponds and created a new connection to treat stormwater flows from the Cone Road ditch, which previously outflowed directly to the IRL. This project was made possible by public-private collaborations between Brevard County, Titusville, Parish Medical Center, Brevard Community College, and SJRWMD. Land acquisition, permitting and design cost approximately \$2 million. The original Chain of Lakes system was constructed for \$2.9 million. A TMDL grant was secured to cost share some of the southern expansion construction costs and recreational amenities were funded by Brevard County Parks and Recreation. Construction was completed in mid-2013; however, grant required monitoring and outreach will continue into fiscal year 2014-2015.

The County completed the Florida Boulevard Managed Aquatic Plant System (MAPS) (Project BC-28). This project installed a floating vegetated island in an existing 2.4-acre stormwater retention pond to provide additional nutrient removal for a 170-acre drainage basin that discharged stormwater into the BRL (see **Figure 3**). The project is located east of Courtenay Parkway (State Road 3), south of Sykes Loop Drive and north of State Road 520 and Diana Boulevard in unincorporated Central Merritt Island. The floating island was installed in mid-2013; however, grant-required monitoring and outreach will extend into fiscal year 2013-2014.



FIGURE 3: BREVARD COUNTY FLORIDA BOULEVARD MAPS

The county also completed the Fountainhead Aquatic Vegetation Harvesting (Project BC-58), which was a pilot project for removing nutrients from a pond and canal by harvesting the dense growth of aquatic weeds. Typically, aquatic weeds at this location are controlled through herbicide use, which kills the vegetation in place and leads to decay, release of nutrients, and organic muck build-up. This successful pilot project was made possible by partnership with the City of Melbourne, Brevard County Public Works, and Brevard County Solid Waste.

Brevard County continued its work on Pine Island Phase I and II (Project BC-24). This project will improve water quality and reduce the duration of flooding within the North Merritt Island drainage basin, which includes a portion of the North IRL and BRL. The project was divided into two phases to modify each of two existing borrow pits. The land is owned jointly by SJRWMD and the Brevard County Environmentally Endangered Lands program. Phase I involved expansion and re-grading of the north borrow pit, installation of the first pump, and fabrication of a diversion weir within the Pine Island Road ditch to redirect stormwater runoff into the borrow pit for water quality treatment (see **Figure 4** through **Figure 6**). The Department, through Section 319 and TMDL grant funding, provided \$1,380,000 in grant funding towards Phase I of the project. Phase I construction was completed in September 2012. The Phase II portion of the North Merritt Island Pine Island Improvements will provide additional storage for water quality treatment and flood control. Phase II construction includes expanding and excavating the south borrow pit and installation of two more pumps to divert additional flow to the pits from the Pine Island Road drainage ditch. The Department awarded the county with an \$800,000 Section 319 grant for Phase II of the project. Phase II construction began in late fall 2013 with completion anticipated in the fall 2014.



FIGURE 4: BREVARD COUNTY PINE ISLAND PROJECT UNDER CONSTRUCTION



 727.520.8181
www.aerophoto.com

Pine Island

Image # 140212 0081
Date 02.12.14

FIGURE 5: BREVARD COUNTY COMPLETED PINE ISLAND PHASE I PROJECT



FIGURE 6: BREVARD COUNTY SAMPLING OF THE PINE ISLAND PROJECT

The county has continued working on the baffle box retrofits at Haverhill Avenue (Project BC-36), Manth Avenue (Project BC-37), Alamanda (Project BC-39), Rivershore #1848 (Project BC-40), Rivershore #1925 (Project BC-41), Cedar Lane (Project BC-42), Oak Ridge (Project BC-45), Lucas Place (BC-33), Indian River Isles (BC-34), McGiver South (BC-56), and 651 Frankyn (BC-57) in the North IRL. To reduce nutrient loading from organic decay, 17 1st generation baffle boxes located county-wide are currently being retrofitted with nutrient removal screens that separate organic debris from the sediment and hold it up out of the water. The screens trap leaves and grass clippings that release nutrients as they decay.

Brevard County continued its education efforts (Projects BC-3 and B-23) during the reporting period. Stormwater outreach is a vital component of the county's watershed management program. The county works to engage the community in activities that reduce pollutant loads at the source, as well as projects that remove pollutants that have already entered the lagoon. Programs incorporate hands-on activities like rain barrel workshops, Florida Yard and Neighborhood (FYN) workshops, oyster gardening, as well as interactive presentations with homeowner associations, civic clubs, and school groups. The county constantly seeks creative approaches to lead the community in best management practices (BMPs) that protect the county's precious waterbodies. Outreach is conducted by the county's in-house stormwater outreach specialist and through a contracted program, Blue Life. Brevard County leads a Blue Life partnership with nine participating jurisdictions, the Brevard Zoo, and Good Education Solutions. This Blue Life partnership provides messaging across jurisdictions, improves cost effectiveness, and provides a venue for volunteers to assist in this community matter. Outreach conducted county-wide (North IRL, Central IRL, and BRL) during the first year of the BMAP includes six categories:

- *Outreach to Children: 118 presentations to 2,803 children.*
- *Outreach to Adults: 40 presentations to 2,185 people.*
- *Outreach at Special Events: 16 events, 7,167 people.*
- *Florida Stormwater Erosion and Sedimentation Control for the Construction Industry: 3 classes, 124 attendees.*
- *Pollution Prevention Employee Training: 21 training sessions, 421 employees.*
- *Public Engagement Projects: 20 events, 633 volunteers, 1,202 hours.*

The county also continued its street sweeping in the basin (Project BC-22). In year one of the BMAP, county staff reviewed road data sheets to estimate that there are 1,062 miles of county roadway that are constructed with curb and gutter. Street sweeping is currently conducted annually on 386 lane miles, or about 36% of the county's 2,125 miles of curb lanes, at a cost of about \$22,000. Staff has recommended that 100% of curb lanes should be swept eight times annually at an approximate cost of \$250,000. It is estimated that this increase in street sweeping coverage and frequency would increase nitrogen load reduction from an estimated 7,333 lbs/yr to 83,548 lbs/yr in all three BMAP areas.

The county also continued its BMP cleanout (Project BC-47). Baffle box/sediment trap cleaning is currently conducted annually. This equates to about 667 lbs/yr of TN removed county-wide. It is recommended that the county increase cleaning frequency to quarterly to remove approximately 2,667 lbs/yr of TN.

Scottsmoor I (Project BC-4) has been delayed from 2013 to 2016, Johnson Junior High MAPS (Project BC-27) has been delayed from 2012 to 2015, and Port St. John B MAPS Project (BC-30) has been delayed from 2013 to 2016. However, these projects will still be completed within the five-year BMAP iteration and the county has already achieved its first iteration reductions.

2.1.2 CITY OF COCOA

The City of Cocoa has contracted with Quentin L. Hampton Associates to assist with BMAP compliance. The city's best stormwater management success story has been the Bracco Reservoir (Projects CC-1, CC-2, and CC-9) (see **Figure 7**).

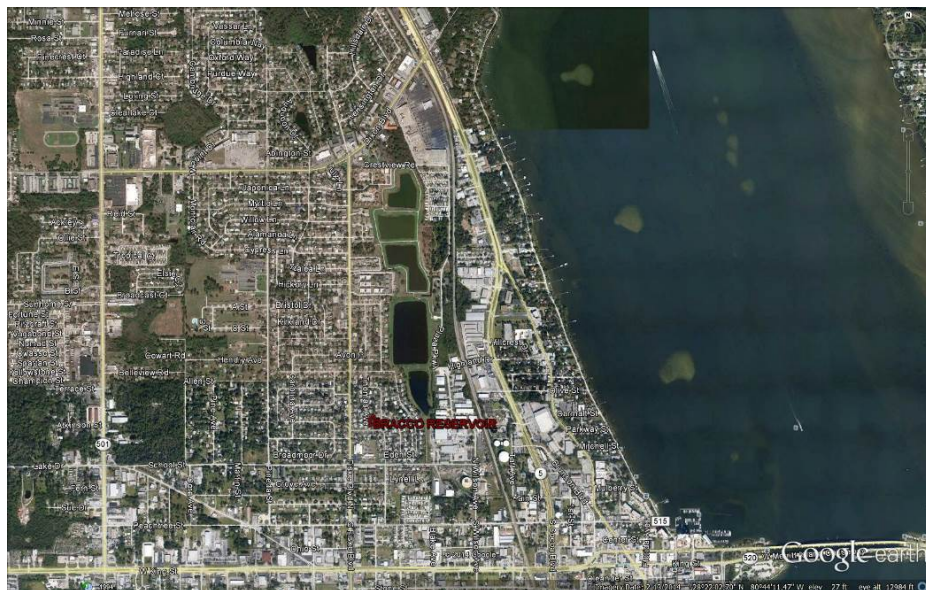


FIGURE 7: CITY OF COCOA BRACCO RESERVOIR

2.1.3 CITY OF EDGEWATER

The City of Edgewater continued its public education and outreach efforts (Project EW-1) (see **Figure 8**). These efforts include utilizing the city newsletter, “Edgewater Shorelines,” to communicate/educate residents:

- *Stop “Poo”llution-Scoop the Poop educational information (April 2013, June 2013, and January 2014).*
- *Protecting Florida’s water educational information (April 2013 and July 2013).*
- *Stormwater runoff educational information (February 2013 and June 2013).*
- *Stormwater drainage system educational information (February 2013, June 2013, October 2013, November 2013, and January 2014).*
- *“Landscaping-What Do Wildflowers Do?” educational information (May 2013).*
- *Irrigation-reclaimed water educational information (April 2013, June 2013, and January 2014).*

The city also utilized business tax receipts/certificates of use for new businesses to mail illicit discharge pamphlets to new businesses each month. The city distributed environmental education information including giveaways (pens, pencils, grocery totes, Frisbees, key rings, letter openers, water bottles, coasters, etc.) and pamphlets (Florida-friendly landscaping, stormwater systems, illicit discharge, Stop “Poo”llution-Scoop the Poop, Protect Your Waters, reclaimed water, etc.) at several events, including:

- *Edgewater Expo.*
- *Local elementary, middle, and high schools classroom programs.*
- *Edgewater Earth Day Party for the Planet community event.*
- *Salt Spray 5K.*
- *River clean up event.*
- *Edgewater Landings homeowner presentation.*

The city has a Stop “Poo”llution-Scoop the Poop campaign in which they handed out giveaways (pet waste dispensers, pens, pencils, backpacks, grocery totes, Frisbees, hand sanitizers, and educational pamphlets/postcards) at several locations:

- *Edgewater animal shelter.*

- *Edgewater veterinary offices.*
- *Edgewater Expo.*
- *New Smyrna Beach Home Expo.*
- *Local elementary, middle, and high schools classroom programs.*
- *Edgewater Earth Day Party for the Planet community event.*
- *Salt Spray 5K.*
- *River clean up event.*
- *Edgewater Landings homeowner presentation.*

Edgewater also installed 12 additional pet waste dispensers/trash containers throughout the city. The city also has an EnviroScape Educational Program in which presentations were made at local elementary, middle, and high schools; Boys & Girls Club; and Boy Scouts.



FIGURE 8: CITY OF EDGEWATER PUBLIC EDUCATION AND OUTREACH ACTIVITIES

In addition, the county has an employee educational training, which includes the MS4 “Rain Check” video and illicit discharge training. The City Environmental Services Department holds the illicit discharge training for the employees each year. The training consists of a PowerPoint presentation along with each

employee receiving their personal illicit discharge manual to keep in their vehicles. This training has given the city the ability to have employees be aware of what is needed to identify an illicit discharge in the field, how to handle an illicit discharge situation, the dangers that can be encountered when an illicit discharge is discovered, along with how and what needs to be documented when an illicit discharge is discovered.

2.1.4 CITY OF MELBOURNE

The City of Melbourne continued its public education and outreach efforts (Project MEL-8) (see **Figure 9**). The city also added additional street sweeping in the basin, which was part of previous BMAP Project MEL-10 but is now combined with the existing street sweeping under Project MEL-9, and the reductions have exceeded anticipated numbers. The City of Melbourne completed a stormwater quality master plan (November 2013), which identifies 46 potential projects. Budgeting for fiscal year 2015 has begun and city staff anticipate adding several projects to next year's budget. In addition, the city received approval of a property transfer from Brevard County to the city, which will allow for a stormwater quality project to be completed within the next fiscal year.



FIGURE 9: CITY OF MELBOURNE PUBLIC EDUCATION AND OUTREACH ACTIVITIES

2.1.5 CITY OF ROCKLEDGE

The City of Rockledge continued its street sweeping (Project ROCK-21) (see **Figure 10**), public education (Project ROCK-23), mechanical ditch cleaning to remove vegetative material, and baffle box cleaning and

filter replacements once per month (see **Figure 11**). In addition, the city has continued work on the Huntington lake retention project, which is 60% complete.



FIGURE 10: CITY OF ROCKLEDGE STREET SWEEPER



FIGURE 11: CITY OF ROCKLEDGE BAFFLE BOX CLEAN OUT

2.1.6 CITY OF TITUSVILLE

The City of Titusville has the Draa Field Stormwater Park (Project TV-3) underway. The original conceptual design for the park is being modified to accommodate the needs of the Brevard County School Board, who own the adjacent property. As a result of the changes, construction is expected to be completed in December 2015, instead of December 2012. However, this project will still be completed within the five-year BMAP period. The project and annual operations and maintenance (O&M) costs are estimated based on the original design and are subject to change as the design is finalized. The city completed the St. John's Basin Stormwater Improvements (Project TV-4) in May 2013 (see **Figure 12**), and water quality monitoring to measure actual TN and TP removal efficiencies is ongoing. Upon

completion of the monitoring in 2015, the city will request an update to the currently assigned credits for this project.



FIGURE 12: CITY OF TITUSVILLE ST. JOHN’S BASIN STORMWATER IMPROVEMENTS PROJECT

The city continued its public education and outreach efforts (Projects TV-7 and TV-9). The City of Titusville Water Resources Department employs a full time Public Outreach Manager whose program is focused on providing residents and businesses with information about pollution prevention, new fertilizer application regulations, the benefits of Florida-friendly landscaping, and water conservation. Between February 2013 and February 2014, the manager attended eight public events and made three public presentations where informational pamphlets were handed out. Educational information and materials are also available on the city’s website.

An annual newsletter, which highlights recent water quality projects completed by the city, educates customers about the health of the IRL, and provides information on reducing nutrient runoff, is mailed to all stormwater customers in the city. In addition, educational kiosks were installed at the senior center ponds in September 2013 that illustrate the nutrient removal functions of the ponds and baffle boxes (see **Figure 13**) and includes other stormwater education information. In the past year, the city has broadcast approximately 600 hours of public service announcements (PSAs) and videos pertaining to pollution prevention, proper fertilizer application in accordance with the recently adopted strong ordinance, the benefits and how-to of Florida-friendly landscaping, the benefits pet waste management, and water conservation via the city’s government access television channel.



FIGURE 13: CITY OF TITUSVILLE BAFFLE BOX CLEAN OUT

The city's illicit discharge program continued this year, with approximately 3,235 feet of storm drain pipe inspected and video recorded between February 2013 and February 2014. In addition, the city's ditches and canals are inspected at an average rate of two canal systems every six weeks. The city has also installed 13 dog waste stations (see **Figure 14**) throughout the city as part of the Bag It! Trash It! Pet Waste Management Program. The waste stations are placed at parks located on the shoreline of the IRL, adjacent to the A. Max Brewer Bridge, near the Titusville Marina, and near a large stormwater pond in an area frequented by dog walkers.



FIGURE 14: CITY OF TITUSVILLE STAFF INSTALLING PET WASTE STATION

In addition, Titusville has continued street sweeping operations throughout the city (Projects TV-8 and TV-10). The city purchased a second street sweeper, which became operational in January 2014 (see **Figure 15**). As a result, both the number of miles swept and the debris collected from the North B project zone have increased. Between February 2013 and February 2014, approximately 4,092 miles of streets

were swept. Approximately 1,414,531 pounds of debris were removed in the North A project zone and 144,009 pounds were removed from the North B project zone.



FIGURE 15: CITY OF TITUSVILLE STREET SWEEPER

2.1.7 FDOT DISTRICT 5

FDOT continued to implement its illicit discharge and stormwater education programs (Projects FDOT-1 and FDOT-20). Due to revisions to maintenance contracts, FDOT's street sweeping program has changed. As a result of these process revisions, FDOT can no longer rely on these maintenance contracts to estimate nutrient reduction credits from street sweeping activities. At this time, FDOT is removing street sweeping from its list of BMAP projects (Projects FDOT-2 and FDOT-21). With the removal of the street sweeping credit, FDOT still has more than enough TN reductions for the first BMAP iteration in both the North A and North B project zones, but is short on credits for the required TP reductions in both project zones. FDOT is currently evaluating an approach to resolve this issue with the street sweeping contracts so that the street sweeping credit can be added back to the BMAP. FDOT must have an eligible project and schedule in place by the end of the next reporting period (February 28, 2015) to provide the Department reasonable assurance that FDOT can meet their reduction schedule.

2.1.8 KENNEDY SPACE CENTER

In addition to Kennedy Space Center's continued efforts to reduce the amount of fertilizer used to maintain the landscapes (Projects KSC-1 and KSC-11), NASA demolished several facilities (J6-2377 and M5-1546) to reduce the impervious footprint in the IRL basin (Projects KSC-18 and KSC-19). These facilities were not previously submitted for credit in the North IRL BMAP.

2.1.9 TOWN OF INDIALANTIC

The Town of Indialantic continued with its public education and outreach efforts (Project TI-3) during the reporting period.

2.1.10 TOWN OF PALM SHORES

The Town of Palm Shores continued its education and outreach efforts and adopted a fertilizer ordinance during the reporting period (Project PS-1).

2.1.11 VOLUSIA COUNTY

Volusia County continued its education and outreach efforts during the reporting period (Project VC-1).

2.1.12 AGRICULTURE

FDACS currently has two field staff and two contracted staff in SJRWMD, working in more than a dozen basins with adopted BMAPs. There have been few new enrollments in the North IRL subbasin since BMAP adoption due to the loss of a contracted employee who was covering the area. FDACS will be looking into providing additional staff coverage for the area. Additionally, the North A project zone shows a loss of enrolled citrus acreage due to the removal of out of production groves. Through December 2013, FDACS has enrolled 197.6 acres in the North A project zone in agricultural BMPs, which is 3.6% of the agricultural acreage in the zone. FDACS has also enrolled 2,763.9 acres in the North B project zone; however, some of the citrus enrolled acreage includes groves that have gone out of production since they were enrolled. FDACS is in the process of collecting data to correct its database, and updated enrollment information will be provided in the 2015 Progress Report.

TABLE 5: AGRICULTURAL ACREAGE, BMP ENROLLMENT, AND FUTURE ENROLLMENT GOALS FOR THE NORTH A PROJECT ZONE

N/A = Not applicable

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.

² FDACS staff have observed no active poultry operations in the BMAP area, but will confirm this.

2000 SJRWMD LAND USE	2000 ACRES	FDACS ADJUSTED ACRES FOR ENROLLMENT ¹	RELATED FDACS BMP PROGRAMS	ACREAGE ENROLLED	RELATED NOTICES OF INTENT
Pasture (2110, 2120, 2130)	1,190.5	1,164.5	Cow/Calf; Future (hay)	86.7	2
Row/Field Crops (2140, 2150)	618.1	574.2	Vegetable/Agronomic Crops	0.0	N/A
Fallow Cropland	40.7	40.7	N/A	N/A	N/A
Horse Farm	119.7	111.0	Equine	0.0	N/A
Citrus	5,115.2	3,515.4	Ridge Citrus; Flatwoods Citrus	83.3	7
Abandoned Groves	936.7	N/A	No enrollment needed	N/A	N/A
Tree Crops	1.7	1.7	Specialty Fruit and Nut	1.0	1
Tree Nurseries	26.5	26.5	Future Nursery; Specialty Fruit and Nut	0.0	N/A
Ornamentals	12.1	12.1	Container Nursery	26.6	4
Poultry Feeding ²	8.0	8.0	Conservation Plan Rule	0.0	N/A
Total	8,069.2	5,454.0	N/A	197.6	14

5-Year Enrollment Goal (50%) (FDACS-adjusted acres for enrollment) = 2,727.0

Acreage Enrolled as of December 31, 2013 (FDACS-adjusted acres for enrollment) = 197.6

Remaining Acres To Enroll (FDACS-adjusted acres for enrollment) = 2,529.4

TABLE 6: AGRICULTURAL ACREAGE, BMP ENROLLMENT, AND FUTURE ENROLLMENT GOALS FOR THE NORTH B PROJECT ZONE

N/A = Not applicable

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.

² Enrolled acreage includes groves that have gone out of production since they were enrolled. FDACS is in the process of collecting data to correct its database.

2000 SJRWMD LAND USE	2000 ACRES	FDACS ADJUSTED ACRES FOR ENROLLMENT ¹	RELATED FDACS BMP PROGRAMS	ACREAGE ENROLLED	RELATED NOTICES OF INTENT
Pasture (2110, 2120, 2130)	164.2	84.8	Cow/Calf; Future (hay)	0.0	N/A
Row/Field Crops (2140, 2150)	42.9	35.3	Vegetable/Agronomic Crops	62.6	1
Tree Crops	2.8	2.8	Specialty Fruit & Nut	0.0	N/A
Citrus ²	3,364.5	2,339.2	Ridge Citrus; Flatwoods Citrus	2,575.7	55
Abandoned Groves	65.7	N/A	No enrollment needed	N/A	N/A
Ornamentals	43.9	43.9	Container Nursery	125.6	6
Specialty Farms	8.0	8.0	Conservation Plan Rule / Equine	0.0	N/A
Total	3,692.0	2,513.9	N/A	2,763.9	63

5-Year Enrollment Goal (50%) (FDACS-adjusted acres for enrollment) = 1,257.0

Acreage Enrolled as of December 31, 2013 (FDACS-adjusted acres for enrollment) = 2,763.9

Remaining Acres To Enroll (FDACS-adjusted acres for enrollment) = 0.0

2.2 SUMMARY OF ACCOMPLISHMENTS

The projects completed during the first annual BMAP reporting period are summarized in **Table 6** for the North A project zone and **Table 6** for the North B project zone. In the North A project zone, these projects resulted in an estimated reduction of 1,849 lbs/yr of TN and 543.4 lbs/yr of TP. These reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 27,838 lbs/yr of TN and 8,544.2 lbs/yr of TP, which are greater than the required reductions in the first BMAP iteration of 14,802.1 lbs/yr of TN and 2,900.3 lbs/yr of TP. In the North B project zone, these projects resulted in an estimated reduction of 4,911 lbs/yr of TN and 2,716.1 lbs/yr of TP. These reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 36,835 lbs/yr of TN and 13,213 lbs/yr of TP, which are greater than the required reductions in the first BMAP iteration of 18,477.3 lbs/yr of TN and 4,908.3 lbs/yr of TP.

The progress towards the TMDL load reductions in the North A project zone for TN and TP are shown in **Figure 16** and **Figure 17**, respectively, and for the North B project zone in **Figure 18** and **Figure 19**. The first bar in these figures shows the baseline load for stormwater runoff. The second bar shows the current estimated loading with the implementation of projects. The third bar shows the total allocation for stormwater runoff to meet the TMDLs. The line shows the target for the first BMAP iteration.

TABLE 7: SUMMARY OF PROJECTS COMPLETED IN THE REPORTING PERIOD (FEBRUARY 7, 2013 THROUGH FEBRUARY 28, 2014) IN THE NORTH A PROJECT ZONE

N/A = Not applicable

ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Brevard County	BC-5	Chain of Lakes Southern Expansion	1,325	440.6
City of Rockledge	ROCK-23	Education – addition of fertilizer ordinance	140	31.5
City of Titusville	TV-4	St. Johns Basin Stormwater Improvements	79	12.5
City of Titusville	TV-7	Public Education and Outreach – addition of fertilizer ordinance	304	58.5
Kennedy Space Center	KSC-18	Demolition of Facility J6-2377	1	0.3
Total	N/A	Total Reductions in Reporting Period	1,849	543.4

TABLE 8: SUMMARY OF PROJECTS COMPLETED IN THE REPORTING PERIOD (FEBRUARY 7, 2013 THROUGH FEBRUARY 28, 2014) IN THE NORTH B PROJECT ZONE

N/A = Not applicable

ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Brevard County	BC-28	Florida Boulevard MAPS	197	21.0
Brevard County	BC-56	Fountainhead Aquatic Vegetation Harvesting	401	64.7
City of Cocoa	CC-11	Fertilizer Ordinance	128	25.8
City of Melbourne	MEL-9	Street Sweeping – additional	4,006	2,546.2
City of Titusville	TV-9	Education – addition of fertilizer ordinance	11	1.2
City of Titusville	TV-10	Street Sweeping – additional	92	41.4
Kennedy Space Center	KSC-19	Demolition of Facility M5-1546	76	15.8
Total	N/A	Total Reductions in Reporting Period	4,911	2,716.1

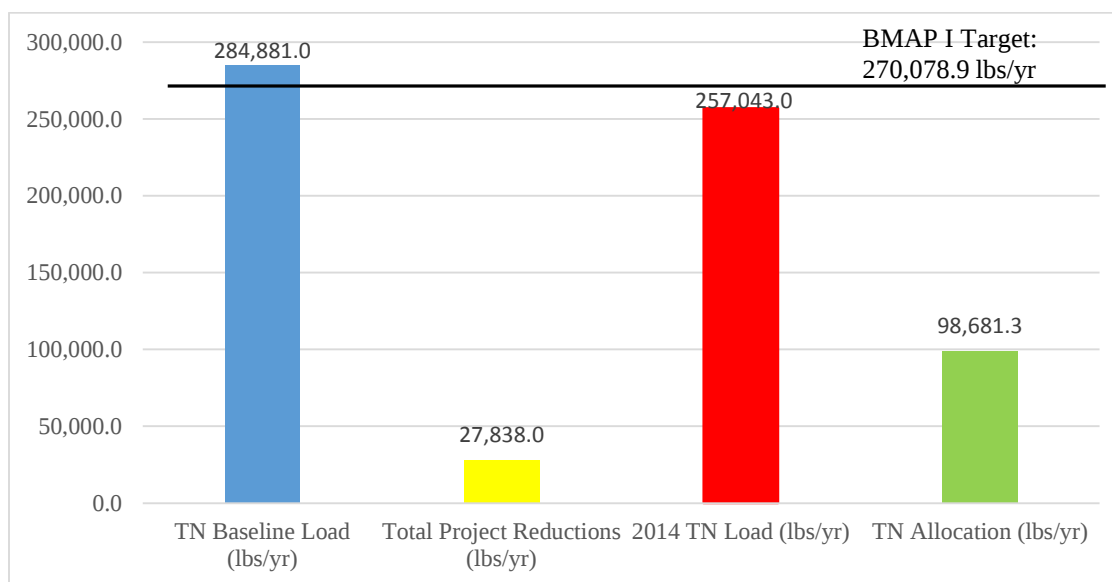


FIGURE 16: PROGRESS TOWARDS THE NORTH A PROJECT ZONE TN TMDL THROUGH FEBRUARY 28, 2014

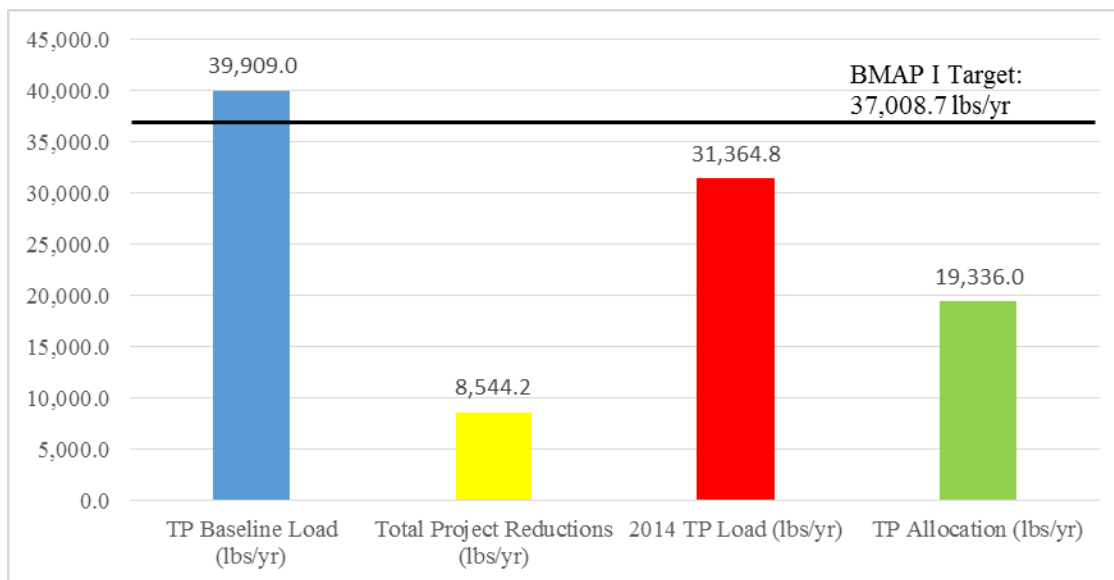


FIGURE 17: PROGRESS TOWARDS THE NORTH A PROJECT ZONE TP TMDL THROUGH FEBRUARY 28, 2014

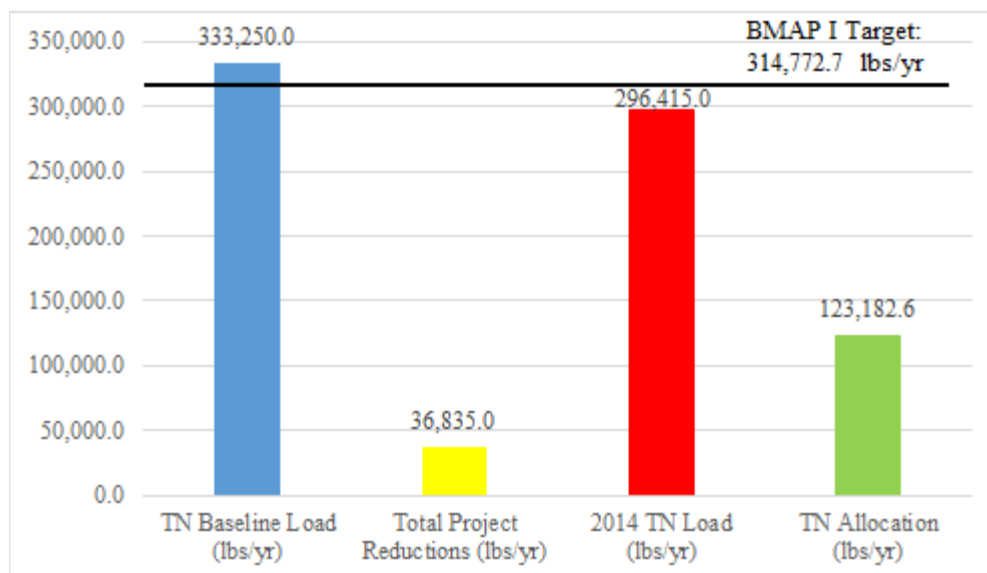


FIGURE 18: PROGRESS TOWARDS THE NORTH B PROJECT ZONE TN TMDL THROUGH FEBRUARY 28, 2014

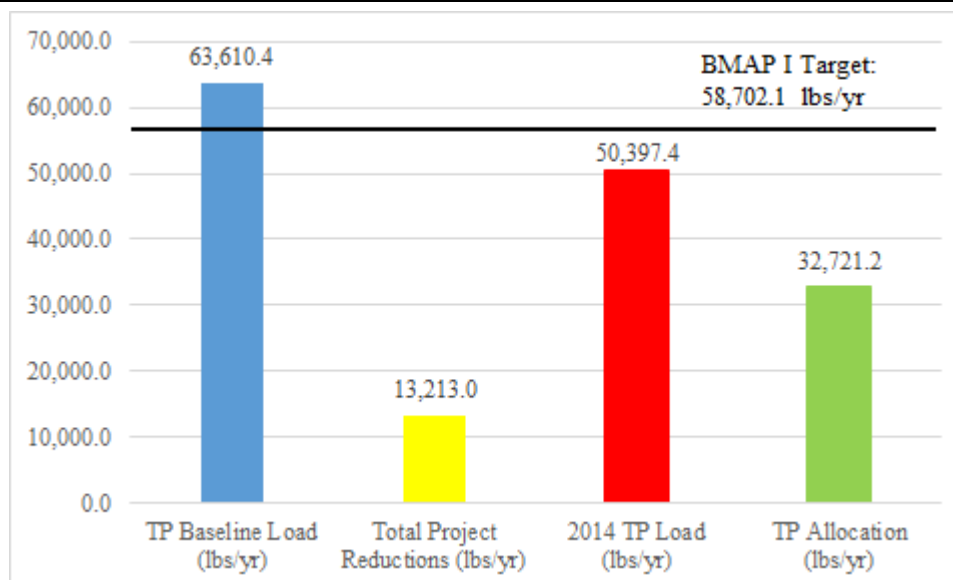


FIGURE 19: PROGRESS TOWARDS THE NORTH B PROJECT ZONE TP TMDL THROUGH FEBRUARY 28, 2014

2.3 FUNDING

Brevard County received an \$117,000 Section 319 grant for its county-wide (North IRL, Central IRL, and BRL) baffle box retrofit projects. The county also received Section 319 grants for the Pine Island Phase I and II project located in the North IRL (Project BC-24) and BRL. The grant for Phase I was \$1,380,000 and the grant for Phase II was \$800,000. The county also received a \$197,625 Section 319 grant for the Chain of Lakes Southern Expansion (Project BC-5). In addition, the county received a \$29,466 IRL National Estuary Program grant for the Florida Boulevard MAPS.

The City of Melbourne received a TMDL grant for the Highland Parking Lot Stormwater Retrofit Project. Construction is anticipated to begin by August.

The City of Rockledge received a grant from the Department for the Huntington lakes retention project.

On October 9, 2013, the Department notified the City of Titusville that the Draa Field Stormwater Park (Project TV-3) was selected to be included in the draft fiscal year 2014 Section 319 grant work plan with a total grant of \$388,825. These funds are a significant contribution toward completion of the project in a timely manner.

2.4 FERTILIZER ORDINANCES

Local governments located within the watershed of a waterbody or water segment that is listed as impaired by nutrients are required to adopt, at a minimum, the Department's Model Ordinance for Florida-Friendly

Fertilizer Use on Urban Landscapes (Section 403.067, F.S.). A status of ordinance development over the past year is summarized in **Table 8**.

TABLE 9: SUMMARY OF FERTILIZER ORDINANCE DEVELOPMENT DURING THE REPORTING PERIOD IN NORTH IRL

LOCAL GOVERNMENT	FERTILIZER ORDINANCE STATUS
Brevard County	Adopted
City of Cocoa	Adopted
City of Edgewater	In discussion
City of Melbourne	Adopted
City of Rockledge	Adopted
City of Titusville	Adopted
Town of Indialantic	Adopted
Town of Palm Shores	Adopted
Volusia County	In discussion

2.5 WATER QUALITY AND SEAGRASS MONITORING

Volusia County has continued to monitor its two water quality stations on a monthly basis in the North A project zone. SJRWMD continued monitoring at 12 water quality stations on a monthly basis throughout the North IRL. The frequency for station 27010875 in the North A project zone was changed from monthly to bimonthly (every other month). SJRWMD also added sampling at the six new stations identified in the BMAP for the North B project zone.

SJRWMD also continued its seagrass transect monitoring in the North IRL, and this monitoring collects data about the seagrass, phytoplankton, epiphyte coverage, and water quality along each transect. In addition, the Department and SJRWMD worked with Dewberry, a consulting firm, to fly the aerial photography for the seagrass imagery analysis in April and May 2013. The final mapped seagrass deep edge from the aerial imagery should be available by late summer or early fall 2014. Completion of the actual mapping process is expected by early summer, and the draft results will then undergo a quality assurance review and correction, as needed.

Section 3: SEAGRASS DEPTH LIMIT TARGET EVALUATION

The goal of the TMDLs is to recover the deeper seagrass habitats, with the biological response of the seagrass being the most important factor in evaluating the success of achieving the TMDL targets. To assess progress for the IRL Basin towards the median seagrass depth limit target, a two-step process is used.

Step 1 in this process is a cumulative frequency distribution analysis. The four most recent mapped seagrass datasets from SJRWMD are used to create a union coverage of the assessment years in Geographic Information System (GIS). Using this union coverage, a 15.8-meter buffer zone is applied to the perimeter of the coverage to establish the deep edge of the seagrass beds. This buffer coverage shows the deepest edge that seagrass grew at any time within the data period, and is used to create a cumulative frequency distribution curve of the depth at which seagrass exist within each project zone in the IRL Basin. This curve is then compared to the union coverage TMDL depth limit target curve. Compliance in Step 1 is achieved when at least 50% or more of the assessment years' frequency distribution curve (including its 50th percentile value) lies on or to the right of the TMDL depth limit target curve.

Step 2 is conducted by calculating the median seagrass depth for each year of the four most recent datasets. Each assessment year median is then compared to the TMDL median depth limit target. Three of the four assessment years' medians must meet or exceed the median TMDL to be Step 2 compliant. If the project zone is both Step 1 and Step 2 compliant, it is considered to be meeting the TMDL seagrass depth limit target. If the basin fails to meet either Step 1 or Step 2, it is not considered to be meeting the TMDL seagrass depth limit target for that set of assessment years.

The Department conducted this two-step evaluation process using the 2006, 2007, 2009, and 2011 mapping years, which were the latest datasets available at the time of this analysis. Based on this time period, neither the North A nor North B project zones were Step 1 compliant (**Figure 20** and **Figure 21**) nor Step 2 compliant (refer to **Table 9**). Therefore, BMAP reductions will continue to work towards achieving the seagrass depth limit targets.

It is important to note the dramatic decrease in the median seagrass depth for 2011 in response to losses of seagrass. Decreases in median depth were greater for the North B project zone than the North A project zone. Between 2009 and 2011, the median depth for the North A project zone decreased by 10% and the median for the North B project zone decreased by 33%. With the continuing algal blooms in the lagoon, it is anticipated that the 2013 median seagrass depths will also be less than the TMDL targets. Finalized

data from 2013 seagrass maps is expected by late summer or early fall 2014, and draft data should be available earlier in the summer. The Department may consider other metrics of seagrass health to better identify negative trends and facilitate response.

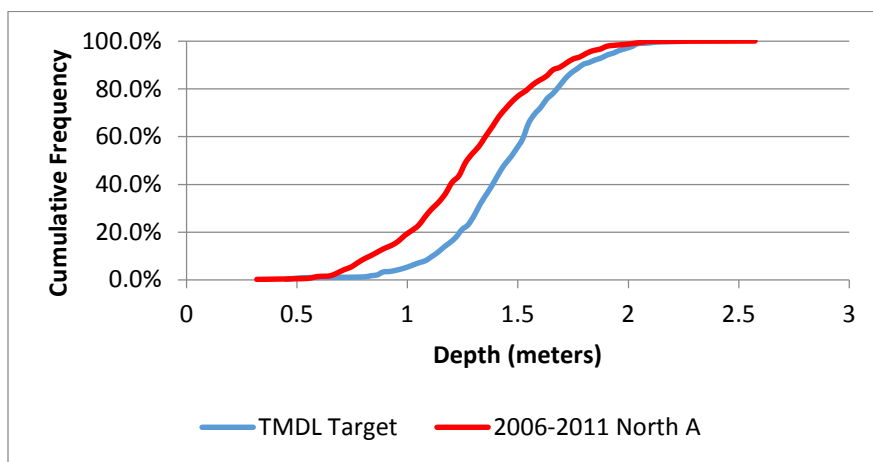


FIGURE 20: STEP 1 COMPLIANCE EVALUATION FOR THE NORTH A PROJECT ZONE FOR 2006-2011

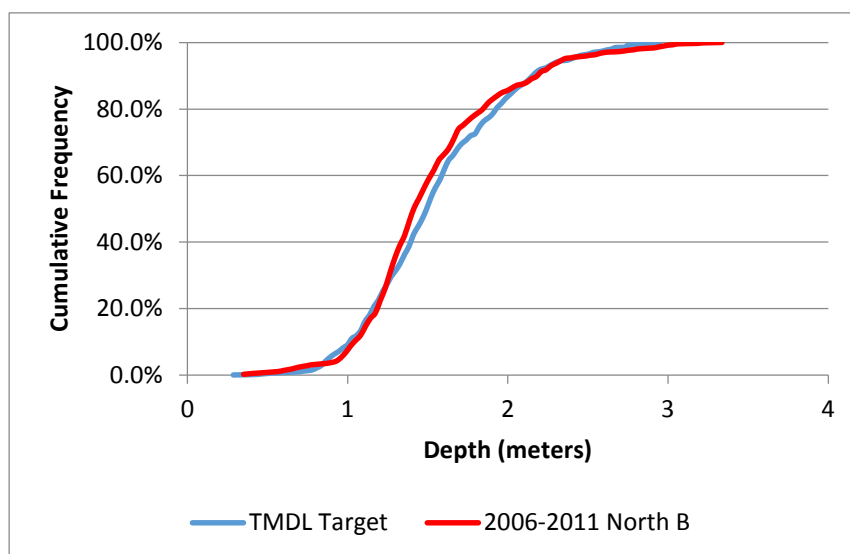


FIGURE 21: STEP 1 COMPLIANCE EVALUATION FOR THE NORTH B PROJECT ZONE FOR 2006-2011

TABLE 10: STEP 2 COMPLIANCE EVALUATION FOR THE NORTH IRL SUBBASIN

YEAR	NORTH A MEDIAN DEPTH (METERS)	NORTH B MEDIAN DEPTH (METERS)
TMDL Median	1.44	1.51
2006	1.20	1.45
2007	1.23	1.39
2009	1.17	1.39
2011	1.05	0.93
Step 2 Compliant?	No	No

Section 4: UPCOMING ACTIVITIES

4.1 ACTIVITIES IN THE UPCOMING REPORTING PERIOD

The second annual progress report will encompass the period of March 1, 2014 through February 28, 2015. The activities that will occur during this time are summarized in **Section 4.1.1** through **Section 4.1.3**.

4.1.1 BREVARD COUNTY

Brevard County will complete Pine Island Phase I and II (Project BC-24) and the Fairglen Elementary MAPS (Project BC-29) in 2014. The county will also complete baffle box upgrades at Lucas Place (Project BC-33), Indian River Isles (Project BC-34), Haverhill Avenue (Project BC-36), Manth Avenue (Project BC-37), Alamanda Indian Harbour Beach (Project BC-39), River Shore 1848 Indialantic (Project BC-40), River Shore 1925 Indialantic (Project BC-41), Cedar Lane Indialantic (Project BC-42), Oak Ridge Indialantic (Project BC-45), McGiver South (Project BC-54), and 651 Franklyn (Project BC-55) in 2014.

4.1.2 AGRICULTURE

FDACS will be looking into providing additional staff coverage for the North IRL subbasin to increase agricultural enrollment in BMPs.

4.1.3 WATER QUALITY AND SEAGRASS MONITORING

Volusia County will continue to monitor its two water quality stations. SJRWMD will continue to monitor its 19 water quality stations and the seagrass transect monitoring in the basin. The Department and SJRWMD will continue to work with their contractor Dewberry on the evaluation of the 2013 seagrass aerial imagery so that the seagrass target evaluation can be updated with the latest data.

4.2 MANAGEMENT STRATEGIES FOR THE SECOND BMAP ITERATION

The North IRL BMAP stakeholders have already begun planning management strategies to achieve additional TN and TP reductions for the second BMAP iteration. The strategies identified to date are summarized in **Section 4.2.1** through **Section 4.2.9**. It is important to note that the activities listed below are not BMAP requirements at this time, but are listed to show that plans are underway to achieve additional nutrient reductions to benefit the North IRL.

Cost share funds for projects that reduce nutrient loading are available from the Department through the Section 319 and TMDL Restoration Grant Programs. The Department announces the availability of these funds to stakeholders, and encourages local governments to use these programs to fund BMAP projects.

4.2.1 BREVARD COUNTY

The following types of projects represent traditional BMPs that Brevard County would like to increase in the near future, pending Brevard County Board of County Commissioners' approval of additional funds:

- *Increased street sweeping.*
- *Increased sediment device cleaning and maintenance frequency.*

The following types of projects receive a designated percentage of provisional BMAP credit; however, Brevard County believes that exceeding the minimum standards for these BMPs will be more effective, timely, affordable, and efficient in the IRL watershed than other traditional BMPs. Therefore, Brevard County would like to invest in expanding these programs:

- *Expanded public outreach (Blue Life, Be Floridian, PSAs, social media, etc.).*
- *FYN Program translated locally as a mobile My Brevard Yard Program.*

The following types of projects represent non-traditional opportunities Brevard County would like to explore for the IRL. Meeting the BMAP allocations and TMDLs may be achieved faster if the Department approves a wider variety of projects for BMAP credit. In addition, the amount of credits allocated for projects could be adjusted to remove economic disincentives for non-traditional approaches. This will provide greater flexibility for stakeholders to pursue projects that could prove to be more effective, affordable, and efficient in the IRL watershed, such as:

- *Denitrification walls and liners.*
- *Open channel baseflow denitrification.*
- *Phosphorus binding media integration into treatment trains.*
- *Living shorelines using littoral vegetation and oyster reefs.*
- *Shellfish and filter feeder population enhancement in the IRL (not just along the shoreline).*
- *Legacy load removal (muck dredging).*
- *Legacy load removal (strategic drift algae harvesting).*

- *Legacy load management and habitat restoration (capping muck deposits with clean fill at appropriate grade to provide seagrass substrate or marsh habitat).*
- *Seagrass planting and/or transplanting in carefully selected refugia/restoration epicenters.*
- *Aquatic plant harvesting from lakes, ponds canals, ditches, etc. (such as the Fountainhead Aquatic Vegetation Harvesting Pilot Project in the North IRL subbasin).*
- *Plugging abandoned, free-flowing artesian wells.*
- *Increased nutrient removal at the source of irrigation reuse water.*
- *Bioswales and other green infrastructure.*
- *Elimination of septic tanks or upgrades to advanced treatment systems.*
- *Code changes to encourage more LID (decreased imperviousness, swales and rain gardens, cisterns, etc.).*
- *Land development incentives to increase the use of stormwater ponds for irrigation.*
- *Economic incentives for modifying exiting private stormwater infrastructure to improve its effectiveness.*

4.2.2 CITY OF COCOA

The City of Cocoa submitted two grant applications for stormwater treatment projects in a 75-acre urban area of Cocoa Village adjacent to the IRL. Both grant applications are through SJRWMD Cooperative Funding for fiscal year 2014-2015.

4.2.3 CITY OF EDGEWATER

The City of Edgewater plans to continue its educational efforts.

4.2.4 CITY OF MELBOURNE

The City of Melbourne is considering several projects for the future, including:

- *Highland Avenue stormwater quality retrofit.*
- *South Croton baffle box.*
- *House of Lights stormwater quality retrofit.*
- *Lime Drive stormwater quality retrofit.*

- *Sarno/US 1 turn lane and stormwater quality project.*
- *Paradise Boulevard baffle box.*
- *South Sarno drainage improvements.*
- *Strawbridge Avenue baffle box.*
- *Wisteria stormwater quality retrofit.*

4.2.5 CITY OF ROCKLEDGE

The City of Rockledge is looking at installing sewer between U.S. 1 and the IRL where there are 367 residential septic tanks. The first phase of the project would include 143 tanks in the Rockwood and Knollwood subdivision at an estimated cost of \$2,500,000. The city is also considering running stormwater from a large facility to the Faull Drive lift station for additional reuse water. The city is currently reviewing cost estimates for this project. In addition, the city is considering the possible purchase of additional acreage to create the south retention area, which would treat at least another 800 acres. The request for appraisal for this project was approved by the city council.

4.2.6 CITY OF TITUSVILLE

For the second BMAP iteration, the City of Titusville is considering: (1) development and implementation of a project master plan for Area 3, the southern portion of the city that drains to the IRL; (2) implementation of a FYN Program; (3) adoption of Florida-friendly landscape ordinance; (4) adoption of a pet waste management ordinance; (5) increasing street sweeping activities with the addition of a second sweeper; (6) installing bio-swales and use of floating wetland islands where feasible; (7) installation of several baffle boxes; (8) elimination of septic tanks; (9) development of living shorelines using littoral vegetation and oyster mats; and (10) removal of sediment and vegetation from the city's canals. The city also continues to pursue partnerships with other BMAP stakeholders for implementation of mutually beneficial projects and programs.

In addition, the city will be requesting adjustments to the TN and TP reductions for the St. Johns Stormwater Basin Improvement (Project TV-4), which were allocated in the first BMAP iteration. Based on the results of ongoing water quality sampling, it is possible that the removal efficiencies for TN and TP for this project exceeds the current allowance. Also, the city's existing irrigation ordinance, which was adopted in May 2009, will be included for consideration.

4.2.7 FDOT DISTRICT 5

FDOT has identified projects on its approved five-year work program, and these projects were provided on the initial project inventory list for the BMAP.

4.2.8 KENNEDY SPACE CENTER

Several stormwater treatment projects as well as muck removal projects are being considered by NASA for the second BMAP iteration.

4.2.9 TOWN OF PALM SHORES

The Town of Palm Shores has a draft amendment to the fertilizer ordinance, which is tentatively scheduled for discussion in April 2014, and the amendment will have more stringent fertilizer management guidelines.

4.3 PATH FORWARD

Local BMAP stakeholders are continuing the design and implementation of projects that will reduce nutrient loading into the North IRL and planning for the second cycle of the BMAP (**Section 4.1** and **Section 4.2**). In addition, stakeholders have identified opportunities to revise the BMAP. Many of these matters were identified in Chapter 1 of the adopted Central IRL BMAP. During year two of the BMAP, the Department will work with stakeholders to identify opportunities to try new technologies or innovative approaches to prevent nutrient loading, including consideration of appropriate credit for such actions. Additionally, the Department will continue to work with stakeholders on the current source loading model to ensure the best methodologies and data are utilized. Brevard County, in partnership with FDOT, the military, and local governments, has started the process of updating and revising model components through the development of the Spatial Watershed Iterative Loading model. The Department is currently reviewing this model and will continue its dialogue with Brevard County and other partners. New information collected about the ecological function of the IRL through the IRL Initiative may provide additional clarification on how nutrients cycle through the system, allowing further model refinement. Stakeholders have also noted the need for additional funding to support water quality restoration activities.

APPENDIX A: BMAP PROJECTS

The BMAP project tables below show the implementation status of the BMAP projects as of February 28, 2014. The tables provide information on the nutrient reduction attributed to each individual project, shown in lbs/yr. These projects were submitted to provide reasonable assurance to the Department that each entity has a plan on how they will meet their allocation; however, this 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 time frame.

NORTH A PROJECT ZONE

TABLE A-1: BREVARD COUNTY PROJECTS IN NORTH A PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	ANNUAL O&M COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
BC-1	Old Dixie Highway 601	Sediment trap	N/A	Unknown	Unknown	Unknown	Completed	4	1.2
BC-2	Chain of Lakes Pond	Wet detention pond	1,072.5	\$2,051,405	Unknown	2010	Completed	2,699	1,109.4
BC-3	FYN, Fertilizer and Pet Waste Ordinances, PSAs, Pamphlets, Website, Illicit Discharge Program	Education	N/A	Unknown	Unknown	Ongoing	Ongoing	1,383	178.4
BC-4	Scottsmeer I	Wet detention pond	530.9	\$601,664	\$1,000	2015	Planned, Funded	1,013	194.3
BC-5	Chain of Lakes Southern Expansion Phase 1	Wet detention pond	575.2	\$3,200,000	\$1,000	2013	Completed	1,325	440.6
BC-6	Chain of Lakes Reuse	Stormwater reuse	N/A	Unknown	Unknown	2005	Completed	498	63.2

Total Project Reductions = 6,922 lbs/yr TN and 1,987.1 lbs/yr TP

Total BMAP I Required Reductions = 2,180 lbs/yr TN and 281.9 lbs/yr TP

Credit for Future BMAPs = 4,742 lbs/yr TN and 1,705.2 lbs/yr TP

TABLE A-2: CITY OF EDGEWATER IN NORTH A PROJECT ZONE

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	ANNUAL O&M COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
EW-1	FYN; Landscaping, Irrigation, and Pet Waste Ordinances; Pamphlets, Website, illicit Discharge Program	Education	\$15,000	Ongoing	Ongoing	74	9.8

Total Project Reductions = 74 lbs/yr TN and 9.8 lbs/yr TP

Total BMAP I Required Reductions = 24.3 lbs/yr TN and 0.0 lbs/yr TP

Credit for Future BMAPs = 49.7 lbs/yr TN and 9.8 lbs/yr TP

TABLE A-3: CITY OF TITUSVILLE IN NORTH A PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	PROJECT COST	ANNUAL O&M COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
TV-1	Area 1 Stormwater Improvements	Wet detention pond	Upsize existing storm pipes and enclose the Florida Ditch; water directed to TV-2	432.2	\$2,151,510	\$4,797	2010	Completed	1,019	411.8
TV-2	Chain of Lakes Regional Stormwater Pond	Wet detention pond	Construction of a regional park, featuring wetlands, treatment ponds, and recreational features	339.8	Unknown	\$15,620	2010	Completed	360	159.6
TV-3	Draa Field Stormwater Park	Wet detention pond	Water quality treatment for Area 2 drainage basin	281.4	\$1,661,443	\$15,000	12/2015	Started	1,598	618.7
TV-4	St. Johns Basin Stormwater Improvements	Wet detention pond	Construction of a 3.5 acre wet detention pond to treat runoff from mixed use lands prior to discharge to the IRL	882.1	\$1,854,254	\$8,000	05/2013	Completed	79	12.5
TV-5	St. Johns Basin Stormwater Improvements	2 nd generation baffle box	Installation of a baffle box downstream of the pond to treat runoff from mixed use lands prior to discharge to the IRL	882.1	\$167,343	Unknown	2011	Completed	1,495	213.9
TV-6	Spaceview Park	Alum treatment	Alum treatment	110.6	\$2,300,000	\$15,000	2007	Completed	1,153	377.9
TV-7	Public Education and Outreach	Education	Fertilizer ordinance, PSAs, pamphlets, pet waste stations, illicit discharge program, newsletter, website	N/A	\$2,500	\$5,000	Ongoing	Ongoing	913	175.7
TV-8	Street Sweeping	Street sweeping	Removes debris from 341 curb miles per cycle at a frequency of 12 cycles per year. For the 13 cycles completed between February 2013 and February 2014, 4,433 miles were swept for a total of 4,092 miles swept annually	N/A	\$188,120	\$63,106	Ongoing	Ongoing	1,699	765.0

Total Project Reductions = 8,316.0 lbs/yr TN and 2,735.1 lbs/yr TP

Total BMAP I Required Reductions = 6,604.6 lbs/yr TN and 1,447.6 lbs/yr TP

Credit for Future BMAPs = 1,711.4 lbs/yr TN and 1,87.5 lbs/yr TP

TABLE A-4: FDOT DISTRICT 5 IN NORTH A PROJECT ZONE

* FDOT is working to resolve the issue with its street sweeping contracts so that credit for street sweeping can be included in the BMAP.

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
FDOT-1	Illicit Discharge Detection and Elimination Training, Brochures, NDPES Flyer	Education efforts	Ongoing	Ongoing	39	11.3
FDOT-2	Street Sweeping	Street sweeping	Ongoing	Ongoing	0	0.0
FDOT-3	Fertilizer Cessation	Fertilizer cessation	2005	Completed	595	0.0

Total Project Reductions = 634 lbs/yr TN and 11.3 lbs/yr TP

Total BMAP I Required Reductions = 396.6 lbs/yr TN and 142.0 lbs/yr TP

Credit for Future BMAPs = 237 lbs/yr TN and -130.7 lbs/yr TP*

TABLE A-5: KENNEDY SPACE CENTER IN NORTH A PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
KSC-1	Landscape Fertilizer Reduction	Fertilizer reduction	Fertilizer use reduced from 60 tons/year in 2000 to 20 tons/year in 2010; formula changed from rapid nitrogen release 16-4-8 to slow nitrogen release, phosphate free 15-0-15	N/A	Ongoing	Ongoing	312	44.2
KSC-2	Citrus Grove Termination Roberts Road	Fertilizer reduction	Grove lease termination resulted in previously fertilized areas abandoned	418.9	2010	Completed	140	557.2
KSC-3	Citrus Grove Termination Schwartz Road	Fertilizer reduction	Grove lease termination resulted in previously fertilized areas abandoned	216.5	2010	Completed	256	308.1
KSC-4	Storage Building L5-0734	Facility demolition	Demolition of facility resulted in loss of impervious area and change of land use	0.02	2010	Completed	0	0.1
KSC-5	Support Building L5-0683	Facility demolition	Demolition of facility resulted in loss of impervious area and change of land use	0.2	2010	Completed	3	1.0
KSC-6	Shuttle Landing Facility - missing from model	Wet detention pond	Runoff is captured and treated before discharging to the IRL	617.8	Unknown	Completed	2,566	1,005.0
KSC-7	Launch Pad 39A	Closed basin	This area is a closed basin	456.5	N/A	Completed	1,255	326.3
KSC-8	Launch Pad 39B	Closed basin	This area is a closed basin	549.0	N/A	Completed	3,043	588.5
KSC-9	Schwartz Road Drainage System - missing from model	Impoundment	Closed system that ultimately drains to the northwest before discharging to an impoundment area adjacent to the IRL	1,614.1	Unknown	Completed	1,290	270.8
KSC-10	Warehouse/Processing Area - missing from model	Wet detention pond	Receives treatment from permitted stormwater treatment systems	15.2	Unknown	Completed	75	33.2
KSC-18	Demolition of Facility J6-2377	Facility demolition	Demolition of facility resulted in loss of impervious area and change of land use	0.1	02/2013	Completed	1	0.3

Total Project Reductions = 8,941 lbs/yr TN and 3,134.7 lbs/yr TP

Total BMAP I Required Reductions = 0 lbs/yr TN and 0.0 lbs/yr TP

Credit for Future BMAPs = 8,941 lbs/yr TN and 3,134.7 lbs/yr TP

TABLE A-6: VOLUSIA COUNTY IN NORTH A PROJECT ZONE

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
VC-1	FYN; Landscaping, Irrigation, Pet Waste Ordinances; Pamphlets, Website, Illicit Discharge Program	Education	Ongoing	Ongoing	515	58.9

Total Project Reductions = 515 lbs/yr TN and 58.9 lbs/yr TP

Total BMAP I Required Reductions = 0 lbs/yr TN and 0.0 lbs/yr TP

Credit for Future BMAPs = 515 lbs/yr TN and 58.9 lbs/yr TP

NORTH B PROJECT ZONE

TABLE A-7: BREVARD COUNTY IN NORTH B PROJECT ZONE

N/A – Not applicable

* This is the cost for the portion of the project located in the North IRL subbasin.

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	ANNUAL O&M COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
BC-8	Twin Lakes North	Baffle box	7.7	\$20,082	Unknown	2005	Completed	10	1
BC-9	Twin Lakes South	Baffle box	8.5	\$20,082	Unknown	2005	Completed	10	1
BC-10	Lucas Place 640 Baffle Box	Baffle box	5.2	\$36,835	Unknown	2003	Completed	8	0.8
BC-11	Rockledge Drive 2055	Baffle box	2.4	\$61,094	Unknown	2008	Completed	2	0.1
BC-12	Rockledge and Riverwoods Baffle Box	Baffle box	3.8	\$47,686	Unknown	2000	Completed	3	0.3
BC-13	Anchor Lane	Baffle box	29.4	\$49,560	Unknown	2000	Completed	47	5.4
BC-14	Kelmore Baffle Box	Baffle box	9.7	\$21,817	Unknown	2003	Completed	10	1.8
BC-15	Puesta Del Sol 735 Baffle Box	Baffle box	2.2	\$24,953	Unknown	2003	Completed	2	0.2
BC-16	Tequesta Harbor Baffle Box	Baffle box	13.1	\$27,582	Unknown	2009	Completed	21	2.4
BC-17	Broadway Boulevard Pond	Pond	85.7	\$553,169	Unknown	2000	Completed	272	55.7
BC-18	Fairglen Elementary School Pond	Pond	80.2	\$730,869	Unknown	2003	Completed	350	111.1
BC-19	Lake George	Pond	719.0	\$347,255	Unknown	2010	Completed	1,261	414.6
BC-20	Merritt Island Courthouse Pond	Pond	7.0	\$95,584	Unknown	2003	Completed	8	2.5
BC-21	Parkway Drive Phase 2 Pond	Pond	1,796.9	\$1,817,720	Unknown	2004	Completed	4,041	1,598.9
BC-22	Street Sweeping	Street sweeping	N/A	Unknown	Unknown	Ongoing	Ongoing	113	50.8
BC-23	Education Efforts	Education efforts	N/A	Unknown	Unknown	Ongoing	Ongoing	6,339	1,035.0
BC-24	Pine Island Phase I and II	Wet detention pond	6,232.9	\$7,835,765*	\$69,430*	2014	Started	10,948	3,217.9
BC-25	Merritt Island Airport	Wet detention pond	49.9	\$652,056	Unknown	2011	Completed	5	1.4
BC-26	Pines Industrial	Wet detention pond	56.0	\$500,000	Unknown	Unknown	Planned, Funded	306	92.0
BC-27	Johnson Junior High	MAPS	133.4	\$43,999	\$19,744	2015	Planned, Funded	318	74.4
BC-28	Florida Boulevard	MAPS	88.4	\$40,772	\$18,295	2012	Completed	197	21.0
BC-29	Fairglen Elementary	MAPS	80.2	\$34,996	\$15,703	2014	Planned, Funded	123	12.2
BC-30	Port St. John B	MAPS	57.9	\$16,308	\$7,315	2016	Planned, Funded	237	41.5
BC-31	Wickham Park North	MAPS	1,796.9	\$75,428	\$33,846	2016	Planned, Funded	2,804	597.8
BC-32	West Avenue 6600	Type 1 baffle box retrofit	50.7	\$15,000	Unknown	Unknown	Planned, Funded	120	12.0
BC-33	Lucas Place	Type 1 baffle box retrofit	5.2	\$15,000	Unknown	2014	Started	8	0.7
BC-34	Indian River Isles	Type 1 baffle box retrofit	51.5	\$15,000	Unknown	2014	Started	63	7.8
BC-35	Granada Street 1030 East	Type 1 baffle box retrofit	38.6	\$15,000	Unknown	Unknown	Planned, Funded	99	16.4
BC-36	Haverhill Avenue	Type 1 baffle box retrofit	47.5	\$15,000	Unknown	2014	Started	80	8.0
BC-37	Manth Avenue	Type 1 baffle box retrofit	69.1	\$15,000	Unknown	2014	Started	226	29.0

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PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	ANNUAL O&M COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
BC-38	Rockledge and Riverwoods Boulevard Rockledge	Type 1 baffle box retrofit	3.8	\$15,000	Unknown	Unknown	Planned, Funded	3	0.2
BC-39	Alamanda Indian Harbour Beach	Type 1 baffle box retrofit	2.8	\$15,000	Unknown	2014	Started	3	0.3
BC-40	River Shore 1848 Indialantic	Type 1 baffle box retrofit	2.7	\$15,000	Unknown	2014	Started	3	0.3
BC-41	River Shore 1925 Indialantic	Type 1 baffle box retrofit	7.4	\$15,000	Unknown	2014	Started	7	0.8
BC-42	Cedar Lane Indialantic	Type 1 baffle box retrofit	3.8	\$15,000	Unknown	2014	Started	6	0.6
BC-43	Riverview 9856 Indialantic	Type 1 baffle box retrofit	5.7	\$15,000	Unknown	Unknown	Planned, Funded	9	0.9
BC-44	Riverview 9864 Indialantic	Type 1 baffle box retrofit	98.5	\$15,000	Unknown	Unknown	Planned, Funded	202	33.4
BC-45	Oak Ridge Indialantic	Type 1 baffle box retrofit	126.5	\$15,000	Unknown	2014	Started	257	38.8
BC-46	Kingsmill-Aurora Phase 2	Wet detention pond	1,220.4	\$1,600,000	\$1,000	Unknown	Planned, Funded	4,059	1,589.8
BC-47	Sediment Trap, Grated Inlet Basket, Inlet Weir Cleaning	BMP clean out	N/A	\$392,105	Unknown	Ongoing	Ongoing	7	2.4
BC-48	Alum Pond MAPS	MAPS	92.6	\$100,362	Unknown	Unknown	Planned, Funded	217	22.4
BC-49	Lake George	MAPS	719.0	\$51,200	Unknown	2015	Funded	505	51.3
BC-50	Wickham Park	Stormwater reuse	43.8	Unknown	Unknown	2010	Completed	75	4.6
BC-51	Ellington Park	Stormwater reuse	N/A	Unknown	Unknown	2005	Completed	409	87.0
BC-52	Rockledge Barton Park Reuse	Stormwater reuse	736.6	Unknown	Unknown	2009	Completed	262	24.1
BC-53	Florida Boulevard Pond	Wet detention pond	88.4	\$350,384	N/A	2002	Completed	545	185.4
BC-54	McGiver South	Type 1 baffle box retrofit	2.8	\$15,000	Unknown	2014	Started	6	0.7
BC-55	651 Franklyn	Type 1 baffle box retrofit	13.7	\$15,000	Unknown	2014	Started	15	1.6
BC-56	Fountainhead	Aquatic vegetation harvesting	N/A	\$39,274	To be determined	10/2013	Completed	401	64.7

Total Project Reductions = 35,022 lbs/yr TN and 9,523.0 lbs/yr TP

Total BMAP I Required Reductions = 5,298 lbs/yr TN and 995.3 lbs/yr TP

Credit for Future BMAPs = 29,724 lbs/yr TN and 8,527.7 lbs/yr TP

TABLE A-8: CITY OF COCOA IN NORTH B PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
CC-1	Bracco Pond B	Wet detention pond	591.8	Unknown	Completed	2,328	1,049.6
CC-2	Bracco Expansion Area	Wet detention pond	775.2	Unknown	Completed	156	41.8
CC-3	Cocoa Village Park	Dry detention pond	13.5	Unknown	Completed	37	6.9
CC-4	Morris Pond	Wet detention pond	16.2	Unknown	Completed	128	46.7
CC-5	North Brevard Avenue Stormwater Treatment Facility	Continuous deflective separation unit	11.3	Unknown	Completed	0	4.8
CC-6	North Fiske Stormwater Retention Facility	100% on-site retention	33.9	Unknown	Completed	42	2.4
CC-7	Suntree Baffle Box #1	2 nd generation baffle box	5.9	Unknown	Completed	7	0.7
CC-8	Street Sweeping	Street sweeping	N/A	Unknown	Ongoing	459	206.6
CC-9	Bracco Supplemental Water Supply	Stormwater reuse	N/A	Unknown	Completed	1,102	107.6
CC-10	Diamond Square Stormwater Improvements	Wet detention pond	95.4	2011	Completed	108	0.0
CC-11	Fertilizer Ordinance	Education	N/A	N/A	Ongoing	128	25.8

Total Project Reductions = 4,495.0 lbs/yr TN and 1,492.9 lbs/yr TP

Total BMAP I Required Reductions = 2,409.5 lbs/yr TN and 557.2 lbs/yr TP

Credit for Future BMAPs = 2,085.5 lbs/yr TN and 935.7 lbs/yr TP

TABLE A-9: CITY OF MELBOURNE IN NORTH B PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
MEL-1	Fee & Apollo Drainage Improvements	Wet detention pond	No treatment is provided within the existing development; completely a water quality addition	43.6	\$525,161	2010	Completed	28	78.8
MEL-2	Dove Street Pond	Wet detention pond	No treatment is provided within the existing development; completely a water quality addition	14.9	\$156,164	2003	Completed	69	31.3
MEL-3	Charles Drive Pipe Replacement	Wet detention pond	Replaced failing stormwater pipe and created wet detention pond; little to no treatment is provided within existing developments	143.3	\$462,644	2010	Completed	183	161.6
MEL-4	Wickham Park Pond	Wet detention pond	Ponds along with piping upgrades help eliminate flooding within the area along with treatment	1,796.9	\$250,000	Unknown	Completed	627	248.3
MEL-5	Babcock Street Realignment	Retention BMPs	Additional treatment was provided for the adjacent drainage basins	42.3	\$1,757,186	Unknown	Completed	163	41.9
MEL-6	Garfield Street Ponds - Lot 12 (North)	Dry detention	Two small dry detention ponds within an existing subdivision (with MEL-7)	24.8	\$181,605	2003	Completed	37	9.2
MEL-7	Garfield Street Ponds - Lot 24 (South)	Dry detention	Two small dry detention ponds within an existing subdivision (with MEL-6)	16.3	Part of MEL-6	2003	Completed	24	6.2
MEL-8	Education Efforts	Education	Irrigation, fertilizer, pet waste management, and landscaping ordinances; pamphlets, presentations, website, illicit discharge program	N/A	Unknown	Ongoing	Ongoing	2,583	587.2
MEL-9	Street Sweeping	Street sweeping	Street sweeping in the basin	N/A	Unknown	Ongoing	Ongoing	4,879	3,128.0
MEL-10	Autumn Woods	Wet detention	The proposed project consists of construction of a wet detention pond for water quality treatment	50.7	\$879,220	2017	Conceptual	279	120.0
MEL-11	Participation in FYN	Education	Future participation in FYN	N/A	Unknown	2017	Planned	2,583	587.2
MEL-12	South Croton Baffle Box	Dry retention and baffle box	The proposed project consists of construction of a dry retention area and baffle box	14.8	\$285,000	2017	60% Design	154	29.0

Total Project Reductions = 11,609 lbs/yr TN and 5,028.7 lbs/yr TP

Total BMAP I Required Reductions = 6,738.5 lbs/yr TN and 1,968.4 lbs/yr TP

Credit for Future BMAPs = 4,870.5 lbs/yr TN and 3,060.3 lbs/yr TP

TABLE A-10: CITY OF ROCKLEDGE IN NORTH B PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	ANNUAL O&M COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
ROCK-1	Orange Avenue Baffle Box	2 nd generation baffle box	10.4	\$8,600	\$2,555	2009	Completed	17	2.3
ROCK-2	Barton Avenue Baffle Box	2 nd generation baffle box	14.6	\$9,350	\$2,555	2009	Completed	20	2.9
ROCK-3	Hardee Circle Baffle Box	2 nd generation baffle box	14.6	\$43,420	\$2,555	2009	Completed	17	2.0
ROCK-4	Rockledge Avenue Baffle Box	2 nd generation baffle box	29.8	Unknown	\$3,682	2004	Completed	65	13.4
ROCK-5	Bougainvillea Drive Baffle Box	2 nd generation baffle box	27.9	\$29,495	\$2,566	2000	Completed	69	11.9
ROCK-6	Park Avenue Baffle Box	2 nd generation baffle box	9.1	\$52,529	\$2,555	2007	Completed	6	0.6
ROCK-7	Little John Lane Baffle Box	2 nd generation baffle box	7.8	\$60,000	\$2,555	2004	Completed	11	1.3
ROCK-8	Fernwood Drive Baffle Box	2 nd generation baffle box	13.2	\$55,750	Unknown	Unknown	Completed	14	1.6
ROCK-9	Valencia Drive Baffle Box	2 nd generation baffle box	9.6	\$58,960	\$2,555	2008	Completed	10	1.2
ROCK-10	Knollwood Baffle Box	2 nd generation baffle box	25.9	\$68,248	\$3,682	2002	Completed	23	2.6
ROCK-11	Sutton Street Baffle Box	2 nd generation baffle box	5.1	Unknown	Unknown	2011	Completed	6	0.6
ROCK-12	River Groves Baffle Box	2 nd generation baffle box	8.9	Unknown	Unknown	2011	Completed	5	0.5
ROCK-13	Summer Place Baffle Box	2 nd generation baffle box	10.6	Unknown	Unknown	2011	Completed	7	0.7
ROCK-14	Sweet Street Swale	Swale	6.3	Unknown	Unknown	2011	Completed	30	4.3
ROCK-15	Community Park of Rockledge Regional Facility Phase 1	Wet detention pond	37.4	\$50,000	\$23,974	2004	Completed	8	1.3
ROCK-16	Pineland Park Unit Three	Wet detention pond	24.1	\$100,000	\$6,234	2009	Completed	0	0.1
ROCK-17	Barton Park Regional Detention System	Wet detention pond	736.6	\$2,600,000	\$40,000	2010	Completed	2,493	1,136.7
ROCK-18	Florida Avenue Stormwater Facility	Wet detention pond	28.0	\$435,000	\$40,950	2010	Completed	88	64.7
ROCK-19	Police Department Pond	Wet detention pond	5.6	\$350,000	\$7,035	2010	Completed	1	0.1
ROCK-20	Huntington Lakes II	Wet detention pond	37.2	\$950,000	Unknown	Unknown	Completed	1	0.3
ROCK-21	Street Sweeping	Street sweeping	N/A	Unknown	\$54,000	Ongoing	Ongoing	750	337.9
ROCK-22	Treatment Missing from PLSM	Wet detention ponds – missing from model	383.2	Unknown	Unknown	1986-1999	Completed	1,248.0	477.3
ROCK-23	Irrigation, Landscaping, Fertilizer, and Pet Waste Management Ordinances; Pamphlets, Website, Storm Drain Markings, Illicit Discharge Program	Education	N/A	Unknown	Unknown	Ongoing	Ongoing	770	173.3

Total Project Reductions = 5,659.0 lbs/yr TN and 2,237.6 lbs/yr TP

Total BMAP I Required Reductions = 2,095.4 lbs/yr TN and 593.6 lbs/yr TP

Credit for Future BMAPs = 3,563.6 lbs/yr TN and 1,644.0 lbs/yr TP

TABLE A-11: CITY OF TITUSVILLE

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT COST	ANNUAL O&M COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
TV-9	Fertilizer Ordinance, PSAs, Pamphlets, Pet Waste Stations, Illicit Discharge Program, Newsletter, Website	Education	\$2,500	\$5,000	Ongoing	Ongoing	34	3.5
TV-10	Street Sweeping	Street sweeping	\$188,120	\$63,106	Ongoing	Ongoing	118	53.0

Total Project Reductions = 152.0 lbs/yr TN and 56.5 lbs/yr TP

Total BMAP I Required Reductions = 46.7 lbs/yr TN and 0.0 lbs/yr TP

Credit for Future BMAPs = 105.3 lbs/yr TN and 56.5 lbs/yr TP

TABLE A-12: FDOT DISTRICT 5

N/A – Not applicable

* FDOT is working to resolve the issue with its street sweeping contracts so that credit for street sweeping can be included in the BMAP.

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
FDOT-4	70100-3517-01 French Drains - missing from model	100% on-site retention	French Drain system along State Road 5 from University Boulevard to Aurora Road	21.3	1996	Completed	57	34.2
FDOT-5	70100-3544-01 French Drains-missing from model	100% on-site retention	Add lanes East of H. Humphrey Bridge to Sykes Creek Parkway	7.0	1995	Completed	26	13.6
FDOT-6	70020-3501-01 Pond 1-missing from model	Wet detention pond	State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road	17.1	2004	Completed	38	22.4
FDOT-7	70020-3501-02A Pond 2A-missing from model	Wet detention pond	State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road	12.6	2004	Completed	35	19.2
FDOT-8	70020-3501-02B Pond 2B-missing from model	Wet detention pond	State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road	4.8	2004	Completed	10	5.2
FDOT-9	70020-3501-03 Pond 3-missing from model	Wet detention pond	State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road	8.4	2004	Completed	18	10.4
FDOT-10	70020-3501-04 Pond 4-missing from model	Dry detention	State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road	7.9	2004	Completed	17	8.8
FDOT-11	70020-3549-01 Pond 1-missing from model	Wet detention pond	State Road 5 - Add lanes and reconstruct from Post Road to State Road 404	9.9	2005	Completed	28	14.2
FDOT-12	70020-3549-02 Pond 2-missing from model	Wet detention pond	State Road 5 - Add lanes and reconstruct from Post Road to State Road 404	18.9	2005	Completed	34	18.2
FDOT-13	70020-3549-03 Pond 3-missing from model	Wet detention pond	State Road 5 - Add lanes and reconstruct from Post Road to State Road 404	11.2	2005	Completed	32	16.5
FDOT-14	70020-3549-04 Pond 4-missing from model	Wet detention pond	State Road 5 - Add lanes and reconstruct from Post Road to State Road 404	3.4	2005	Completed	14	7.0
FDOT-15	70020-3549-05 Pond 5-missing from model	Wet detention pond	State Road 5 - Add lanes and reconstruct from Post Road to State Road 404	3.4	2005	Completed	11	6.0
FDOT-16	70140-3514-01 Pond A-missing from model	Dry detention	State Road 3 - Replace Christa McAuliffe Bridge	1.5	1997	Completed	4	2.4

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PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
FDOT-17	70140-3514-02 Pond B-missing from model	Wet detention pond	State Road 3 - Replace Christa McAuliffe Bridge	5.9	1997	Completed	18	7.5
FDOT-18	70120-3518-01 Pond 7 - missing from model	Wet detention pond	State Road 518 at State Road 513	9.9	1984	Completed	45	21.1
FDOT-19	70008-3505-01 Pond 1 - missing from model	Wet detention pond	From south of State Road 518 (Eau Gallie Causeway) to Banana River Drive	2.3	1992	Completed	6	3.4
FDOT-20	Education Efforts	Education	Illicit Discharge Detection and Elimination training, stormwater brochures, NDPES flyer	N/A	Ongoing	Ongoing	86	28.0
FDOT-21	Street Sweeping	Street sweeping	Street sweeping	N/A	Ongoing	Ongoing	0	0.0
FDOT-22	Fertilizer Cessation	Fertilizer Cessation	Elimination of fertilizer use along the rights-of-way	N/A	2005	Completed	1,552	0.0

Total Project Reductions = 2,031.0 lbs/yr TN and 238.1 lbs/yr TP

Total BMAP I Required Reductions = 649.9 lbs/yr TN and 318.9 lbs/yr TP

Credit for Future BMAPs = 1,381.1 lbs/yr TN and -80.8 lbs/yr TP*

TABLE A-13: KENNEDY SPACE CENTER IN NORTH B PROJECT ZONE

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
KSC-11	Landscape Fertilizer Reduction	Fertilizer reduction	Fertilizer use reduced from 60 tons/year in 2000 to 20 tons/year in 2010; formula changed from rapid nitrogen release 16-4-8 to slow nitrogen release, phosphate free 15-0-15	155.0	Ongoing	Ongoing	312	44.2
KSC-12	Citrus Grove Termination Jerome Road West	Fertilizer reduction	Grove lease termination resulted in previously fertilized areas abandoned	715.7	2010	Completed	184	850.8
KSC-13	KARS II Racquetball Court M6-0328A	Facility demolition	Demolition of facility resulted in loss of impervious area and change of land use	0.1	2010	Completed	1	0.2
KSC-14	Visitor Center Storage Building M6-0503	Facility demolition	Demolition of facility resulted in loss of impervious area and change of land use	0.1	2010	Completed	1	0.3
KSC-15	Causeway Wetland Mitigation	Wet detention pond	Missing from PLSM - existing permitted stormwater treatment pond	12.6	Unknown	Completed	8	3.8
KSC-16	Visitors Complex/ NASA Badging Center	Wet detention pond	Missing from PLSM - existing permitted stormwater treatment pond	131.7	Unknown	Completed	452	169.4
KSC-17	NASA Parkway West	Swales	Missing from PLSM - ditch along south side of NASA Parkway West, ends before the IRL	135.8	Unknown	Completed	239	100.9
KSC-19	Demolition of Facility M5-1546	Facility demolition	Demolition of facility resulted in loss of impervious area and change of land use	5.0	06/2012	Completed	76	15.8

Total Project Reductions = 1,273 lbs/yr TN and 1,185.4 lbs/yr TP

Total BMAP I Required Reductions = 0 lbs/yr TN and 0.0 lbs/yr TP

Credit for Future BMAPs = 1,273 lbs/yr TN and 1,185.4 lbs/yr TP

TABLE A-14: TOWN OF INDIALANTIC IN NORTH B PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
TI-1	Swales North of US192 Causeway	Swales	29.2	2001	Completed	297	51.7
TI-2	100% On-Site Retention	Retention	3.5	2001	Completed	35	6.1
TI-3	Pamphlet, Website	Education	N/A	Ongoing	Ongoing	9	1.6

Total Project Reductions = 341.0 lbs/yr TN and 59.4 lbs/yr TP

Total BMAP I Required Reductions = 142.4 lbs/yr TN and 30.1 lbs/yr TP

Credit for Future BMAPs = 198.6 lbs/yr TN and 29.3 lbs/yr TP

TABLE A-15: TOWN OF PALM SHORES IN NORTH B PROJECT ZONE

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
PS-1	Fertilizer and Landscaping Ordinances, Pamphlets, Presentations	Education	Ongoing	Ongoing	21	4.2

Total Project Reductions = 21 lbs/yr TN and 4.2 lbs/yr TP

Total BMAP I Required Reductions = 0 lbs/yr TN and 0.0 lbs/yr TP

Credit for Future BMAPs = 21 lbs/yr TN and 4.2 lbs/yr TP