

2014 PROGRESS REPORT

for the Banana 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
**Banana River Lagoon Basin
Technical Stakeholders**

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This 2014 Banana 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 Banana River Lagoon stakeholders.



Cape Canaveral Air Force Station Kennedy Space Center Patrick Air Force Base

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LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AFS	Air Force Station
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BRL	Banana River Lagoon
CDS	Continuous Deflective Separation (Unit)
Department	Florida Department of Environmental Protection
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
O&M	Operations and Maintenance
PLSM	Pollutant Load Screening Model
PSA	Public Service Announcement
SJRWMD	St. Johns River Water Management District
SRF	State Revolving Fund
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
UF–IFAS	University of Florida–Institute of Food and Agricultural Sciences
WBID	Waterbody Identification
WWTP	Wastewater Treatment Plant

SUMMARY

TOTAL MAXIMUM DAILY LOADS (TMDLS)

The Banana River Lagoon (BRL) 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 BRL BMAP, and it describes the implementation activities that occurred during the reporting period from February 7, 2013 through February 28, 2014.

The nutrient TMDLs for the main stem of the Indian River Lagoon (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 two projects, the City of Indian Harbor Beach completed five projects, the City of Satellite Beach completed two projects (one of which had 20 components), and Patrick Air Force Base (AFB) completed one project in the BRL B project zone. In addition, Kennedy Space Center completed two projects in the BRL A project zone.

These projects completed during the first annual BMAP reporting period in the BRL B project zone resulted in an estimated reduction of 4,334.1 pounds per year (lbs/yr) of total nitrogen (TN) and 1,111.8 lbs/yr of total phosphorus (TP). These reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 17,125 lbs/yr of TN and 4,125.3 lbs/yr of TP, which are greater than the required reductions in the first BMAP iteration for the BRL B project zone of 14,608.5 lbs/yr of TN and 3,535.4 lbs/yr of TP. The progress towards the TMDL load reductions in the BRL B project zone for TN and TP are shown in **Figure ES-1** and **Figure ES-2**, respectively.

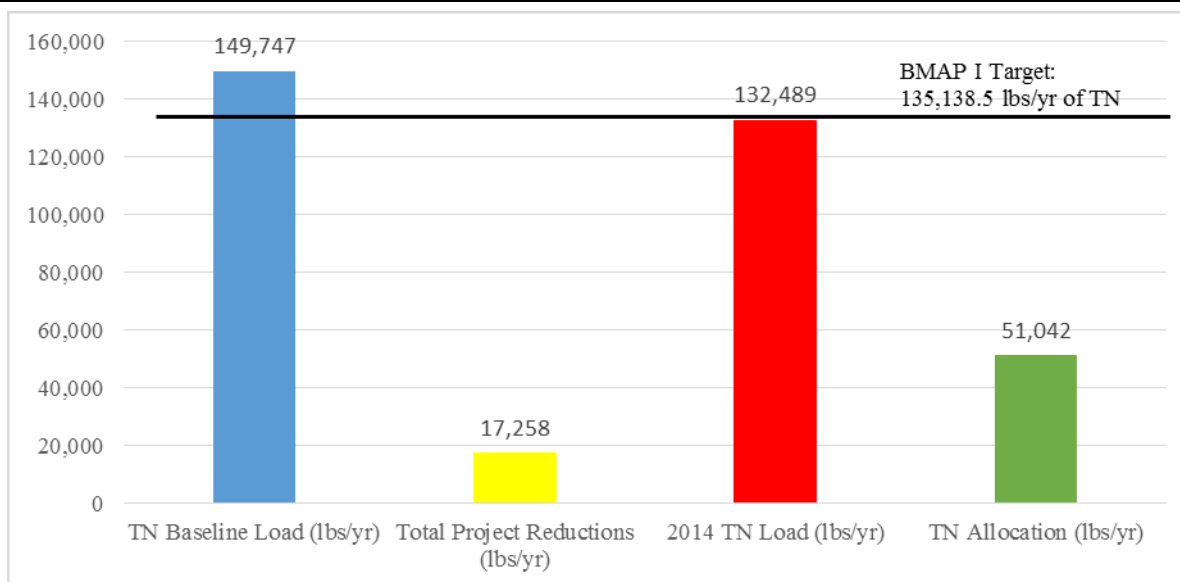


FIGURE ES-1: PROGRESS TOWARDS THE BRL B PROJECT ZONE TN TMDL

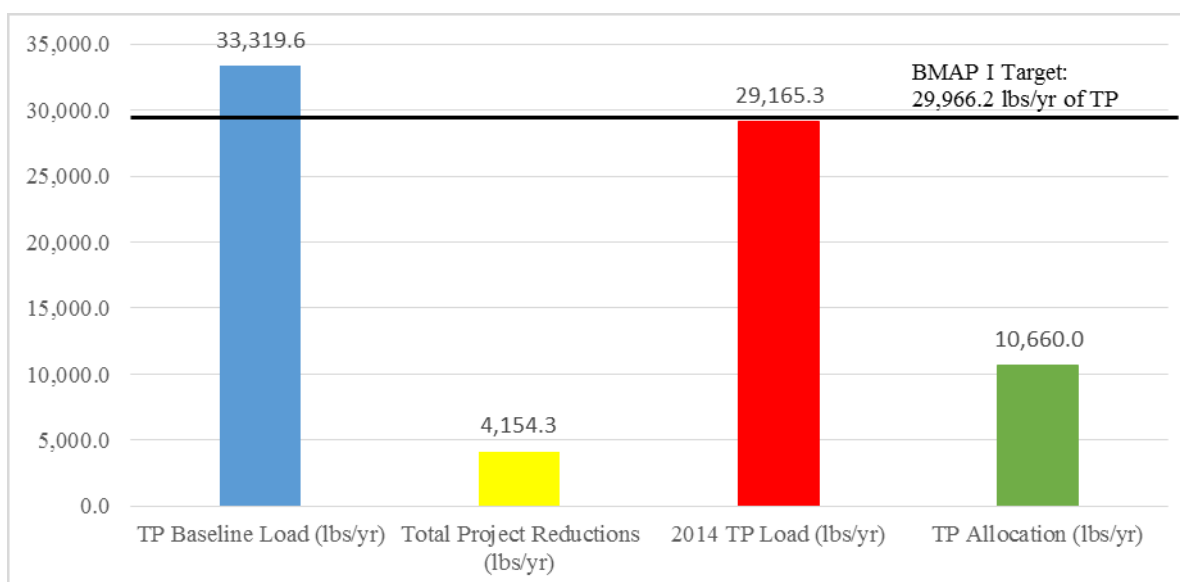


FIGURE ES-2: PROGRESS TOWARDS THE BRL B PROJECT ZONE TP TMDL

In addition, although allocations were not assigned in the BRL A project zone, stakeholders in this area have implemented projects. The total reductions achieved to date in the BRL A project zone are 18,655 lbs/yr of TN and 2,850.1 lbs/yr of TP.

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. The BRL A project zone was determined to be both Step 1 and Step 2 compliant, and the BRL B project zone was found to be neither Step 1 nor Step 2 compliant. Therefore, the BRL A project zone continues to meet the TMDL target and not require additional reductions at this time, while the BMAP reductions will continue in the BRL B project zone to work towards achieving the seagrass depth limit target. 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. The bloom was particularly detrimental to the BRL A project zone.

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 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 Banana River Lagoon (BRL) 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 BRL BMAP in 2013, extended duration algal super blooms were occurring in the Indian River Lagoon (IRL). The blooms resulted in large losses of seagrass acreage, 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 potential causes of the algal bloom. 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 BRL BASIN

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) BRL, (2) North IRL, and (3) Central IRL. Separate BMAPs were developed for each subbasin; this report focuses solely on the BRL subbasin.

The BRL is located between the barrier island cities of Cape Canaveral to Indian Harbour Beach and Merritt Island, and connects to the IRL at its south end. The lagoon has a limited outlet to the Atlantic Ocean through the lock at Port Canaveral. Net water flow is from the IRL to the BRL because the rate of evapotranspiration exceeds rainfall and basin inflows. The BRL system is a “negative estuary,” characterized by little freshwater inflows and poor flushing resulting in high water residence time. For assessment purposes, the Department has divided the BRL 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, BRL 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 BRL subbasin was split into two project zones as follows:

- *BRL A – the area north of and including the State Road 528 Causeway.*
- *BRL B – the area south of State Road 528 Causeway.*

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

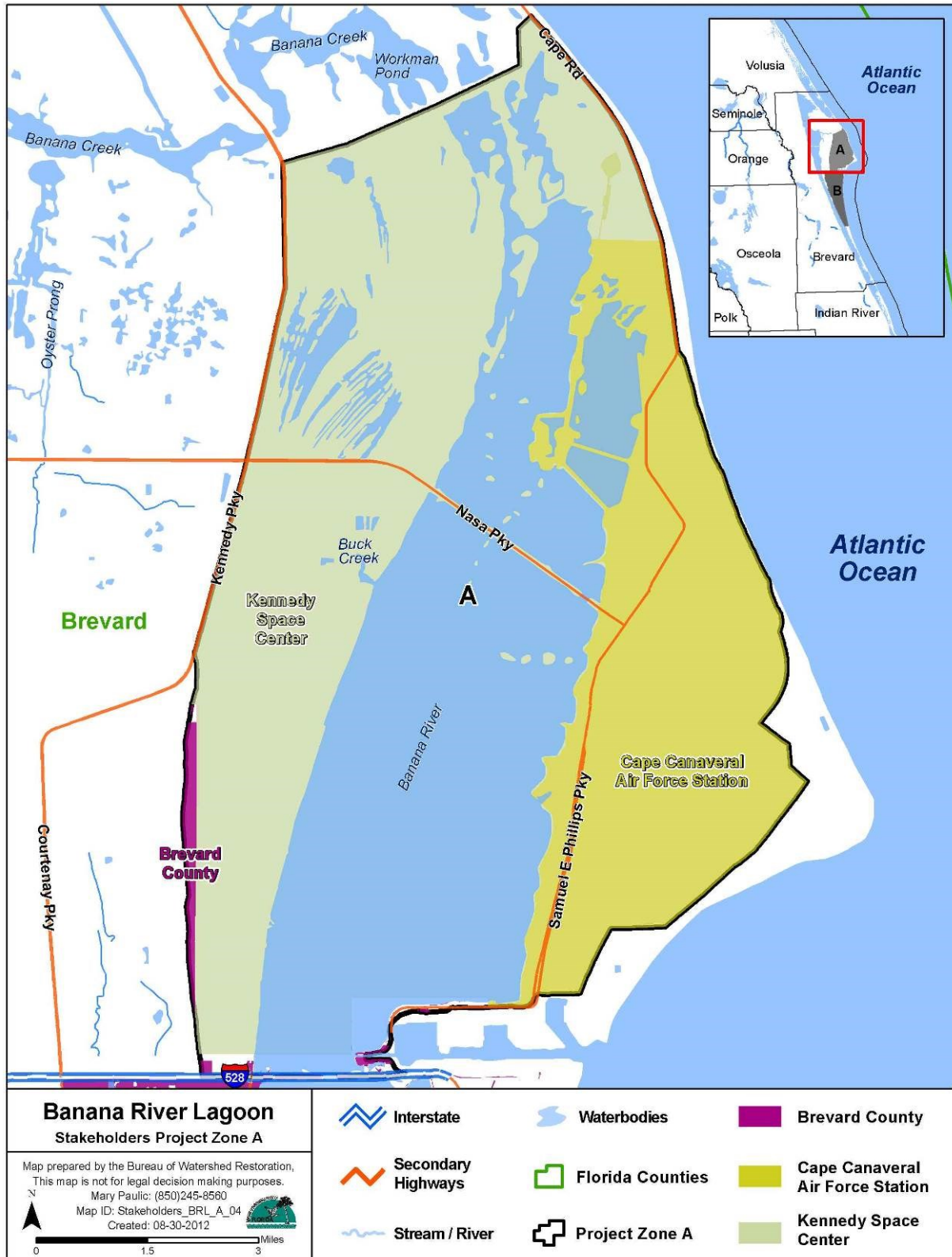


FIGURE 1: ENTITIES IN THE BRL A PROJECT ZONE

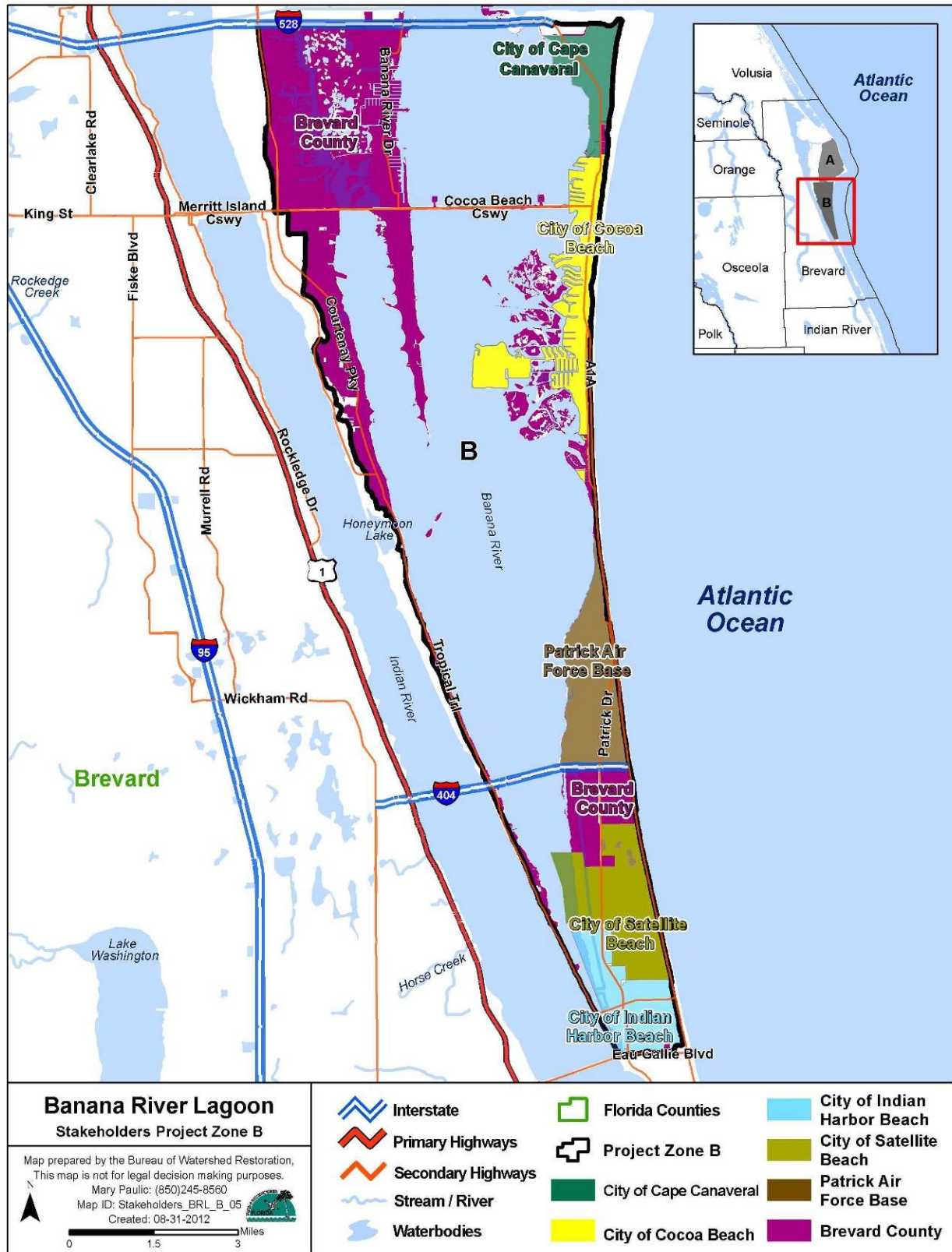


FIGURE 2: ENTITIES IN THE BRL B PROJECT ZONE

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 BRL subbasin decreased over the years due to changes in water quality conditions resulting from anthropogenic influences. **Table 1** lists the TMDLs and pollutant load allocations adopted by rule for the BRL subbasin.

TABLE 1: TMDLS IN THE BRL 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)
3057C	Banana River above Barge Canal	BRL A	TN	116,314	1,214	41,614	73,486
3057A+ 3057B	Banana River below 520 Causeway + Banana River above 520 Causeway	BRL B	TN	144,780	6,173	47,539	91,069
3044A	Newfound Harbor	BRL B	TN	30,661	N/A	15,489	15,172
TN Total	BRL TN Total	Not applicable	TN	291,755	7,387	104,642	179,727
3057C	Banana River above Barge Canal	BRL A	TP	7,825	302	5,874	1,649
3057A+ 3057B	Banana River below 520 Causeway + Banana River above 520 Causeway	BRL B	TP	12,181	1221	8,916	2,044
3044A	Newfound Harbor	BRL B	TP	3,247	N/A	2,907	340
TP Total	BRL TP Total	Not applicable	TP	23,253	1,523	17,697	4,033

1.3 RESPONSIBLE PARTIES AND KEY STAKEHOLDERS

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

- *Brevard County.*
- *City of Cape Canaveral.*
- *City of Cocoa Beach.*
- *City of Indian Harbour Beach.*
- *City of Satellite Beach.*
- *Cape Canaveral Air Force Station (AFS).*

- *Florida Department of Transportation (FDOT) District 5*
- *Kennedy Space Center.*
- *Patrick Air Force Base (AFB).*

In addition to these entities, 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 BRL A project zone was meeting seagrass depth limit targets (see Error! Reference source not found.); therefore, additional reductions were not required in this project zone and allocations were not calculated. For the entities in the BRL B project zone, 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. Based on these starting loads, agriculture, Port Canaveral, and the City of Melbourne were determined to be *de minimus* and were not assigned allocations in the first BMAP iteration. Each of these *de minimus* stakeholders contributed less than 0.5% of the total load for both TN and TP and combined they contribute approximately 1% of the total load.

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 BRL 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 for the first BMAP iteration are shown in **Table 2**.

TABLE 2: TN AND TP REQUIRED REDUCTIONS FOR THE FIRST BMAP ITERATION

ENTITY	BMAP 1 TN REQUIRED REDUCTIONS (LBS/YR)	BMAP 1 TP REQUIRED REDUCTIONS (LBS/YR)
Brevard County	6,343.1	1,378.5
City of Cape Canaveral	886.4	220.3
City of Cocoa Beach	1,701.9	353.9
City of Indian Harbour Beach	1,017.6	174.8
City of Satellite Beach	1,572.9	298.2
FDOT District 5	471.9	179.3
Patrick AFB	2,614.7	748.4

Section 2: ACCOMPLISHMENTS DURING THE REPORTING PERIOD

During the reporting period, Brevard County completed two projects, the City of Indian Harbor Beach completed five projects, the City of Satellite Beach completed two projects (one of which had 20 components), and Patrick AFB completed one project in the BRL B project zone. These projects resulted in an estimated reduction of 4,334.1 lbs/yr of TN and 1,111.8 lbs/yr of TP. In addition, Kennedy Space Center completed two projects in the BRL A project zone, which achieved 14 lbs/yr of TN and 4.1 lbs/yr of TP reductions.

The accomplishments during the reporting period 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 Florida Boulevard Managed Aquatic Plant System (MAPS) (Project BC-18). This project consists of installing floating vegetated islands in the existing Florida Boulevard Pond 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. This 2.4 acre stormwater retention pond provides nutrient removal for a 170-acre drainage basin that discharges stormwater into the BRL. The floating island was installed in summer 2013 with grant-required monitoring and outreach extending into fiscal year 2013-2014.

The Cassia Phase III project was completed through a partnership with the City of Satellite Beach (Project BC-25). The city designed, permitted, bid, and constructed this water quality and flood control project. The county provided cost-share in exchange for 100 lbs/yr of TN removal credit within the BRL B project zone.

At the time of initial BMAP adoption, Brevard County had not finished development of sufficient projects to meet the TN load reductions required for the first iteration of the BMAP in the BRL B project zone. Brevard County's plan for meeting this remaining reduction is to partner with Patrick AFB on an appropriate portion of the total annualized cost of their Golf Course Pond Stormwater Reuse Project. Brevard County has been working with the Air Force to develop a methodology for "TMDL Capacity Sharing" through a new "Air Force Community Partnership Initiative." This nationwide initiative began as a pilot project at just a few bases, however last year Patrick AFB was asked to be part

of an expanding list of pilot sites. TMDL Capacity Sharing will be a new element for the Community Partnership Initiative and, therefore, requires a business case analysis that may need to be reviewed/supported by an Air Force Center of Excellence. In addition, a task force has been established to determine what authority is needed, what agreement vehicle is most appropriate, what existing guidance criteria should be applied, and what waivers may be needed.

Brevard County has continued work on Pine Island Phase I and II (Project BC-2). 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 BRL and North IRL. 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 3** through **Figure 5**). The Department, through Section 319 and TMDL grant funding, provided \$1,380,000 towards Phase I of the project. Phase I construction was completed in September 2012. The Phase II portion 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 3: BREVARD COUNTY PINE ISLAND PROJECT UNDER CONSTRUCTION



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Pine Island

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FIGURE 4: BREVARD COUNTY COMPLETED PINE ISLAND PHASE I PROJECT



FIGURE 5: BREVARD COUNTY SAMPLING OF THE PINE ISLAND PROJECT

The county has also continued work on the Fortenberry Pond (Project BC-16). This project involves multi-phase construction of a 22.3-acre regional stormwater treatment pond on Merritt Island (see **Figure 6**). In September 2009, the Merritt Island Redevelopment Authority purchased a 50-acre parcel to accommodate a regional water quality treatment/stormwater management system to serve roughly 170 commercially developed acres along the south side of State Road 520. The first phase of construction, completed in November 2012, excavated nearly 11 acres of pond and provided immediate potential for economic redevelopment along the State Road 520 corridor. Excavation of the Phase 2 area, an additional 11.65 acres, began construction in fall 2013 using a combination of available stormwater assessment revenues, grants and commercial paper. This project will be completed in 2014.



FIGURE 6: BREVARD COUNTY FORTENBERRY POND UNDER CONSTRUCTION

The county has continued its baffle box retrofits at 3rd Avenue, 4th Place, Thrush, and Ocean Boulevard (Projects BC-19, BC-21, BC-22, and BC-29) in the BRL Basin. 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-1 and B-14) 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 (BRL, North IRL, and Central IRL) 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-15). 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-20). 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.

2.1.2 CAPE CANAVERAL AFS

Base policy at Cape Canaveral AFS precludes the use of fertilizers by grounds maintenance contracts through operating instructions and performance work statements (Project CCAFS-1). Specifications are reviewed to ensure fertilizer application is not included in project specifications during construction project design reviews. Periodic street sweeping is conducted at set intervals and after activities occur that generate sediment (Project CCAFS-2). In addition, new employee briefings are utilized to reinforce the Air Force policy on the nonuse of fertilizer and educate participants on the importance of reducing nutrient loads to the IRL.

2.1.3 CITY OF CAPE CANAVERAL

During the reporting period, the City of Cape Canaveral continued street sweeping of all curbed city streets on a monthly basis, with a total of 169 cubic yards of sand and debris collected (Project CC-8). The city also continued its education and outreach efforts (Project CC-10). These efforts include the adoption of an ordinance strengthening enforcement authority for illicit discharges to the city's

stormwater system (City Council readings in May and June 2013); continued distribution of stormwater-related documents at the city's public library, with a total of 533 documents distributed; continued distribution of stormwater-related documents in business license renewal packages mailed to area businesses, with a total of 275 packages mailed; and continued participation in Brevard County's Blue Life Program. The city has also continued to collect sediment from the city's baffle boxes, which was a total of 22 cubic yards of sediment and debris (Project CC-16). The city also collects floatable debris from the city's nine baffle boxes after every rainfall event. The city adopted an ordinance strengthening land developer requirements in the prevention of stormwater runoff from construction sites, installed an underground stormwater vault system at the city's new fire station, and installed exfiltration piping in the rights-of-way along several city streets to allow for infiltration of stormwater into the surficial aquifer and to prevent street flooding.

The city has also been working on the Central Ditch dredging (Project CC-17). Over the past years, this stormwater conveyance ditch was subject to illegal dumping activities. Therefore, the project included the removal of 2,016 cubic yards of muck/debris from a 400-foot section of the ditch north of West Central Boulevard, the installation of three culverts with reinforced concrete piping in the ditch channel, backfilling of all excavations, and sodding the entire area to prevent illegal dumping (see **Figure 7** and **Figure 8**).

The City of Cape Canaveral had delays in three of the BMAP projects. The Stormwater Exfiltration on North Atlantic Ave (Project CC-13) was delayed to September 2015 from December 2013, Stormwater Exfiltration at Canaveral City Park (Project CC-14) was delayed to September 2016 from December 2015, and Stormwater Pond on West Central Boulevard (Project CC-14) was delayed to September 2019 from December 2016. The first two projects will still be completed within the five-year BMAP period. The third project will be completed during the second, five-year BMAP period; however, the city has exceeded the reductions needed for the first BMAP iteration.



FIGURE 7: CITY OF CAPE CANAVERAL CENTRAL DRAINAGE DITCH PROJECT CONSTRUCTION



FIGURE 8: CITY OF CAPE CANAVERAL COMPLETED CENTRAL DRAINAGE DITCH PROJECT

2.1.4 CITY OF COCOA BEACH

The City of Cocoa Beach's Minutemen Corridor Streetscape and Stormwater/Low Impact Development (LID) Improvement (Project CB-39) is on track and close to 100% design (see **Figure 9**). Depending on funding sources, the city is expecting to start construction in fall 2014. This LID project includes using landscape urban planter rain gardens, pervious pavers, and under parking exfiltration. These LID BMPs form the basis for the streetscape revitalization. Additionally, the project uses nutrient sorption media in all BMPs (with the exception of monitoring control BMPs) to capture nitrogen and phosphorus, further protecting the lagoon as well as the groundwater sources. Monitoring of pre-groundwater, discharge canal, and discharge flow will give baseline data and post-monitoring includes these same parameters and also inflow/outflow nutrient concentration of nutrient sorption media BMPs and one BMP of each type without the sorption media.

The city has had many success stories with the completed projects submitted for the BRL BMAP. The Maritime Hammock Preserve Alum-Enhanced Stormwater Pond (Project CB-1) takes approximately 128-acres of high density residential and commercial land use, including the high-traffic State Road

A1A, and treats runoff with alum in a natural setting one-acre pond (see **Figure 10**). A collection manifold at the pond's bottom allows settled material and floc to be pumped back to the city's wastewater facility for treatment. This pond rarely discharges back to the BRL, and the city is working on flow meter installation to obtain accurate flow to the pond and discharge flow from the pond back to the lagoon. The city will be conducting groundwater testing in the near future to see how this pond may be affected the local groundwater table in the area of the pond.



FIGURE 9: CITY OF COCOA BEACH MINUTEMEN CORRIDOR STREETScape AND STORMWATER/LID IMPROVEMENT PROJECT DESIGN



FIGURE 10: CITY OF COCOA BEACH MARITIME HAMMOCK PRESERVE STORMWATER POND

The Ocean Beach Boulevard Bioretention/Exfiltration System (Project CB-2) is on a 1.5-mile high traffic corridor that was improved for pedestrian, bicycle, and vehicular traffic. The project reduced the impervious area greatly and added much needed green space and sidewalk canopy. The roadway was narrowed and turning lanes installed so that the roadway medians could be widened into native coastal landscaped bioswales (see **Figure 11**). The existing drainage pipe was removed and slotted exfiltration pipe was installed in its place to allow the stormwater to percolate through the sandy beach soils. Years after this project was completed, this is a highly used pedestrian corridor where bicycles can safely traverse the city, and the landscape is maturing to create a beautiful coastal corridor. This corridor stormwater and streetscape improvement has been highlighted in *Florida Today* and WESH News for lagoon stormwater improvements.



FIGURE 11: CITY OF COCOA BEACH OCEAN BEACH BOULEVARD BIORETENTION/EXFILTRATION PROJECT

The State Road A1A and Ocean Beach Boulevard Bioswales involved approximately 22 bioswales that have been installed at intersections, interrupting storm flow prior to storm drains. These bioswales are landscaped with native coastal grasses, saw palmetto, and sabal palms and provide attractive “gateways” to the city’s beach accesses, as well as keep significant storm runoff out of lagoon (see **Figure 12**).



FIGURE 12: CITY OF COCOA BEACH STATE ROAD A1A BIOSWALES PROJECT

The City of Cocoa Beach continued its routine street sweeping of two times per month for the more treed/debris areas and once per month for all other curbed roadways (Project CB-37).

The city has also continued its public education and outreach efforts (Project CB-38). The city adopted a pet waste/illicit discharge ordinance over two years ago, and the city installed seven pet waste stations along the most frequently used walking corridors. The city adopted a more protective fertilizer ordinance in January 16, 2014, which included a Florida-friendly landscape element (see **Section 2.4** for more details). The city has reclaimed water irrigation, which is utilized by 88% of the residential and commercial properties. The City of Cocoa Beach has a program in place to inspect and enforce its ordinance prohibiting reclaimed water overspray or over-irrigation that causes this reclaimed water to runoff to street. The city is partnering with the City of Cape Canaveral and Brevard County University of Florida–Institute of Food and Agricultural Sciences (UF–IFAS) in a “My Brevard Yard: seminar to be held April 8, 2014 at the Cape Canaveral Library. This seminar, offered to residents and landscape/lawn firms, will include education on proper fertilization, Florida-friendly plants, proper irrigation, pest management, and the nuances of the cities’ fertilizer ordinances. In addition, Cocoa Beach is a partner in Blue Life and a board member with the Marine Resources Council. The city’s active public outreach program includes a Citizens Academy, robust eco information/resources on the city’s website, an email distribution of environmental/watershed information/events as needed, downtown kiosk on the land/water stormwater connection, partnership with Friends of the Thousand

Islands and Cocoa Beach Surfrider with associated events, Cocoa Beach Library presentations/workshops, Keep Brevard Beautiful/city island cleanup events, and organization speakers bureau (e.g. Cocoa Beach Garden Club and League of Women Voters), to name a few. The city also has over 90% of the storm drains labeled with the IRL snook marker.

2.1.5 CITY OF INDIAN HARBOUR BEACH

The City of Indian Harbour Beach completed several projects during the reporting period. The fire station project (Project IHB-11) was originally envisioned as a dry retention pond adjacent to the fire station. Due to budgetary limitations, the constructed project was two inlets with 599 linear feet of offline 12-inch exfiltration trench to treat a 2.8-acre drainage basin (see **Figure 13**). The estimates for annual TN and TP removal for this project have been updated to reflect the actual project. Park Road Exfiltration (Project IHB-12) was also completed, and involved the construction of 130 linear feet of perforated 24-inch pipe between two houses, in conjunction with installation of three inlets and two storm drainpipes at the intersection of Park Drive and School Road (see **Figure 14**). The project served dual purposes: (1) to relieve flooding at said intersection, and (2) to provide retention volume for the stormwater in this drainage basin. The exfiltration pipe had a weir installed on the south end to provide retention before the weir overflowed and discharged to a downstream pipe.



FIGURE 13: CITY OF INDIAN HARBOUR BEACH FIRE STATION INLET AND EXFILTRATION TRENCH



FIGURE 14: CITY OF INDIAN HARBOUR BEACH PARK STREET INLET AND EXFILTRATION TRENCH

Yuma Drive Exfiltration (Project IHB-13) was completed and is located along Yuma Drive adjacent to the schoolyard between Cheyenne Drive and Sioux Drive. An existing 15-inch drainage pipe along the north side of Yuma Drive was undersized, leading to periodic flooding at the school entrance driveway. The old pipe was removed and replaced with 235 linear feet of 2- to 15-inch high density polyethylene perforated pipes behind the curb line, providing increased conveyance and flood protection for Yuma Drive (see **Figure 15**). A weir at the north end of the pipe created an inline pipe that overflowed to downstream pipes. The exfiltration trenches also provided retention storage for 11.15 acres. The Lime Bay Exfiltration Pipes (Project IHN-14) were completed in subdivision that consists of 26.86 acres, which drain fairly uniformly to Markley Court, Hawthorne Court East, Hawthorne Court West (see **Figure 16**), Summerset Court East, and Summerset Court West. At the end of each street was a bottomless inlet that percolates water into the ground at a slow rate. While these inlets kept the street dry during small storms, during larger storms runoff overflowed the curbs and sheet flowed offsite. This project installed 381 linear feet of off-line exfiltration trenches with 12-inch perforated pipes at each inlet to reduce flooding and increase retention volume. In addition, the Andros Lane Exfiltration Pipes Retrofit (Project IHB-15) was completed because there was a flood prone inlet with no outfall pipe. The inlet was replaced and 93 linear feet of 12-inch high density polyethylene pipe and exfiltration trench installed behind the curb line.



FIGURE 15: CITY OF INDIAN HARBOUR BEACH YUMA STREET EXFILTRATION TRENCH



FIGURE 16: CITY OF INDIAN HARBOUR BEACH INLET AT HAWTHORNE COURT WEST AS PART OF THE LIME BAY EXFILTRATION PROJECT

As part of public works maintenance activities, rusted out corrugated metal pipe is being replaced with perforated polyethylene pipe, gravel bedding, and weirs for retention storage. At locations where water ponds in streets, these drainage complaints are addressed by installing an inlet and short runs of dead end exfiltration pipe. Thus, the drainage problem is fixed and BMAP credit is obtained for taking the runoff offline into the ground.

The city continued its public education and outreach efforts (Projects IHB-4). The city also continued inlet cleaning two to seven times on inlets throughout the city, and continued street sweeping eight times

over the year (Projects IHB-5 and IHB-6). The city continued irrigation of Gleason Park with pond water at historic withdrawal rates (Project IHB-9).

The City of Indian Harbour Beach has planning and land acquisition for the Lift Station Pond (Project IHB-10) underway but the project was not completed in June 2013. The project will now be completed in September 2015, which is within the five-year BMAP iteration.

2.1.6 CITY OF SATELLITE BEACH

The City of Satellite Beach completed the Cassia Phase III drainage project (Projects SB-21 through SB-40), which included replacing an open drainage ditch with piping, drainage structures, and retention swales (see **Figure 17**). The project also allowed for the construction of an 8 foot pedway, around and through the swales (see **Figure 18**). The pedway replaced a bicycle path that was a safety issue for students going to and from a local elementary school. Increased pedestrian traffic also increased the amount of dog waste in the area. Therefore, dog waste stations were purchased by the city's beautification board, and 4th grade students from the elementary school worked with the board for awareness signage around the dog waste stations. Post-construction monitoring of the project is in progress. The city also completed the North Basin Stormwater Retrofit (Project SB-18).



FIGURE 17: CITY OF SATELLITE BEACH CASSIA PHASE III PROJECT UNDER CONSTRUCTION

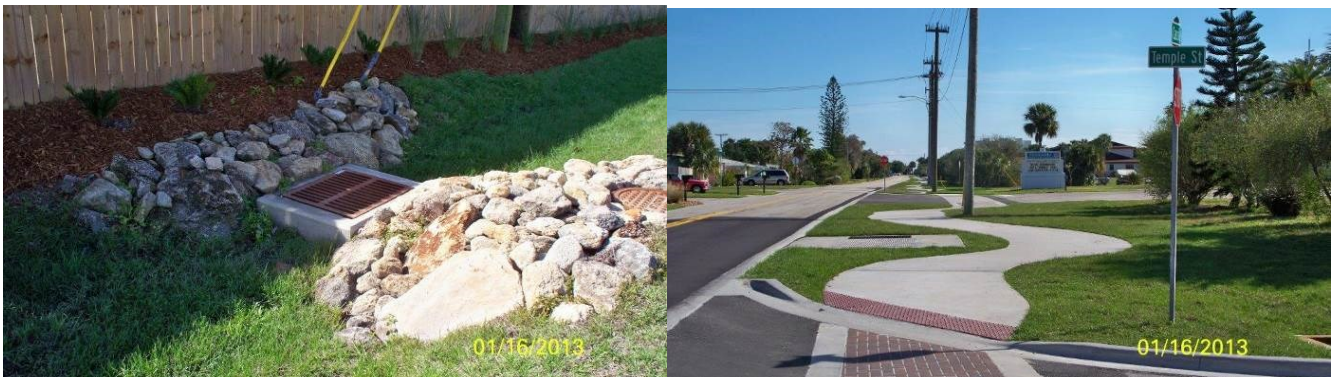


FIGURE 18: CITY OF SATELLITE BEACH COMPLETED CASSIA PHASE III PROJECT

2.1.7 FDOT DISTRICT 5

FDOT continued to implement its illicit discharge and stormwater education programs (Projects FDOT-2 and FDOT-15). 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 in the BRL BMAP. At this time, FDOT is removing street sweeping from its list of project BMPs for the BMAP (Projects FDOT-1 and FDOT-14). With the removal of the street sweeping credit, FDOT still has more than enough TN reductions for the first BMAP iteration, but is short on credits for the required TP reductions. 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 (KSC-1), several facilities (M7-1521, M7-1522, and M6-0339) were demolished to reduce the impervious footprint in the BRL Basin (Projects KSC-20 and KSC-21). The demolition of these facilities were not previously submitted for credit in the BRL BMAP.

2.1.9 PATRICK AFB

Patrick AFB completed the Golf Course Regional Stormwater System (Project PAFB-6) in May 2013. The system was designed to connect and enlarge numerous small storm systems to increase capacity for stormwater, slow the velocity of stormwater flows, and establish a stormwater reuse pond to capture stormwater entering the system and use it to irrigate the golf course, effectively reducing discharges and nutrient loading to the river by 40%.

2.2 SUMMARY OF ACCOMPLISHMENTS

The projects completed during the first annual BMAP reporting period in the BRL B project zone are summarized in **Table 3**. These projects resulted in an estimated reduction of 4,467.1 lbs/yr of TN and 1,140.8 lbs/yr of TP. These reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 17,258 lbs/yr of TN and 4,154.3 lbs/yr of TP, which are greater than the required reductions in the first BMAP iteration for the BRL B project zone of 14,608.5 lbs/yr of TN and 3,535.4 lbs/yr of TP.

The progress towards the TMDL load reductions in the BRL B project zone for TN and TP are shown in **Figure 19** and **Figure 20**, respectively. The first bar in these figures shows the baseline load for stormwater runoff. The second bar shows the total load reductions from projects implemented through February 28, 2014. The third bar shows the current estimated loading with the implementation of projects. The fourth bar shows the total allocation for stormwater runoff to meet the TMDLs. The line shows the target for the first BMAP iteration.

TABLE 3: SUMMARY OF PROJECTS COMPLETED IN THE REPORTING PERIOD (FEBRUARY 7, 2013 THROUGH FEBRUARY 28, 2014) IN THE BRL B PROJECT ZONE

ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Brevard County	BC-18	Florida Boulevard Pond MAPS	117	14.3
Brevard County	BC-25	Cassia Phase 3	100	0.0
City of Cape Canaveral	CC-10	Education – addition of fertilizer ordinance	42	9.9
City of Cocoa Beach	CB-38	Education – addition of fertilizer ordinance	91	19.1
City of Indian Harbour Beach	IHB-11	Fire Station Exfiltration	0.1	0.0
City of Indian Harbour Beach	IHB-12	Park Road Exfiltration	18	3.6
City of Indian Harbour Beach	IHB-13	Yuma Drive Exfiltration	26	5.9
City of Indian Harbour Beach	IHB-14	Lime Bay Exfiltration	5	1.2
City of Indian Harbour Beach	IHB-15	Andros Lane Exfiltration	5	0.7
City of Satellite Beach	SB-18	North Basin Stormwater Retrofit	318	80.5
City of Satellite Beach	SB-21	Cassia Phase 3 - C3A	0	0.6
City of Satellite Beach	SB-22	Cassia Phase 3 - C3B	0	0.5
City of Satellite Beach	SB-23	Cassia Phase 3 - C3C	0	0.5
City of Satellite Beach	SB-24	Cassia Phase 3 - C3D	0	0.8
City of Satellite Beach	SB-25	Cassia Phase 3 - C3E	0	0.7
City of Satellite Beach	SB-26	Cassia Phase 3 - C3F	0	3.0
City of Satellite Beach	SB-27	Cassia Phase 3 - C3G	0	2.3
City of Satellite Beach	SB-28	Cassia Phase 3 - C5A	0	0.5
City of Satellite Beach	SB-29	Cassia Phase 3 - C5B	0	5.4
City of Satellite Beach	SB-30	Cassia Phase 3 - C7A	0	0.4
City of Satellite Beach	SB-31	Cassia Phase 3 - C7B	0	3.5
City of Satellite Beach	SB-32	Cassia Phase 3 - C9A	0	0.6
City of Satellite Beach	SB-33	Cassia Phase 3 - C9B	19	2.8
City of Satellite Beach	SB-34	Cassia Phase 3 - C13A	7	1.9
City of Satellite Beach	SB-35	Cassia Phase 3 - C13B	0	0.3
City of Satellite Beach	SB-36	Cassia Phase 3 - C13C	0	1.7
City of Satellite Beach	SB-37	Cassia Phase 3 - C13D	7	1.6
City of Satellite Beach	SB-38	Cassia Phase 3 - C13E	9	2.2
City of Satellite Beach	SB-39	Cassia Phase 3 - C13F	11	2.6
City of Satellite Beach	SB-40	Cassia Phase 3 - C13G	15	3.8
Patrick AFB	PAFB-6	Golf Course Pond Stormwater Reuse	3,677	969.9
Total	N/A	Total Reductions in Reporting Period	4,467.1	1,140.8

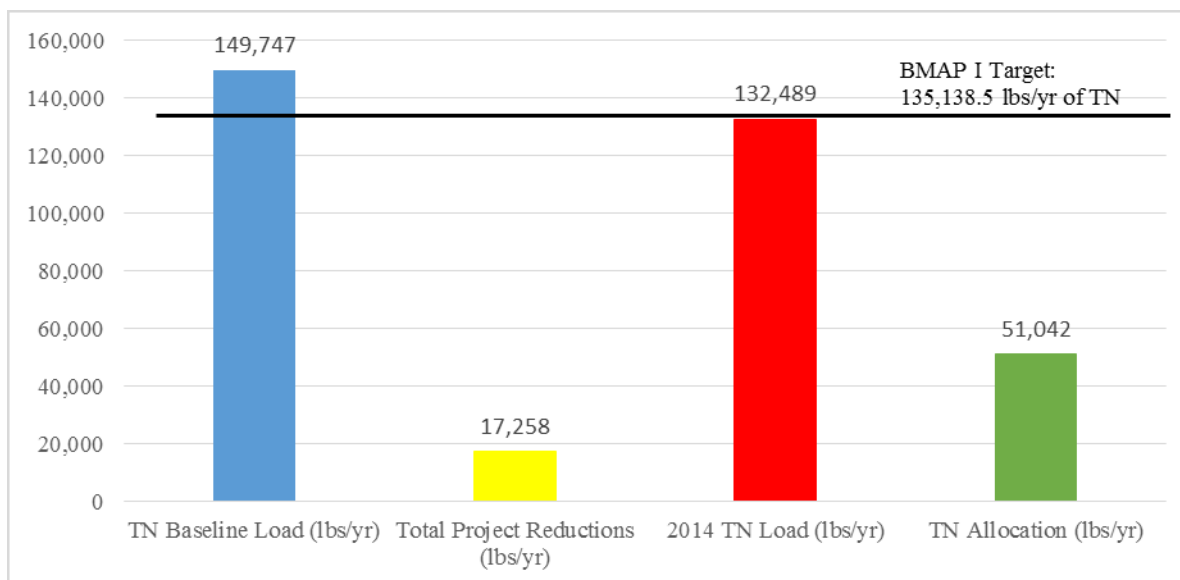


FIGURE 19: PROGRESS TOWARDS THE BRL B PROJECT ZONE TN TMDL THROUGH FEBRUARY 28, 2014

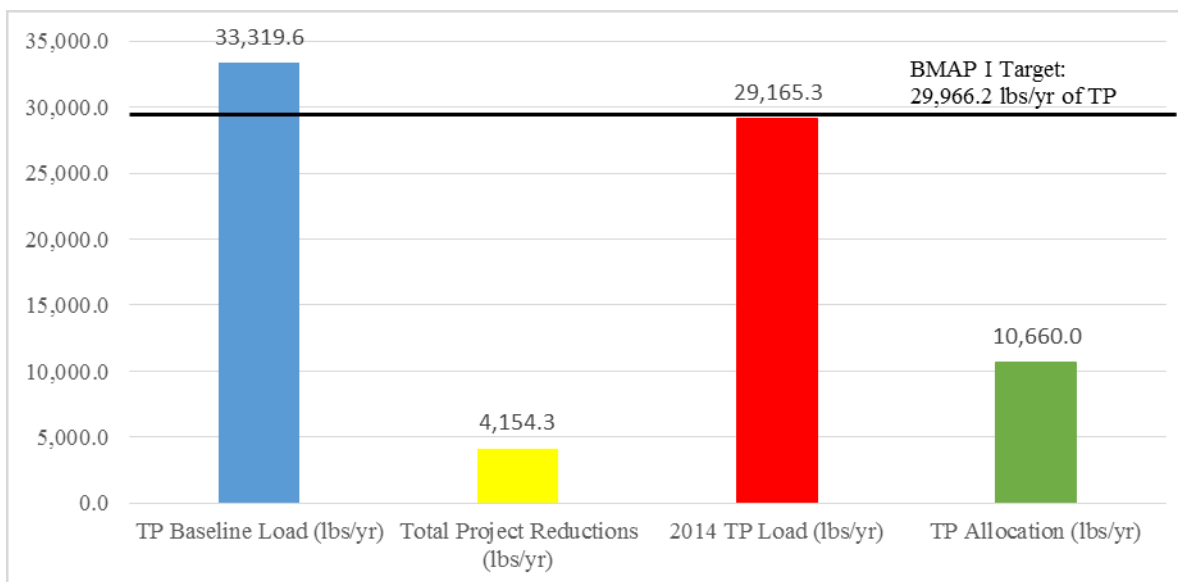


FIGURE 20: PROGRESS TOWARDS THE BRL B PROJECT ZONE TP TMDL THROUGH FEBRUARY 28, 2014

In addition, although allocations were not assigned in the BRL A project zone, stakeholders in this area have implemented projects. The projects completed in the BRL A project zone during the reporting period are shown in **Table 4**, and these projects achieve 14 lbs/yr of TN and 4.1 lbs/yr of TP reductions. The total reductions achieved to date in the BRL A project zone are 18,669 lbs/yr of TN and 2,854.2 lbs/yr of TP.

TABLE 4: SUMMARY OF PROJECTS COMPLETED IN THE REPORTING PERIOD (FEBRUARY 7, 2013 THROUGH FEBRUARY 28, 2014) IN THE BRL A PROJECT ZONE

ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
Kennedy Space Center	KSC-20	Demolition of Facilities M7-1521 and M7-1522	7	1.8
Kennedy Space Center	KSC-21	Demolition of Facility M6-0339	7	2.3
Total	N/A	Total Reductions in Reporting Period	14	4.1

2.3 FUNDING

Brevard County received an \$117,000 Section 319 grant for its county-wide (BRL, North IRL, and Central IRL) baffle box retrofit projects. The county also received Section 319 grants for the Pine Island Phase I and II project located in the BRL (Project BC-2) and North IRL. The grant for Phase I was \$1,380,000 and the grant for Phase II was \$800,000. In addition, the county received a \$341,955 TMDL grant for Fortenberry Phase II (Project BC-16).

The City of Cape Canaveral acquired \$8,000,000 in funding from the Department's State Revolving Fund (SRF) Program for stormwater- and wastewater-related improvements. Stormwater improvement projects to be funded through the SRF include the construction of bio-swales as part of the North Atlantic Avenue Streetscape Project in fiscal year 2014/2015 (Project CC-13), and construction of exfiltration vaults beneath Canaveral City Park in fiscal year 2015/2016 (Project CC-14). The SRF funding will also be used for construction of a 2.5 million reclaimed water storage tank at the city's wastewater treatment plant (WWTP) in fiscal year 2014/2015. This project will eliminate most, if not all, of the WWTP discharges to the BRL.

The City of Cocoa Beach was recently awarded a Section 319 grant for \$544,540, and submitted a TMDL grant application for \$450,000.

The City of Satellite Beach received a Section 319 grant for Cassia Phase III (Projects SB-21 through SB-40). The total project cost was \$1,237,180, with an additional \$146,576 for pedway and decorative crosswalks from other funding sources.

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 5**.

TABLE 5: SUMMARY OF FERTILIZER ORDINANCE DEVELOPMENT DURING THE REPORTING PERIOD IN THE BRL

LOCAL GOVERNMENT	FERTILIZER ORDINANCE STATUS
Brevard County	Adopted
City of Cape Canaveral	Adopted
City of Cocoa Beach	Adopted
City of Indian Harbour Beach	Adopted
City of Satellite Beach	Adopted

2.5 WATER QUALITY AND SEAGRASS MONITORING

SJRWMD monitors six stations in the BRL, and these stations were monitored monthly during the reporting period. SJRWMD also continued its seagrass transect monitoring in the BRL, 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 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, BRL A was found to be Step 1 compliant (see **Figure 21**) and Step 2 compliant (refer to **Table 6**). BRL B was not found to be Step 1 compliant (see **Figure 22**) nor Step 2 compliant (refer to **Table 6**). Therefore, the BRL A project zone continues to meet the TMDL target and not require additional reductions at this time, while the BMAP reductions will continue in the BRL B project zone to work towards achieving the seagrass depth limit target.

It is important to note the dramatic decrease in the median seagrass depth for 2011. Decreases in median depth were substantial for both the BRL A and BRL B project zones. Between 2009 and 2011,

the median depth for the BRL A project zone decreased by 60% and the median for the BRL B project zone decreased by 53%. With the continuing problems 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, and draft data could be available earlier in the summer. The Department may consider other metrics of seagrass health to better identify negative trends and facilitate response.

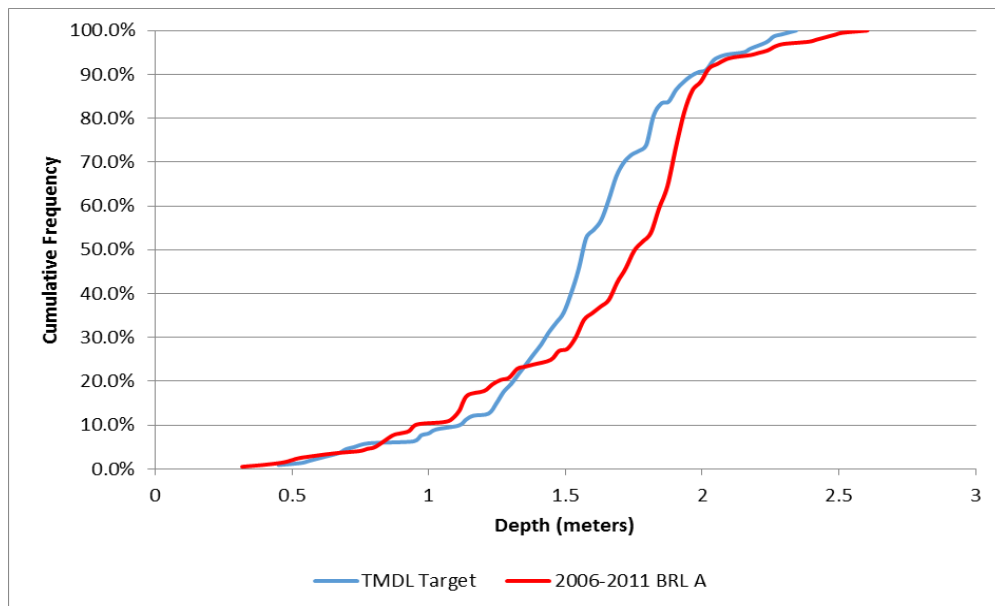


FIGURE 21: STEP 1 COMPLIANCE EVALUATION FOR THE BRL A PROJECT ZONE FOR 2006-2011

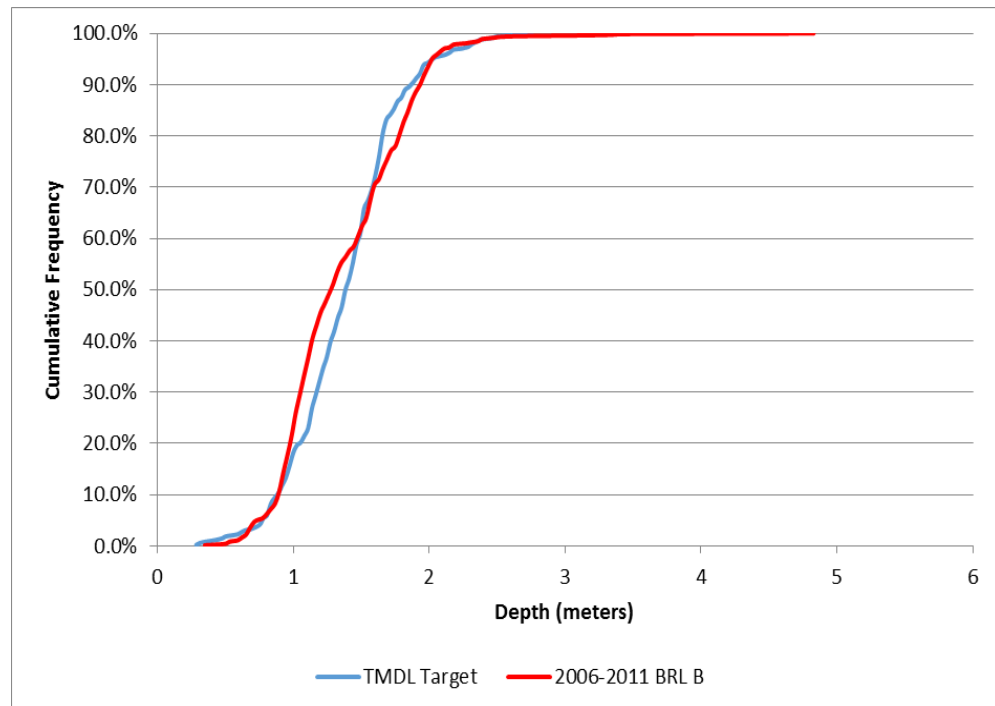


FIGURE 22: STEP 1 COMPLIANCE EVALUATION FOR THE BRL B PROJECT ZONE FOR 2006-2011

TABLE 6: STEP 2 COMPLIANCE EVALUATION FOR THE BRL SUBBASIN

* Shaded cells indicate years that the TMDL median depth limit target was achieved in the project zone.

YEAR	BRL A MEDIAN DEPTH (METERS)	BRL B MEDIAN DEPTH (METERS)
TMDL Median	1.58	1.41
2006	1.75*	1.29
2007	1.81*	1.32
2009	1.78*	1.32
2011	0.71	0.62
Step 2 Compliant?	Yes	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 4.1.4**.

4.1.1 *BREVARD COUNTY*

Brevard County will complete Pine Island Phase I and II (Project BC-2), Fortenberry Pond (Project BC-16), and the South Patrick Drive baffle box (Project BC-26) in 2014.

4.1.2 *CITY OF CAPE CANAVERAL*

The City of Cape Canaveral will dredge muck (approximately 1,800 cubic yards) from a 900-foot section of the Central Ditch south of West Central Boulevard in fiscal year 2014 (Project CC-17). The city will prepare a revised stormwater master plan in fiscal year 2014. Staff and UF-IFAS have scheduled a Florida-friendly Yards seminar for local residents on April 5, 2014 (Project CC-10). The city will also train city staff (public works and code enforcement personnel) in the requirements of the city's new fertilizer ordinance.

4.1.3 *CITY OF COCOA BEACH*

The City of Cocoa Beach is estimated to begin design of the Minutemen Corridor Stormwater Improvement Project (Project CB-39) in September 2014.

4.1.4 *WATER QUALITY AND SEAGRASS MONITORING*

SJRWMD will continue to monitor the six water quality stations in the BRL Basin, and continue the seagrass transect monitoring in the basin. The Department and SJRWMD will continue to work with 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 BRL 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 4.2.8**. 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 BRL.

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 take advantage of the programs.

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, public service announcements [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 Basin).*
- *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 CAPE CANAVERAL AFS

Regional stormwater treatment designs are in progress to address regulatory permitting requirements and anticipated future nutrient removal goals for Cape Canaveral AFS.

4.2.3 CITY OF CAPE CANAVERAL

The City of Cape Canaveral has a number of large stormwater improvement projects/initiatives scheduled for the next five years. The city will continue installation of exfiltration piping in the rights-of-way along city streets (Project CC-18) in fiscal year 2014 through fiscal year 2018. The city will construct a 2.5 million gallon reclaimed water storage tank at the city's WWTP in fiscal year 2014/2015. The city will construct bio-swales as part of the North Atlantic Avenue Streetscape Project (Project CC-13) in fiscal year 2014/2015, install a stormwater vault system associated with a new City Hall complex, construct exfiltration vaults beneath Canaveral City Park in fiscal year 2015/2016 (Project CC-14), and convert five 1st generation baffle boxes to 2nd generation baffle boxes in fiscal year 2015 through fiscal year 2017. The streetscape projects along Central Boulevard and Thurm Boulevard include a number of

stormwater improvements (primarily exfiltration) in fiscal year 2016 through fiscal year 2019. In addition, the city is pursuing the purchase of land for the construction of a stormwater park in the Canaveral Drainage Basin.

4.2.4 CITY OF COCOA BEACH

The next capital improvement plan projects in the City of Cocoa Beach's long-term budget are all LID projects – improvements to the city's oldest and most urban area – downtown and the adjacent neighborhoods. The concept is minimizing and disconnecting impervious areas by adding green space in the form of bioswales and adding porous pavers in parking areas and sidewalks. Underground exfiltration will augment what the surface retention cannot mitigate. These projects will be an extension of the Minutemen Corridor (Project CB-39) concept, and the city will use the monitoring results from that project to steer the design and better incorporate nutrient sorption media into key BMPs.

4.2.5 CITY OF INDIAN HARBOUR BEACH

As land and willing homeowners become available, the City of Indian Harbour Beach will add new projects to its capital improvements plan list.

4.2.6 CITY OF SATELLITE BEACH

The City of Satellite Beach has the Lori Laine Basin Improvements Phase I project in design.

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

Kennedy Space Center is considering several stormwater treatment projects, as well as muck removal projects for the second BMAP iteration.

4.3 PATH FORWARD

Local BMAP stakeholders are continuing the design and implementation of projects that will reduce nutrient loading into the BRL 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 BRL 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 timeframe.

BRL A PROJECT ZONE

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

N/A – Not applicable

* This is the cost for the portion of the project located in the BRL Basin.

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	ANNUAL OPERATIONS AND MAINTENANCE (O&M) COSTS	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
BC-1	FYN; Landscape, Irrigation, Fertilizer, Pet Waste Ordinances; PSAs, Pamphlets, Website, Illicit Discharge Program	Education efforts	N/A	N/A	N/A	Ongoing	Ongoing	66	12.0
BC-2	Pine Island Phase I and II	Wet detention pond	15.3	\$19,235*	\$170*	2014	Started	76	36.0
N/A	Total Project Reductions	N/A	N/A	N/A	N/A	N/A	N/A	142.0	48.0
N/A	Credit for Future BMAPs	N/A	N/A	N/A	N/A	N/A	N/A	142.0	48.0

TABLE A-2: CAPE CANAVERAL AIR FORCE STATION PROJECTS IN BRL A PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
CCAFS-1	Nonuse of Fertilizer/ Fertilizer Ordinance	Education efforts	Ongoing	Ongoing	176	46.0
CCAFS-2	Street Sweeping	Street sweeping	Ongoing	Ongoing	9	4.2
N/A	Total Project Reductions	N/A	N/A	N/A	185	50.2
N/A	Credit for Future BMAPs	N/A	N/A	N/A	185	50.2

TABLE A-3: FDOT DISTRICT 5 PROJECTS IN BRL A PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
FDOT-1	Street Sweeping	Street sweeping	Street sweeping	Ongoing	Ongoing	0	0.0
FDOT-2	Education	Education	Pamphlets, illicit discharge program	Ongoing	Ongoing	1	0.5
FDOT-3	Fertilizer Cessation	Fertilizer cessation	Elimination of fertilizer application on right-of-ways	2005	Completed	102	0.0
N/A	N/A	N/A	Total Project Reductions	N/A	N/A	103	0.5
N/A	N/A	N/A	Credit for Future BMAPs	N/A	N/A	103	0.5

TABLE A-4: KENNEDY SPACE CENTER PROJECTS IN BRL A 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)
KSC-1	Landscape Fertilizer Reduction	Fertilizer reduction	Fertilizer reduced from 60 tons/year in 2000 to 20 tons/year in 2010; changed from rapid nitrogen release 16-4-8 to slow nitrogen release, phosphate free 15-0-15	200.0	Unknown	Ongoing	Ongoing	1,872	265.4
KSC-2	Citrus Grove Termination Jerome Road East	Change in land use	Grove lease termination resulted in previously fertilized areas abandoned	49.4	Unknown	2010	Completed	0	0
KSC-3	Citrus Grove Termination TEL-IV	Change in land use	Grove lease termination resulted in previously fertilized areas abandoned	20.5	Unknown	2010	Completed	0	0
KSC-4	Vertical Processing Facility M7-1469	Change in land use	Demolition of facility resulted in loss of impervious area and change of land use	2.3	Unknown	2010	Completed	24	9.4
KSC-5	Spacecraft Assembly Encapsulation Facility 2 M7-1210	Change in land use	Demolition of facility resulted in loss of impervious area and change of land use	1.2	Unknown		Completed	15	4.9
KSC-6	Central Heat Plant M6-595	Change in land use	Demolition of facility resulted in stormwater system treatment in excess of permit requirement	0.2	Unknown	2010	Completed	3	1
KSC-7	Utility Shops K6-1246	Change in land use	Demolition of facility resulted in stormwater system treatment in excess of permit requirement	0.3	Unknown		Completed	3	1
KSC-8	Fire Station 2 K6-1198	Change in land use	Demolition of facility resulted in stormwater system treatment in excess of permit requirement	0.4	Unknown	2009	Completed	5	1.5
KSC-9	Vehicle Loading Ramp M7-0651	Change in land use	Demolition of facility resulted in stormwater system treatment in excess of permit requirement	0.0	Unknown	2007	Completed	0	0.1
KSC-10	Hypergol Module Storage East M7-1412	Change in land use	Demolition of facility resulted in loss of impervious area and change of land use	0.5	Unknown	2005	Completed	6	2.1
KSC-11	Hypergol Module Storage West M7-1410	Change in land use	Demolition of facility resulted in loss of impervious area and change of land use	0.6	Unknown	2005	Completed	8	2.6
KSC-12	Regional Stormwater Management System	Wet detention pond	Wet detention pond designed and constructed to treat 593 acres with build out of 40% impervious area	593.2	Unknown	2004	Completed	2,541	1,022.1

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PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	PROJECT DETAIL	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
KSC-13	ARF Stormwater System	Retention BMP	ARF area drains to a wet detention pond – missing from model.	55.4	Unknown	Unknown	Completed	320	67.8
KSC-14	VAB South Wetland Treatment System	Wetland treatment	VAB South area drains to a wetland treatment system – missing from model.	188.5	Unknown	Unknown	Completed	672	330.3
KSC-15	Schwartz Road Landfill	100% onsite retention	The landfill is a closed basin surrounded by berms.	122.5	Unknown	Unknown	Completed	1,341	257.1
KSC-16	Closed Basin 4 (Spoil Site - Static Test Road)	100% onsite retention	This area is a closed basin surrounded by berms.	68.2	Unknown	Unknown	Completed	844	160.6
KSC-17	Impounded Areas	100% onsite retention	These areas are impounded.	1,655.3	\$62,406	Unknown	Completed	2,444	149.6
KSC-18	Depressional Storage (22nd St. to 28th St.)	100% onsite retention	This area is characterized by depressional storage throughout the basin. It is surrounded by ridges on all sides (i.e., areas of high elevation, roads, berms, etc.).	1,008.1	\$491,976	Unknown	Completed	4,139	228.3
KSC-19	Depressional Storage (Jerome Road to 22 nd Street)	100% onsite retention	This area is characterized by depressional storage throughout the basin, with no discharge.	982.0	\$477,506	Unknown	Completed	4,064	283.6
KSC-20	Demolition of Facilities M7-1521 and M7-1522	Change in land use	Two facilities and associated slabs removed.	0.5	Unknown	2/2013	Completed	7	1.8
KSC-21	Demolition of Facility M6-0339	Change in land use	Facility and associated slab removed. Within Region 1 basin.	0.5	Unknown	4/2013	Completed	7	2.3
N/A	N/A	N/A	Total Project Reductions	N/A	N/A	N/A	N/A	18,315	2,791.5
N/A	N/A	N/A	Credit for Future BMAPs	N/A	N/A	N/A	N/A	18,315	2,791.5

BRL B PROJECT ZONE

TABLE A-5: BREVARD COUNTY PROJECTS IN BRL B PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	ANNUAL O&M COSTS	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
BC-3	Florida Boulevard Pond	Wet detention pond	73.6	\$350,384.00	N/A	2002	Completed	324	126.4
BC-4	Hampton North (Riverside)	1st generation baffle box	15.3	\$27,000.00	N/A	2010	Completed	1	1.4
BC-5	Hampton South (Needle Boulevard)	1st generation baffle box	18.1	\$29,000.00	N/A	2010	Completed	1	1.6
BC-6	Albatross	1st generation baffle box	21.8	\$33,000.00	N/A	2010	Completed	1	1.5
BC-7	Surfside	1st generation baffle box	22.8	\$31,500.00	N/A	2010	Completed	2	2.2
BC-8	West Scots	2 nd generation baffle box	9.7	\$41,000.00	N/A	2010	Completed	30	5.9
BC-9	Johns Circle	1st generation baffle box	19.5	\$31,000.00	N/A	2010	Completed	2	1.8
BC-10	Farrington Drive	2 nd generation baffle box	7.8	\$37,500.00	N/A	2010	Completed	24	4.9
BC-11	Porpoise Street	2 nd generation baffle box	7.8	\$42,000.00	N/A	2010	Completed	25	4.9
BC-12	Angler Street	1st generation baffle box	10.2	\$30,700.00	N/A	2010	Completed	1	0.9
BC-13	Diana Shores	Vortek unit	38.6	\$102,000.00	N/A	2010	Completed	0	17.0
BC-14	FYN; Landscape, Irrigation, Fertilizer, Pet Waste Ordinances; PSAs, Pamphlets, Website, Illicit Discharge Program	Education efforts	N/A	N/A	N/A	Ongoing	Ongoing	3,212	687.0
BC-15	Street Sweeping	Street sweeping	N/A	N/A	N/A	Ongoing	Ongoing	32	14.5
BC-16	Fortenberry Pond	Wet detention pond	164.5	\$10,900,000	\$35,000	04/2014	Started	847	364.6
BC-17	Merritt Island Airport Pond	Wet detention pond	148.2	\$652,056	N/A	2011	Completed	458	160.0
BC-18	Florida Boulevard	MAPS	73.6	\$40,772	\$18,295	2012	Completed	117	14.3
BC-19	Third Avenue Baffle Box	Type 1 baffle box retrofit	53.1	\$15,000	N/A	Unknown	Funded	93	10.0
BC-20	BMP Cleanout	Inlet baskets and weirs	N/A	\$95,069	N/A	Ongoing	Ongoing	7	2.2
BC-21	Fourth Place Baffle Box	Type 1 baffle box retrofit	57.0	\$15,000	Unknown	Unknown	Funded	146	25.7
BC-22	Thrush 405 Baffle Box	Type 1 baffle box retrofit	4.3	\$15,000	Unknown	Unknown	Funded	7	0.7
BC-23	Fortenberry Pond MAPS	MAPS	164.5	\$151,588	Unknown	Unknown	Funded	256	31.4
BC-24	Alum Pond MAPS	MAPS	99.0	\$100,362	Unknown	Unknown	Funded	147	16.5
BC-25	Cassia Phase 3	Retention BMP	18.4	\$100,000	Unknown	2012	Completed	100	0.0
BC-26	South Patrick Drive	2 nd generation baffle box	73.9	\$625,000	Unknown	2014	Funded	132	16.9
BC-27	Kelly Park Reuse	Stormwater reuse	32.9	Unknown	Unknown	2001	Completed	19	1.3
BC-28	Patrick Air Force Base Golf Course Pond Stormwater Reuse	Stormwater reuse	N/A	Unknown	Unknown	2017	Planned, Not Yet Funded	359.1	0.0
BC-29	Ocean Boulevard	Type 1 baffle box retrofit	6.0	Unknown	Unknown	Unknown	Funded	10	1.4
N/A	Total Project Reductions	N/A	N/A	N/A	N/A	N/A	N/A	6,353.1	1,515.0
N/A	Total BMAP I Required Reductions	N/A	N/A	N/A	N/A	N/A	N/A	6,343.1	1,378.5
N/A	Credit for Future BMAPs	N/A	N/A	N/A	N/A	N/A	N/A	10.0	136.5

TABLE A-6: CITY OF CAPE CANAVERAL PROJECTS IN BRL B PROJECT ZONE

N/A – Not applicable
TBD – To be determined

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	ANNUAL O&M COSTS	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
CC-1	Baffle Box - Holman Road	1 st generation baffle box	35.2	\$75,000	\$1,200	2005	Completed	2	2.3
CC-2	Baffle Box - Center Street	1 st generation baffle box	48.2	\$75,000	\$1,200	2005	Completed	3	2.6
CC-3	Baffle Box - International Drive	1 st generation baffle box	94.7	\$75,000	\$1,200	2000	Completed	7	7.5
CC-4	Baffle Box - Angel Isles	1 st generation baffle box	73.2	\$75,000	\$1,200	2005	Completed	2	1.1
CC-5	Baffle Box - WWTP	1 st generation baffle box	11.6	\$15,000	\$1,200	2000	Completed	0	0.1
CC-6	Baffle Box - West Central Boulevard	1 st generation baffle box	199.1	\$75,000	\$1,200	2000	Completed	11	11.2
CC-7	3 Baffle Boxes - Central Ditch	2 nd generation baffle box	121.6	\$270,000	\$3,600	2009	Completed	178	30.9
CC-8	Street Sweeping	Street sweeping	N/A	\$12,322/year	N/A	Ongoing	Ongoing	427	192.3
CC-9	Shorewood Drainage Sub-basin	100% on-site retention	61.9	Unknown	N/A	2001	Completed	567	134.0
CC-10	Irrigation, Fertilizer, and Pet Waste Management Ordinances; Pamphlets; Website; Illicit Discharge Program	Education efforts	N/A	\$3,100	N/A	Ongoing	Ongoing	252	59.6
CC-11	Manatee Park Stormwater Improvements	Wet detention pond	11.5	\$193,000	\$5,000	2011	Completed	2	0.1
CC-12	Banana River Park Stormwater Improvements	Swales	5.6	\$38,000	\$2,500	2011	Completed	13	0.7
CC-13	Stormwater Exfiltration on North Atlantic Avenue	Retention	37.0	\$436,000	\$10,000	09/2015	Planned, Funded	160	37.8
CC-14	Stormwater Exfiltration at Canaveral City Park	Retention	30	\$1,000,000	\$10,000	09/2016	Planned, Funded	286	68
CC-15	Stormwater Pond on West Central Blvd	Wet detention pond	61.3	\$1,800,000	\$10,000	09/2019	Envisioned, Not Funded	366	158.5
CC-16	Clean Out of Baffle Boxes	Clean out	N/A	N/A	Unknown	Ongoing	Ongoing	45	18
CC-17	Central Ditch Dredging Project	Dredging/backfill	TBD	\$195,000	NA	09/30/14	Planned, Funded	TBD	TBD
CC-18	Exfiltration Piping Installations – 8 Locations (two additional installations are added each year)	Exfiltration	TBD	\$25,000/yr.	NA	Ongoing	Planned, Funded	TBD	TBD
CC-19	2.5 Million Gallon Reclaimed Water Tank	Reclaimed water	NA	\$2,246,750	\$10,000	09/30/15	Planned, Funded	TBD	TBD
CC-20	Conversion of Baffle Boxes (5) to Next Generation	Baffle boxes	TBD	\$295,000	\$5,000	09/30/17	Planned, Funded	TBD	TBD
N/A	Total Project Reductions	N/A	N/A	N/A	N/A	N/A	N/A	2,321.0	724.7
N/A	Total BMAP I Required Reductions	N/A	N/A	N/A	N/A	N/A	N/A	886.4	220.3
N/A	Credit for Future BMAPs	N/A	N/A	N/A	N/A	N/A	N/A	1,434.6	504.4

TABLE A-7: CITY OF COCOA BEACH PROJECTS IN BRL B PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
CB-1	Maritime Hammock Preserve Alum Pond	Alum/wet detention pond	130.2	\$960,000	2008	Completed	746	317.5
CB-2	Ocean Beach Blvd Bioretention/Exfiltration	Swales	50.6	\$1,150,00	2010	Completed	218	46.3
CB-3	2 nd Street South	2 nd generation baffle box	52.0	\$181,974	2003	Completed	135	25.0
CB-4	Cottage Row Parking Facilities Lot	Exfiltration	2.4	Unknown	2007	Completed	37	9.1
CB-5	Shepard Park Improvements	Dry detention pond	0.0	Unknown	2003	Completed	0	0.0
CB-6	Burris Way (alley) Exfiltration	Exfiltration	0.8	Unknown	2010	Completed	4	1.0
CB-7	Brevard Avenue Exfiltration	Swales	0.5	Unknown	2003	Completed	5	1.0
CB-8	50 Danube River Exfiltration	Swales	2.7	Unknown	2003	Completed	2	0.3
CB-9	12 Bougainvillea Drive Exfiltration	Swales	1.7	Unknown	2003	Completed	1	0.2
CB-10	9 th Street South & Brevard Avenue Exfiltration	Swales	1.9	Unknown	2003	Completed	2	0.3
CB-11	321 Jack Drive Exfiltration	Swales	2.0	Unknown	2006	Completed	1	0.2
CB-12	125 Cedar Avenue Exfiltration	Swales	1.4	Unknown	2008	Completed	1	0.3
CB-13	Meade Bioretention	Swales	0.0	Unknown	2009	Completed	0	0.0
CB-14	Osceola E Bioretention	Swales	0.7	Unknown	2009	Completed	2	0.3
CB-15	4 th Street North North Bioretention	Swales	0.1	Unknown	2009	Completed	1	0.3
CB-16	4 th Street North South Bioretention	Swales	0.5	Unknown	2009	Completed	2	0.5
CB-17	3 rd Street South North Bioretention	Swales	0.5	Unknown	2009	Completed	1	0.1
CB-18	3 rd Street South South Bioretention	Swales	2.1	Unknown	2009	Completed	3	0.3
CB-19	Holiday Lane Bioretention	Swales	5.2	Unknown	2007	Completed	34	7.3
CB-20	South Banana/St. Lucie Swale	Swales	4.7	Unknown	2000	Completed	17	4.0
CB-21	South Banana/St. Lucie Swale	Swales	2.2	Unknown	2000	Completed	4	0.4
CB-22	Banana River Retention	Dry detention pond	1.1	Unknown	2001	Completed	2	0.4
CB-23	Banana River Retention	Dry detention pond	1.4	Unknown	2001	Completed	2	0.5
CB-24	Minutemen/Country Club Swale	Swales	3.2	Unknown	2001	Completed	13	3.1
CB-25	Palm Avenue Swale	Swales	1.2	Unknown	2002	Completed	2	0.1
CB-26	Minutemen/Cocoa Beach High School	Swales	1.3	Unknown	2002	Completed	20	4.8
CB-27	Minutemen/Public Works Complex Swale	Swales	1.9	Unknown	2002	Completed	4	0.8
CB-28	Tom Warriner/Public Works Complex Swale	Swales	0.9	Unknown	2003	Completed	3	0.4
CB-29	Shepard Drive Swale	Swales	3.2	Unknown	2006	Completed	16	3.6
CB-30	Shepard Drive Swale	Swales	2.4	Unknown	2006	Completed	10	2.0
CB-31	West Gadsden/Banana Swale	Swales	1.4	Unknown	2006	Completed	3	0.4
CB-32	West Pasco/Banana Swale	Swales	1.0	Unknown	2006	Completed	2	0.2
CB-33	West Pasco/Banana Swale	Swales	2.3	Unknown	2006	Completed	3	0.4
CB-34	32 Inlet Baskets	Inlet basket	N/A	Unknown	2003/2004	Completed	32	10.3
CB-35	Dino Museum/ Store, South Cayer, 250 West Cocoa Beach Causeway	Dry detention pond	1.2	Unknown	Unknown	Completed	1	0.1
CB-36	332-334 North Orlando, contractor	Dry detention pond	1.7	Unknown	Unknown	Completed	3	0.6
CB-37	Street Sweeping	Street sweeping	N/A	Unknown	Ongoing	Ongoing	146	65.5

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PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
CB-38	FYN; Pet Waste, Landscape, Fertilizer, Irrigation Ordinances; Pamphlets, Website, Illicit Discharge Program	Education	N/A	Unknown	Ongoing	Ongoing	1,052	219.2
CB-39	Minutemen Corridor Stormwater Improvement/LID	Bioretention/rain tanks/paver storage/nutrient sorption media	20.3	\$2,171,735	02/2016	Design – estimated start 09/2014	330	74.2
N/A	Total Project Reductions	N/A	N/A	N/A	N/A	N/A	2,860.0	801.0
N/A	Total BMAP I Required Reductions	N/A	N/A	N/A	N/A	N/A	1,701.9	353.9
N/A	Credit for Future BMAPs	N/A	N/A	N/A	N/A	N/A	1,158.1	447.1

TABLE A-8: CITY OF INDIAN HARBOUR BEACH PROJECTS IN BRL 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)
IHB-1	North Osceola Drive	Exfiltration trench	8.6	\$60,000	\$500	2008	Completed	27	3.8
IHB-2	Datura Drive	Exfiltration trench	0.7	\$50,000	\$300	2004	Completed	3	0.4
IHB-3	Coquina Palms Subdivision	100% retention	6.3	N/A	N/A	2000	Completed	61	10.9
IHB-4	Landscape, Irrigation, Fertilizer, Pet Waste Ordinances; Pamphlets, Illicit Discharge Program	Education	N/A	Unknown	Unknown	Ongoing	Ongoing	282	52.5
IHB-5	Inlet Cleaning	Inlet cleaning	N/A	Unknown	Unknown	Ongoing	Ongoing	0.5	0.3
IHB-6	Street Sweeping	Street sweeping	N/A	\$9,800	N/A	Ongoing	Ongoing	194	87.3
IHB-7	Gleason Park Phase 1	Wet detention pond	101.3	\$135,000	\$200	2011	Completed	357	114.7
IHB-8	Atlantic Avenue Swale	Retention BMP	1.0	Unknown	Unknown	2011	Completed	8	1.2
IHB-9	Gleason Park Irrigation	Stormwater reuse	101.3	Unknown	Unknown	Ongoing	Ongoing	38	6.8
IHB-10	Lift Station Pond	Dry retention	2.3	\$13,277	N/A	09/2015	Planned, Funded	28	6.8
IHB-11	Fire Station Exfiltration	Exfiltration	2.8	\$11,481	N/A	09/2013	Completed	0.1	0.0
IHB-12	Park Road Exfiltration	Exfiltration	15.8	Unknown	N/A	08/2012	Completed	18	3.6
IHB-13	Yuma Drive Exfiltration	Exfiltration	11.15	Unknown	Unknown	08/2012	Completed	26	5.9
IHB-14	Lime Bay Exfiltration	Exfiltration	26.86	Unknown	Unknown	12/2012	Completed	5	1.2
IHB-15	Andros Lane Exfiltration	Exfiltration	15.83	Unknown	Unknown	12/2012	Completed	5	0.7
N/A	Total Project Reductions	N/A	N/A	N/A	N/A	N/A	N/A	1,052.6	296.1
N/A	Total BMAP I Required Reductions	N/A	N/A	N/A	N/A	N/A	N/A	1,017.6	174.8
N/A	Credit for Future BMAPs	N/A	N/A	N/A	N/A	N/A	N/A	35.0	121.3

TABLE A-9: CITY OF SATELLITE BEACH PROJECTS IN BRL B PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
SB-1	Jackson Exfiltration	Exfiltration pipes	24.7	Unknown	2002	Completed	9	2.2
SB-2	Jackson Exfiltration	Exfiltration pipes	8.2	Unknown	2002	Completed	6	0.8
SB-3	Jackson Exfiltration	Exfiltration pipes	8.6	Unknown	2002	Completed	6	1.7
SB-4	Avocado Continuous Deflective Separation (CDS) Unit	CDS unit	8.6	Unknown	2002	Completed	0	3.2
SB-5	Jackson Exfiltration	Exfiltration pipes	11.7	Unknown	2002	Completed	3	0.4
SB-6	Coconut Exfiltration	Exfiltration pipes	39.7	Unknown	2005	Completed	27	4.6
SB-7	Desoto Exfiltration	Exfiltration pipes	108.2	Unknown	2005	Completed	97	13.7
SB-8	Desoto Exfiltration	Exfiltration pipes	7.8	Unknown	2005	Completed	25	3.5
SB-9	Jamaica Boulevard Ponds	Wet detention ponds	216.2	Unknown	2007	Completed	600	160.2
SB-10	Jamaica Pond Reuse	Stormwater reuse	216.2	Unknown	2002	Completed	277	25.0
SB-11	Desoto Exfiltration	Exfiltration pipes	3.5	Unknown	2005	Completed	17	2.4
SB-12	Desoto Baffle Boxes	2 nd generation baffle box	57.8	Unknown	2007	Completed	82	9.5
SB-13	Cassia Phase 1-22	2 nd generation baffle box	32.5	\$1,796,800	2010	Completed	61	8.2
SB-14	Cassia Phase 1-23	2 nd generation baffle box	12.9	Part of SB-13	2010	Completed	30	5.6
SB-15	Cassia Phase 1-24	Retention BMP	12.8	Part of SB-13	2010	Completed	18	3.5
SB-16	Cassia Phase 1-25	Retention BMP	19.7	Part of SB-13	2010	Completed	13	1.8
SB-17	Cassia Phase 1-26	Retention BMP	14.1	Part of SB-13	2010	Completed	12	2.6
SB-18	North Basin Stormwater Retrofit	Retention BMP	97.9	Unknown	12/2012	Completed	318	80.5
SB-19	Street Sweeping	Street sweeping	N/A	Unknown	Ongoing	Ongoing	251	113.0
SB-20	Landscape, Irrigation, Fertilizer, Pet Waste Ordinances; PSAs, Pamphlets, Website, Illicit Discharge Program	Education	N/A	Unknown	Ongoing	Ongoing	501	98.5
SB-21	Cassia Phase 3 - C3A	Retention BMP	0.2	Unknown	3/2012	Completed	0	0.6
SB-22	Cassia Phase 3 - C3B	Retention BMP	0.2	Unknown	3/2012	Completed	0	0.5
SB-23	Cassia Phase 3 - C3C	Retention BMP	0.2	Unknown	3/2012	Completed	0	0.5
SB-24	Cassia Phase 3 - C3D	Retention BMP	0.2	Unknown	3/2012	Completed	0	0.8
SB-25	Cassia Phase 3 - C3E	Retention BMP	0.2	Unknown	3/2012	Completed	0	0.7
SB-26	Cassia Phase 3 - C3F	Retention BMP	2.0	Unknown	3/2012	Completed	0	3.0
SB-27	Cassia Phase 3 - C3G	Retention BMP	1.3	Unknown	3/2012	Completed	0	2.3
SB-28	Cassia Phase 3 - C5A	Retention BMP	0.2	Unknown	3/2012	Completed	0	0.5
SB-29	Cassia Phase 3 - C5B	Retention BMP	5.9	Unknown	3/2012	Completed	0	5.4
SB-30	Cassia Phase 3 - C7A	Retention BMP	0.4	Unknown	3/2012	Completed	0	0.4
SB-31	Cassia Phase 3 - C7B	Retention BMP	4.1	Unknown	3/2012	Completed	0	3.5
SB-32	Cassia Phase 3 - C9A	Retention BMP	0.5	Unknown	3/2012	Completed	0	0.6
SB-33	Cassia Phase 3 - C9B	Retention BMP	2.1	Unknown	3/2012	Completed	19	2.8
SB-34	Cassia Phase 3 - C13A	Retention BMP	1.2	Unknown	3/2012	Completed	7	1.9
SB-35	Cassia Phase 3 - C13B	Retention BMP	0.1	Unknown	3/2012	Completed	0	0.3
SB-36	Cassia Phase 3 - C13C	Retention BMP	3.1	Unknown	3/2012	Completed	0	1.7
SB-37	Cassia Phase 3 - C13D	Retention BMP	0.5	Unknown	3/2012	Completed	7	1.6

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PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
SB-38	Cassia Phase 3 - C13E	Retention BMP	0.9	Unknown	3/2012	Completed	9	2.2
SB-39	Cassia Phase 3 - C13F	Retention BMP	1.6	Unknown	3/2012	Completed	11	2.6
SB-40	Cassia Phase 3 - C13G	Retention BMP	3.3	Unknown	3/2012	Completed	15	3.8
N/A	Total Project Reductions	N/A	N/A	N/A	N/A	N/A	2,421.0	576.6
N/A	Total BMAP I Required Reductions	N/A	N/A	N/A	N/A	N/A	1,572.9	298.2
N/A	Credit for Future BMAPs	N/A	N/A	N/A	N/A	N/A	848.1	278.4

TABLE A-10: FDOT DISTRICT 5 PROJECTS IN BRL B PROJECT ZONE

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	FM: 237139 D5_70120-3518-01	Wet detention pond	State Road 518 at State Road 513	4.7	1984	Completed	63	15.8
FDOT-5	FM: 237454 D5_70100-3553-01	Retention BMP	State Road 520 widening - missing from model	5.0	1994	Completed	23	11.3
FDOT-6	FM: 237447 D5_70008-3505-02	Wet detention pond	State Road 513 S/West drainage from north of East Eau Gallie Boulevard to Parkside Place - missing from model	3.4	1992	Completed	9	5.0
FDOT-7	FM: 237447 D5_70008-3505-03	Retention BMP	State Road 513 Parkside Place to north of Yacht Club Boulevard - missing from model	2.8	1992	Completed	7	4.2
FDOT-8	FM: 237447 D5_70008-3505-04	Retention BMP	State Road 513 from north of Yacht Club Boulevard to Banana River Drive (County Road 3) - missing from model	3.8	1992	Completed	12	6.8
FDOT-9	FM: 237482 D5_70060-3533-01	Retention BMP	State Road A1A drainage improvements from south of North Drive to south of Sherry Lee Lane - missing from model	0.4	1991	Completed	1	0.8
FDOT-10	FM: 237453 D5_70008-3507-01	Wet detention pond	State Road 513 from Banana River Drive (County Road 3) to just south of Anchor Drive - missing from model	8.7	1997	Completed	26	9.5
FDOT-11	FM: 237453 D5_70008-3507-02	Wet detention pond	State Road 513 from just south of Anchor Drive to Desoto Parkway - missing from model	10.7	1997	Completed	24	7.4
FDOT-12	FM: 237712 D5_70060-3519-01	Retention BMP	State Road A1A drainage improvements on north bound lane from north of 1 st Street to South of 4 th Street	2.5	2001	Completed	36	8.9
FDOT-13	FM: 422691-01 D5_422691-01	Retention BMP	State Road A1A drainage improvements from 1 st Street to just south of 4 th Street	1.3	2008	Completed	15	3.8
FDOT-14	Street Sweeping	Street sweeping	Street sweeping	N/A	Ongoing	Ongoing	0	0.0
FDOT-15	Education	Education	Pamphlets, illicit discharge program and call in	N/A	Ongoing	Ongoing	25	8.0
FDOT-16	Fertilizer Cessation	Fertilizer cessation	Elimination of fertilizer application on right-of-ways	N/A	2005	Completed	1,358	0.0
N/A	N/A	N/A	Total Project Reductions	N/A	N/A	N/A	1,599.0	81.5
N/A	N/A	N/A	Total BMAP I Required Reductions	N/A	N/A	N/A	471.9	179.3
N/A	N/A	N/A	Credit for Future BMAPs	N/A	N/A	N/A	1,127.1	-97.8*

TABLE A-11: PATRICK AIR FORCE BASE PROJECTS IN BRL B PROJECT ZONE

N/A – Not applicable

PROJECT NUMBER	PROJECT NAME	PROJECT TYPE	TREATMENT ACRES	PROJECT COST	END DATE	STATUS	TN REDUCTION (LBS/YR)	TP REDUCTION (LBS/YR)
PAFB-1	Youth Center Building 3656	Retention	1.7	Unknown	2002	Completed	3	0.9
PAFB-2	Building 543 Replace Main Gate	Retention	0.2	Unknown	2005	Completed	0	0.1
PAFB-3	Basin 6B No Discharge	100% retention	3.2	Unknown	N/A	Completed	46	12.5
PAFB-4	Basin 6C No Discharge	100% retention	11.3	Unknown	N/A	Completed	164	43.5
PAFB-5	Nonuse of Fertilizer/Fertilizer Ordinance	Education	N/A	Unknown	Ongoing	Ongoing	122	32.3
PAFB-6	Golf Course Pond Stormwater Reuse	Stormwater reuse	348.9	\$850,000	5/2013	Completed	3,677	969.9
N/A	Total Project Reductions	N/A	N/A	N/A	N/A	N/A	4,012.0	1,059.2
N/A	Total BMAP I Required Reductions	N/A	N/A	N/A	N/A	N/A	2,614.7	748.4
N/A	Credit for Future BMAPs	N/A	N/A	N/A	N/A	N/A	1,397.3	310.8