

FINAL

2016 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

with participation from the
Banana River Lagoon Basin Stakeholders

September 2016

2600 Blair Stone Road
Tallahassee, FL 32399



ACKNOWLEDGMENTS

This 2016 Progress Report for the Banana River Lagoon (BRL) Basin Management Action Plan (BMAP) was developed 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 with participation from the BRL stakeholders.

List of Banana River Lagoon Basin Management Action Plan Participants

Type of Governmental or Private Entity	Participant
Counties	Brevard County
Municipalities	City of Cape Canaveral City of Cocoa Beach City of Indian Harbour Beach City of Satellite Beach
Agencies	Florida Department of Agriculture and Consumer Services (FDACS) Florida Department of Environmental Protection (DEP) South Florida Water Management District (SFWMD) St. Johns River Water Management District (SJRWMD) Florida Department of Transportation (FDOT) District 5 Cape Canaveral Air Force Station (AFS) Kennedy Space Center (KSC) Patrick Air Force Base (AFB)
Other Interested Parties	Agriculture

For additional information on the watershed management approach in the BRL, contact:

Yesenia Escribano, Basin Coordinator
 Florida Department of Environmental Protection
 Water Quality Restoration Program
 2600 Blair Stone Road, Mail Station 3565
 Tallahassee, FL 32399-2400
 Email: yesenia.escribano@dep.state.fl.us
 Phone: (850) 245-8446
 Fax: (850) 245-8434

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Micrograms Per Liter
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
DEO	Florida Department of Economic Opportunity
DEP	Florida Department of Environmental Protection
DO	Dissolved Oxygen
FDOT	Florida Department of Transportation
FY	Fiscal Year
IRL	Indian River Lagoon
KSC	Kennedy Space Center
lbs/yr	Pounds Per Year
LID	Low Impact Development
m	Meter
MAPS	Managed Aquatic Plant System
mL	Milliliter
O&M	Operations and Maintenance
ppt	Parts Per Thousand
SJRWMD	St. Johns River Water Management District
SR	State Road
TBD	To Be Determined
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
WWTP	Wastewater Treatment Plant
WBID	Waterbody Identification

SUMMARY

Total Maximum Daily Loads (TMDLs)

In March 2009, the Florida Department of Environmental Protection (DEP) adopted the [Indian River Lagoon \(IRL\) Basin TMDLs](#) for total nitrogen (TN) and total phosphorus (TP), with a focus on the water quality conditions necessary for seagrass regrowth at historical depth limits. These limits are the depths where seagrass historically grew based on a multiyear composite of seagrass coverage in the basin. The median depth limits of seagrass coverage in the IRL Basin have decreased over the years because of changes in water quality conditions resulting from human (anthropogenic) influences.

The [Banana River Lagoon \(BRL\) Basin Management Action Plan \(BMAP\)](#) was adopted in January 2013 to implement the TMDLs in the watershed. This is the third annual Progress Report for the BRL BMAP, and it describes the activities that occurred during the reporting period from March 1, 2015, through February 29, 2016.

Summary of Load Reductions

During the reporting period, 9 projects were completed for the BRL BMAP: 5 by Brevard County, 1 by the City of Cape Canaveral, 1 by the City of Indian Harbour Beach, and 2 by Patrick Air Force Base. In the BRL, these projects resulted in an estimated reduction of 2,049 pounds per year (lbs/yr) of TN and 263 lbs/yr of TP. These reductions are in addition to those projects given credit at BMAP adoption. Therefore, the total reductions to date are 21,733 lbs/yr of TN and 5,190 lbs/yr of TP, which are 22 % of the TN and 23 % of the TP reductions needed to meet the TMDLs allocated to the BRL.

Water Quality and Biological Monitoring

Routine St. Johns River Water Management District water quality sampling was completed the first week of February 2016. Water clarity continued to decline from Cocoa southward through Grant-Valkaria. YSI-measured chlorophyll-*a* increased in the same region. Bloom samples were collected on February 1, 2016, south of the State Road 520 Causeway in Cocoa. The samples contained a mixed assemblage of species, including picocyanobacteria, *Aureoumbra lagunensis*, and green nanoeukaryotes. *A. lagunensis* predominated, making up 84 % of the sample. Another bloom sample was collected in Rockledge, again with *A. lagunensis* dominating the biovolume. Chlorophyll-*a* increased at the continuous monitoring station at the Melbourne Causeway. Salinity remained in the low 20 parts per thousand.

Section 1: INTRODUCTION

1.1 Purpose of the Report

This is the third annual Progress Report for the Banana River Lagoon (BRL) Basin Management Action Plan (BMAP). **Section 2** describes the activities during the period from March 1, 2015, through February 29, 2016. **Section 3** summarizes stakeholder compliance with the BMAP, and **Section 4** summarizes the results of the water quality and biological evaluation.

1.2 Total Maximum Daily Loads (TMDLs) for the BRL Basin

The Florida Department of Environmental Protection (DEP) identified the Indian River Lagoon (IRL) Basin as impaired for nutrients because of excessive amounts of total nitrogen (TN) and total phosphorus (TP). In March 2009, DEP adopted the nutrient and dissolved oxygen (DO) [IRL Basin TMDLs](#), with a focus on the water quality conditions necessary for seagrass regrowth at the depth limits where seagrass historically grew in the basin, based on a multiyear composite of seagrass coverage. The median depth limits of seagrass coverage in the IRL Basin have decreased over the years because of changes in water quality conditions resulting from human (anthropogenic) influences. **Table 1** and **Table 2** list the TN and TP TMDLs and pollutant load allocations, respectively, adopted by rule for the segments with waterbody identification (WBID) numbers in the BRL Subbasin.

Table 1: TN TMDLs in the BRL Subbasin

lbs/yr = Pounds per year

WBID Number	WBID Name	Project Zone	Parameter	TMDL (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 and 3057B	Banana River below State Road (SR) 520 Causeway and Banana River above SR 520 Causeway	BRL B	TN	144,780	6,173	47,539	91,069
3044A	Newfound Harbor	BRL B	TN	30,661		15,489	15,172
	Total		TN	291,755	7,387	104,642	179,727

Table 2: TP TMDLs in the BRL Subbasin

N/A = Not applicable

WBID Number	WBID Name	Project Zone	Parameter	TMDL (lbs/yr)	Wastewater Facilities Allocation (lbs/yr)	Stormwater Allocation (lbs/yr)	Atmospheric Deposition Allocation (lbs/yr)
3057C	Banana River above Barge Canal	BRL A	TP	7,825	302	5,874	1,649
3057A and 3057B	Banana River below SR 520 Causeway and Banana River above SR 520 Causeway	BRL B	TP	12,181	1,221	8,916	2,044
3044A	Newfound Harbor	BRL B	TP	3,247	N/A	2,907	340
	Total		TP	23,253	1,523	17,697	4,033

1.3 BRL Subbasin

Because of the large geographic extent of the IRL Basin and the diversity of hydrologic characteristics throughout the basin, DEP 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.

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

- BRL A – The area north of and including the SR 520 Causeway, and
- BRL B – The area south of the SR 520 Causeway.

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

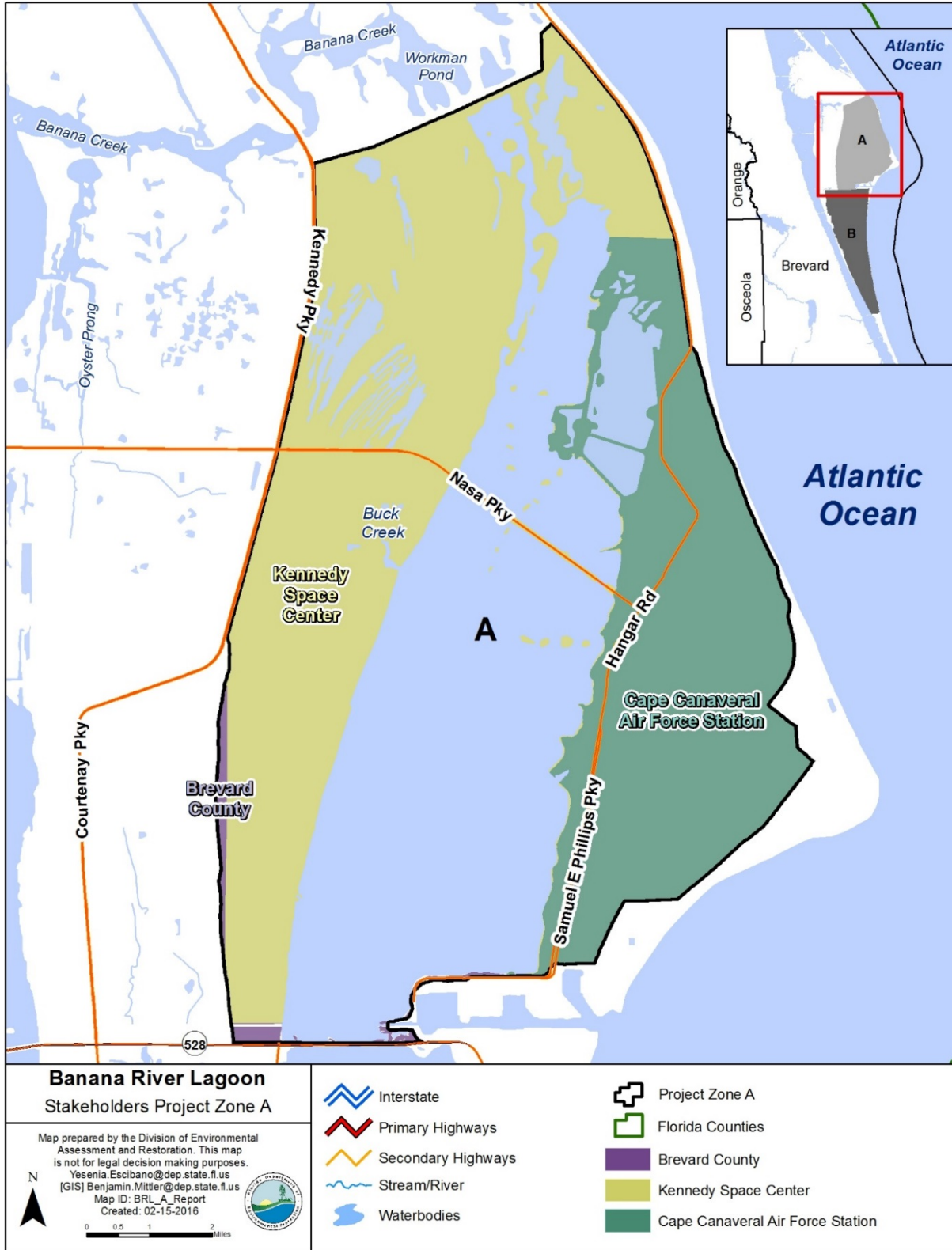


Figure 1: BRL Project Zone A stakeholders

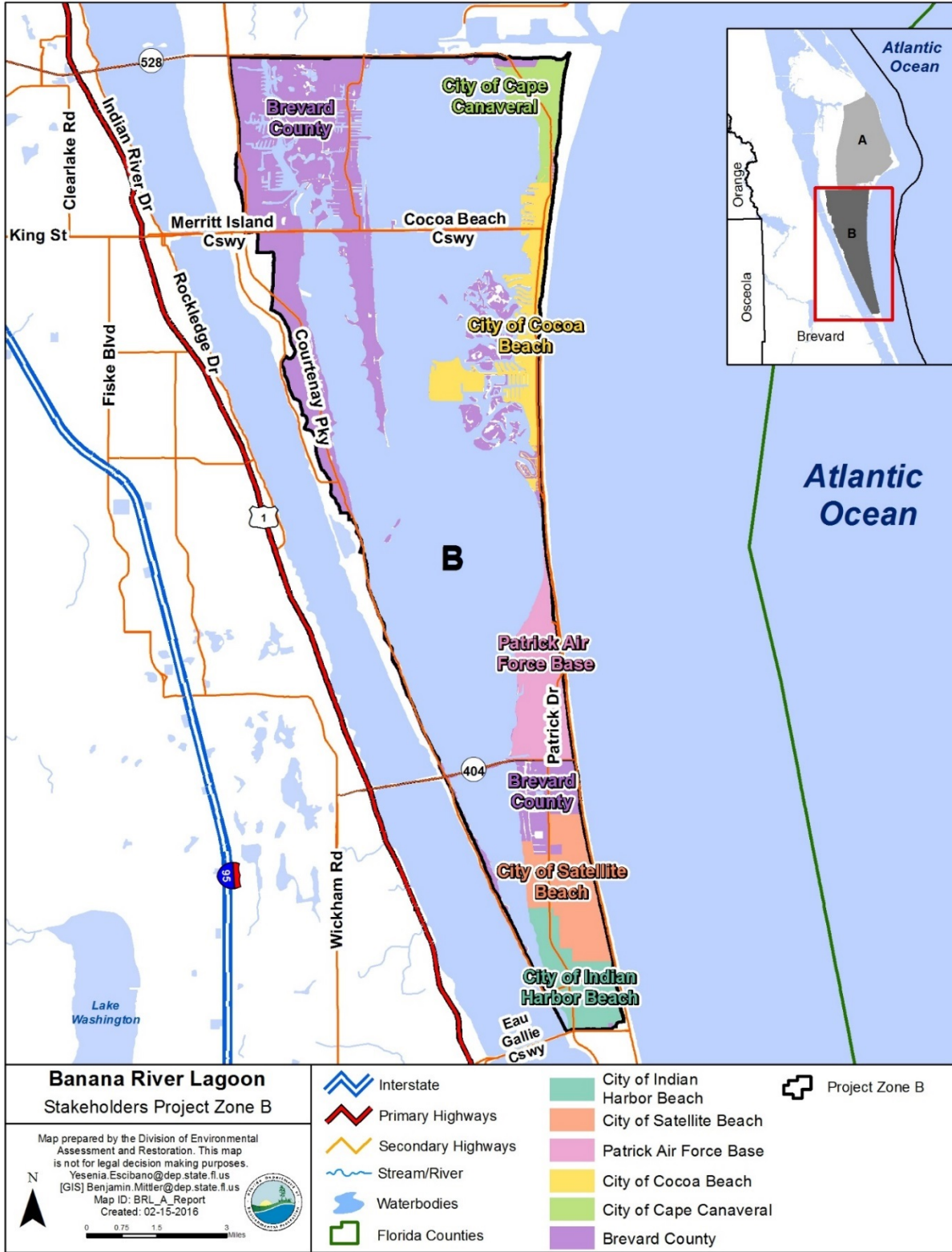


Figure 2: BRL Project Zone B stakeholders

Section 2: ACTIVITIES DURING THE REPORTING PERIOD

Section 2.1 and **Section 2.2** describe the accomplishments in the BRL during the reporting year. New projects added to the individual project tables are described below, as well as individual projects completed during the reporting period. Ongoing efforts such as street sweeping, ordinances, and public education efforts are not specifically described below but must continue each year in order for the project credit to remain effective. **Appendix A** contains the individual project tables.

2.1 Activities by Entity

2.1.1 Brevard County

During the reporting period, Brevard County completed the Pine Island Phase I and II Wet Detention Pond (BC-2) in Project Zone A. With assistance from TMDL grant funding, Brevard County also completed Phase I of the countywide program to retrofit 1st-generation baffle boxes into 2nd-generation nutrient-separating boxes, which have nutrient removal screens that separate organic debris from the sediment and hold it out of the water. Of the 17 boxes retrofitted, 4 are located in BRL Project Zone B: Third Ave. baffle box (BC-19), Fourth Pl. baffle box (BC-21), Thrush 405 baffle box (BC-22), and Ocean Blvd. baffle box (BC-29).

The Brevard County Natural Resources Management Department, in partnership with the Brevard Zoo, with cost-share from the St. Johns River Water Management District (SJRWMD), will construct 2,360 linear feet of oyster reef living shorelines along the IRL in Brevard County during Fiscal Year (FY) 2015–16 and 2016–17. The pilot sites will include native saltmarsh vegetation and living oyster reefs as wave breaks. The county is also working with the zoo to engage the Brevard County community in a citizen-based oyster propagation program to raise juvenile oysters to populate living shoreline oyster reef sites constructed during FY 2015–16 and FY 2016–17.

2.1.2 Cape Canaveral

Cape Canaveral completed the construction of a 2.5-million-gallon reclaimed water storage tank (CC-19) at the city's wastewater treatment plant (WWTP) to more than double the city's storage capacity for reclaimed water. The storage tank also eliminates almost all discharges of treated wastewater from the WWTP to the Banana River. Load reductions for this project were 1,602 lbs/yr TN and 114 lbs/yr TP.

The city repaired a major stormwater pipe along West Central Blvd. (CC-6). The pipe is constructed of galvanized metal and had deteriorated to the point where a significant amount of ground water was entering the pipe and discharging to the Banana River via the Central Ditch. The interior of the pipe was cleaned of all sediment and debris and coated with a concrete-based liner to prevent the intrusion of groundwater and discharge to the Banana River.

The city continued the construction of stormwater swales along North Atlantic Ave. (CC-13) that are constructed atop a coastal ridge consisting of fine to medium sand. There is currently no stormwater system along most of the roadway; stormwater flows from the street and sidewalks onto private properties and into stormwater inlets located along side streets. The construction of stormwater swales will allow stormwater to infiltrate into the surficial aquifer, eliminating flow to private properties and reducing flow to the city's stormwater system.

The city formally adopted the revised Stormwater Master Plan (*City of Cape Canaveral Basin Management Action Plan Compliance Strategy*) prepared in late 2014. The report includes numerous proposed stormwater improvement projects that, if completed, will allow the city to meet its 15-year target for reducing TN and TP in stormwater runoff.

The city also added 11 new projects to be completed during the second phase of the BMAP: 3 wet detention ponds (CC-26, CC-29, and CC-30), 2 retention projects (CC-28 and CC-31), and 6 treatment train projects (CC-22, CC-23, CC-24, CC-25, CC-27, and CC-32).

2.1.3 City of Cocoa Beach

Cocoa Beach's Minutemen Corridor Streetscape and Stormwater/Low Impact Development (LID) Improvement Project (CB-39) is behind schedule but is currently in the bidding process, with construction scheduled to start in mid-May 2016. This LID project includes using landscape urban planter rain gardens, pervious pavers, and exfiltration under parking. The project also uses nutrient sorption media in all best management practices (BMPs) (with the exception of monitoring control BMPs) to capture nitrogen and phosphorus, further protecting the lagoon as well as groundwater sources. The monitoring of pregroundwater discharge canals and discharge flow will provide baseline data. Postproject monitoring includes these same parameters and also the inflow and outflow nutrient concentration of nutrient sorption media BMPs and one BMP of each type without the sorption media.

2.1.4 City of Indian Harbour Beach

Indian Harbour Beach completed a small exfiltration project in Inwood Lane (IHB-18) and is working with private development (Indian Harbour Beach Condo) to construct a dry retention pond to treat 2.3 acres (IHB-10). The Gleason Park wet pond (IHB-9) is being extensively used for irrigation, and metered information allows the total volume irrigated to be accurately measured. Finally, the city was awarded a Florida Department of Economic Opportunity (DEO) grant to develop a Stormwater Management Plan to address water quality issues. The city has been developing the plan since late 2015, and the final plan should be completed by summer 2016. It will provide additional guidance for BMAP implementation in the upcoming five-year basin management cycle.

The city also added 19 new projects: 2 2nd-generation baffle boxes (IHB-25 and IHB-26), dredging (IHB-35), 6 exfiltration trenches (IHB-17, IHB-28, IHB-30, IHB-31, IHB-32, and IHB-33), floating aquatic vegetation treatment (IHB-21), pervious pavement (IHB-27),

stormwater reuse (IHB-19), 3 swales (IHB-22, IHB-23, and IHB-29), 2 treatment trains (IHB-20 and IHB-34), and a wet detention pond (IHB-24).

2.1.5 Patrick AFB

Patrick AFB added five new projects: two 2nd-generation baffle boxes (PAFB-9 and PAFB-10), the demolition of a facility with conversion of land use to natural lands (PAFB-8), a retention BMP (PAFB-11), and street sweeping (PAFB-7).

2.2 Summary of Accomplishments

Table 3 summarizes the projects completed during the third annual BMAP reporting period for the BRL. These projects resulted in an estimated reduction of 2,049 lbs/yr of TN and 263 lbs/yr of TP. These reductions are in addition to those projects given credit at BMAP adoption. Therefore, the total reductions to date are 21,733 lbs/yr of TN and 5,190 lbs/yr of TP, which are 22 % of the TN and 23 % of the TP reductions needed to meet the TMDLs allocated to the BRL, respectively. **Figure 3** and **Figure 4** show the load reductions for TN and TP, respectively, compared with the starting load and allocations.

Table 3: Summary of projects completed in the reporting period in the BRL

Stakeholders	Project Zone	Project Number	Project Name	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Brevard County	A	BC-2	Pine Island Phase I and II	111.0	65.0
Brevard County	B	BC-19	Third Ave. Baffle Box	93.0	10.0
Brevard County	B	BC-21	Fourth Pl. Baffle Box	146.0	25.7
Brevard County	B	BC-22	Thrush 405 Baffle Box	7.0	0.7
Brevard County	B	BC-29	Ocean Blvd. Baffle Box	10.0	1.4
City of Cape Canaveral	B	CC-19	2.5-Million-Gallon Reclaimed Water Tank	1,602.0	114.0
City of Indian Harbour Beach	B	IHB-18	Inwood Lane Exfiltration	7.5	1.07
Patrick Air Force Base (AFB)	B	PAFB-7	Street Sweeping	68.0	43.0
Patrick AFB	B	PAFB-11	Canal/Basin Cleanout	5.0	3.0
Total			Total Reductions in Reporting Period	2,049	263

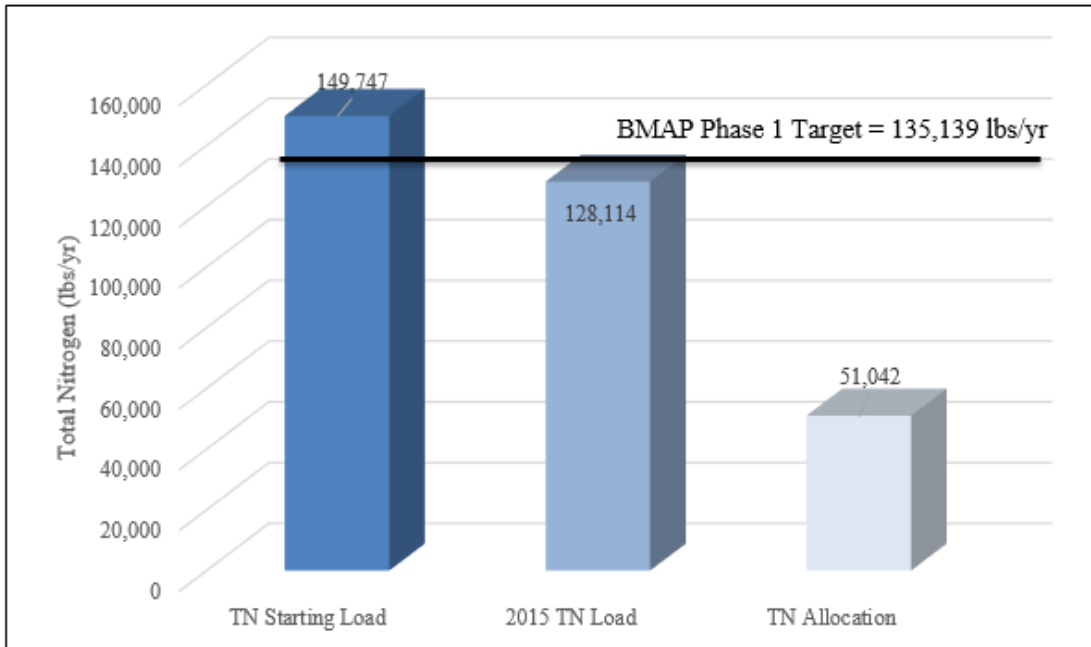


Figure 3: Summary of load reductions for TN

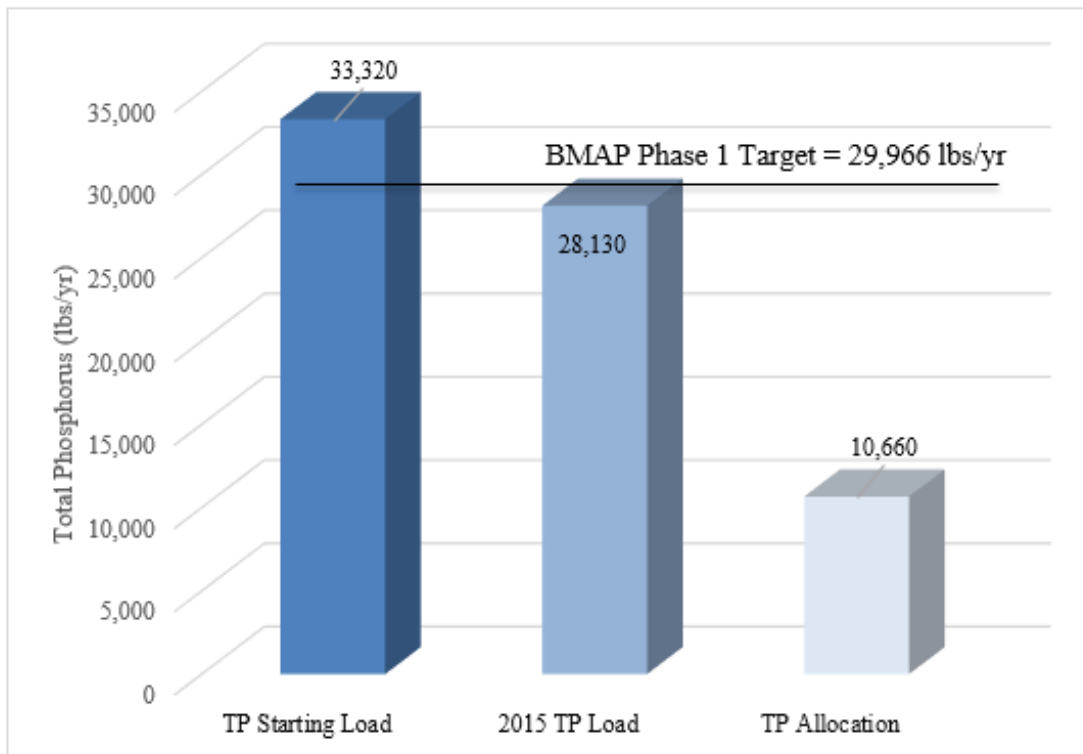


Figure 4: Summary of load reductions for TP

Section 3: COMPLIANCE

As stated in the BRL BMAP adopted in January 2013, DEP will annually review each entity's progress towards achieving the overall TMDL goal. **Table 4** outlines the number of committed projects by entity, the number of completed projects, and the number of projects stakeholders have committed to that are still under way. **Table 5** summarizes the allocations and reductions achieved by each entity in the BMAP. The entities designated as *de minimus* in **Table 5** contribute relatively small loadings to the BRL and were therefore not assigned specific reductions in the 2013 BMAP. However, these entities may be assigned specific reductions in future BMAP updates.

Table 4: Summary of completed projects identified in the BMAP by entity

Entity	Projects Listed in 2013 BMAP	Completed	Under Way	Cancelled
Brevard County	28	24	3	1
Cape Canaveral Air Force Station (AFS)	2	2		
City of Cape Canaveral	15	12	3	
City of Cocoa Beach	36	34	1	1
City of Indian Harbour Beach	12	11	1	
City of Satellite Beach	40	40		
Florida Department of Transportation (FDOT) District 5	16	16		
Kennedy Space Center (KSC)	19	19		
Patrick AFB	6	6		
Total	177	163	12	1

Table 5: Summary of allocations and reduction status by entity

Project Zone	Entity	TN Allocation (lbs/yr)	TP Allocation (lbs/yr)	Total TN Required Reduction (lbs/yr)	Total TP Required Reduction (lbs/yr)	Current TN Reduction (lbs/yr)	Current TP Reduction (lbs/yr)
A	Brevard County	1,327	204	No required reductions	No required reductions	715	415
A	Cape Canaveral AFS	35,328	9,204	No required reductions	No required reductions	402	124
A	FDOT District 5	286	101	No required reductions	No required reductions	152	32
A	KSC	22,597	5,690	No required reductions	No required reductions	18,348	2,800
B	Brevard County	21,949	4,584	42,287	9,193	6,063	1,573
B	City of Cape Canaveral	2,484	519	5,907	1,467	2,786	471
B	City of Cocoa Beach	6,954	1,452	11,347	2,360	2,471	715
B	City of Indian Harbour Beach	4,482	936	6,787	1,167	1,370	353
B	City of Satellite Beach	6,206	1,296	10,487	1,987	2,818	592
B	FDOT District 5	1,930	403	3,147	1,193	2,017	350
B	City of Melbourne – <i>de minimus</i>						
B	Patrick AFB	7,037	1,470	17,433	4,987	4,208	1,138
B	City of Port Canaveral – <i>de minimus</i>						

Section 4: WATER QUALITY AND BIOLOGICAL EVALUATION

4.1 Water Quality Monitoring

The BRL BMAP monitoring plan was designed to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track water quality trends. The information gathered through the monitoring plan will measure progress toward achieving the TMDLs and provide a better understanding of watershed loading. The BMAP monitoring plan consists of ambient water quality sampling and biological monitoring. A few highlights of the BMAP monitoring efforts are described below.

4.1.1 Monitoring Network

The SJRWMD monitors six stations in the BRL, and these were monitored monthly during the reporting period. The SJRWMD also continued seagrass transect monitoring in the BRL for seagrass, phytoplankton, epiphyte coverage, and water quality along each transect.

In addition, DEP and the SJRWMD worked with Dewberry, a consulting firm, to collect aerial photography for the seagrass imagery analysis in April and May 2015. The mapped seagrass deep edge from the aerial imagery was used to update the seagrass depth limit evaluation, which is discussed in **Section 4.2. Figure 5** and **Figure 6** show the locations of the water quality monitoring stations in Project Zones A and B, respectively.

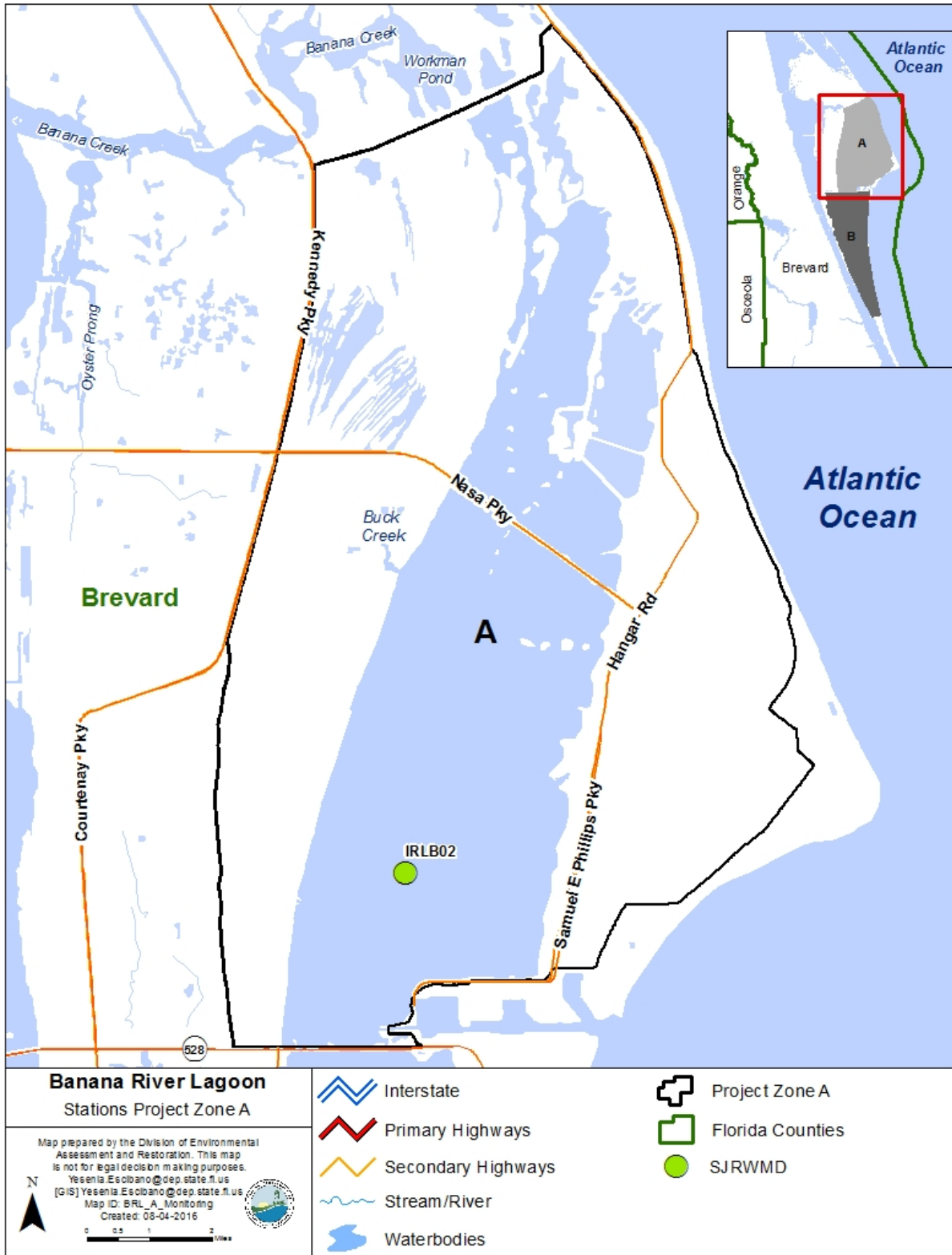


Figure 5: Water quality monitoring stations in BRL Project Zone A

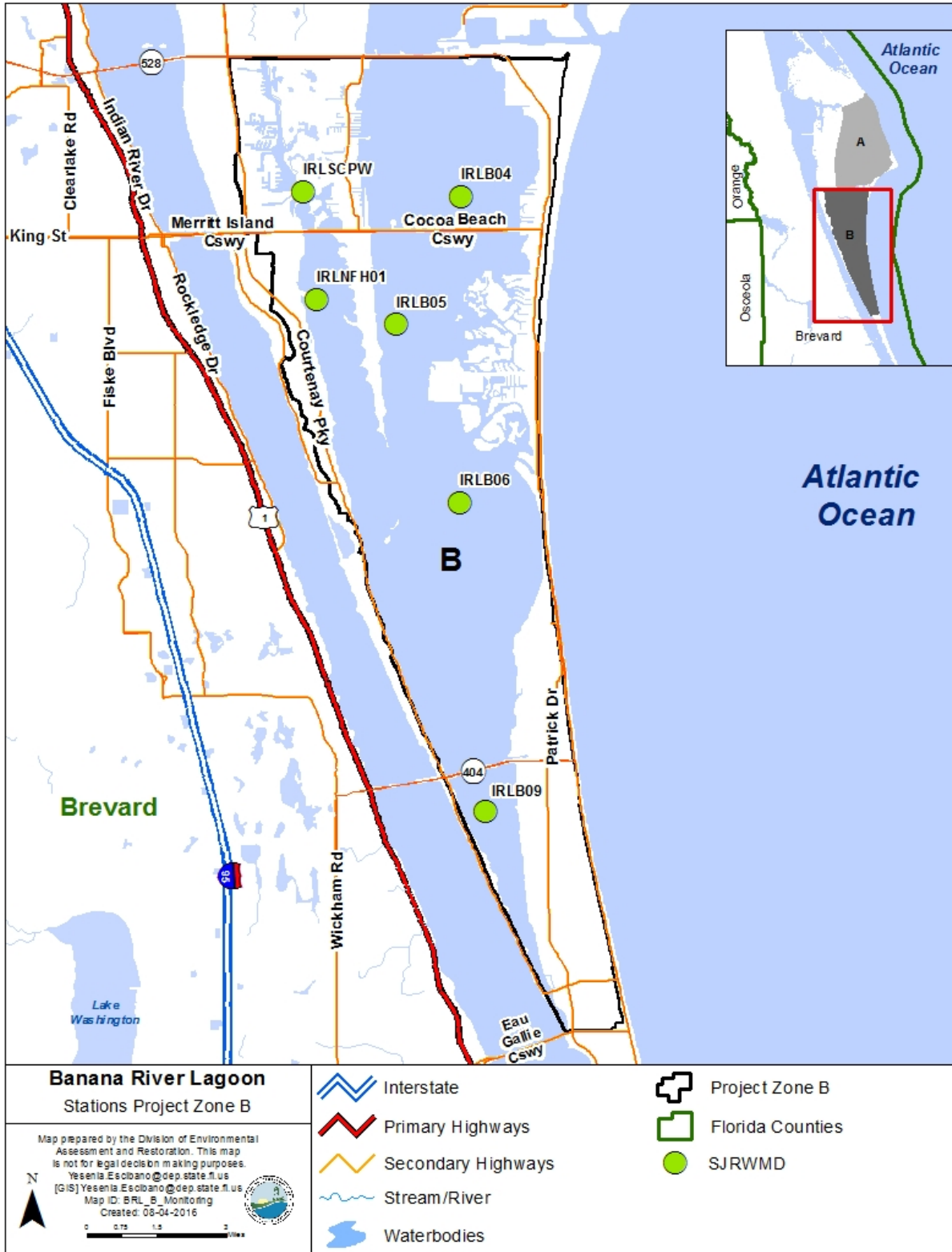


Figure 6: Water quality monitoring stations in BRL Project Zone B

4.1.2 SJRWMD

Routine SJRWMD water quality sampling was completed the first week of February 2016. Water clarity continued to decline, with Secchi depths less than 0.4 meters (m) from Cocoa through Grant-Valkaria in North IRL Project Zone B. YSI-measured chlorophyll-*a* increased in the same region of North IRL Project Zone B to Central IRL Project Zone A, with the highest concentrations in the Rockledge area (350 micrograms per liter [$\mu\text{g/L}$]) and decreasing southward towards Grant-Valkaria (43 $\mu\text{g/L}$).

Bloom samples were collected on February 1, 2016, south of the SR 520 Causeway in Cocoa (North IRL Project Zone B). The samples contained a mixed assemblage of species, including picocyanobacteria (2,198,379 cells/milliliter [mL]), *Aureoumbra lagunensis* (1,281,667 cells/mL), and green nanoeukaryotes (244,847 cells/mL). *A. lagunensis* predominated, making up 84 % of the sample. Another bloom sample was collected in Rockledge (North IRL Project Zone B), again with *A. lagunensis* dominating the biovolume. Chlorophyll-*a* increased at the continuous monitoring station at the Melbourne Causeway (North IRL Project Zone B), with the highest concentrations (402 $\mu\text{g/L}$) observed on February 14, 2016. Salinity remains in the low 20 parts per thousand (ppt). Maintenance on this station was completed on February 8, 2016, and was scheduled again on March 8, 2016.

Data collected from 6 stations (**Figure 7**) between January 6, 2016, and April 6, 2016, showed that values for 4 forms of nitrogen, 3 forms of phosphorus, and chlorophyll-*a* varied in space and over time (**Figure 8**, **Figure 9**, and **Figure 10**). Ammonium concentrations at IRLB04 (BRL), IRLI06 (North IRL Project Zone A), IRLI13 (North IRL Project Zone B), and IRLI23 (Central IRL Project Zone A) were elevated in samples from November and December 2015, which was the period preceding the bloom of *A. lagunensis*, or brown tide (**Figure 8**). An increase in ammonium also was noted prior to the first bloom of *A. lagunensis* in Laguna Madre, Texas.

Phosphorus concentrations remained slightly higher than the concentrations recorded before 2010, especially at more northern stations (**Figure 9**).

Brown tide was evident as increased concentrations of chlorophyll-*a* at IRLB04, IRLI06, IRLI13, and IRLI23 from December 2015 to March 2016, with no evidence of an event at IRLIRJ07 (Central IRL Project Zone B; **Figure 10**). The last reports of large numbers of *A. lagunensis* ($> 2,000,000$ cells mL^{-1}) were from the southern Mosquito Lagoon and southern BRL on March 7, 2016. Overall, water quality, especially in the northern IRL, remained unsettled.

Station map for IRL data page
 Updated on: 4/10/2016

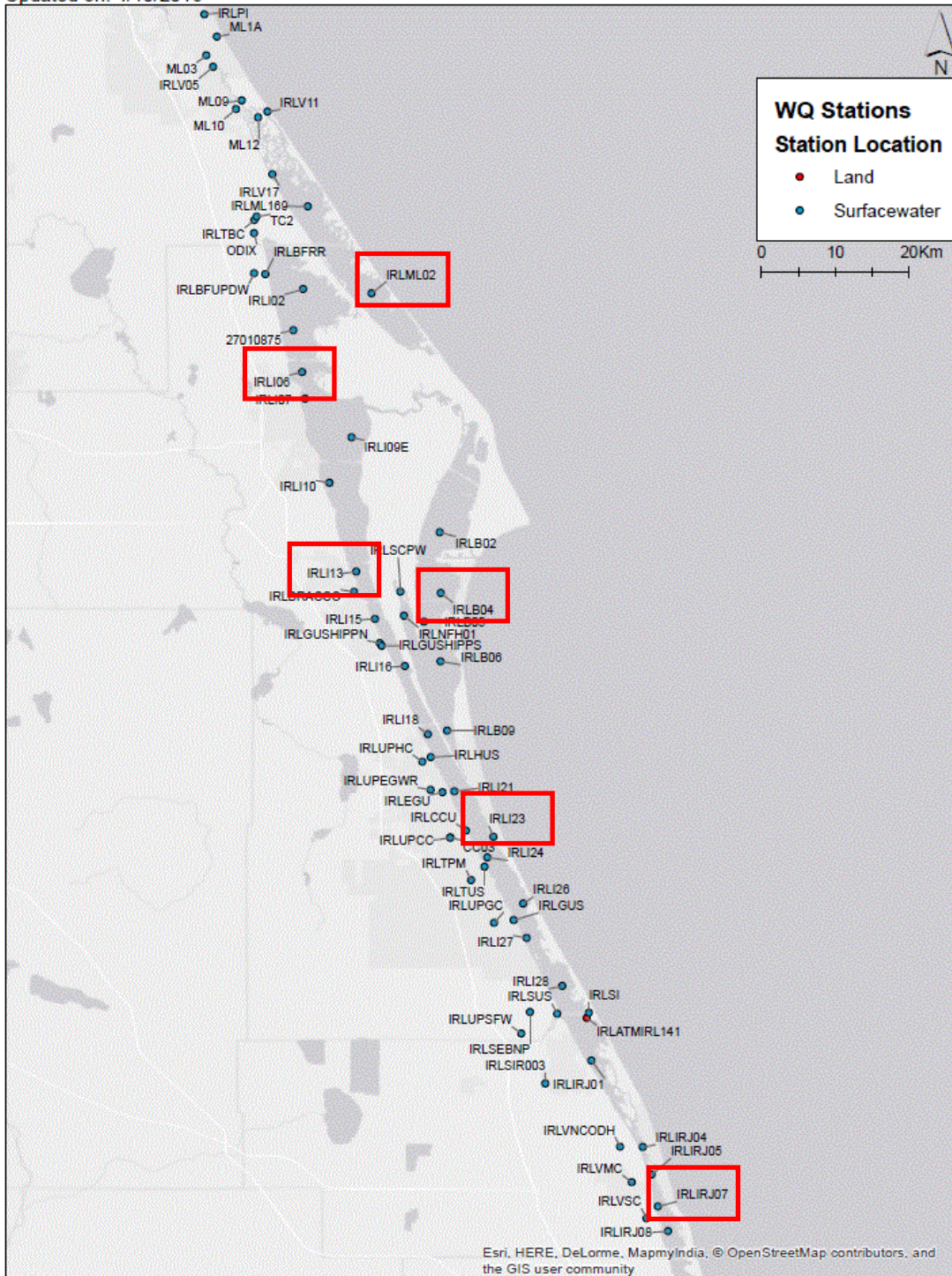


Figure 7: Water quality sampling stations

Red boxes = Representative stations

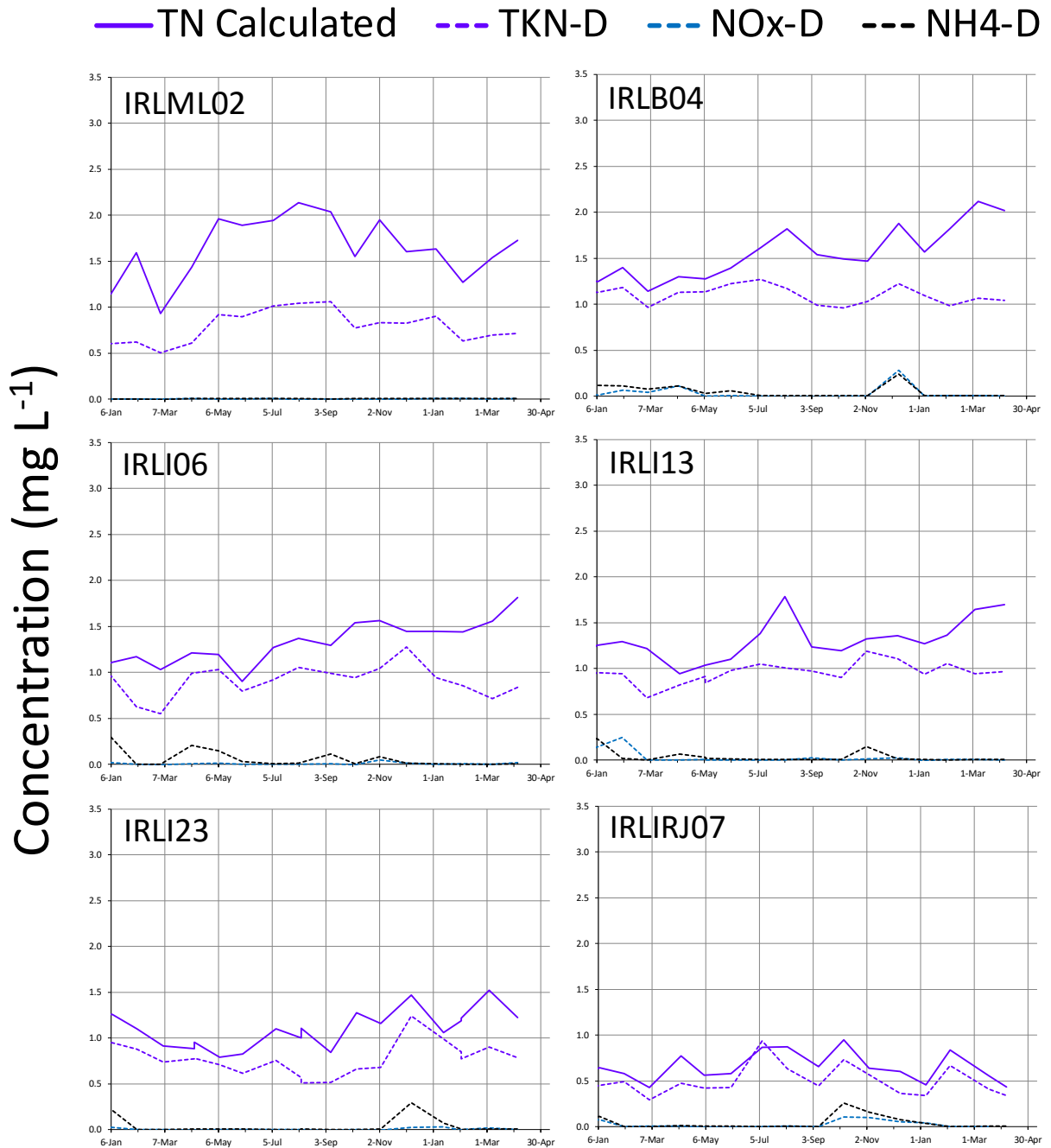


Figure 8: Concentrations of various forms of nitrogen

TN Calculated = Total nitrogen calculated from other forms, TKN-D = Total dissolved Kjeldahl nitrogen, NOx-D = Dissolved nitrate and nitrite, NH4-D = Dissolved ammonium

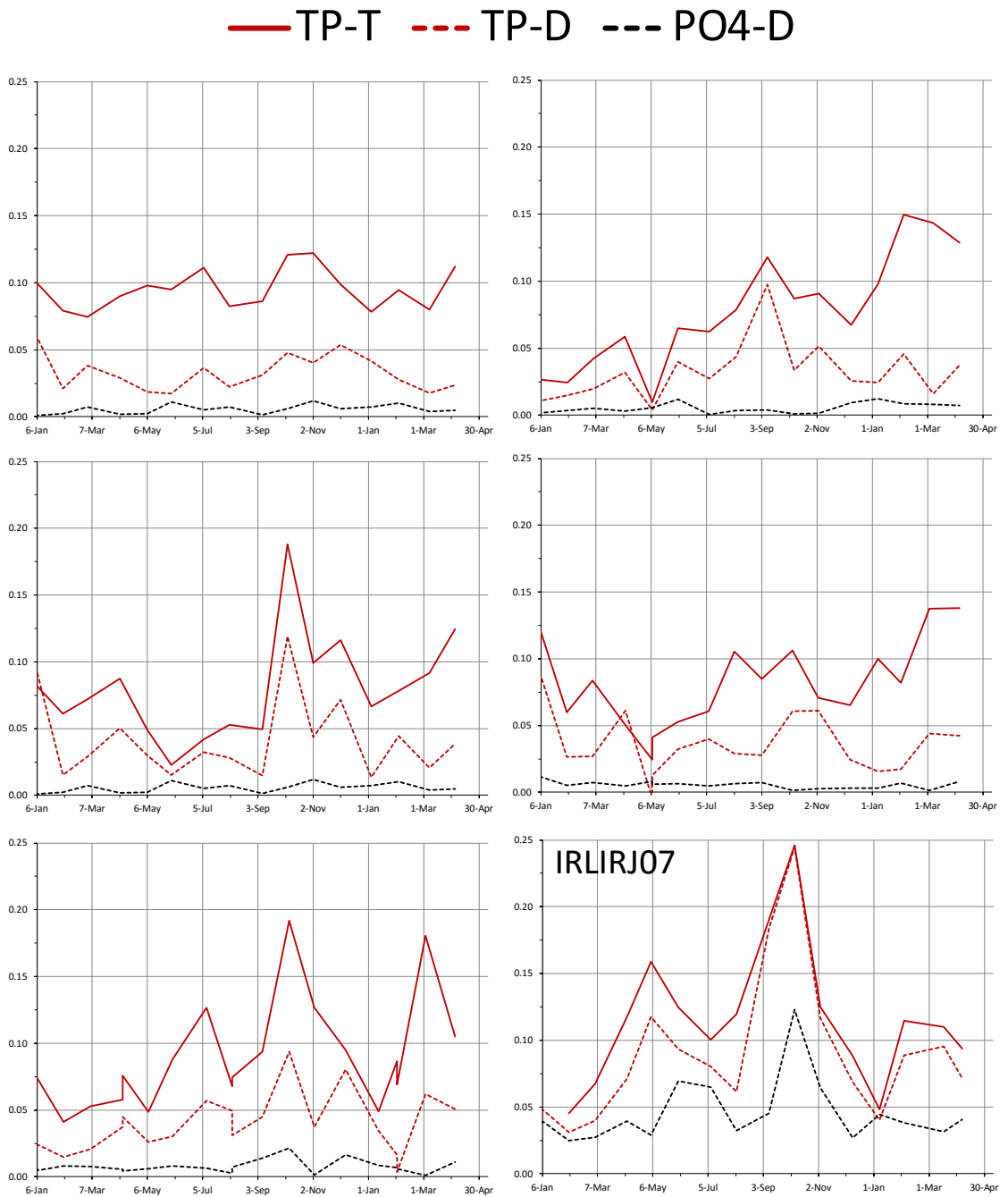


Figure 9: Concentrations of various forms of phosphorus

TP-T = Total phosphorus, TP-D = Total dissolved phosphorus, PO4-D = Dissolved orthophosphate

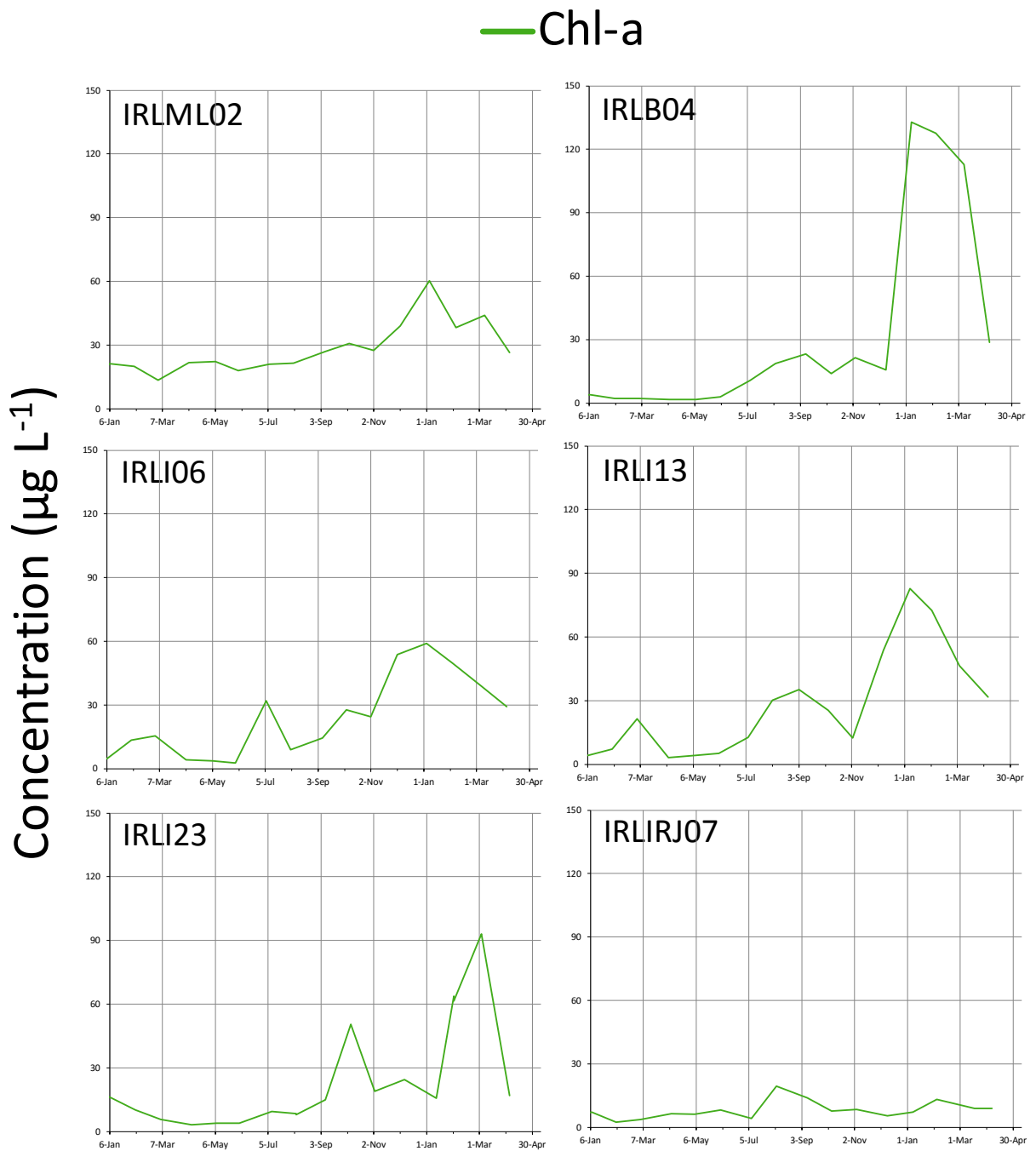


Figure 10: Chlorophyll concentrations

Chl-a = Chlorophyll-a

4.2 Seagrass Compliance Test

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 TMDLs. To assess progress in the IRL Basin towards the median seagrass depth limit target, the following two-step compliance test was used:

- Step 1 is a cumulative frequency distribution analysis in which the four most recent mapped seagrass datasets are used to create a union coverage of the assessment years and establish the deep edge of the seagrass beds. A cumulative frequency distribution curve of the assessment years' depths is then compared with 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 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 mapped seagrass datasets. Each assessment year median is then compared with 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.

DEP conducted this two-step evaluation process using the 2009, 2011, 2013, and 2015 mapping years, which were the latest datasets available at the time of this analysis. BRL Project Zone A was found to be Step 1 compliant, while Project Zone B was determined to be Step 1 noncompliant (**Figure 11** and **Figure 12**) but not Step 2 compliant (**Figure 13** and **Figure 14**). **Table 6** summarizes the Step 2 compliance results, and highlighted cells indicate where the assessment year median depth exceeded the TMDL depth limit median. Therefore, BMAP stakeholders will continue to work towards achieving the seagrass depth limit targets.

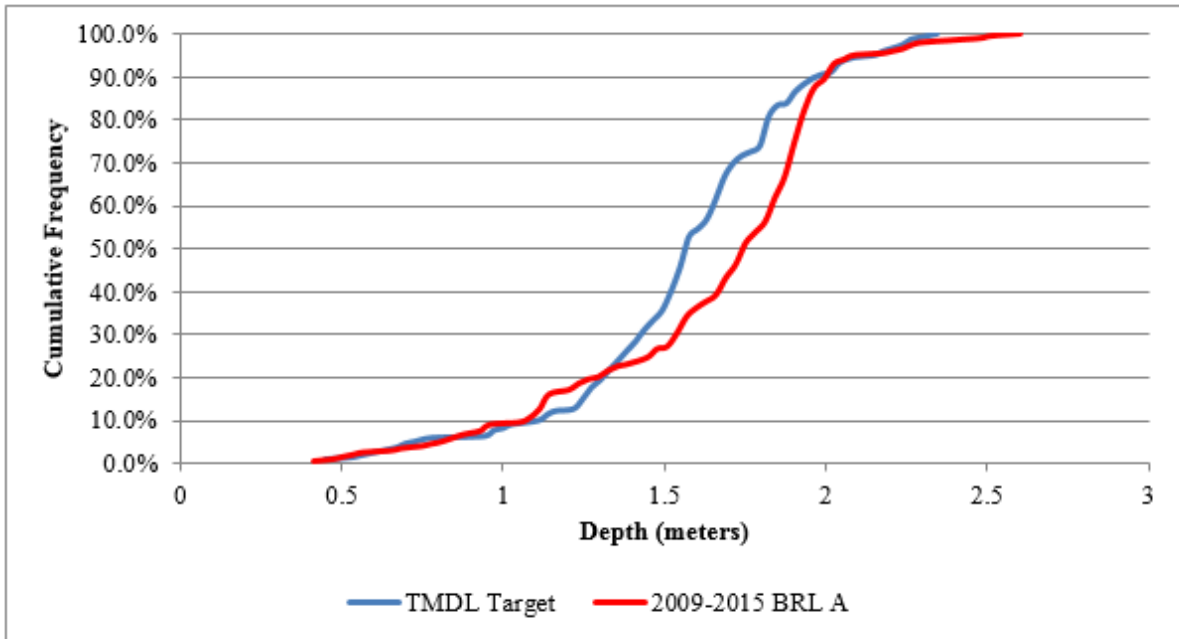


Figure 11: Step 1 compliance evaluation for BRL Project Zone A, 2009–15

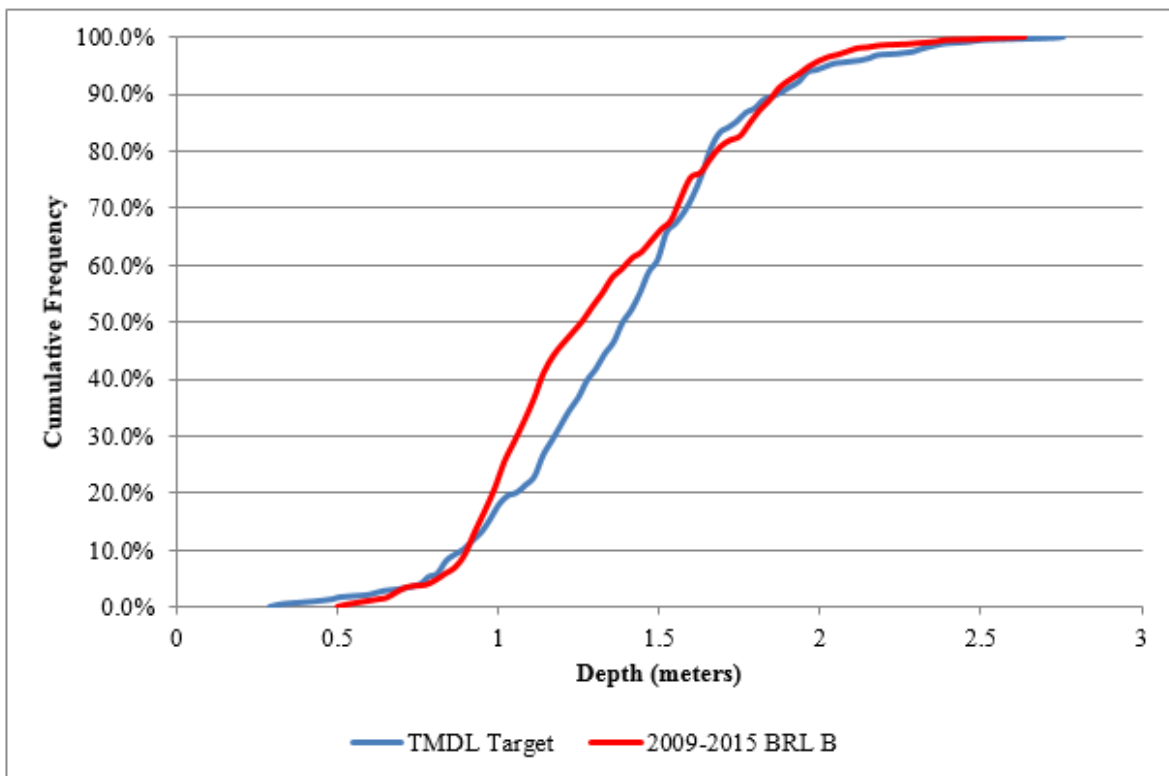


Figure 12: Step 1 compliance evaluation for BRL Project Zone B, 2009–15

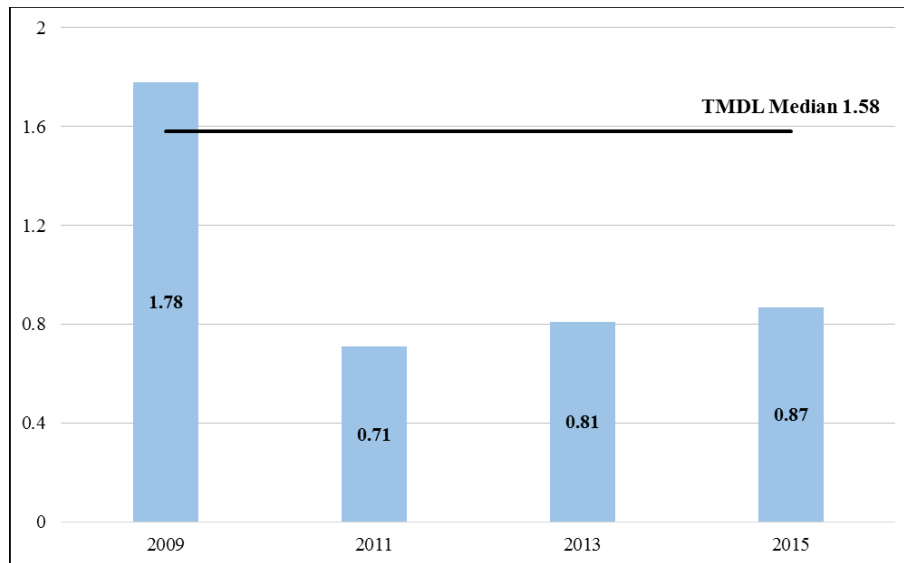


Figure 13: Step 2 compliance evaluation for BRL Project Zone A, 2009–15

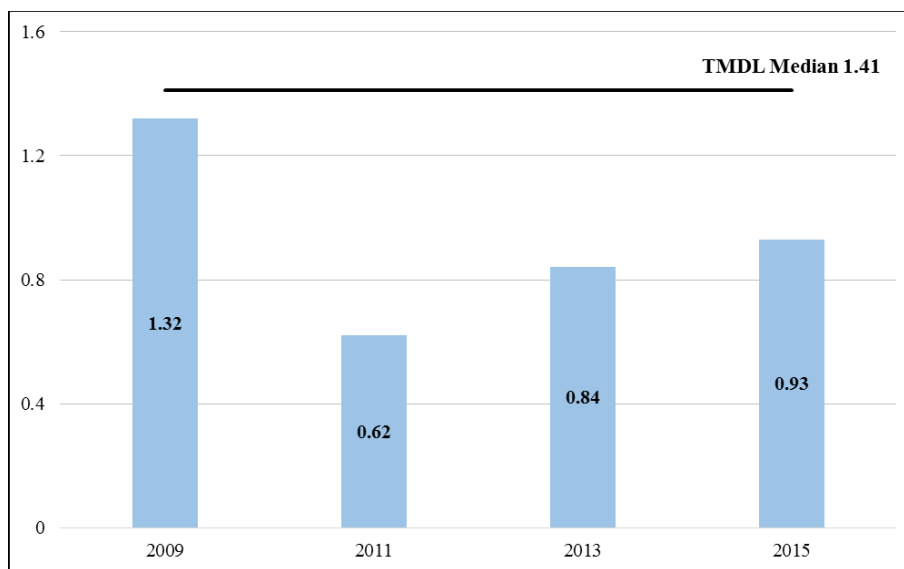


Figure 14: Step 2 compliance evaluation for BRL Project Zone B, 2009–15

Table 6: Step 2 compliance evaluation for the BRL Subbasin

Year	BRL A Median Depth (m)	BRL B Median Depth (m)
TMDL Median	1.58	1.41
2007	1.81*	1.32
2009	1.78*	1.32
2011	0.71	0.62
2013	0.81	0.84
2015	0.87	0.93
Step 2 Compliant?		No

APPENDICES

Appendix A: BMAP Projects

The BMAP project tables in this appendix show the implementation status of the BMAP projects as of February 29, 2016. The tables list (in lbs/yr) the nutrient reductions attributable to each individual project. These projects were submitted to provide reasonable assurance to DEP that each entity has a plan on how to meet its allocation; however, the list of projects is meant to be flexible enough to allow for changes that may occur over time, provided that the reduction is still met within the specified period.

Table A-1: Brevard County projects in the BRL

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual Operations and Maintenance (O&M)	Project Zone
2013	BC-1	Education Efforts	Education Efforts	Ongoing		79.00	14.00			A
2013	BC-2	Pine Island Phase I and II	Wet Detention Pond	Completed	266.22	111.00	65.00	\$19,235		A
2013	BC-3	Florida Blvd. Pond	Wet Detention Pond	Completed	73.60	324.00	126.40	\$350,384		B
2013	BC-4	Hampton North (Riverside)	Baffle Box – 1st Generation	Completed	15.30	1.00	1.40	\$27,000		B
2013	BC-5	Hampton South (Needle Blvd.)	Baffle Box – 1st Generation	Completed	18.10	1.00	1.60	\$29,000		B
2013	BC-6	Albatross	Baffle Box – 1st Generation	Completed	21.80	1.00	1.50	\$33,000		B
2013	BC-7	Surfside	Baffle Box – 1st Generation	Completed	22.80	2.00	2.20	\$31,500		B
2013	BC-8	West Scots	Baffle Box – 1st Generation	Completed	9.70	30.00	5.90	\$41,000		B
2013	BC-9	Johns Cir.	Baffle Box – 1st Generation	Completed	19.50	2.00	1.80	\$31,000		B
2013	BC-10	Farrington Dr.	Baffle Box – 2nd Generation	Completed	7.80	24.00	4.90	\$37,500		B
2013	BC-11	Porpoise St.	Baffle Box – 2nd Generation	Completed	7.80	25.00	4.90	\$42,000		B
2013	BC-12	Angler St.	Baffle Box – 1st Generation	Completed	10.20	1.00	0.90	\$30,700		B
2013	BC-13	Diana Shores	Vortek Unit	Completed	38.60	0.00	17.00	\$102,000		B

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual Operations and Maintenance (O&M)	Project Zone
2013	BC-14	Education Efforts	Education Efforts	Ongoing		3,854.00	825.00			B
2013	BC-15	Street Sweeping	Street Sweeping	Ongoing		525.00	336.00			A
2013	BC-16	Fortenberry Pond	Wet Detention Pond	Completed	164.50	847.00	364.60	\$10,900,000	\$35,000	B
2013	BC-17	Merritt Island Airport Pond	Wet Detention Pond	Completed	148.20	458.00	160.00	\$652,056		B
2013	BC-18	Florida Blvd.	Managed Aquatic Plants Systems (MAPS)	Completed	73.60	117.00	14.30	\$40,772	\$18,295	B
2013	BC-19	Third Ave. Baffle Box	Baffle Box – Type 1 Retrofit	Completed	53.10	93.00	10.00	\$31,452		B
2013	BC-20	BMP Cleanout	BMP Cleanout	Ongoing		1.00	1.00	\$95,069	\$55,300	B
2013	BC-21	Fourth Pl. Baffle Box	Baffle Box – Type 1 Retrofit	Completed	57.00	146.00	25.70	\$34,037		B
2013	BC-22	Thrush 405 Baffle Box	Baffle Box – Type 1 Retrofit	Completed	4.30	7.00	0.70	\$12,507		B
2013	BC-23	Fortenberry Pond MAPS	MAPS	Cancelled	164.50	256.00	31.40	\$151,588		B
2013	BC-24	Merritt Ridge Pond 3A	MAPS	Funded	84.40	210.00	48.70	\$114,914	\$25,091	B
2013	BC-25	Cassia Phase 3	Retention BMP	Completed	18.40	100.00	0.00	\$100,000		B
2013	BC-26	South Patrick Dr. Baffle Box	Baffle Box – 2nd Generation	Funded	73.90	132.00	16.90	\$625,000		B
2013	BC-27	Kelly Park Reuse	Stormwater Reuse	Completed	32.90	19.00	1.30			B
2013	BC-28	Patrick AFB Golf Course Pond Stormwater Reuse	Stormwater Reuse	Planned, not funded	88.33	359.10	0.00			B
2014	BC-29	Ocean Blvd.	Baffle Box – Type 1 Retrofit	Completed	6.00	10.00	1.40	\$12,507		B
2015	BC-30	Street Sweeping	Street Sweeping	Started		0.00	0.00			A
2015	BC-31	BMP Cleanout	BMP Cleanout	Started		0.00	0.00			A

Table A-2: Cape Canaveral AFS projects in the BRL

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	CCAFS-1	Nonuse of Fertilizer/ Fertilizer Ordinance	Education Efforts	Ongoing		377.00	107.90			A
2013	CCAFS-2	Street Sweeping	Street Sweeping	Ongoing		25.00	16.00			A

Table A-3: City of Cape Canaveral projects in the BRL

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	CC-1	Holman Rd. Baffle Box	Baffle Box – 1st Generation	Completed	35.20	2.10	2.30	\$75,000	\$1,200	B
2013	CC-2	Center St. Baffle Box	Baffle Box – 1st Generation	Completed	72.00	4.00	4.00	\$75,000	\$1,200	B
2013	CC-3	International Dr. Baffle Box	Baffle Box – 1st Generation	Completed	110.00	8.00	9.00	\$75,000	\$1,200	B
2013	CC-4	Angel Isles Baffle Box	Baffle Box – 1st Generation	Completed	40.00	1.00	1.10	\$75,000	\$1,200	B
2013	CC-5	WWTP Baffle Box	Baffle Box – 1st Generation	Completed	11.60	0.30	0.10	\$15,000	\$1,200	B
2013	CC-6	West Central Blvd. Baffle Box	Baffle Box – 1st Generation	Completed	150.00	10.00	11.00	\$75,000	\$1,200	B
2013	CC-7	Central Ditch Baffle Box (3 count)	Baffle Box – 2nd Generation	Completed	121.60	189.00	30.90	\$270,000	\$3,600	B
2013	CC-8	Street Sweeping	Street Sweeping	Ongoing		168.00	108.00	\$12,322		B
2013	CC-9	Shorewood Drainage Subbasin	100 % On-Site Retention	Completed	37.00	326.00	80.00			B
2013	CC-10	Education Efforts	Education Efforts	Ongoing		461.62	109.31	\$3,100		B
2013	CC-11	Manatee Park SW Improvements	Wet Detention Pond	Completed	11.50	2.00	0.20	\$193,000	\$5,000	B
2013	CC-12	Banana River Park SW Improvements	Swales	Completed	5.60	11.00	0.60	\$38,000	\$2,500	B
2013	CC-13	SW Exfiltration on North Atlantic Ave.	Exfiltration	Started	37.00	102.00	24.00	\$436,000	\$10,000	B
2013	CC-14	SW Exfiltration at Canaveral City Park	Exfiltration	Planned, funded	11.00	103.00	24.00	\$988,103	\$10,000	B

2016 Progress Report for the Banana River Lagoon Basin Management Action Plan – September 2016

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	CC-15	SW Pond on West Central Blvd.	Wet Detention Pond	Planned, not funded	61.00	340.00	145.10	\$1,800,000	\$10,000	B
2014	CC-16	Clean Out of Baffle Boxes	BMP Cleanout	Ongoing		1.00	0.00		\$4,500	B
2014	CC-17	Central Ditch Dredging Project	Dredging	Cancelled				\$195,000		B
2014	CC-18	Exfiltration Piping Installations	Exfiltration	Cancelled						B
2014	CC-19	2.5-Million-Gallon Reclaimed Water Tank	Stormwater Reuse	Completed		1602.00	114.00	\$3,030,000	\$10,000	B
2014	CC-20	Conversion of 5 Baffle Boxes to Next Generation	Baffle Box – 1st Generation	Planned, funded				\$295,000	\$5,000	B
2015	CC-21	Holman Rd. Swale	Treatment Train	Planned, funded	1.60	13.00	4.00	\$26,250		B
2016	CC-22	Cocoa Palms LID	Treatment Train	Planned, funded	3.90	8.00	2.00		\$1,000	B
2016	CC-23	Cherrie Down Park	Treatment Train	Planned, funded	2.70				\$1,000	B
2016	CC-24	Carver Cove Berm	Treatment Train	Planned, funded	5.00	9.00	2.00		\$1,000	B
2016	CC-25	Cape Shores Swales (3 count)	Treatment Train	Planned, funded	8.00	29.00	7.00		\$1,000	B
2016	CC-26	International Dr.	Wet Detention Pond	Planned, not funded	51.00	214.00	108.00		\$2,500	B
2016	CC-27	Justamere Rd. Swale	Treatment Train	Planned, funded	1.00	2.00	1.00		\$1,000	B
2016	CC-28	Hitching Post Berm	Dry Retention Swale	Planned, funded	8.00	17.00	4.00		\$1,000	B
2016	CC-29	Center St. Pond	Wet Detention Pond	Planned, funded	60.00	243.00	117.00		\$2,500	B
2016	CC-30	Holman Rd. Pond	Wet Detention Pond	Planned, not funded	12.00	17.00	18.00		\$2,500	B
2016	CC-31	Costa Del Sol Pond	Dry Retention Pond	Planned, funded	1.00	9.00	2.00			B
2016	CC-32	Costa Del Sol Denitrification Wall	Treatment Train	Planned, funded	13.00	3.00				B

Table A-4: City of Cocoa Beach projects in the BRL

TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	CB-1	Maritime Hammock Preserve Alum Pond	Treatment Train	Completed	130.20	746.00	317.50	\$960,000	\$20,000	B
2013	CB-2	Ocean Beach Blvd. Bioretention/Exfiltration	Swales	Completed	50.60	218.00	46.30	\$1,150,000	\$18,000	B
2013	CB-3	2nd St. South PCD	Baffle Box – 2nd Generation	Completed	52.00	135.00	25.00	\$181,974	\$1,200	B
2013	CB-4	Cottage Row Parking Facilities Lot	Exfiltration	Completed	2.40	37.00	9.10		\$500	B
2013	CB-5	Shepard Park Improvements	Dry Detention Pond	Completed	0.00	0.00	0.00		\$3,000	B
2013	CB-6	Burris Way (alley) Exfiltration	Exfiltration	Completed	0.80	4.00	1.00		\$1,200	B
2013	CB-7	Brevard Ave. Exfiltration	Swales	Completed	0.50	5.00	1.00		\$300	B
2013	CB-8	50 Danube River Exfiltration	Swales	Completed	1.50	1.00	0.10		\$300	B
2013	CB-9	12 Bougainvillea Dr. Exfiltration	Swales	Completed	1.00	1.00	0.10		\$300	B
2013	CB-10	9th St. S and Brevard Ave. Exfiltration	Swales	Completed	0.10	0.10	0.02		\$300	B
2013	CB-11	321 Jack Dr. Exfiltration	Swales	Completed	0.70	0.42	0.06		\$120	B
2013	CB-12	125 Cedar Ave. Exfiltration	Swales	Completed	0.90	1.00	0.20		\$120	B
2013	CB-13	Meade Bioretention	Swales	Completed	0.010	0.01	0.00		\$300	B
2013	CB-14	Osceola E Bioretention	Swales	Completed	TBD	TBD	TBD			Outside model boundary
2013	CB-15	4th St. North N Bioretention	Swales	Completed	0.10	1.00	0.30		\$120	B
2013	CB-16	4th St. North S Bioretention	Swales	Completed	0.50	2.00	0.50		\$120	B
2013	CB-17	3rd St. South N Bioretention	Swales	Completed	TBD	TBD	TBD			Outside model boundary
2013	CB-18	3rd St. South S Bioretention	Swales	Completed	TBD	TBD	TBD			Outside model boundary

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	CB-19	Holiday Lane Bioretention	Swales	Completed	5.20	34.00	7.30		\$1,200	B
2013	CB-20	S Banana/ St. Lucie Swale	Swales	Completed	3.80	13.00	2.80		\$120	B
2013	CB-21	S Banana/ St. Lucie Swale	Swales	Completed	0.80	2.00	0.20		\$120	B
2013	CB-22	Banana River Retention	Dry Retention Pond	Completed	1.10	2.00	0.40		\$1,500	B
2013	CB-23	Banana River Retention	Dry Retention Pond	Completed	1.40	2.00	0.50		\$1,500	B
2013	CB-24	Minutemen/ Country Club Swale	Swales	Completed	1.90	7.00	1.60		\$120	B
2013	CB-25	Palm Ave. Swale	Swales	Completed	0.20	0.00	0.00		\$120	B
2013	CB-26	Minutemen/Cocoa Beach High School	Swales	Completed	1.30	20.00	4.80		\$500	B
2013	CB-27	Minutemen/ Public Works Complex Swale	Swales	Completed	1.90	4.00	0.80		\$3,000	B
2013	CB-28	Tom Warriner/ Public Works Complex Swale	Swales	Completed	0.90	3.00	0.40		\$3,000	B
2013	CB-29	Shepard Dr. Swale	Swales	Completed	0.60	3.00	0.50		\$120	B
2013	CB-30	Shepard Dr. Swale	Swales	Completed	1.30	5.00	0.40		\$120	B
2013	CB-31	W Gadsden/ Banana Swale	Swales	Cancelled					\$120	B
2013	CB-32	W Pasco/ Banana Swale	Swales	Completed	1.00	2.00	0.20		\$120	B
2013	CB-33	W Pasco/ Banana Swale	Swales	Completed	2.30	3.00	0.40		\$120	B
2013	CB-34	32 Inlet Baskets	BMP Cleanout	Completed	TBD	32.00	10.30		\$1,200	B
2013	CB-35	Dino Museum/Store, S Cayer, 250 W CB Cswy.	Dry Detention Pond	Completed	2.10	4.00	0.90		\$120	B
2013	CB-36	332-334 N Orlando, Contractor	Dry Detention Pond	Completed	0.50	1.00	0.20		\$120	B
2013	CB-37	Street Sweeping	Street Sweeping	Ongoing		84.00	54.00	\$38,405	\$38,405	B
2013	CB-38	Education Efforts	Education Efforts	Ongoing		1098.00	228.00	\$5,000	\$5,000	B

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	CB-39	Minutemen Corridor Stormwater Improvement/LID	Treatment Train	Design	20.30	330.00	74.20	\$4,625,328	\$12,000	B
2016	CB-40	Downtown North LID	Treatment Train	Envisioned, but not funded	43.00	TBD	TBD			B

Table A-5: City of Indian Harbour Beach projects in the BRL

TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	IHB-1	N. Osceola Dr.	Exfiltration	Completed	8.62	41.79	5.92	\$60,000	\$500	B
2013	IHB-2	Datura Dr.	Exfiltration	Completed	0.73	3.53	0.53	\$50,000	\$300	B
2013	IHB-3	Coquina Palms Subdivision	100% On-Site Retention	Completed	6.30	61.00	10.90			B
2013	IHB-4	Education Efforts	Education Efforts	Ongoing		619.63	115.57			B
2013	IHB-5	Inlet Cleaning	BMP Cleanout	Ongoing						B
2013	IHB-6	Street Sweeping	Street Sweeping	Ongoing		116.00	74.00	\$9,800		B
2013	IHB-7	Gleason Park Phase 1	Wet Detention Pond	Completed	128.88	382.20	118.56	\$135,000	\$200	B
2013	IHB-8	Atlantic Ave. Swale	Swales	Completed	0.96	8.00	1.20			B
2013	IHB-9	Gleason Park Irrigation	Stormwater Reuse	Ongoing	128.88	47.78	8.38			B
2013	IHB-10	Indian Harbour Beach Condo Pond	Dry Retention Pond	Planned, funded	2.35	28.00	6.80	\$13,277		B
2013	IHB-11	Fire Station Exfiltration	Exfiltration	Completed	2.80	9.00	1.00	\$11,481		B
2013	IHB-12	School Rd. at Park Dr.	Exfiltration	Completed	15.80	15.00	3.10			B
2014	IHB-13	Yuma Dr. Exfiltration	Exfiltration	Completed	11.15	26.00	5.80			B
2014	IHB-14	Lime Bay Exfiltration	Exfiltration	Completed	31.22	27.75	6.17			B
2014	IHB-15	Andros Lane Exfiltration	Exfiltration	Completed	8.73	1.57	0.22			B
2015	IHB-16	Indian Harbour Beach Condo Pond	Dry Retention Pond	Cancelled						B
2016	IHB-17	Fire Station Exfiltration	Exfiltration	Completed	2.79	3.3	0.35			B

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2016	IHB-18	Inwood Lane Exfiltration	Exfiltration	Completed	7.72	7.5	1.07			B
2016	IHB-19	Gleason Park Irrigation Expansion	Stormwater Reuse	Envisioned, but not funded	128.88	TBD	TBD			B
2016	IHB-20	Oars and Paddles Dry Pond	Treatment Train	Envisioned, but not funded	35.20	TBD	TBD			B
2016	IHB-21	FDOT Pond #3 Beemats	Floating Aquatic Vegetation Treatment	Envisioned, but not funded	137.89	TBD	TBD	\$10,000		B
2016	IHB-22	Kristi and Pinetree Dr. Swale	Swales	Envisioned, but not funded	3.62	54	12.2	\$12,000		B
2016	IHB-23	Wimico Dr. Swale	Swales	Envisioned, but not funded	2.51	23	3.3	\$10,000		B
2016	IHB-24	Crispino Wet Pond	Wet Detention Pond	Envisioned, but not funded	34.24	99.25	32.09	\$600,000		B
2016	IHB-25	Big Muddy Canal Bafflebox @ Dorothy	Baffle Box – 2nd Generation	Envisioned, but not funded	TBD	TBD	TBD			B
2016	IHB-26	Cheyenne Dr./ Marion Baffle	Baffle Box – 2nd Generation	Envisioned, but not funded	TBD	TBD	TBD			B
2016	IHB-27	Beach Funeral Home Pervious Parking	Pervious Pavement	Envisioned, but not funded	TBD	TBD	TBD			B
2016	IHB-28	Townhouse Estates Exfiltration	Exfiltration	Envisioned, but not funded	4.94	TBD	TBD	\$15,000		B
2016	IHB-29	Palm Springs Swale	Swales	Envisioned, but not funded	4.81	83.1	21.3	\$10,000		B
2016	IHB-30	Alhambra Exfiltration	Exfiltration	Envisioned, but not funded	15.58	62.62	9.99	\$500,000		B
2016	IHB-31	Ronnie Exfiltration Extension	Exfiltration	Envisioned, but not funded	2.17	15.35	2.15	\$200,000		B
2016	IHB-32	Atlantic Exfiltration East	Exfiltration	Envisioned, but not funded	37.62	187.86	26.81	\$1,400,000		B
2016	IHB-33	Atlantic Exfiltration West	Exfiltration	Envisioned, but not funded	32.00	106.66	15.09	\$1,200,000		B
2016	IHB-34	Pinetree Streetscaping	Treatment Train	Envisioned, but not funded	90.97	TBD	TBD			B
2016	IHB-35	Muck Dredging	Dredging	Envisioned, but not funded	TBD	TBD	TBD			B

Table A-6: City of Satellite Beach projects in the BRL

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	SB-1	Jackson Exfiltration	Exfiltration	Completed	24.70	9.00	2.20			B
2013	SB-2	Jackson Exfiltration	Exfiltration	Completed	8.20	6.00	0.80			B
2013	SB-3	Jackson Exfiltration	Exfiltration	Completed	216.20	6.00	1.70			B
2013	SB-4	Avocado Continuous Deflective Separation (CDS) Unit	CDS Unit	Completed	8.60	0.00	3.20			B
2013	SB-5	Jackson Exfiltration	Exfiltration	Completed	11.70	3.00	0.40			B
2013	SB-6	Coconut Exfiltration	Exfiltration	Completed	39.70	27.00	4.60			B
2013	SB-7	Desoto Exfiltration	Exfiltration	Completed	108.20	97.00	13.70			B
2013	SB-8	Desoto Exfiltration	Exfiltration	Completed	7.80	25.00	3.50			B
2013	SB-9	Jamaica Blvd. Ponds	Wet Detention Pond	Completed	216.20	600.00	160.20			B
2013	SB-10	Jamaica Pond Reuse	Stormwater Reuse	Completed	216.20	277.00	25.00			B
2013	SB-11	Desoto Exfiltration	Exfiltration	Completed	3.50	17.00	2.40			B
2013	SB-12	Desoto Baffle Boxes	Baffle Box – 2nd Generation	Completed	57.80	82.00	9.50			B
2013	SB-13	Cassia Phase 1-22	Baffle Box – 2nd Generation	Completed	32.50	61.00	8.20	\$1,796,800		B
2013	SB-14	Cassia Phase 1-23	Baffle Box – 2nd Generation	Completed	12.90	30.00	5.60			B
2013	SB-15	Cassia Phase 1-24	Retention BMP	Completed	12.80	18.00	3.50			B
2013	SB-16	Cassia Phase 1-25	Retention BMP	Completed	19.70	13.00	1.80			B
2013	SB-17	Cassia Phase 1-26	Retention BMP	Completed	14.10	12.00	2.60			B
2013	SB-18	North Basin Stormwater Retrofit	Retention BMP	Completed	97.90	318.00	80.50			B
2013	SB-19	Street Sweeping	Street Sweeping	Ongoing		47.00	30.00			B
2013	SB-20	Education Efforts	Education Efforts	Ongoing		1,002.00	197.00			B
2013	SB-21	Cassia Phase 3 – C3A	Retention BMP	Completed	0.20	0.00	0.60			B
2013	SB-22	Cassia Phase 3 – C3B	Retention BMP	Completed	0.20	0.00	0.50			B
2013	SB-23	Cassia Phase 3 – C3C	Retention BMP	Completed	0.20	0.00	0.50			B
2013	SB-24	Cassia Phase 3 – C3D	Retention BMP	Completed	0.20	0.00	0.80			B
2013	SB-25	Cassia Phase 3 – C3E	Retention BMP	Completed	0.20	0.00	0.70			B
2013	SB-26	Cassia Phase 3 – C3F	Retention BMP	Completed	2.00	0.00	3.00			B
2013	SB-27	Cassia Phase 3 – C3G	Retention BMP	Completed	1.30	0.00	2.30			B
2013	SB-28	Cassia Phase 3 – C5A	Retention BMP	Completed	0.20	0.00	0.50			B
2013	SB-29	Cassia Phase 3 – C5B	Retention BMP	Completed	5.90	0.00	5.40			B
2013	SB-30	Cassia Phase 3 – C7A	Retention BMP	Completed	0.40	0.00	0.40			B
2013	SB-31	Cassia Phase 3 – C7B	Retention BMP	Completed	4.10	0.00	3.50			B

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	SB-32	Cassia Phase 3 – C9A	Retention BMP	Completed	0.50	0.00	0.60			B
2013	SB-33	Cassia Phase 3 – C9B	Retention BMP	Completed	2.10	19.00	2.80			B
2013	SB-34	Cassia Phase 3 – C13A	Retention BMP	Completed	1.20	7.00	1.90			B
2013	SB-35	Cassia Phase 3 – C13B	Retention BMP	Completed	0.10	0.00	0.30			B
2013	SB-36	Cassia Phase 3 – C13C	Retention BMP	Completed	3.10	0.00	1.70			B
2013	SB-37	Cassia Phase 3 – C13D	Retention BMP	Completed	0.50	7.00	1.60			B
2013	SB-38	Cassia Phase 3 – C13E	Retention BMP	Completed	0.90	9.00	2.20			B
2013	SB-39	Cassia Phase 3 – C13F	Retention BMP	Completed	1.60	11.00	2.60			B
2013	SB-40	Cassia Phase 3 – C13G	Retention BMP	Completed	3.30	15.00	3.80			B

Table A-7: FDOT District 5 projects in the BRL

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	FDOT-1	Street Sweeping	Street Sweeping	Ongoing		49.00	31.20			A
2013	FDOT-2	Education Efforts	Education Efforts	Ongoing		1.00	0.50			A
2013	FDOT-3	Elimination of Fertilizer Application on Rights-of-Way	Fertilizer Cessation	Completed		102.00	0.00			A
2013	FDOT-4	FM: 237139 D5_70120-3518-01	Wet Detention Pond	Completed	4.70	63.00	15.80			B
2013	FDOT-5	FM: 237454 D5_70100-3553-01	Retention BMP	Completed	5.00	23.00	11.30			B
2013	FDOT-6	FM: 237447 D5_70008-3505-02	Wet Detention Pond	Completed	3.40	9.00	5.00			B
2013	FDOT-7	FM: 237447 D5_70008-3505-03	Retention BMP	Completed	2.80	7.00	4.20			B
2013	FDOT-8	FM: 237447 D5_70008-3505-04	Retention BMP	Completed	3.80	12.00	6.80			B
2013	FDOT-9	FM: 237482 D5_70060-3533-01	Retention BMP	Completed	0.40	1.00	0.80			B
2013	FDOT-10	FM: 237453 D5_70008-3507-01	Wet Detention Pond	Completed	8.70	26.00	9.50			B
2013	FDOT-11	FM: 237453 D5_70008-3507-02	Wet Detention Pond	Completed	10.70	24.00	7.40			B
2013	FDOT-12	FM: 237712 D5_70060-3519-01	Retention BMP	Completed	2.50	36.00	8.90			B
2013	FDOT-13	FM: 422691-01 D5_422691-01	Retention BMP	Completed	1.30	15.00	3.80			B
2013	FDOT-14	Street Sweeping	Street Sweeping	Ongoing		418.00	268.00			B
2013	FDOT-15	Education Efforts	Education Efforts	Ongoing		25.00	8.00			B
2013	FDOT-16	Fertilizer Cessation	Fertilizer Cessation	Completed		1,358.00	0.00			B

Table A-8: KSC projects in the BRL

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	KSC-1	KSC Landscape Fertilizer Reduction	Fertilizer Reduction	Ongoing	200.00	1,872.00	265.40			A
2013	KSC-2	KSC Citrus Grove Termination Jerome Rd. East	Land Use Change	Completed	49.40	0.00	0.00			A
2013	KSC-3	KSC Citrus Grove Termination TEL-IV	Land Use Change	Completed	20.50	0.00	0.00			A
2013	KSC-4	Vertical Processing Facility M7-1469	Land Use Change	Completed	2.30	24.00	9.40			A
2013	KSC-5	Spacecraft Assembly Encapsulation Facility 2 M7-1210	Land Use Change	Completed	1.20	15.00	4.90			A
2013	KSC-6	Central Heat Plant M6-595	Land Use Change	Completed	0.20	3.00	1.00			A
2013	KSC-7	Utility Shops K6-1246	Land Use Change	Completed	0.30	3.00	1.00			A
2013	KSC-8	Fire Station 2 K6-1198	Land Use Change	Completed	0.40	5.00	1.50			A
2013	KSC-9	Vehicle Loading Ramp M7-0651	Land Use Change	Completed	0.00	0.00	0.10			A
2013	KSC-10	Hypergol Module Storage East M7-1412	Land Use Change	Completed	0.50	6.00	2.10			A
2013	KSC-11	Hypergol Module Storage West M7-1410	Land Use Change	Completed	0.60	8.00	2.60			A
2013	KSC-12	Regional Stormwater Management System	Wet Detention Pond	Completed	593.20	2,541.00	1,022.10			A
2013	KSC-13	ARF Stormwater System	Retention BMP	Completed	55.40	320.00	67.80			A
2013	KSC-14	VAB South Wetland Treatment System	Wetland Treatment	Completed	188.50	672.00	330.30			A
2013	KSC-15	Schwartz Rd. Landfill	100 % On-Site Retention	Completed	122.50	1,341.00	257.10			A
2013	KSC-16	Closed Basin 4 (Spoil Site – Static Test Rd.)	100 % On-Site Retention	Completed	68.20	844.00	160.60			A
2013	KSC-17	Impounded Areas	100 % On-Site Retention	Completed	1,655.30	2,444.00	149.60	\$62,406		A

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	KSC-18	Depressional Storage (22nd St. to 28th St.)	100 % On-Site Retention	Completed	1,008.10	4,139.00	228.30	\$491,976		A
2013	KSC-19	Depressional Storage (Jerome Rd. to 22nd St.)	100 % On-Site Retention	Completed	982.00	4,064.00	283.60	\$477,506		A
2014	KSC-20	Demolition of Facilities M7-1521 and M7-1522	Land Use Change	Completed	0.50	7.00	1.80			A
2014	KSC-21	Demolition of Facility M6-0339	Land Use Change	Completed	0.50	7.00	2.30			A
2015	KSC-22	Demolition of Facility M7-0862	Land Use Change	Completed	0.02	0.00	0.10			A
2015	KSC-23	Demolition of Facility M7-1012	Land Use Change	Completed	0.01	0.00	0.00			A
2015	KSC-24	Demolition of Facility M7-1061	Land Use Change	Completed	1.30	15.00	3.90			A
2015	KSC-25	Demolition of Facility M7-1112	Land Use Change	Completed	0.11	2.00	0.50			A
2015	KSC-26	Demolition of Facility M7-0961	Land Use Change	Completed	1.04	16.00	4.10			A
2015	KSC-27	Demolition of Facility K7-2468	Land Use Change	Completed	0.10	0.00	0.00			A

Table A-9: Patrick AFB projects in the BRL

TBD = To be determined

Year Project Added	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
2013	PAFB-1	Youth Center Bldg. 3656	Retention BMP	Completed	1.70	3.00	0.90			B
2013	PAFB-2	Building 543 Replace Main Gate	Retention BMP	Completed	0.20	0.00	0.10			B
2013	PAFB-3	Basin 6B No Discharge	100 % On-Site Retention	Completed	3.20	46.00	12.50			B
2013	PAFB-4	Basin 6C No Discharge	100 % On-Site Retention	Completed	11.30	164.00	43.50			B
2013	PAFB-5	Nonuse of Fertilizer/ Fertilizer Ordinance	Education Efforts	Ongoing		245.00	64.60			B
2013	PAFB-6	Golf Course Pond Stormwater Reuse	Stormwater Reuse	Completed	348.90	3,677.00	969.90	\$850,000		B
2016	PAFB-7	Street Sweepings	Street Sweeping	Completed		68	43			B
2016	PAFB-8	Demo Air Force Technical Applications Center Bldg.	Land Use Change	Completed	TBD	TBD	TBD			B
2016	PAFB-9	Fuel Farm	Baffle Box – 2nd Generation	Completed	TBD	TBD	TBD			B
2016	PAFB-10	South Patrick Dr. Baffle Box	Baffle Box – 2nd Generation	Started	TBD	TBD	TBD			B
2016	PAFB-11	Canal/Basin Cleanout	Retention BMP	Completed		5.00	3.00			B

Appendix B: Unfunded Future BMAP Projects

During project collection for this reporting period, DEP requested information from stakeholders on future projects that have potential for additional load reductions in the basin, but for which funding has not yet been identified. Table B-1 list these unfunded future projects in addition to projects that were committed to by stakeholders in the BMAP and previous annual reports. The year indicated in the column "Year Project Added" differentiates future projects (2016) from the projects that have already been committed to (2013, 2014, or 2015). Stakeholders in this BMAP are currently exceeding their Phase I targeted reductions. However, the continual funding of projects is a key part of meeting reductions required for future phases. This list will continue to be updated as project collection and verification efforts are refined.

Table B-1: Summary list of unfunded projects in previous project tables

TBD = To be determined

Year Project Added	Lead Entity	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Start Date
2013	Brevard County	BC-28	Patrick AFB Golf Course Pond Stormwater Reuse	Stormwater Reuse	Planned, not funded	88.33	359.10	0.00			
2013	City of Cape Canaveral	CC-15	SW Pond on West Central Blvd.	Wet Detention Pond	Planned, not funded	61.00	340.00	145.10	\$1,800,000	\$10,000	
2016	City of Cape Canaveral	CC-26	International Dr.	Wet Detention Pond	Planned, not funded	51.00	214.00	108.00		\$2,500	2016–17
2016	City of Cape Canaveral	CC-30	Holman Rd. Pond	Wet Detention Pond	Planned, not funded	12.00	17.00	18.00		\$2,500	2017–18
2016	City of Cocoa Beach	CB-40	Downtown North LID	Treatment Train	Envisioned, but not funded	43.00	TBD	TBD			2017
2016	City of Indian Harbour Beach	IHB-19	Gleason Park Irrigation Expansion	Stormwater Reuse	Envisioned, but not funded	128.88	TBD	TBD			2017–18
2016	City of Indian Harbour Beach	IHB-20	Oars and Paddles Dry Pond	Treatment Train	Envisioned, but not funded	35.20	TBD	TBD			2017–18
2016	City of Indian Harbour Beach	IHB-21	FDOT Pond #3 Beemats	Floating Aquatic Vegetation Treatment	Envisioned, but not funded	137.89	TBD	TBD	\$10,000		2017–18
2016	City of Indian Harbour Beach	IHB-22	Kristi and Pinetree Dr. Swale	Swales	Envisioned, but not funded	3.62	54	12.2	\$12,000		2017–18
2016	City of Indian Harbour Beach	IHB-23	Wimico Dr. Swale	Swales	Envisioned, but not funded	2.51	23	3.3	\$10,000		2018–19

Year Project Added	Lead Entity	Project Number	Project Name	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Start Date
2016	City of Indian Harbour Beach	IHB-24	Crispino Wet Pond	Wet Detention Pond	Envisioned, but not funded	34.24	99.25	32.09	\$600,000		After 2018
2016	City of Indian Harbour Beach	IHB-25	Big Muddy Canal Bafflebox @ Dorothy	Baffle Box – 2nd Generation	Envisioned, but not funded	TBD	TBD	TBD			After 2017
2016	City of Indian Harbour Beach	IHB-26	Cheyenne Dr./ Marion Baffle	Baffle Box – 2nd Generation	Envisioned, but not funded	TBD	TBD	TBD			After 2017
2016	City of Indian Harbour Beach	IHB-27	Beach Funeral Home Pervious Parking	Pervious Pavement	Envisioned, but not funded	TBD	TBD	TBD			After 2018
2016	City of Indian Harbour Beach	IHB-28	Townhouse Estates Exfiltration	Exfiltration	Envisioned, but not funded	4.94	TBD	TBD	\$15,000		After 2019
2016	City of Indian Harbour Beach	IHB-29	Palm Springs Swale	Swales	Envisioned, but not funded	4.81	83.1	21.3	\$10,000		After 2017
2016	City of Indian Harbour Beach	IHB-30	Alhambra Exfiltration	Exfiltration	Envisioned, but not funded	15.58	62.62	9.99	\$500,000		After 2018
2016	City of Indian Harbour Beach	IHB-31	Ronnie Exfiltration Extension	Exfiltration	Envisioned, but not funded	2.17	15.35	2.15	\$200,000		After 2019
2016	City of Indian Harbour Beach	IHB-32	Atlantic Exfiltration East	Exfiltration	Envisioned, but not funded	37.62	187.86	26.81	\$1,400,000		After 2019
2016	City of Indian Harbour Beach	IHB-33	Atlantic Exfiltration West	Exfiltration	Envisioned, but not funded	32.00	106.66	15.09	\$1,200,000		After 2020
2016	City of Indian Harbour Beach	IHB-34	Pinetree Streetscaping	Treatment Train	Envisioned, but not funded	90.97	TBD	TBD			After 2020
2016	City of Indian Harbour Beach	IHB-35	Muck Dredging	Dredging	Envisioned, but not funded	TBD	TBD	TBD			After 2020