

FINAL

2016 PROGRESS REPORT

for the
North Indian River Lagoon
Basin Management Action Plan

prepared by the

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

with participation from the
North Indian River Lagoon Basin
Stakeholders

May 2016

2600 Blair Stone Road
Tallahassee, FL 32399



ACKNOWLEDGMENTS

This *2016 Progress Report for the North Indian River Lagoon Basin Management Action Plan* 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 with participation from the North IRL stakeholders:

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List of North Indian River Lagoon Basin Management Action Plan participants

Type of Governmental or Private Entity	Participant
Counties	Brevard County Volusia County
Municipalities	City of Cocoa City of Edgewater City of Indian Harbour Beach City of Oak Hill City of Rockledge City of Titusville Town of Indialantic Town of Palm Shores Town of Melbourne Village
Agencies	Florida Department of Agriculture and Consumer Services (FDACS) Florida Department of Environmental Protection (DEP) Florida Department of Transportation (FDOT) District 5 Kennedy Space Center (KSC) St. Johns River Water Management District (SJRWMD)
Other Interested Parties	Agriculture

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LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Micrograms Per Liter
BAM	Biosorption Activated Media
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BRL	Banana River Lagoon
CDS	Continuous Deflective Separation
DEP	Florida Department of Environmental Protection
FDACS	Florida Department of Agriculture and Consumer Services
FDOT	Florida Department of Transportation
FFL	Florida-Friendly Landscaping
FVI	Floating Vegetative Island
FWRI	Florida Fish and Wildlife Research Institute
FY	Fiscal Year
FYN	Florida Yards and Neighborhood (Program)
IDDE	Illicit Discharge Detection and Elimination System
IRL	Indian River Lagoon
KSC	Kennedy Space Center
lbs/yr	Pounds Per Year
MAPS	Managed Aquatic Plant System
mg/L	Milligrams Per Liter
mL	Milliliter
NASA	National Aeronautics and Space Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
PAM	Polyacrylamide
PLSM	Pollutant Load Screening Model
ppt	Parts Per Thousand
PSA	Public Service Announcement
SJRWMD	St. Johns River Water Management District
SR	State Road
TBD	To Be Determined
TKN	Total Kjeldahl Nitrogen
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

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 depths at which 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 due to changes in water quality conditions resulting from human (anthropogenic) influences.

The [North IRL 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 North IRL 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, Brevard County completed 21 projects for the North IRL. In the North A Project Zone, these projects resulted in an estimated reduction of 3,219 pounds per year (lbs/yr) of TN and 1,156 lbs/yr of TP. These reductions are in addition to those projects given credit at BMAP adoption and in previous annual Progress Reports. Therefore, the total reductions to date are 29,184 lbs/yr of TN and 9,971 lbs/yr of TP, or 30 % of the TN and 52 % of the TP reductions allocated to the North A Project Zone to meet the TMDLs.

In the North B Project Zone, these projects resulted in estimated reductions of 1,504 lbs/yr of TN and 232 lbs/yr of TP. These reductions are in addition to those projects given credit at BMAP adoption and in previous annual reports. Therefore, the total reductions to date are 59,186 lbs/yr of TN and 19,380 lbs/yr of TP, or 48 % of the TN and 59 % of the TP reductions allocated to the North B Project Zone to meet the TMDLs.

Table 7 summarizes the projects completed during the third annual BMAP reporting period for the North IRL.

Water Quality and Biological Monitoring

Water quality monitoring efforts continued in the North IRL. The IRLTBC station exhibited a significant increasing trend in TP concentration. The median TP concentration for the 2000 to 2015 period was 0.175 milligrams per liter (mg/L). The TN concentration trend for IRLTBC was similar to that of TP and was also significant ($p < 0.01$). The median TN concentration for the 2000 to 2015 period was 1.839 mg/L.

Routine St. Johns River Water Management District (SJRWMD) 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* has increased in the same

region. Bloom samples were collected on February 1, 2016, south of the State Road 520 Causeway in Cocoa. The sample contained a mixed assemblage of species, including *Aureoumbra lagunensis*, picocyanobacteria, 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.

The Florida Wildlife Research Institute reported one instance of *Pseudo-nitzschia* on February 17, 2016, north of the Melbourne Causeway. High concentrations of nanoplankton were observed between Cocoa and Melbourne throughout February 2016.

Section 1: INTRODUCTION

1.1 Purpose of the Report

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

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

The Florida Department of Environmental Protection (DEP) identified the IRL Basin as impaired for nutrients due to excessive amounts of total nitrogen (TN) and total phosphorus (TP). In March 2009, DEP adopted the [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 due to 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 North IRL Subbasin.

Table 1: TN TMDLs in the North IRL Subbasin

N/A = Not applicable
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)
2963F	Indian River above Max Brewer	North A	TN	177,220	N/A	88,322	88,898
2963E	Indian River above National Aeronautics and Space Administration (NASA) Causeway	North A	TN	173,232	N/A	95,932	77,300
2963D	Indian River above 520 Causeway	North B	TN	147,524	8,111	73,882	65,531
2963B and 2963C	Indian River above Melbourne Causeway	North B	TN	189,068	9,200	114,458	65,410
Total			TN	687,044	17,311	372,594	297,139

Table 2: TP TMDLs in the North IRL Subbasin

WBID Number	WBID Name	Project Zone	Parameter	TMDL (lbs/yr)	Wastewater Facilities Allocation (lbs/yr)	Stormwater Allocation (lbs/yr)	Atmospheric Deposition Allocation (lbs/yr)
2963F	Indian River above Max Brewer	North A	TP	9,320	N/A	7,307	2,013
2963E	Indian River above NASA Causeway	North A	TP	14,793	N/A	13,042	1,751
2963D	Indian River above 520 Causeway	North B	TP	11,845	1,609	8,752	1,484
2963B and 2963C	Indian River above Melbourne Causeway	North B	TP	20,592	225	18,886	1,481
	Total		TP	56,550	1,834	47,987	6,729

1.3 North IRL Subbasin

Due to 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) North IRL, (2) Central IRL, and (3) Banana River Lagoon (BRL). Separate BMAPs were developed for each subbasin; this document focuses solely on the North IRL Subbasin.

In addition to dividing the overall IRL Basin into subbasins, the North IRL was further divided into project zones. The boundaries of these zones are based on the distinct hydrology in different areas of the basin and the respective annual residence times. They 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 load reductions achieve the desired response for each subbasin. The North IRL Subbasin was split into two project zones, as follows:

- North A – Turnbull Creek to ASA) Causeway (State Road [SR] 405), and
- North B – NASA Causeway to Melbourne Causeway (U.S. Highway 192).

Figure 1 and **Figure 2** show the locations of the project zones and the associated stakeholders.

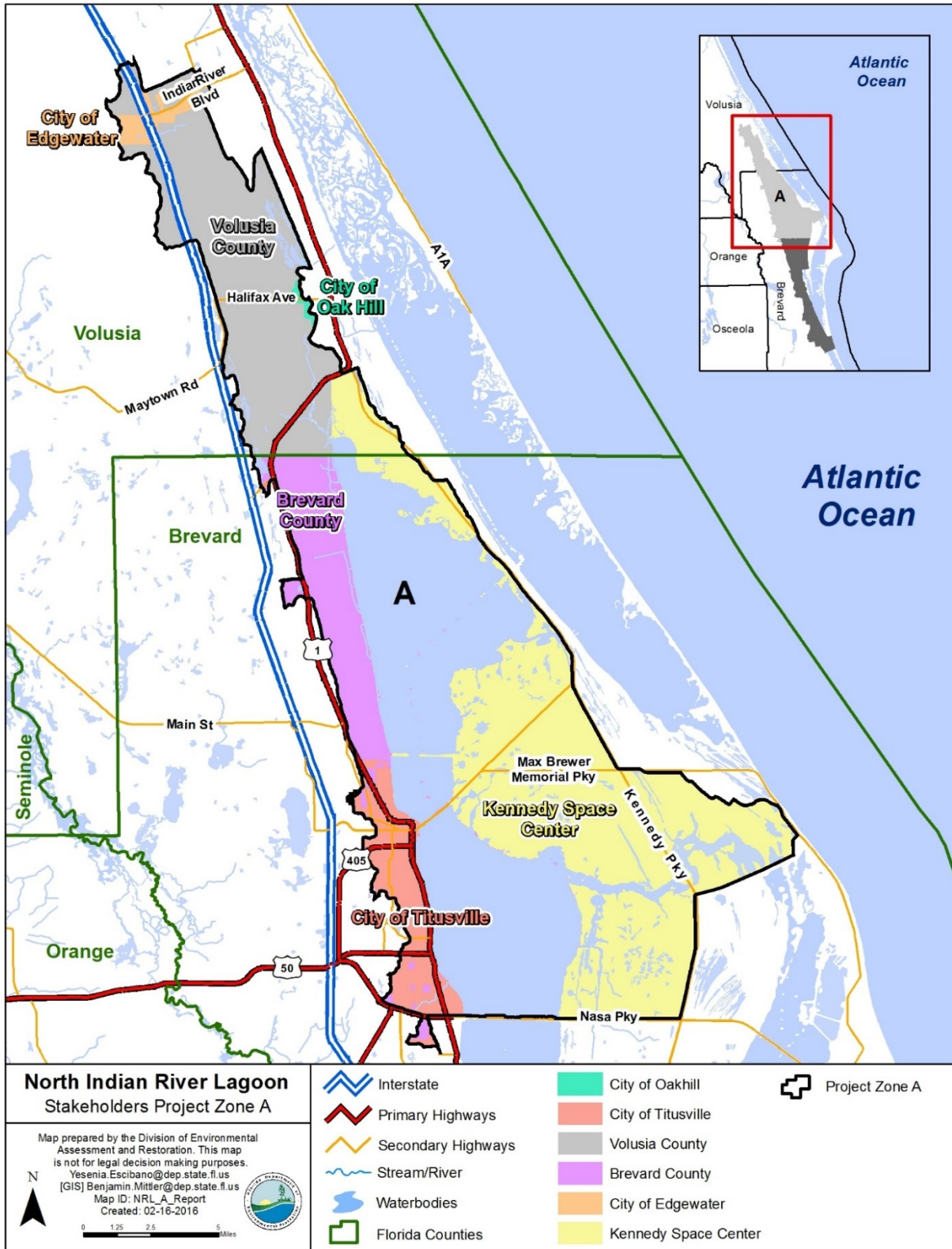


Figure 1: North IRL Project Zone A stakeholders

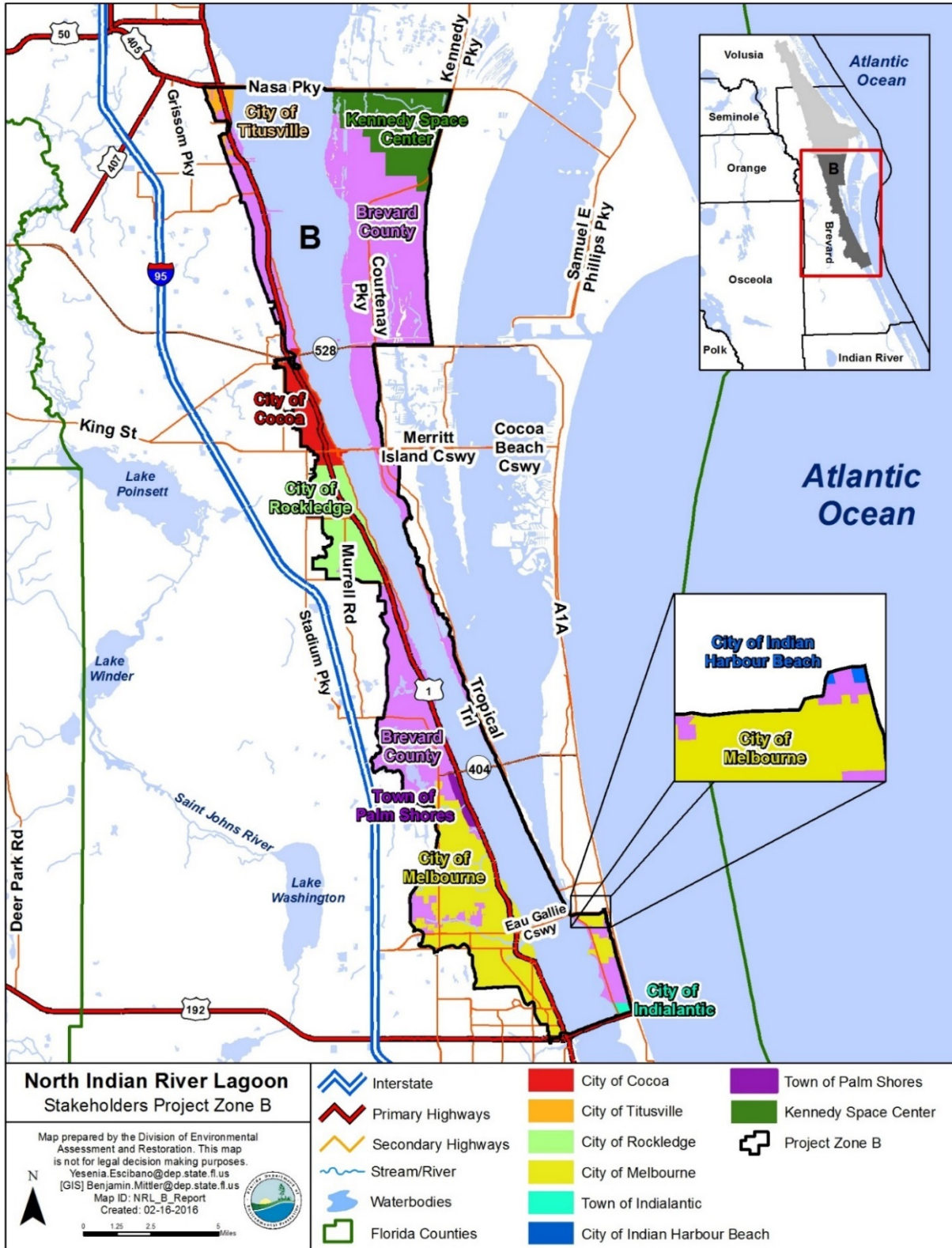


Figure 2: North IRL Project Zone B stakeholders

Section 2: ACTIVITIES DURING THE REPORTING PERIOD

Section 2.1 and **Section 2.2** describe the accomplishments in the North IRL during the reporting year. New projects added to the individual project tables are described below, as are 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 Chain of Lakes Regional Stormwater Facility Expansion (BC-2) in North IRL Project Zone A. The original Chain of Lakes facility is a regional multiuse stormwater park located in north Brevard, consisting of 3 large wet detention ponds that treat stormwater runoff from a 575-acre drainage basin. The 3 original ponds are designed to provide a 14 % TN reduction and a 44.9 % TP reduction. The expansion project, completed with TMDL grant funding, adds 1.35 acres of wet detention pond treatment area and is expected to remove 381.6 lbs/yr and 47.8 lbs/yr of TN and TP, respectively.

The county also increased the pollutant removal effectiveness of existing wet detention ponds by adding floating vegetative islands (FVIs), which include Huntington Road (BC-60) and Port St. John C (BC-61). The FVIs are estimated to provide 20 % nutrient removal efficiency above and beyond treatment obtained in the pond.

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 with nutrient removal screens that separate organic debris from the sediment and hold it out of the water. These projects included the following: Lucas Place (BC-33), Indian River Isles (BC-34), Granada St. 1030 East (BC-35), Haverhill Ave. (BC-36), Manth Ave. (BC-37), Rockledge and Riverwoods Blvd. Rockledge (BC-38), Alamanda Indian Harbour Beach (BC-39), River Shore 1848 Indianantic (BC-40), River Shore 1925 Indianantic (BC-41), Cedar Lane Indianantic (BC-42), Riverview 9856 Indianantic (BC-43), Riverview 9864 Indianantic (BC-44), Oak Ridge Indianantic (BC-45), McIver South (BC-54), 651 Franklyn (BC-55), and Fiske (BC-57).

In 2015, the University of Florida–Institute of Food and Agricultural Sciences (UF–IFAS) Extension Service partnered with the Brevard County Natural Resources Management Department, Melbourne, and Palm Bay to deliver a 3-hour Florida-Friendly Landscaping (FFL) seminar to 432 participants. The Extension Service also delivered 7 My Brevard Workshops to 74 participants and conducted 39 on-site visits. Soil and water samples were taken, residents' questions about their lawns and landscapes were answered, and, based on the results of soil test, a personalized fertilizer recommendation was emailed to them. In the follow-up survey to the My

Brevard Yard workshops, 35 (47 %) of the participants responded and indicated they had changed the following practices:

- 34 % irrigate at the recommended time and rate,
- 31 % apply the recommended amount of fertilizer,
- 26 % keep the grass clippings on the turf, and
- 24 % apply fertilizer at the correct rate by pushing the fertilizer spreader at a consistent speed.

Brevard County Natural Resources Management Department, in partnership with the Brevard Zoo, with cost-share from the 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 Brevard 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 2016–17.

2.1.2 City of Cocoa

In an effort to achieve additional load reductions, Cocoa identified a number of projects, including the following: Peachtree St. Reconstruction (CC-12), Cocoa Riverfront Park (CC-13), Control Gate (CC-14), Florida Ave. Improvements (CC-15), AT&T Detention Pond Retrofit (CC-16), Church St. Baffle Box (CC-17), John Garren St. Realignment and Parking (CC-18), and Brevard Ave. Bioretention and Tree Preservation (CC-19).

2.1.3 City of Melbourne

Melbourne purchased a property adjacent to the Sherwood Park neighborhood that has no stormwater treatment and will be constructing a new wet detention pond for treatment (MEL-17). In an effort to achieve additional load reductions, the city identified additional projects, including the following: Croton Rd. Baffle Box (MEL-18) and Young St. Existing Baffle Box Upgrade (MEL-19).

2.1.4 City of Rockledge

Rockledge completed aquatic vegetation removal activities from ditches, and efforts are in place to quantify the reductions. In addition, the Huntington Lakes II (ROCK-24) retention facility and the septic phase-out of the Breeze Swept subdivision (ROCK-26) received DEP funding. The city also requested funding for the additional biosorption activated media (BAM) treatment in its Gus Hipp wet detention pond (ROCK-29). In an effort to achieve additional load reductions, the city identified a number of additional projects, including the following: Aquatic Harvesting (ROCK-25), Breeze Swept Septic Phase-out (Rock-26), River Ridge Nondischarge (ROCK-27), Southwest Gus Hipp Conveyance (ROCK-28), Gus Hipp Pond (ROCK-29), Public Works Pond

1 (ROCK-30), Public Works Pond 2 (ROCK-31), School Triangle Pond (ROCK-32), Barton Park Irrigation (ROCK-33), and Winchester Cove NonDischarge (ROCK34).

2.1.5 City of Titusville

Titusville completed the design of the Draa Field Stormwater Park (TV-3) and began construction December 1, 2015. The project is expected to be completed by the end of 2016. Based on 2 years of water quality monitoring data, the city is requesting an increased reduction for the St. John Basin Stormwater Improvements Project (TV-4). Monitoring results show that project is achieving 83 % TP removal and 4 % TN removal.

On May 12, 2015, Titusville passed an ordinance enacting pet waste disposal requirements. The city continued to administer the "Bag It! Trash It!" Pet Waste Management Program with educational materials and maintenance of the existing pet waste stations. In July 2015, the city entered into an interlocal agreement with UF–IFAS Brevard County Extension Service to implement an FYN/My Brevard Yard Program in Titusville. Three FYN/My Brevard Yard classes were held on September 17, 2015, September 30, 2015, and January 19, 2016. The city also broadcast public service announcements (PSAs) and videos on pollution prevention, proper fertilizer application, the benefits of FFL, pet waste management, and water conservation via the city 's government access television channel.

The city's Illicit Discharge Detection and Elimination (IDDE) Program continued to proactively identify and eliminate illicit discharges and connections. Between March 2015 and February 2016, approximately 1,150 feet of storm drain pipe were inspected and video recorded. In addition, the city's ditches and canals were periodically inspected both proactively and reactively.

In an effort to achieve additional load reductions, Titusville identified and funded a number of additional projects, including the following: Senior Center Pond Floating Islands (TV-11), Senior Center Ponds Littoral Zone Plantings (TV-12), Royal Oak Littoral Zone Plantings (TV-13), Main St. Baffle Box with Polyacrylamide (PAM) (TV-14), and Sycamore St. Baffle Box with PAM (TV-15).

The city has also identified some additional projects, not yet funded, that will help achieve load reductions, including Knox McRae Baffle Box (TV-16), Coleman Basin TMDL Improvements (TV-17), South St. Basin TMDL Improvements (TV-18), St. Theresa Basin TMDL Improvements (TV-19), La Paloma Basin TMDL Improvements (TV-20), THS Basin TMDL Improvements (TV-21), Brevard St. Basin TMDL Improvements (TV-22), St Johns 2nd-Generation Baffle Box TMDL Improvements (TV-23), Marina Basin TMDL Improvements (TV-24), Grace Basin TMDL Improvements (TV-25), Miracle City Basin TMDL Improvements (TV-26), South Marina Basin TMDL Improvements (TV-27), SR 50 Basin TMDL Improvements (TV-28), Commons Basin TMDL Improvements (TV-29), Broad St. Basin TMDL Improvements (TV-30), Riverview St. Basin TMDL Improvements (TV-31), and THS 2 Basin TMDL Improvements (TV-32).

2.1.6 Agriculture

The Florida Department of Agriculture and Consumer Services (FDACS) currently has two field staff and one contracted staff in the SJRWMD area and is currently evaluating the possibility of contracting and hiring additional staff to assist with enrollments in the area.

During the reporting period in Project Zone A, FDACS staff enrolled 60 acres in the [Statewide Citrus BMP Manual](#) (**Table 3** and **Table 4**). During the reporting period in Project Zone B, FDACS staff enrolled 20 acres in the Statewide Citrus BMP Manual (**Table 5** and **Table 6**).

During the reporting period, FDACS also deactivated all the notices of intent (NOIs) associated with the Ridge Citrus BMP Manual, as all NOIs enrolled under that manual will be required to enroll under the Statewide Citrus BMP Manual.

In the upcoming year, FDACS will continue to enroll producers in the North IRL Subbasin. Staff will also investigate the Division of Plant Industry's data to determine how much citrus acreage according to 2000 land use is still in existence today. Staff will also verify that there are no poultry operations to be enrolled in the Water Quality/Quantity Best Management Practices (BMPs) for Florida Poultry Operations Manual in the BMAP area. In 2015, FDACS adopted a new Vegetable and Agronomic Crop BMP Manual that includes specific nutrient and irrigation management BMPs for plastic mulch, bare ground, sugarcane, hay/silage, and greenhouse production systems. FDACS staff will work to enroll producers in this manual as applicable.

Table 3: FDACS BMP enrollment in North IRL Project Zone A as of December 31, 2015

N/A = Not applicable

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

2000 SJRWMD Land Use	2000 Acres	FDACS-Adjusted Acres for Enrollment ¹	Related FDACS BMP Programs	Acreage Enrolled as of December 31, 2015	Related NOIs/Certification
Pasture (2110, 2120, 2130)	1,190.5	1,164.5	Cow/Calf; Vegetable/Agronomic Crops (hay/forage)		
Row/Field Crops (2140, 2150)	618.1	574.2	Vegetable/Agronomic Crops		
Fallow Cropland	40.7	40.7	No Enrollment Needed	N/A	N/A
Horse Farm	119.7	111.0	Equine		
Citrus	5,115.2	3,515.4	Statewide Citrus	223.8	7
Abandoned Groves	936.7	N/A	No Enrollment Needed	N/A	N/A
Tree Crops	1.7	1.7	Specialty Fruit and Nut	1.0	1
Tree Nurseries	26.5	26.5	Future Nursery; Specialty Fruit and Nut	0.00006	1
Ornamentals	12.1	12.1	Container Nursery		
Poultry Feeding	8.0	8.0	Conservation Plan Rule		
Total	8,069.2	5,454.0		223.8	8

Table 4: FDACS BMP enrollment summary for North IRL Project Zone A

Category	Acres
Total Acreage Remaining in Basin for Enrollment	5,229.2
Five-Year Enrollment Goal (50%)	2,727
Acreage Enrolled as of December 31, 2015	223.8
Remaining Acres To Enroll in Phase I	2,503

Table 5: FDACS BMP enrollment in North IRL Project Zone B as of December 31, 2015

N/A = Not applicable

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

2000 SJRWMD Land Use	2000 Acres	FDACS-Adjusted Acres for Enrollment ¹	Related FDACS BMP Programs	Acreage Enrolled as of December 31, 2015	Related NOIs/ Certification
Pasture (2110, 2120, 2130)	164.2	84.8	Cow/Calf; Future (hay)	8.98	1
Row/Field Crops (2140, 2150)	42.9	35.3	Vegetable/ Agronomic Crops		
Tree Crops	2.8	2.8	Specialty Fruit and Nut		
Citrus	3,364.5	2,339.2	Statewide Citrus	212	6
Abandoned Groves	65.7	N/A	No Enrollment Needed	N/A	N/A
Ornamentals	43.9	43.9	Container Nursery	14.1	4
Specialty Farms	8.0	8.0	Conservation Plan Rule/ Equine		
Total	3,692.0	2,513.9		235.1	11

Table 6: FDACS BMP enrollment summary for the North IRL Project Zone B BMAP

Category	Acres
Total Acreage Remaining in Basin for Enrollment	2,278.8
Five-Year Enrollment Goal (50 %)	1,257
Acreage Enrolled as of December 31, 2015	235.1
Remaining Acres To Enroll in Phase I	1,022

2.2 Summary of Accomplishments

Table 7 summarizes the projects completed during the third annual BMAP reporting period for the North IRL. In the North A Project Zone, these projects resulted in an estimated reduction of 3,219 lbs/yr of TN and 1,156 lbs/yr of TP. These reductions are in addition to those projects given credit at BMAP adoption and in previous annual Progress Reports. Therefore, the total reductions to date are 29,184 lbs/yr of TN and 9,971 lbs/yr of TP, or 30 % of the TN and 52 % of the TP reductions needed to meet the TMDLs allocated to the North A Project Zone. In the North B Project Zone, these projects resulted in an estimated reduction of 1,504 lbs/yr of TN and 232 lbs/yr of TP. These reductions are in addition to those projects given credit at BMAP adoption

and in previous annual reports. Therefore, the total reductions to date are 59,186 lbs/yr of TN and 19,380 lbs/yr of TP, or 48 % of the TN and 59 % of the TP reductions needed to meet the TMDLs allocated to the North B Project Zone.

Table 7: Summary of projects completed in the reporting period in the North IRL

Entity	Project Zone	Project Number	Project Name	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Brevard County	A	BC-2	Chain of Lakes	2,699	1,109
Brevard County	A	BC-60	Huntington Road	520	47
Brevard County	B	BC-33	Lucas Place	8	1
Brevard County	B	BC-34	Indian River Isles	63	8
Brevard County	B	BC-35	Granada St. 1030 East	99	16
Brevard County	B	BC-36	Haverhill Ave.	80	8
Brevard County	B	BC-37	Manth Ave.	226	29
Brevard County	B	BC-38	Rockledge and Riverwoods Blvd.	3	
Brevard County	B	BC-39	Alamanda Indian Harbour Beach	3	
Brevard County	B	BC-40	River Shore 1848 Indialantic	3	
Brevard County	B	BC-41	River Shore 1925 Indialantic	7	1
Brevard County	B	BC-42	Cedar Lane Indialantic	6	1
Brevard County	B	BC-43	Riverview 9856 Indialantic	9	1
Brevard County	B	BC-44	Riverview 9864 Indialantic	202	33
Brevard County	B	BC-45	Oak Ridge Indialantic	257	39
Brevard County	B	BC-48	Merritt Ridge (also known as Alum Pond)	138	27
Brevard County	B	BC-54	McIver South	6	1
Brevard County	B	BC-55	651 Franklyn	15	2
Brevard County	B	BC-57	Fiske	317	56
Brevard County	B	BC-61	Port St. John C	62	10
Total			Total Reductions in Reporting Period	4,723	1,389

Figure 3 and **Figure 4** show the load reductions compared with the starting load and allocations for the North IRL Project Zone A for TN and TP, respectively. **Figure 5** and **Figure 6** compare the same data for the North IRL Project Zone B for TN and TP, respectively.

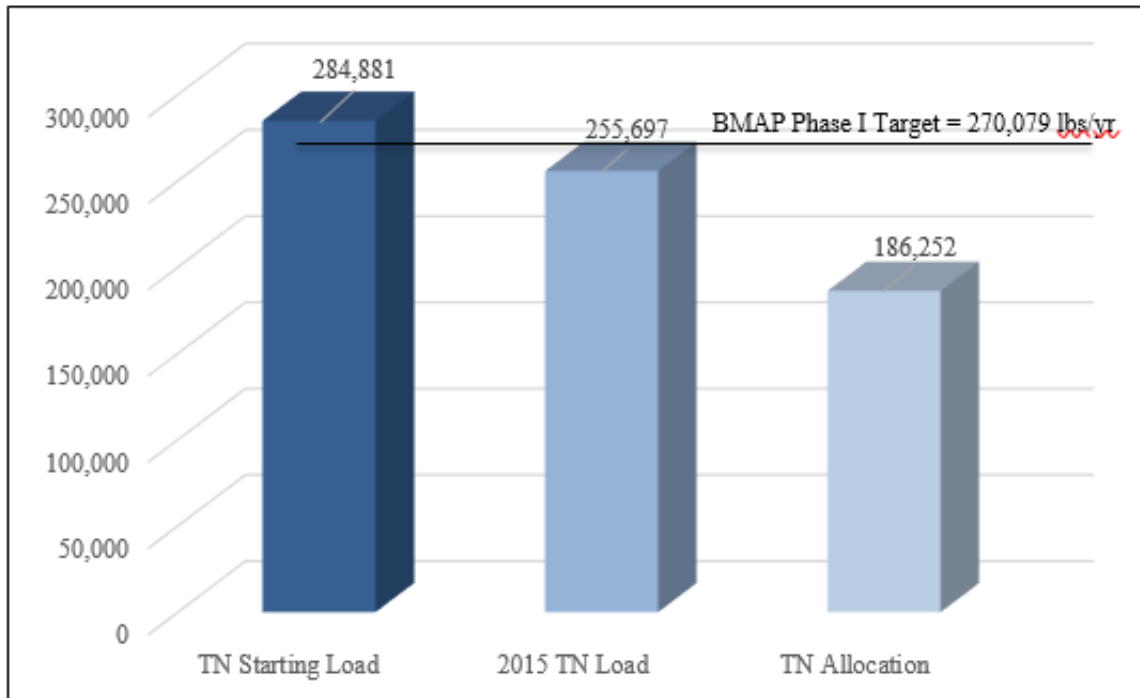


Figure 3: Summary of TN load reductions for North IRL Project Zone A

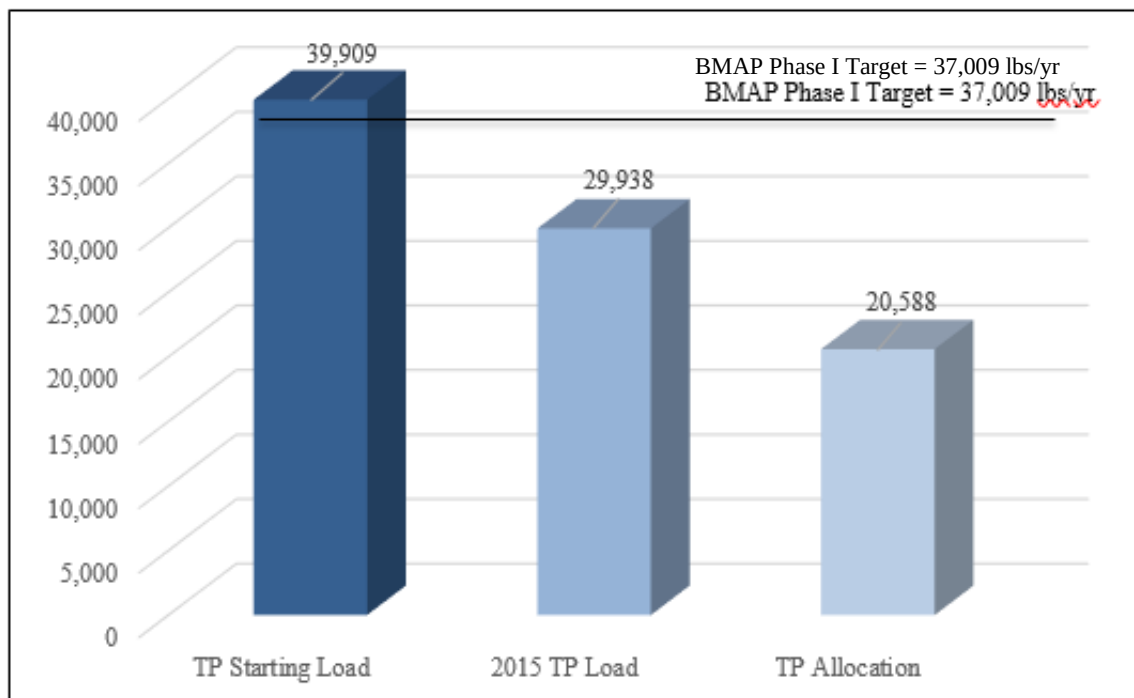


Figure 4: Summary of TP load reductions for North IRL Project Zone A

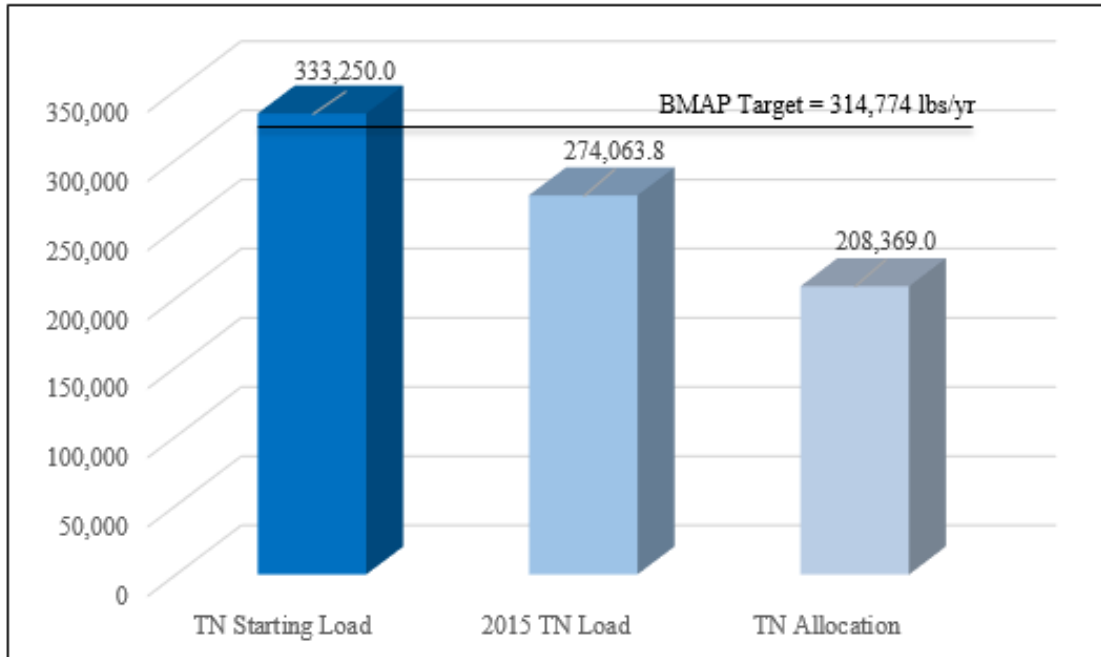


Figure 5: Summary of TN load reductions for North IRL Project Zone B

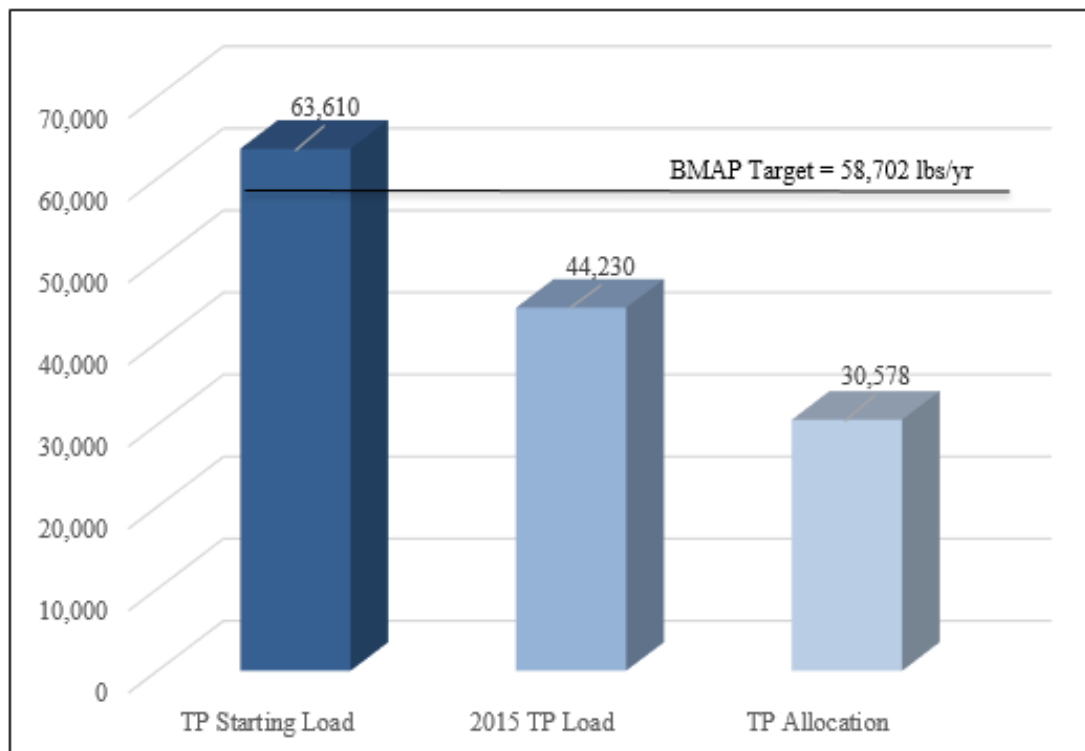


Figure 6: Summary of TP load reductions for North IRL Project Zone B

Section 3: COMPLIANCE

As stated in the North IRL BMAP, adopted in January 2013, DEP will annually review each entity's progress towards achieving the TMDL. **Table 8** 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 9** summarizes the allocations and reductions achieved by each entity in the BMAP.

Table 8: Summary of completed projects identified in the BMAP by entity

Entity	Projects Listed in 2013 BMAP	Completed	Under Way
Agriculture	2	2	
Brevard County	52	44	8
City of Cocoa	10	10	
City of Edgewater	1	1	
City of Melbourne	11	10	1
City of Rockledge	23	23	
City of Titusville	10	9	1
FDOT District 5	22	22	
KSC	17	17	
Town of Indialantic	3	3	
Town of Palm Shores	1	1	
Volusia County	1	1	
Total	153	143	10

Table 9: 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	Agriculture	17,155	1,896	37,313	6,860	5,047	1,420
A	Brevard County	17,427	1,926	14,533	1,880	6,812	1,945
A	City of Edgewater	2,513	278	160		84	11
A	City of Titusville	12,208	1,349	44,033	9,653	6,893	3,262
A	FDOT District 5	753	83	2,647	947	819	130
A	Kennedy Space Center (KSC)	86,281	9,537			8,941	3,135
A	Oak Hill – <i>De minimus</i>	271	30				
A	Volusia County	49,645	5,488			588	67
B	Agriculture	16,253	2,385	7,313	2,967	4,739	1,029
B	Brevard County	98,597	14,469	35,327	6,633	27,493	7,448
B	City of Cocoa	9,235	1,355	16,067	3,713	8,063	3,868
B	City of Melbourne	42,531	6,242	44,920	13,120	7,622	2,530
B	City of Rockledge	16,831	2,470	13,967	3,960	6,818	2,548
B	City of Titusville	2,589	380	313		160	73
B	FDOT District 5	4,076	598	4,327	2,127	2,647	633
B	KSC	17,509	2,569			1,273	1,185
B	Town of Indialantic	741	109	947	200	350	61
B	Town of Indian Harbour Beach – <i>De minimus</i>	6	1				
B	Town of Palm Shores – <i>De minimus</i>	1,165	171			21	4

Section 4: WATER QUALITY AND BIOLOGICAL EVALUATION

4.1 Water Quality Monitoring

The IRL BMAP monitoring plan was designed to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track water quality trends. The information gathered through the monitoring plan measures progress toward achieving the TMDL and provides a better understanding of watershed loading. The BMAP monitoring plan consists of ambient water quality sampling and biological monitoring. **Figure 7** and **Figure 8** show the locations of the water quality monitoring stations in North IRL Project Zones A and B, respectively.

4.1.1 Monitoring Network

Volusia County continued to monitor three water quality stations on a monthly basis in the North A Project Zone. One of these stations is identified as Station TC1 by the county and Station IRLTBC by the SJRWMD. Volusia County conducts some of the water quality sampling on behalf of the SJRWMD. The SJRWMD continued monthly monitoring at 20 water quality stations throughout the North IRL and also continued its seagrass transect monitoring in the North IRL to collect data about the seagrass, phytoplankton, epiphyte coverage, and water quality along each transect. In addition, DEP and 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**.

4.1.2 Volusia County

The IRLTBC station exhibits a significant increasing TP concentration trend using both simple linear and Mann-Kendall regression ($p < 0.01$). The median TP concentration for the 2000 to 2015 period analyzed was 0.175 mg/L. The TN concentration was calculated as the sum of total Kjeldahl nitrogen (TKN) concentration and nitrate/nitrite concentration. The TN concentration trend for IRLTBC was similar to that of TP and was also significant ($p < 0.01$). The median TN concentration for the 2000 to 2015 period was 1.839 mg/L.

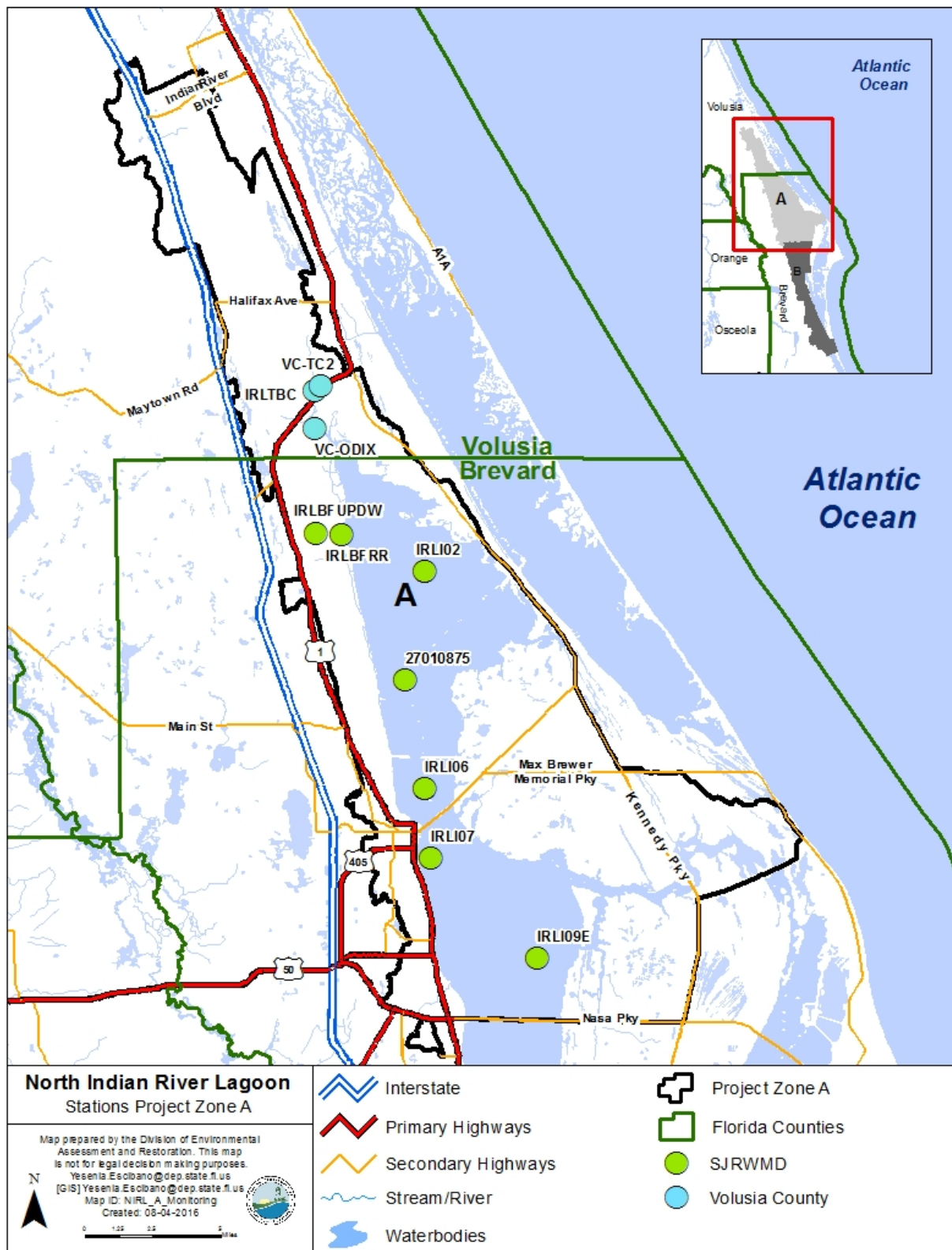


Figure 7: Water quality monitoring stations in North IRL Project Zone A

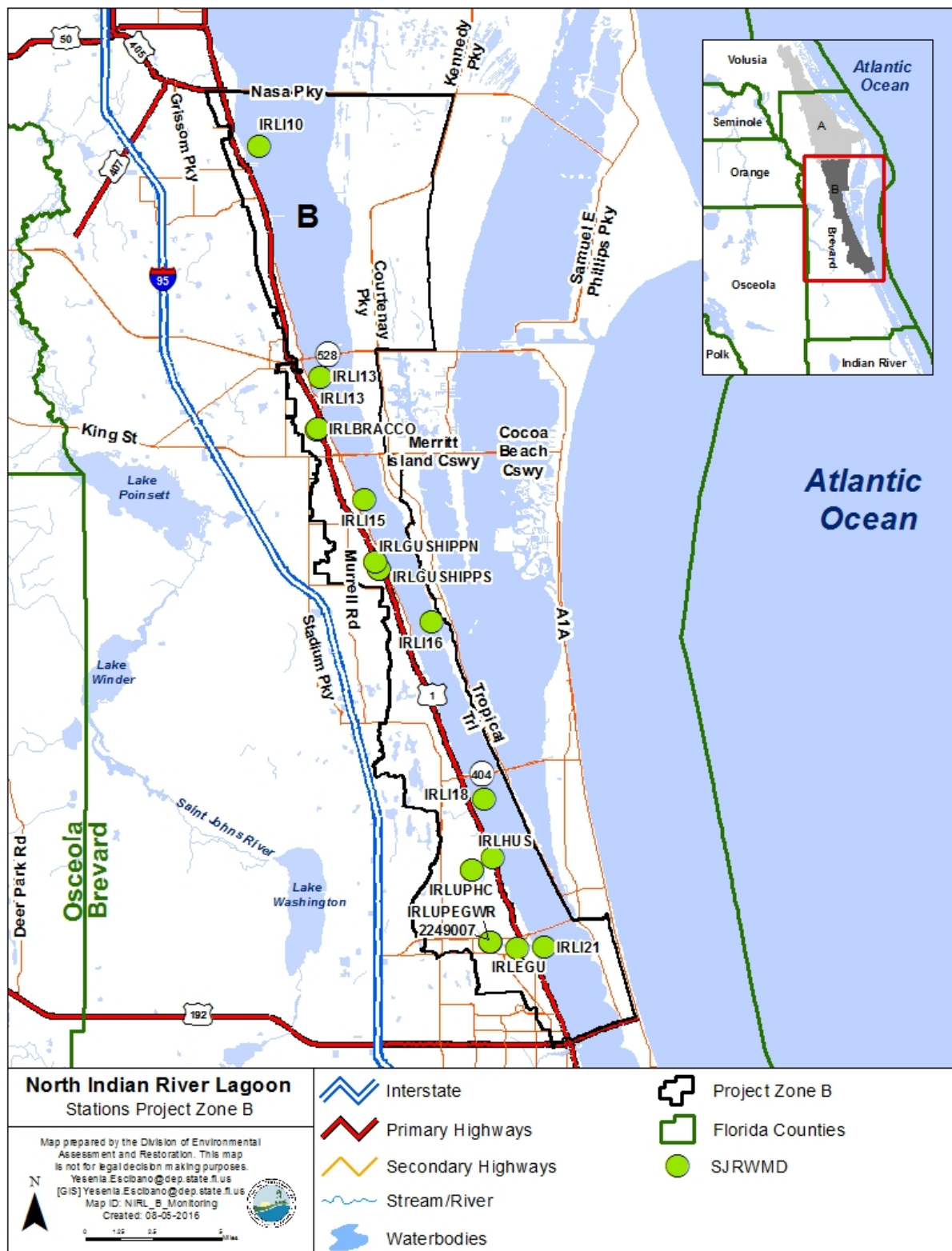


Figure 8: Monitoring station locations in North IRL Project Zone B

4.1.3 SJRWMD

Additional water quality sampling beyond the routine SJRWMD water quality sampling was completed by the SJRWMD during the first week of February 2016 through the Central IRL and North IRL due to algal blooms. Water clarity in the IRL continued to decline, with Secchi depths less than 0.4 meters (m) from Cocoa southward through Grant-Valkaria (North IRL Project Zone B). YSI-measured chlorophyll-*a* has increased in the same region (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 sample 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 ppt. Maintenance on this station was completed on February 8, 2016, and is scheduled again on March 8, 2016.

Data collected from 6 stations between January 6, 2016, and April 6, 2016 (**Figure 9**) showed that values for 4 forms of nitrogen, 3 forms of phosphorus, and chlorophyll-*a* varied in space and over time (**Figure 10**, **Figure 11**, and **Figure 12**). 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 10**). 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 concentrations recorded before 2010, especially at more northern stations (**Figure 11**).

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 12**). 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 North IRL, remained unsettled.

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

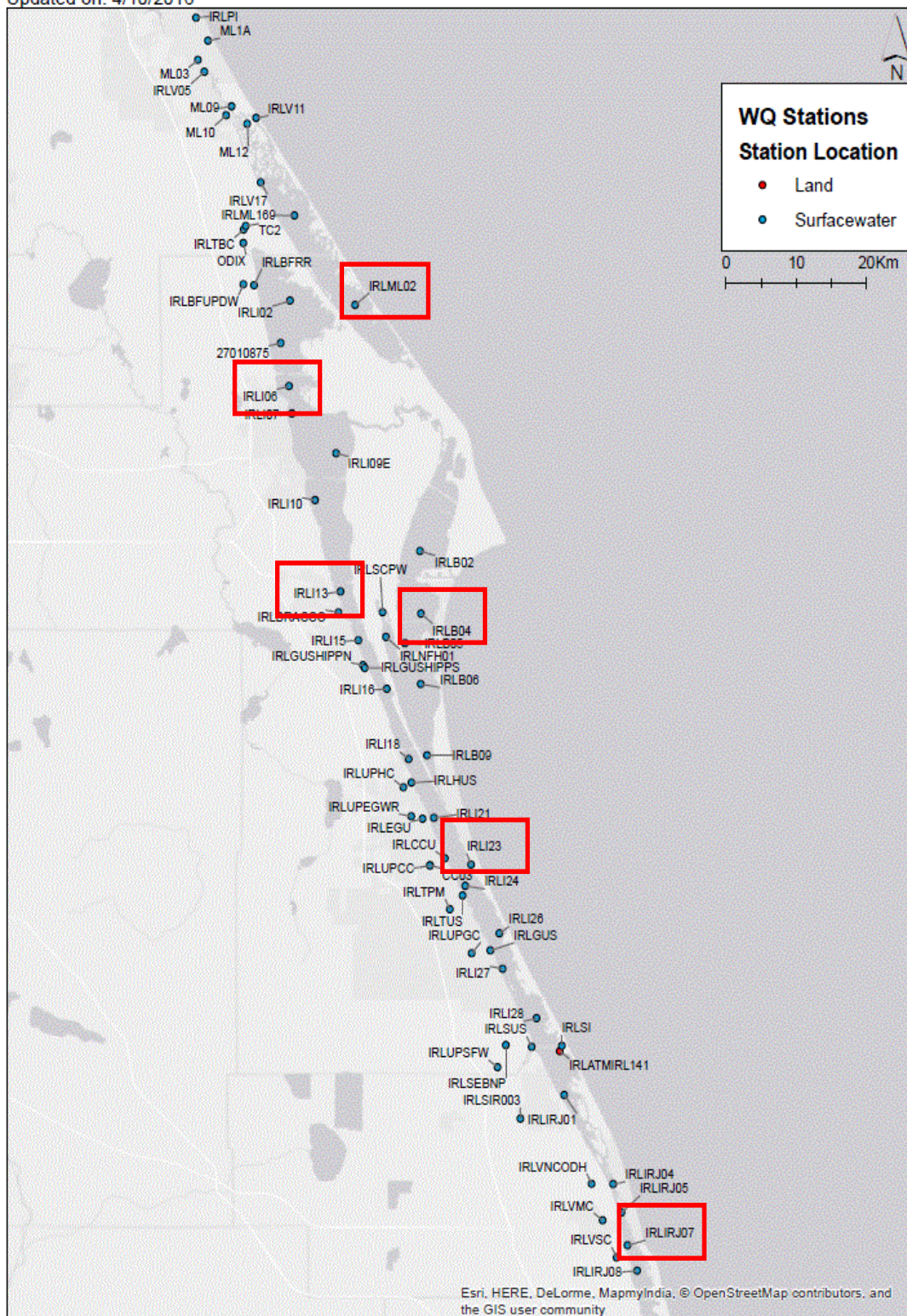


Figure 9. Water quality sampling stations

Red boxes = Representative stations

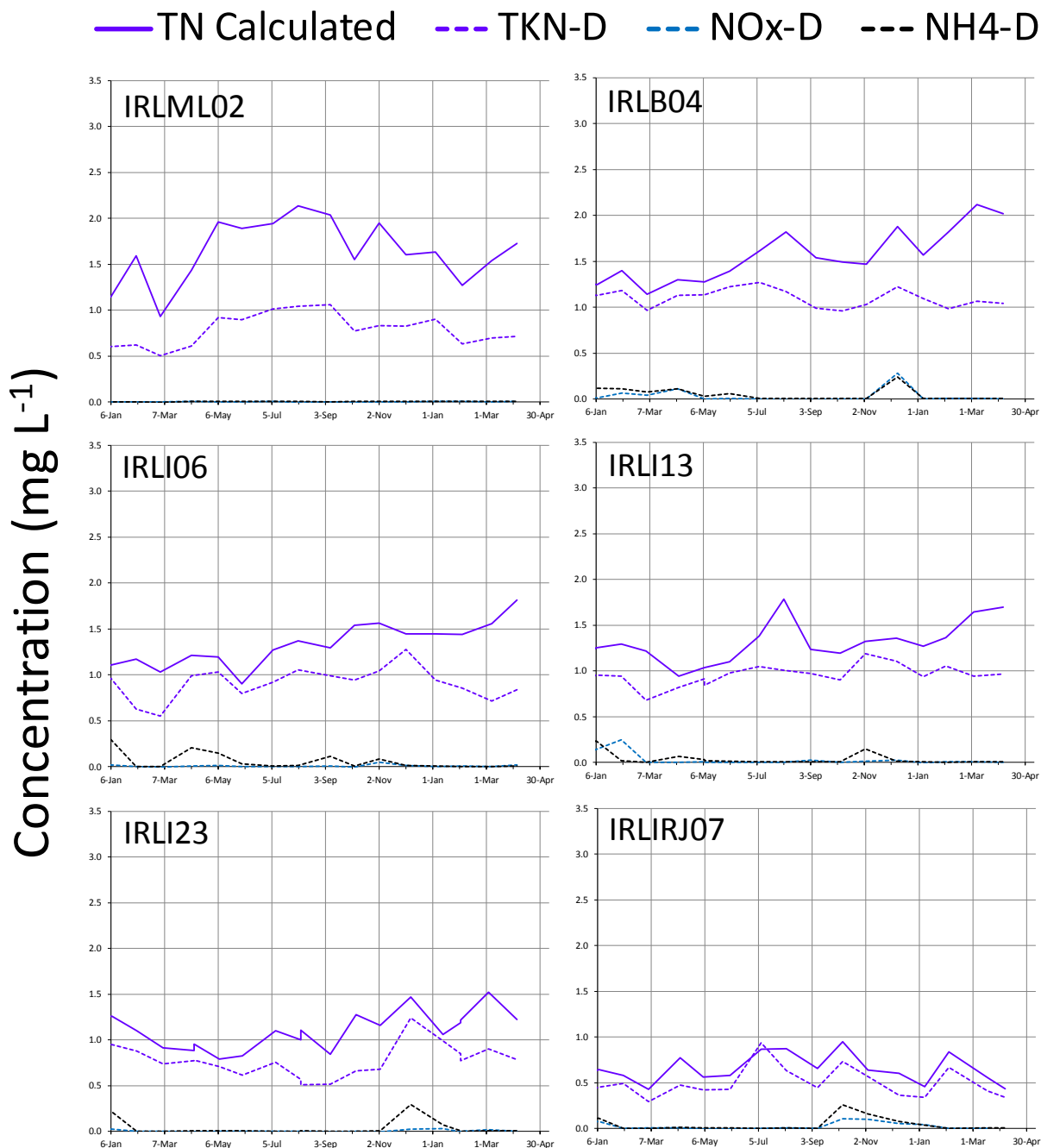


Figure 10. Concentrations of various forms of nitrogen

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

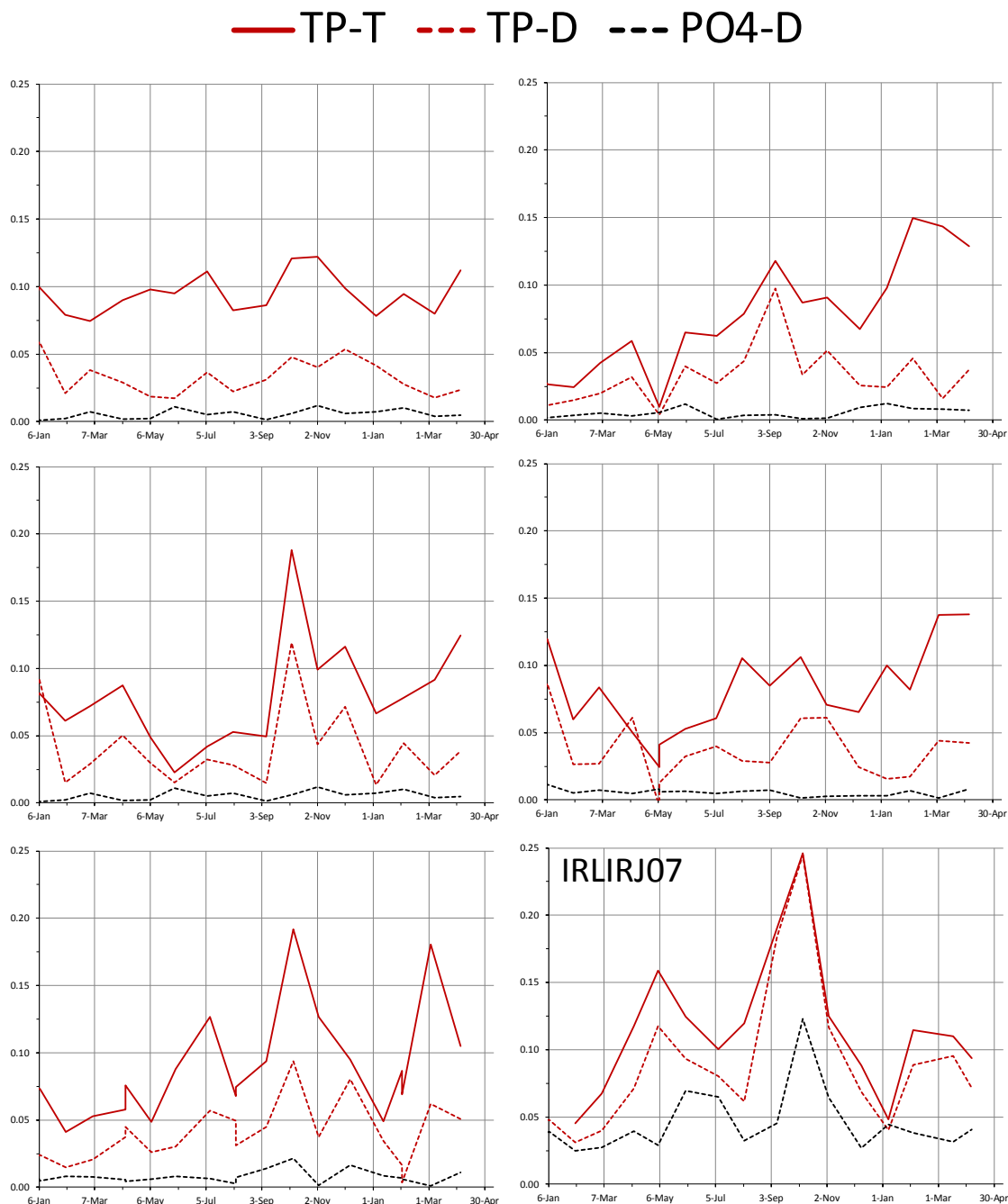


Figure 11. Concentrations of various forms of phosphorus

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

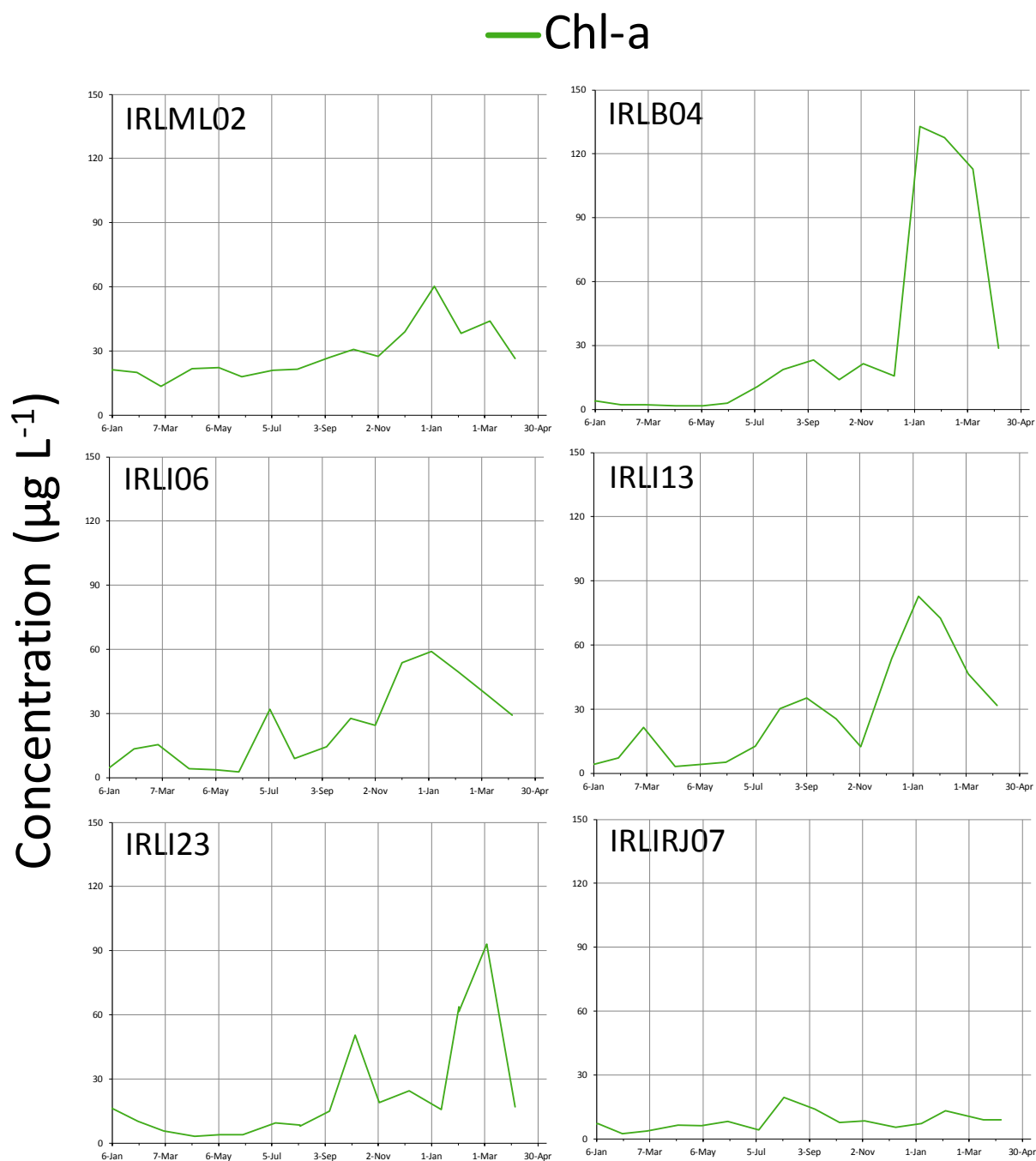


Figure 12. Chlorophyll concentrations

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 TMDL targets. 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. Both North IRL Project Zones A and B were determined to be Step 1 noncompliant (**Figure 13** and **Figure 14**) and Step 2 noncompliant (**Figure 15** and **Figure 16**). **Table 10** summarizes the Step 2 compliance test. Therefore, BMAP stakeholders will continue to work towards achieving the seagrass depth limit targets.

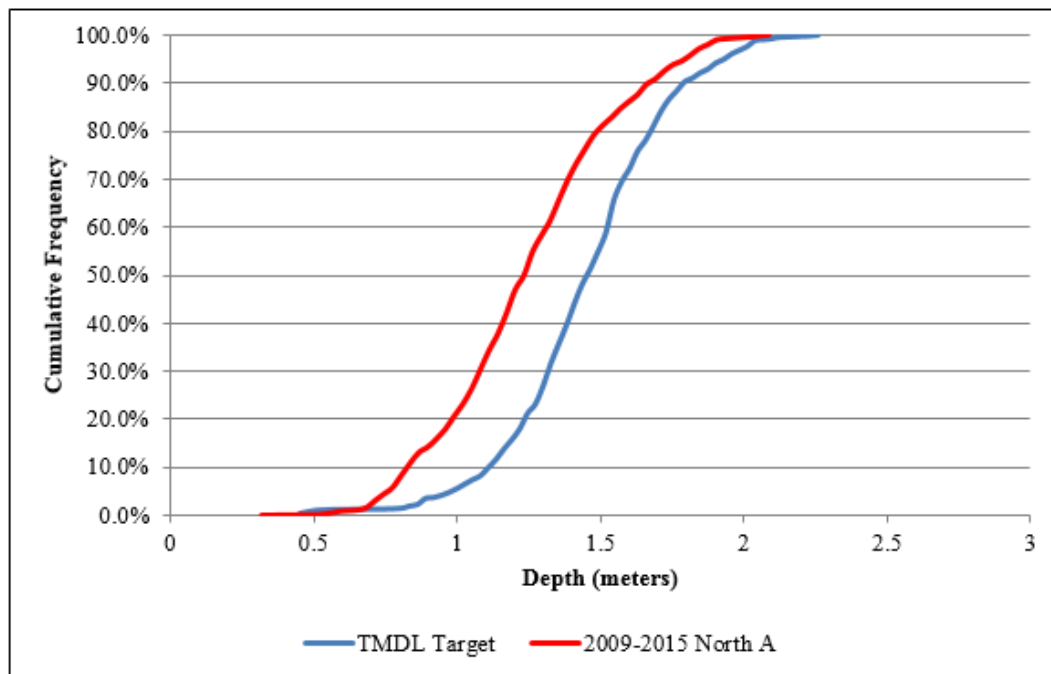


Figure 13: Step 1 compliance evaluation for North IRL Project Zone A, 2009–15

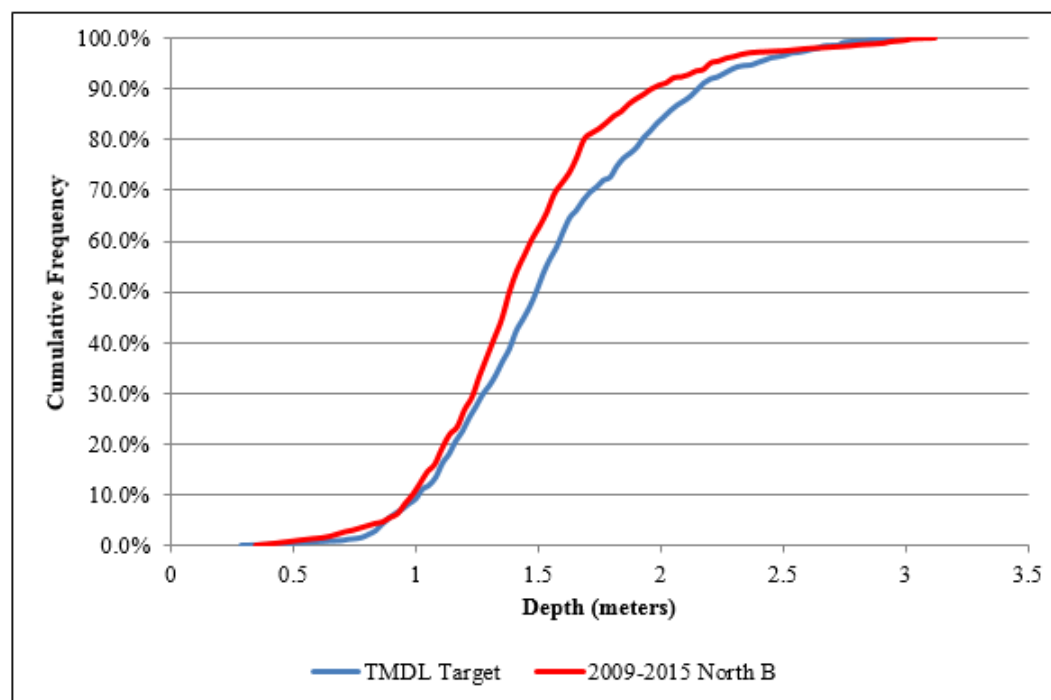


Figure 14: Step 1 compliance evaluation for North IRL Project Zone B, 2009–15

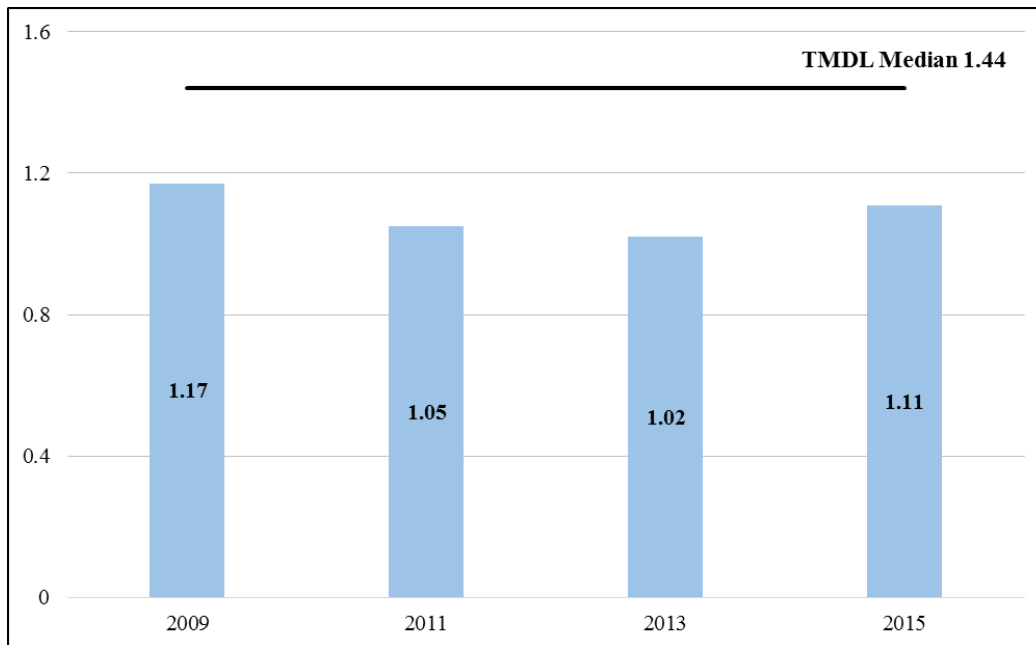


Figure 15: Step 2 compliance evaluation for North IRL Project Zone A, 2009–15

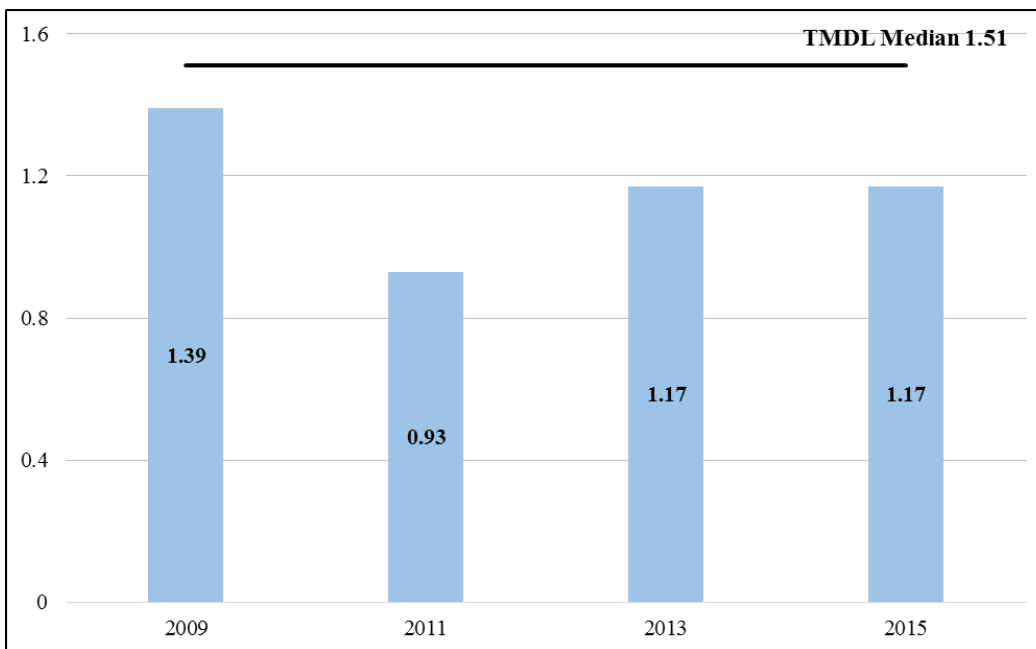


Figure 16: Step 2 compliance evaluation for North IRL Project Zone B, 2009–15

Table 10: Step 2 compliance evaluation for the North IRL Subbasin

Year	NIRL A Median Depth (m)	NIRL B Median Depth (m)
TMDL Median	1.44	1.51
2007	1.23	1.39
2009	1.17	1.39
2011	1.05	0.93
2013	1.02	1.17
2015	1.11	1.17
Step 2 Compliant?	No	No

APPENDICES

Appendix A: BMAP Projects

The BMAP project tables below 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 North IRL

TBD = To be determined

Project Number	Project Name	Project Type	Year Project Added	Status
BC-1	Old Dixie Highway 601	BMP Cleanout	2013	Completed
BC-2	Chain of Lakes Pond	Wet Detention Pond	2013	Completed
BC-3	Education Efforts	Education Efforts	2013	Ongoing
BC-4	Scottsmoor I	Treatment Train	2013	Planned, funded
BC-5	Chain of Lakes Southern Expansion Phase 1	Wet Detention Pond	2013	Completed
BC-6	Chain of Lakes Reuse	Stormwater Reuse	2013	Completed
BC-7	Scottsmoor C	Treatment Train	2015	Planned, funded
BC-8	Twin Lakes North	Baffle Box – 1 st Generation	2013	Completed
BC-9	Twin Lakes South	Baffle Box – 1 st Generation	2013	Completed
BC-10	Lucas Place 640 Baffle Box	Baffle Box – 1 st Generation	2013	Completed
BC-11	Rockledge Dr. 2055	Baffle Box – 1 st Generation	2013	Completed
BC-12	Rockledge and Riverwoods Baffle Box	Baffle Box – 1 st Generation	2013	Completed
BC-13	Anchor Lane	Baffle Box – 1 st Generation	2013	Completed
BC-14	Kelmore Baffle Box	Baffle Box – 1 st Generation	2013	Completed
BC-15	Puesta Del Sol 735 Baffle Box	Baffle Box – 1 st Generation	2013	Completed
BC-16	Tequesta Harbor Baffle Box	Baffle Box – 1 st Generation	2013	Completed
BC-17	Broadway Blvd. Pond	Wet Detention Pond	2013	Completed

Project Number	Project Name	Project Type	Year Project Added	Status
BC-18	Fairglen Elementary School Pond	Wet Detention Pond	2013	Completed
BC-19	Lake George	Wet Detention Pond	2013	Completed
BC-20	Merritt Island Courthouse Pond	Wet Detention Pond	2013	Completed
BC-21	Parkway Dr. Phase 2 Pond	Wet Detention Pond	2013	Completed
BC-22	Street Sweeping	Street Sweeping	2013	Ongoing
BC-23	Education Efforts	Education Efforts	2013	Ongoing
BC-24	Pine Island Phase I and II	Wet Detention Pond	2013	Completed
BC-25	Merritt Island Airport	Wet Detention Pond	2013	Completed
BC-26	Pines Industrial	Wet Detention Pond	2013	Planned, funded
BC-27	Johnson Junior High	MAPS	2013	Planned, funded
BC-28	Florida Blvd.	MAPS	2013	Completed
BC-29	Fairglen Elementary	MAPS	2013	Planned, funded
BC-30	Port St. John B	MAPS	2013	Completed
BC-31	Wickham Park North	MAPS	2013	Planned, funded
BC-32	West Ave. 6600	Baffle Box – Type 1 Retrofit	2013	Planned, funded
BC-33	Lucas Place	Baffle Box – Type 1 Retrofit	2013	Completed
BC-34	Indian River Isles	Baffle Box – Type 1 Retrofit	2013	Completed
BC-35	Granada St. 1030 East	Baffle Box – Type 1 Retrofit	2013	Completed
BC-36	Haverhill Ave.	Baffle Box – Type 1 Retrofit	2013	Completed
BC-37	Manth Ave.	Baffle Box – Type 1 Retrofit	2013	Completed
BC-38	Rockledge and Riverwoods Blvd. Rockledge	Baffle Box – Type 1 Retrofit	2013	Completed
BC-39	Alamanda Indian Harbour Beach	Baffle Box – Type 1 Retrofit	2013	Completed
BC-40	River Shore 1848 Indialantic	Baffle Box – Type 1 Retrofit	2013	Completed
BC-41	River Shore 1925 Indialantic	Baffle Box – Type 1 Retrofit	2013	Completed
BC-42	Cedar Lane Indialantic	Baffle Box – Type 1 Retrofit	2013	Completed
BC-43	Riverview 9856 Indialantic	Baffle Box – Type 1 Retrofit	2013	Completed
BC-44	Riverview 9864 Indialantic	Baffle Box – Type 1 Retrofit	2013	Completed
BC-45	Oak Ridge Indialantic	Baffle Box – Type 1 Retrofit	2013	Completed
BC-46	Kingsmill-Aurora Phase 2	Wet Detention Pond	2013	Planned, funded
BC-47	Sediment Trap, Grated Inlet Basket, Inlet Weir Cleaning	BMP Cleanout	2013	Ongoing
BC-48	Merritt Ridge 3A	MAPS	2013	Completed
BC-49	Lake George	MAPS	2013	Funded
BC-50	Wickham Park	Stormwater Reuse	2013	Completed
BC-51	Ellington Park	Stormwater Reuse	2013	Completed
BC-52	Rockledge Barton Park Reuse	Stormwater Reuse	2013	Completed
BC-53	Florida Blvd. Pond	Wet Detention Pond	2013	Completed
BC-54	McGiver South	Baffle Box – Type 1 Retrofit	2014	Completed

Project Number	Project Name	Project Type	Year Project Added	Status
BC-55	651 Franklyn	Baffle Box – Type 1 Retrofit	2014	Completed
BC-56	Fountainhead	Aquatic Vegetation Harvesting	2014	Completed
BC-57	Fiske	Baffle Box – Type 1 Retrofit	2015	Completed
BC-58	Street Sweeping	Street Sweeping	2015	Ongoing
BC-59	Baffle Box/ Sediment Trap Cleaning Increasing to Quarterly	BMP Cleanout	2015	Started
BC-60	Huntington Rd.	MAPS	2016	Completed
BC-61	Port St. John C	MAPS	2016	Completed
BC-62	Shoreview Cir.	Baffle Box – Type 1 Retrofit	2016	Under way
BC-63	Granada West	Baffle Box – Type 1 Retrofit	2016	Under way
BC-64	Shoreview Lane	Baffle Box – Type 1 Retrofit	2016	Under way
BC-65	Sunset Park North	Baffle Box – Type 1 Retrofit	2016	Under way
BC-66	Oak St.	Baffle Box – Type 1 Retrofit	2016	Under way
BC-67	Sunrise Village	Baffle Box – Type 1 Retrofit	2016	Under way

Table A-2: City of Cocoa projects in the North IRL

TBD = To be determined

Project Number	Project Name	Project Type	Year Project Added	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
CC-1	Bracco Pond B	Wet Detention Pond	2013	Completed	591.80	2,328.00	1,049.60	\$250,000		B
CC-2	Bracco Expansion Area	Wet Detention Pond	2013	Completed	775.20	156.00	41.80	\$570,762		B
CC-3	Cocoa Village Park	Dry Detention Pond	2013	Completed	13.50	37.00	6.90	\$330,000		B
CC-4	Morris Pond	Wet Detention Pond	2013	Completed	16.20	128.00	46.70	\$247,480		B
CC-5	North Brevard Ave. Stormwater Treatment Facility	Continuous Deflective Separation (CDS) Unit	2013	Completed	11.30	0.00	4.80			B
CC-6	North Fiske Stormwater Retention Facility	100% On-Site Retention	2013	Completed	33.90	42.00	2.40	\$330,000		B
CC-7	Suntree Baffle Box #1	Baffle Box – 2nd Generation	2013	Completed	5.90	7.00	0.70	\$80,000		B
CC-8	Street Sweeping	Street Sweeping	2013	Ongoing		4,027.00	2,582.00	\$80,000		B
CC-9	Bracco Supplemental Water Supply	Stormwater Reuse	2013	Completed		1,102.00	107.60	1,200,000		B
CC-10	Diamond Square Stormwater Improvements	Wet Detention Pond	2013	Completed	95.40	108.00	0.00	\$210,000		B
CC-11	Education Efforts	Education Efforts	2014	Ongoing		128.00	25.80			B
CC-12	Peachtree St. Reconstruction	Other Structural BMP	2016	Ongoing (completion expected soon)		TBD	TBD	\$1,700,000		B
CC-13	Cocoa Riverfront Park	Other Structural BMP	2016	Ongoing (completion expected soon)		TBD	TBD	\$162,000		B
CC-14	Control Gate	Control Structure	2016	Under way	TBD	TBD	TBD			B
CC-15	Florida Ave. Improvements	Treatment Train	2016	Planned, funded	6.90	TBD	TBD	\$2,400,000		B
CC-16	AT&T Detention Pond Retrofit	Treatment Train	2016	Planned, funded	12.33	TBD	TBD	\$207,641		B

Project Number	Project Name	Project Type	Year Project Added	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
CC-17	Church St. Baffle Box	Baffle Box	2016	Planned, funded		TBD	TBD	\$173,620	\$3,000	B
CC-18	John Garren St. Realignment and Parking	Treatment Train	2016	Planned, unfunded	TBD	TBD	TBD	\$500,000	\$2,000	B
CC-19	Brevard Ave. Bioretention and Tree Preservation	Treatment Train	2016	Planned, unfunded	TBD	TBD	TBD	\$500,000	\$2,000	B

Table A-3: City of Edgewater Projects in the North IRL

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Annual O&M Cost	Location
EW-1	Education Efforts	Education Efforts	2013	Ongoing		84.00	11.30	\$80,000		A

Table A-4: City of Melbourne projects in the North IRL

TBD = To be determined

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Annual O&M Cost	Location
MEL-1	Fee and Apollo Drainage Improvements	Wet Detention Pond	2013	Completed	43.60	28.00	78.80	1,200,000		B
MEL-2	Dove St. Pond	Wet Detention Pond	2013	Completed	14.90	69.00	31.30			B
MEL-3	Charles Dr. Pipe Replacement	Wet Detention Pond	2013	Completed	143.30	183.00	161.60	\$250,000		B
MEL-4	Wickham Park Pond	Wet Detention Pond	2013	Completed	1,796.90	627.00	248.30	\$156,164		B
MEL-5	Babcock St. Realignment	Retention BMP	2013	Completed	42.30	163.00	41.90	\$462,644		B
MEL-6	Garfield St. Ponds – Lot 12 (North)	Dry Detention Pond	2013	Completed	24.80	37.00	9.20	\$250,000		B
MEL-7	Garfield St. Ponds – Lot 24 (South)	Dry Detention Pond	2013	Completed	16.30	24.00	6.20	\$1,757,186		B
MEL-8	Education Efforts	Education Efforts	2013	Ongoing		2,583.00	587.20	\$181,605		B
MEL-9	Street Sweeping	Street Sweeping/ Inlet Cleaning	2013	Ongoing		1,176.00	743.00			B
MEL-10	Autumn Woods	Wet Detention Pond	2013	90 % design	56.91	TBD	TBD		\$15,000	B
MEL-11	Participation in FYN	Education Efforts	2013	Ongoing		2,583.00	587.20	\$525,161		B
MEL-12	South Croton Baffle Box	Treatment Train	2015	Under construction	14.70	TBD	TBD	\$879,220		B
MEL-13	Bell St. Baffle Box	Baffle Box – 2nd Generation with Media Filter	2015	Out for bid	123.42	1,391.00	332.90			B
MEL-14	Paradise Baffle Box	Baffle Box – 2nd Generation with Media Filter	2015	50 % complete	TBD	TBD	TBD	\$285,000		B
MEL-15	Garfield North Baffle Box	Baffle Box – 2nd Generation with Media Filter	2015	Out for bid	66.99	745.00	175.70	\$300,000		B
MEL-16	Garfield South Baffle Box	Baffle Box – 2nd Generation with Media Filter	2015	Out for bid	12.14	134.00	32.00	\$200,000		B

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Annual O&M Cost	Location
MEL-17	Sherwood Stormwater Quality Project	Wet Detention Pond	2016	Envisioned, but not funded	246.17	TBD	TBD	\$350,000		B
MEL-18	Croton Rd. Baffle Box	Baffle Box – 2nd Generation with Media Filter	2016	Completed	13.39	149.00	35.00	\$150,000		B
MEL-19	Young St. Existing Baffle Box Upgrade	Baffle Box – 2nd Generation with Media Filter	2016	Started	TBD	TBD	TBD	\$2,168,800		B

Table A-5: City of Rockledge projects in the North IRL

TBD = To be determined

Project Number	Project Name	Project Type	Year Project Added	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
ROCK-1	Orange Ave. Baffle Box	Baffle Box – 2nd Generation	2013	Completed	10.40	16.00	2.30	\$8,600	\$2,555	B
ROCK-2	Barton Ave. Baffle Box	Baffle Box – 2nd Generation	2013	Completed	27.10	35.00	4.90	\$9,350	\$2,555	B
ROCK-3	Hardee Cir. Baffle Box	Baffle Box – 2nd Generation	2013	Completed	14.60	16.00	1.80	\$43,420	\$2,555	B
ROCK-4	Rockledge Ave. Baffle Box	Baffle Box – 2nd Generation	2013	Completed	40.97	73.00	13.50		\$3,682	B
ROCK-5	Bougainvillea Dr. Baffle Box	Baffle Box - 2nd Generation	2013	Completed	35.74	104.00	17.70	\$29,495	\$2,566	B
ROCK-6	Park Ave. Baffle Box	Baffle Box - 2nd Generation	2013	Completed	13.18	9.00	0.90	\$52,529	\$2,555	B
ROCK-7	Little John Lane Baffle Box	Baffle Box – 2nd Generation	2013	Completed	11.87	16.00	1.90	\$60,000	\$2,555	B
ROCK-8	Fernwood Dr. Baffle Box	Baffle Box – 2nd Generation	2013	Completed	12.88	14.00	1.60	\$55,750		B
ROCK-9	Valencia Dr. Baffle Box	Baffle Box – 2nd Generation	2013	Completed	22.88	38.00	5.80	\$58,960	\$2,555	B
ROCK-10	Knollwood Baffle Box	Baffle Box – 2nd Generation	2013	Completed	24.30	26.00	3.00	\$68,248	\$3,682	B
ROCK-11	Sutton St. Baffle Box	Baffle Box – 2nd Generation	2013	Completed	8.00	9.00	1.00			B
ROCK-12	River Groves Baffle Box	Baffle Box – 2nd Generation	2013	Completed	7.40	5.00	0.40			B
ROCK-13	Summer Place Baffle Box	Baffle Box – 2nd Generation	2013	Completed	9.80	7.00	0.70			B
ROCK-14	Sweet St. Swale	Swales	2013	Completed	8.00	38.00	5.10			B
ROCK-15	Community Park of Rockledge Regional Facility Phase 1	Wet Detention Pond	2013	Completed	25.60	5.00	0.50	\$50,000	\$23,974	B
ROCK-16	Pineland Park Unit Three	Wet Detention Pond	2013	Completed	54.30	1.00	0.20	\$100,000	\$6,234	B
ROCK-17	Barton Park Regional Detention System	Wet Detention Pond	2013	Completed	757.00	2,823.00	1,248.90	\$2,600,000	\$40,000	B
ROCK-18	Florida Ave. Stormwater Facility	Wet Detention Pond	2013	Completed	25.20	76.00	49.50	\$435,000	\$40,950	B

Project Number	Project Name	Project Type	Year Project Added	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Project Zone
ROCK-19	Police Department Pond	Wet Detention Pond	2013	Completed	39.10	16.00	5.10	\$350,000	\$7,035	B
ROCK-20	Huntington Lakes I	Wet Detention Pond	2013	Completed	36.90	1.00	0.20	\$950,000		B
ROCK-21	Street Sweeping	Street Sweeping	2013	Ongoing		498.00	319.00		\$54,000	B
ROCK-22	Treatment Missing from Pollutant Load Screening Model (PLSM)	Model Recalculation	2013	Completed	383.20	1,248.00	477.30			B
ROCK-23	Education Efforts	Education Efforts	2013	Ongoing		1,541.00	346.50			B
ROCK-24	Huntington Lakes II	Retention Facility	2015	Started	133.50	TBD	TBD			B
ROCK-25	Aquatic Harvesting	Aquatic Vegetation Harvesting	2016	Ongoing		TBD	TBD			B
ROCK-26	Breeze Swept Septic Phase-Out	Septic Tank Phase-Out	2016	Started		TBD	TBD			B
ROCK-27	River Ridge Nondischarge	100% On-Site Retention	2016	Completed	35.26	190.00	38.70			B
ROCK-28	Southwest Gus Hipp Conveyance	Treatment Train	2016	Ongoing	TBD	TBD	TBD			B
ROCK-29	Gus Hipp Pond	Wet Detention Pond	2016	Envisioned, but not funded	TBD	TBD	TBD	\$335,000		B
ROCK-30	Public Works Pond 1	Dry Detention Pond	2016	Envisioned, but not funded	5.69	3.90	0.98	\$5,000		B
ROCK-31	Public Works Pond 2	Dry Detention Pond	2016	Envisioned, but not funded	6.96	12.60	3.39	\$10,000		B
ROCK-32	School Triangle Pond	Dry Detention Pond	2016	Envisioned, but not funded	1.22	1.60	0.44	\$20,300		B
ROCK-33	Barton Park Irrigation	Stormwater Reuse	2016	Envisioned, but not funded		TBD	TBD			B
ROCK-34	Winchester Cove Nondischarge	100% On-Site Retention	2016	Completed	1.90	13.00	1.60			B

Table A-6: City of Titusville projects in the North IRL

TBD = To be determined

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Annual O&M Cost	Location
TV-1	Area 1 Stormwater Improvements	Wet Detention Pond	2013	Completed	432.20	1,019.00	411.80	\$55,750		A
TV-2	Chain of Lakes Regional Stormwater Pond	Wet Detention Pond	2013	Completed	339.80	360.00	159.60			A
TV-3	Draa Field Stormwater Park	Wet Detention Pond	2013	Started	105.07	771.00	312.00			A
TV-4	St. Johns Basin Stormwater Improvements	Wet Detention Pond	2013	Completed	882.10	317.00	1,155.90			A
TV-5	St. Johns Basin Stormwater Improvements	Baffle Box – 2nd Generation	2013	Completed	882.10	1,510.00	215.90			A
TV-6	Spaceview Park	Alum Treatment	2013	Completed	110.60	1,153.00	377.90	\$1,854,254	\$8,000	A
TV-7	Education Efforts	Education Efforts	2013	Ongoing		1,522.00	292.00	\$167,343		A
TV-8	Street Sweeping	Street Sweeping	2013	Ongoing		1,012.00	649.00	\$2,300,000	\$15,000	A
TV-9	Education Efforts	Education Efforts	2013	Ongoing		56.00	5.80	\$2,500	\$5,000	B
TV-10	Street Sweeping	Street Sweeping	2013	Ongoing		104.00	67.00	\$58,960	\$2,555	B
TV-11	Senior Center Pond Floating Islands	Floating Aquatic Vegetative Island	2016	Completed		TBD	TBD	\$2,151,510	\$4,797	A
TV-12	Senior Center Ponds Littoral Zone Plantings	Treatment Train	2016	Started	TBD	TBD	TBD	\$188,120	\$63,106	A
TV-13	Royal Oak Littoral Zone Plantings	Treatment Train	2016	Started	TBD	TBD	TBD	\$52,536	\$43,720	A
TV-14	Main St. Baffle Box with PAM	Treatment Train	2016	Planned, funded	TBD	TBD	TBD	\$50,000		A
TV-15	Sycamore St. Baffle Box with PAM	Treatment Train	2016	Planned, funded	TBD	TBD	TBD	\$50,000		A
TV-16	Knox Mc Rae Baffle Box	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD	\$300,000	\$8,000	A

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Annual O&M Cost	Location
TV-17	Coleman Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD	\$300,000	\$8,000	A
TV-18	South St. Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-19	St Theresa Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-20	La Paloma Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-21	THS Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD		\$15,620	A
TV-22	Brevard St. Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-23	St Johns 2 nd -Generation Baffle Box TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-24	Marina Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-25	Grace Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-26	Miracle City Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-27	South Marina Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-28	SR 50 Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-29	Commons Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Annual O&M Cost	Location
TV-30	Broad St. Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A
TV-31	Riverview St. Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD	\$1,661,443	\$15,000	A
TV-32	THS 2 Basin TMDL Improvements	Treatment Train	2016	Envisioned, but not funded	TBD	TBD	TBD			A

Table A-7: FDOT District 5 projects in the North IRL

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Location
FDOT-1	IDDE Training, Brochures, National Pollutant Discharge Elimination System (NDPES) Flyer	Education Efforts	2013	Ongoing		39.00	11.30	\$188,120	\$63,106	A
FDOT-2	Street Sweeping	Street Sweeping	2013	Ongoing		185.00	119.00			A
FDOT-3	Fertilizer Cessation	Fertilizer Cessation	2013	Completed		595.00	0.00			A
FDOT-4	70100-3517-01 French Drains	100% On-Site Retention	2013	Completed	21.30	57.00	34.20			B
FDOT-5	70100-3544-01 French Drains	100% On-Site Retention	2013	Completed	7.00	26.00	13.60			B
FDOT-6	70020-3501-01 Pond 1	Wet Detention Pond	2013	Completed	17.10	38.00	22.40			B
FDOT-7	70020-3501-02A Pond 2A	Wet Detention Pond	2013	Completed	12.60	35.00	19.20			B
FDOT-8	70020-3501-02B Pond 2B	Wet Detention Pond	2013	Completed	4.80	10.00	5.20			B
FDOT-9	70020-3501-03 Pond 3	Wet Detention Pond	2013	Completed	8.40	18.00	10.40			B
FDOT-10	70020-3501-04 Pond 4	Dry Detention Pond	2013	Completed	7.90	17.00	8.80	\$2,500	\$5,000	B
FDOT-11	70020-3549-01 Pond 1	Wet Detention Pond	2013	Completed	9.90	28.00	14.20			B
FDOT-12	70020-3549-02 Pond 2	Wet Detention Pond	2013	Completed	18.90	34.00	18.20			B
FDOT-13	70020-3549-03 Pond 3	Wet Detention Pond	2013	Completed	11.20	32.00	16.50			B
FDOT-14	70020-3549-04 Pond 4	Wet Detention Pond	2013	Completed	3.40	14.00	7.00			B
FDOT-15	70020-3549-05 Pond 5	Wet Detention Pond	2013	Completed	3.40	11.00	6.00			B
FDOT-16	70140-3514-01 Pond A	Dry Detention Pond	2013	Completed	1.50	4.00	2.40			B
FDOT-17	70140-3514-02 Pond B	Wet Detention Pond	2013	Completed	5.90	18.00	7.50			B
FDOT-18	70120-3518-01 Pond 7	Wet Detention Pond	2013	Completed	9.90	45.00	21.10			B

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Location
FDOT-19	70008-3505-01 Pond 1	Wet Detention Pond	2013	Completed	2.30	6.00	3.40			B
FDOT-20	Education Efforts	Education Efforts	2013	Ongoing		86.00	28.00			B
FDOT-21	Street Sweeping	Street Sweeping	2013	Ongoing		616.00	395.00			B
FDOT-22	Fertilizer Cessation	Fertilizer Cessation	2013	Completed		1,552.00	0.00			B

Table A-8: KSC projects in the North IRL

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Location
KSC-1	Landscape Fertilizer Reduction	Fertilizer Reduction	2013	Ongoing		312.00	44.20			A
KSC-2	Citrus Grove Termination Roberts Rd.	Fertilizer Reduction	2013	Completed		140.00	557.20			A
KSC-3	Citrus Grove Termination Schwartz Rd.	Fertilizer Reduction	2013	Completed		256.00	308.10			A
KSC-4	Storage Building L5-0734	Land Use Change	2013	Completed	0.02	0.00	0.10			A
KSC-5	Support Building L5-0683	Land Use Change	2013	Completed	0.20	3.00	1.00			A
KSC-6	Shuttle Landing Facility – Missing from Model	Wet Detention Pond	2013	Completed	617.80	2,566.00	1,005.00			A
KSC-7	Launch Pad 39A	Other Nonstructural BMP	2013	Completed	456.50	1,255.00	326.30			A
KSC-8	Launch Pad 39B	Other Nonstructural BMP	2013	Completed	549.00	3,043.00	588.50			A
KSC-9	Schwartz Rd. Drainage System – Missing from Model	Impoundment	2013	Completed	1,614.10	1,290.00	270.80			A
KSC-10	Warehouse/Processing Area – Missing from Model	Wet Detention Pond	2013	Completed	15.20	75.00	33.20			A
KSC-11	Landscape Fertilizer Reduction	Fertilizer Reduction	2013	Ongoing		312.00	44.20			B
KSC-12	Citrus Grove Termination Jerome Rd. West	Fertilizer Reduction	2013	Completed		184.00	850.80			B
KSC-13	KARS II Racquetball Court M6-0328A	Land Use Change	2013	Completed	0.10	1.00	0.20			B
KSC-14	Visitor Center Storage Building M6-0503	Land Use Change	2013	Completed	0.10	1.00	0.30			B
KSC-15	Causeway Wetland Mitigation	Wet Detention Pond	2013	Completed	12.60	8.00	3.80			B
KSC-16	Visitors Complex/ NASA Badging Center	Wet Detention Pond	2013	Completed	131.70	452.00	169.40			B
KSC-17	NASA Parkway West	Swales	2013	Completed	135.80	239.00	100.90			B

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Location
KSC-18	Demolition of Facility J6-2377	Land Use Change	2014	Completed	0.10	1.00	0.30			A
KSC-19	Demolition of Facility M5-1546	Land Use Change	2015	Completed	5.00	76.00	15.80			B

Table A-9: Town of Indialantic projects in the North IRL

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Location
TI-1	Swales North of U.S. 192 Causeway	Swales	2013	Completed	29.20	297.00	51.70			B
TI-2	100% On-Site Retention	Retention BMP	2013	Completed	3.50	35.00	6.10			B
TI-3	Education Efforts	Education Efforts	2013	Ongoing		18.00	3.20			B

Table A-10: Town of Palm Shores projects in the North IRL

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Location
PS-1	Education Efforts	Education Efforts	2013	Ongoing		21.00	4.20			B

Table A-11: Volusia County projects in the North IRL

Project Number	Project Name	Project Type	Year Project Added	Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Cost	Cost Annual O&M	Location
VC-1	Education Efforts	Education Efforts	2013	Ongoing		588.00	67.40			A

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: Unfunded future BMAP projects

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 Cocoa	CC-18	John Garren St. Realignment and Parking	Treatment Train	Planned, unfunded		TBD	TBD	\$500,000	\$2,000	
2016	City of Cocoa	CC-19	Brevard Ave. Bioretention and Tree Preservation	Treatment Train	Planned, unfunded		TBD	TBD	\$500,000	\$2,000	
2016	City of Melbourne	MEL-17	Sherwood Stormwater Quality Project	Wet Detention Pond	Envisioned, but not funded	246.17	TBD	TBD	\$2,168,800		2018
2016	City of Rockledge	ROCK-29	Gus Hipp Pond	Wet Detention Pond	Envisioned, but not funded	TBD	TBD	TBD	\$335,000		
2016	City of Rockledge	ROCK-30	Public Works Pond 1	Dry Detention Pond	Envisioned, but not funded	5.69	3.90	0.98	\$5,000		2017
2016	City of Rockledge	ROCK-31	Public Works Pond 2	Dry Detention Pond	Envisioned, but not funded	6.96	12.60	3.39	\$10,000		2018
2016	City of Rockledge	ROCK-32	School Triangle Pond	Dry Detention Pond	Envisioned, but not funded	1.22	1.60	0.44	\$20,300		2018
2016	City of Rockledge	ROCK-33	Barton Park Irrigation	Stormwater Reuse	Envisioned, but not funded		TBD	TBD			
2016	City of Titusville	TV-16	Knox Mc Rae Baffle Box	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-17	Coleman Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-18	South St. Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			

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 Titusville	TV-19	St. Theresa Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-20	La Paloma Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-21	THS Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-22	Brevard St. Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-23	St Johns 2nd-Generation Baffle Box TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-24	Marina Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-25	Grace Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-26	Miracle City Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-27	South Marina Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-28	SR 50 Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-29	Commons Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-30	Broad St. Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-31	Riverview St. Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			
2016	City of Titusville	TV-32	THS 2 Basin TMDL Improvements	Treatment Train	Envisioned, but not funded	TBD	TBD	TBD			