STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In re: BANANA RIVER LAGOON BASIN MANAGEMENT ACTION PLAN
_____/

OGC Case No. 21-0080

FINAL ORDER ESTABLISHING THE BANANA RIVER LAGOON BASIN MANAGEMENT ACTION PLAN

Pursuant to Sections 403.067(7), Florida Statutes, this Final Order adopts the attached Basin Management Action Plan ("BMAP") for certain surface waterbodies within the Banana River Lagoon subbasin. The adopted BMAP, entitled "Banana River Lagoon Basin Management Action Plan" (hereafter referred to as the "Banana River Lagoon BMAP") and dated February 2021, is attached hereto and incorporated herein as Exhibit 1.

The Banana River Lagoon BMAP has been developed as part of the Florida Department of Environmental Protection's ("department") Total Maximum Daily Load ("TMDL") Program, as authorized under the Florida Watershed Restoration Act (Section 403.067, Florida Statutes). Surface waters in the Banana River Lagoon subbasin are designated as a Class II and III waters in accordance with Chapter 62-302, Florida Administrative Code ("F.A.C."). Water quality for Class II waters are intended to have suitable water quality for shellfish propagation or harvesting. Class III waters are meant to be suitable for

recreational use and for the propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

The Banana River Lagoon subbasin is located in Brevard County. The department established TMDLs for certain waters in the Banana River Lagoon subbasin within Rule 62-304.520, F.A.C. Excessive nutrients are the primary pollutants contributing to the impairments. Tables 3 and 4 in the attached Exhibit 1 identifies the applicable TMDLs addressed in this BMAP.

In 2013, the department first adopted a BMAP for the Banana River Lagoon. This updated BMAP (Exhibit 1) supersedes and replaces the 2013 BMAP in its entirety.

The department worked closely with the affected stakeholders, including local and state agencies, in developing the Banana River Lagoon BMAP to achieve the associated TMDLs. Beyond direct work with the affected stakeholders, the department encouraged public participation to the greatest practicable extent by providing routine updates in technical meetings and requests for comment at technical meetings on the Banana River Lagoon BMAP. The department held a noticed public meeting in the subbasin on December 16, 2020, to discuss the BMAP and receive comments.

The Banana River Lagoon BMAP represents the collaborative effort of stakeholders to identify current and planned management actions to achieve pollutant load reductions required by the TMDL. The adopted BMAP documents the projects and management actions that have been, or will be, undertaken by stakeholders to reduce the contribution of pollutants in the watershed. The projects and management actions (completed, ongoing, and planned) identified in the BMAP address known sources of pollutants, facilitate investigation of unknown sources, prevent new sources, and address future loads associated with growth and land use changes in the subbasin.

The specific pollutant reduction allocations, projects and management actions required of individual entities are set forth in Chapters 2 and 3 and Appendices A and B of the BMAP. Unless otherwise noted in the BMAP, all requirements of this BMAP are enforceable upon the effective date of this Order.

This Final Order and incorporated BMAP are enforceable pursuant to Sections 403.067, 403.121, 403.141, 403.161, 373.119 and 373.129, Florida Statutes.

THEREFORE, IT IS ORDERED that the attached Exhibit 1 is hereby adopted as the Banana River Lagoon Basin Management Action Plan.

NOTICE OF RIGHTS

The Banana River Lagoon Basin Management Action Plan shall become final unless a timely petition for an administrative proceeding is filed pursuant to the provisions of Sections 120.569 and 120.57 of the Florida Statutes, before the deadline for filing a petition. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the department's proposed agency action may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57 of the Florida Statutes. The petition must contain the information set forth below and must be filed (received) in the department's Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000.

Petitions must be filed within 21 days of publication of the public notice or within 21 days of receipt of this order, whichever occurs first. Under Section 120.60(3), Florida Statutes, however, any person who asked the department for notice of agency action may file a petition within 21 days of receipt of such notice, regardless of the date of publication. The failure of any person to file a petition within the appropriate time period shall

constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57 of the Florida Statutes, or to intervene in this proceeding and participate as a party to it. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, F.A.C.

A petition that disputes the material facts on which the department's action is based must contain the following information:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name, address, any e-mail address, any facsimile number, and telephone number of the petitioner, if the petitioner is not represented by an attorney or a qualified representative; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination;

(c) A statement of when and how the petitioner received notice of the agency decision;

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action;

(f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and

(g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

A petition that does not dispute the material facts on which the department's action is based shall state that no such facts are in dispute and otherwise shall contain the same information as set forth above, as required by Rule 28-106.301, F.A.C.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the department's final action may be different from the position taken by it in this order. Persons whose substantial interests will be affected by any such final decision of the department on the petition have the right to

petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation is not available for this proceeding.

A party who is adversely affected by this order has the right to seek judicial review under Section 120.68 of the Florida Statutes, by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the department in the Office of the General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within thirty days after this order is filed with the clerk of the department.

DONE AND ORDERED this 17th day of February 2021, in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Noah Valenstein
Secretary

Marjorie Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

FILED ON THIS DATE PURSUANT TO § 120.52, FLORIDA STATUTES, WITH THE DESIGNATED DEPARTMENT CLERK, RECEIPT OF WHICH IS HEREBY ACKNOWLEDGED.

Lea Crandall Digitally signed by Lea Crandall
Date: 2021.02.17 12:50:47 -05'00'

CLERK DATE

Indian River Lagoon Basin

Banana River Lagoon Basin Management Action Plan

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

with participation from the
Banana River Indian River Lagoon Stakeholders

February 2021

2600 Blair Stone Road
Tallahassee, FL 32399-2400
https://floridadep.gov/

Acknowledgments

The *Banana 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 Banana River Lagoon stakeholders identified below.

Type of Governmental or Private Entity	Participant
Local Governments	Brevard County City of Cape Canaveral City of Cocoa Beach City of Indian Harbour Beach City of Satellite Beach
Federal Agencies	Kennedy Space Center U.S. Air Force
Port Authorities	Port Canaveral
Regional and State Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Transportation District 5 Indian River Lagoon Estuary Program St. Johns River Water Management District

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List of Acronyms and Abbreviations

AFCEC	U.S. Air Force Civil Engineering Center
AFERA	U.S. Air Force Environmental Restoration Account
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
BRL	Banana River Lagoon
CDD	Community Development District
CERP	Comprehensive Everglades Restoration Plan
CIRL	Central Indian River Lagoon
CMAC	Continuous Monitoring and Adaptive Control
CR	County Road
CWA	Clean Water Act
DEP	Florida Department of Environmental Protection
DO	Dissolved Oxygen
DOR	Florida Department of Revenue
DWM	Dispersed Water Management
EMC	Event Mean Concentration
EPA	U.S. Environmental Protection Agency
ESOHTN	Environmental, Safety, and Occupational Health Training Network
F.A.C.	Florida Administrative Code
FDACS	Florida Department of Agriculture and Consumer Services
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
F.S.	Florida Statutes
FSAID	Florida Statewide Agricultural Irrigation Demand (geodatabase)
FWRA	Florida Watershed Restoration Act
GIS	Geographic Information System
HSPF	Hydrologic Simulation Program–Fortran
IDDE	Illicit Discharge Detection and Elimination
IRL	Indian River Lagoon
IRP	Installation Restoration Program
IWR	Impaired Surface Waters Rule
lbs	Pounds
lbs/yr	Pounds Per Year
km	Kilometer
lbs/ac/yr	Pounds Per Acre Per Year
LET	Load Estimation Tool
LF	Linear Foot
LID	Low Impact Development
LPA	Load Per Acre

m	Meter
MAPS	Managed Aquatic Plant System
mgd	Million Gallons Per Day
mg/L	Milligrams Per Liter
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
OAWP	Office of Agricultural Water Policy
OSTDS	Onsite Sewage Treatment and Disposal System
PAFB	Patrick Air Force Base
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
RRLA	Rapid Rate Land Application
RWWTF	Regional Wastewater Treatment Facility
SR	State Road
STEM	Science, Technology, Engineering, and Modeling
STORET	STOrage and RETrieval (Database)
SWIL	Spatial Watershed Iterative Loading
SWMP	Stormwater Management Program
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USGS	U.S. Geological Survey
WBID	Waterbody Identification (number)
WCD	Water Control District
WIN	Watershed Information Network (Database)
WWTF	Wastewater Treatment Facility

Executive Summary

Background

The Indian River Lagoon (IRL) is a 156-mile-long estuary along Florida's east coast. The impaired portions of the IRL are directly adjacent to lands in only Volusia, Brevard, Indian River, and St. Lucie counties. The northern portion of the watershed extends to near the Ponce De Leon Inlet in Volusia County and the southern portion to near the Fort Pierce Inlet at the Indian River County–St. Lucie County boundary line. Because of the large geographical extent of the IRL Basin and the hydrological differences throughout the basin, the Florida Department of Environmental Protection (DEP) determined the best way to address the total maximum daily loads (TMDLs) and impairments for the IRL Basin was to divide the watershed into 3 subbasins: (1) Central IRL (CIRL), (2) North IRL (NIRL), and (3) Banana River Lagoon (BRL).

Separate basin management action plans (BMAPs) were developed for each subbasin; this document focuses solely on the BRL Subbasin. The BRL is located between the barrier island communities of the City of Cape Canaveral to Indian Harbour Beach and Merritt Island, and connects to the IRL at its south end (**Figure ES-1**). The BRL has a limited outlet to the Atlantic Ocean through the lock at Port Canaveral. Net water flow is from the IRL to the BRL because the rate of evapotranspiration exceeds rainfall and basin inflows. The BRL system is a "negative estuary," characterized by low freshwater inflows and poor flushing, resulting in high water residence time.

Intense and extensive algal blooms in the IRL began in 2011 and have returned periodically. Harmful algal blooms (HABs) cause shading that stresses seagrass in the IRL, adverse effects on wildlife, and, in some cases, detrimental effects on human health. The St. Johns River Water Management District (SJRWMD) launched the Indian River Lagoon Protection Initiative in 2013, including a multiyear investigation that increased the understanding of these blooms. This and other research indicate it is important to persevere with projects that decrease nutrient loads to the IRL, because that approach will limit the severity of HABs and their impacts on the system.

TMDLs

A TMDL is a water quality restoration goal establishing the maximum amount of a pollutant that a waterbody can assimilate without causing exceedances of water quality standards. The nutrient TMDLs for the main stem of the IRL were adopted by DEP in March 2009. The TMDLs focus on the water quality conditions necessary for seagrass regrowth at water depth limits where seagrass historically grew in the lagoon, based on a multiyear composite of seagrass coverage. The median depth limits of seagrass coverage in the IRL decreased over the years because of changes in water quality conditions resulting from anthropogenic influences. As polluted runoff reaches the lagoon, it contributes to conditions that prevent the seagrass from growing in deeper water.

Additionally, TMDLs were adopted in 2013 for one tributary to the BRL, Sykes Creek/Barge Canal, that is now addressed in this BMAP. For Sykes Creek/Barge Canal (waterbody identification [WBID] number 3044B), the reductions were based on the main stem nutrient TMDL for Segment BR6 in the BRL. The TMDL reductions of 66 % for total nitrogen (TN) and 70 % for total phosphorus (TP) in Sykes Creek/Barge Canal only apply to the existing nutrient loads from the immediate Sykes Creek–Newfound Harbor segment.

BRL BMAP

In addition to dividing the overall IRL Watershed 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 the flushing times vary greatly among locations and consequently affect how nutrient reductions will impact these distinct areas of the basin. The project zones identify large areas where projects should be implemented to ensure that the load reductions achieve the desired response for each subbasin. BRL Subbasin was split into two project zones, as follows:

- **Banana River A** – The area north of and including the State Road 528 Causeway.

- **Banana River B** – The area south of State Road 528 Causeway.

However, for this BMAP update the project zones have not been used for allocations, and so the loadings and allocations are reported for the BRL as a whole. Projects will still be tracked by their location and if the future restoration of the BRL indicates that project zones should be applied again through the BMAP, that adjustment can be made in future iterations.

DEP first adopted the BRL BMAP in 2013 to implement TN and TP TMDLs. BMAPs are designed to be implemented in a phased approach. In 2018, DEP and several local stakeholders were developing several components of an updated BMAP, including the local completion and DEP review of a new water quality model, the Spatial Watershed Iterative Loading (SWIL) Model. The SWIL Model was developed through cooperative funding provided by Brevard County, all of its cities, and Florida Department of Transportation (FDOT) District 5, as well as support from the U.S. Air Force, in an effort to update the data being used to predict loading. In this BMAP update, the SWIL Model is used to estimate loading to the BRL. The percent reductions adopted in the original TMDL rules are applied as the water quality targets.

This 2020 BMAP was developed based on several changes since the 2013 BMAP was adopted, including updated modeling efforts, boundary adjustments, updated allocations and load reductions to the responsible stakeholders, updated management actions to achieve nutrient reductions, and a revised monitoring plan to continue to track trends in water quality. This update sets a deadline for achieving load reductions no later than 2035, which is 22 years after the initial BMAP adoption in 2013.

As part of the adaptive management process for this BMAP, DEP will explore refinements to the SWIL Model used to develop BMAP allocations and estimate project credits. This effort could include updates to some of the SWIL Model input layers (e.g., land use, soils, etc.), the verification of watershed boundaries in some areas, revisions to the model period of record, and the validation of predicted flows in selected calibration basins. There are also several optional tasks that could streamline efforts during the load allocation and project calculation processes. The SWIL Model revisions may change the loading estimates presented in this BMAP, and may therefore result in changes to allocations in future iterations of the BMAP. Although the direction and magnitude of those changes is uncertain, DEP anticipates that some may be higher, and some may be lower.

Summary of Load Reductions

DEP requested stakeholders provide information on management actions, including projects, programs, and activities, that may reduce nutrient loads to the BRL. Management actions are included in the BMAP to address nutrient loads to the lagoon and have to meet several criteria to be considered eligible for credit. Projects completed to date are estimated to achieve total reductions of 41,280 lbs/yr of TN, which is 37 % of the reductions needed for TN TMDL. Projects completed to date are estimated to achieve total reductions of 4,090 lbs/yr of TP, which is 37 % of the reductions needed to meet the TP TMDL. **Figure ES-2** and **Figure ES-3** show progress towards the TN and TP TMDL load reductions through July 31, 2020.

To achieve the TMDLs, stakeholders must identify and submit additional local projects as well as determine the significant funding that will be necessary. Enhancements to programs addressing basinwide sources will also be required.

Source Requirements

Florida law (Section 403.086, Florida Statutes [F.S.], and Chapter 2020-150, Laws of Florida) requires all domestic wastewater facilities directly discharging to surface waters of the state within or connected to the IRL to meet advanced wastewater treatment requirements no later than July 1, 2025. Additionally, this BMAP sets TN and TP effluent limits in the BRL for individually permitted domestic wastewater facilities and their associated rapid rate land application (RRLA) effluent disposal systems and reuse activities, unless the owner or operator can demonstrate reasonable assurance that the discharge or associated RRLA or reuse activity would not cause or contribute to a failure to achieve the TMDLs or an exceedance of water quality standards. Local governments must also develop remediation plans to address loads from wastewater facilities and septic systems in the BMAP area.

Agricultural nonpoint sources are a small contributor of TN and TP loading to the BRL. Since the adoption of the BRL BMAP in 2013, no agricultural producers have enrolled in the Florida Department of Agriculture and Consumer Services (FDACS) Best Management Practices (BMP) Program. To address TN and TP loading from agricultural nonpoint sources to the BRL, FDACS will continue to carry out its statutory authority and fulfill its statutory obligations to facilitate BMP

enrollment and implementation verification, pursuant to Paragraphs 403.067(7)(c) and 403.067(7)(d), F.S.

Within five years of the adoption of this BMAP, DEP will evaluate any entity located in the BMAP area that serves a minimum resident population of at least 1,000 individuals who are not currently covered by a municipal separate storm sewer system (MS4) permit and designate eligible entities as regulated MS4s, in accordance with Chapter 62-624, Florida Administrative Code (F.A.C.). In accordance with Subsection 373.4131(6), F.S., DEP and the water management districts are planning to update the stormwater design and operation requirements in Environmental Resource Permit rules and incorporate the most recent scientific information available to improve nutrient reduction benefits.

Water Quality Monitoring

The updated BRL BMAP monitoring network consists of seven stations sampled by SJRWMD. The monitoring plan also includes research priorities to better understand the lagoon, nutrient sources, and the responses of seagrass to nutrient loading, both internal and external, to the lagoon.

BMAP Cost

The project costs provided for the BMAP may include capital costs as well as those associated with construction, routine operations and maintenance, and monitoring. Many BMAP projects were built to achieve multiple objectives, and not just nutrient reductions. Funds for some projects have already been spent, others have been obligated to ongoing projects, and the remainder are yet to be appropriated.

The funding sources for the projects range from local public and private contributions to state and federal legislative appropriations. DEP will continue to work with stakeholders to explore new opportunities for funding assistance to ensure that the activities listed in this BMAP can be maintained at the necessary level of effort and that additional projects can be constructed by 2035.

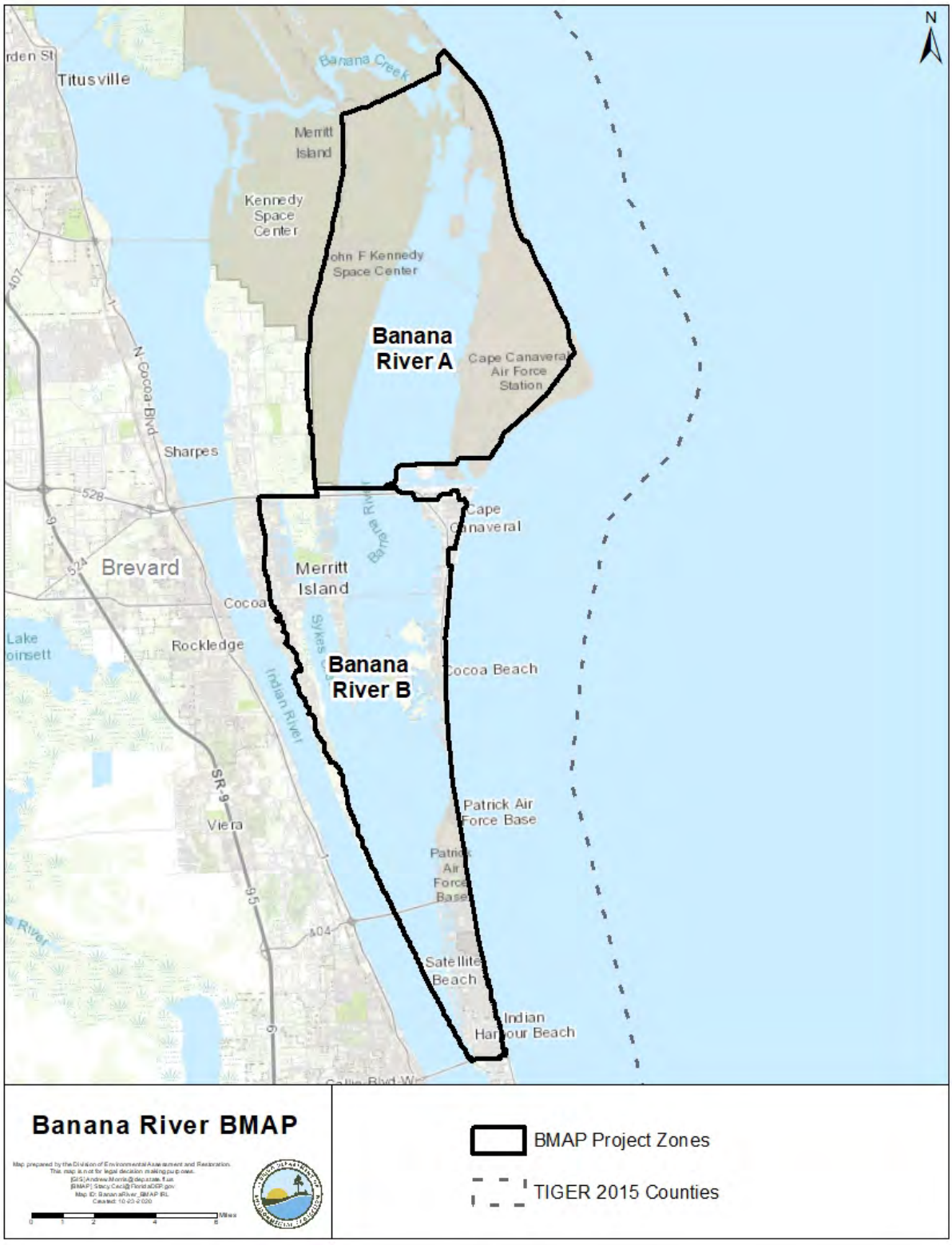

Figure ES-1. BRL BMAP area and project zones

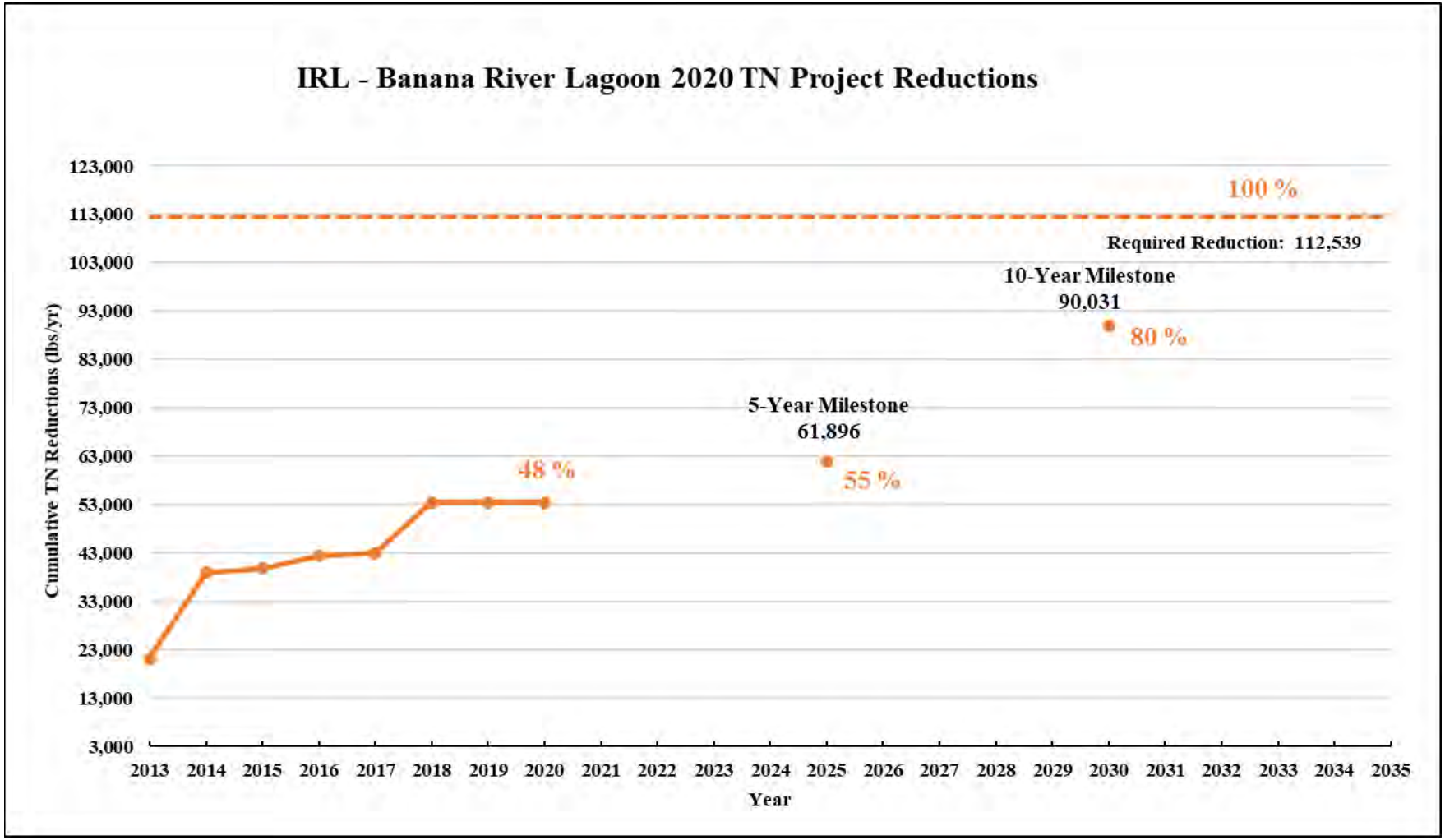

Figure ES-2. Estimated progress towards the BRL BMAP TN milestones with projects completed through July 31, 2020

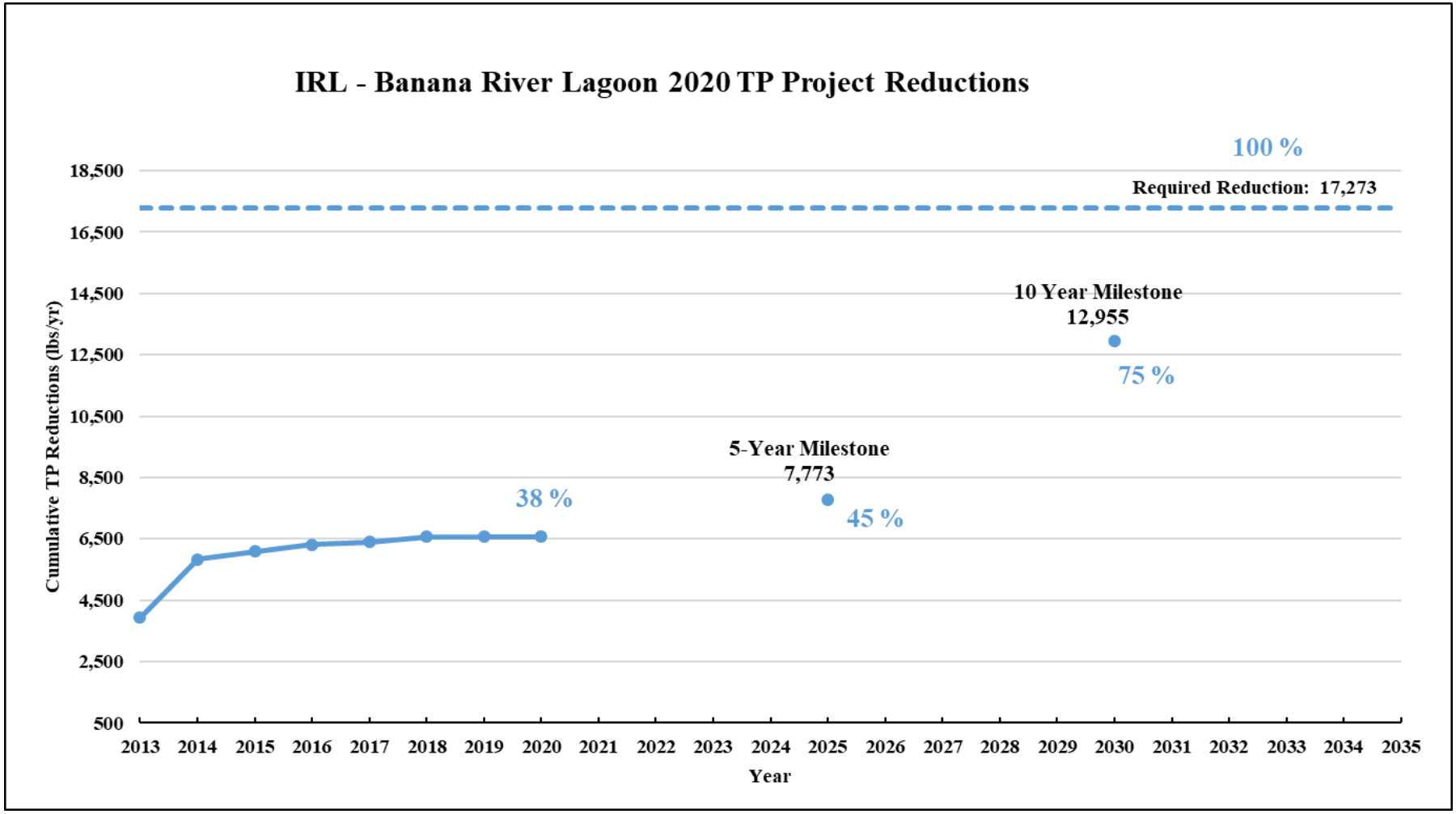

Figure ES-3. Estimated progress towards the BRL BMAP TP milestones with projects completed through July 31, 2020

Chapter 1. Background Information

1.1 Water Quality Standards and Total Maximum Daily Loads (TMDLs)

Florida's water quality standards are designed to ensure that surface waters fully support their designated uses, such as drinking water, aquatic life, recreation, and agriculture. Currently, most surface waters in Florida, including many of those in the Banana River Lagoon (BRL), are categorized as Class III waters, meaning they must be suitable for recreation and must support fish consumption and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. In addition, many waterbody segments (also known as waterbody identification units, WBIDs) are categorized as Class II waters, which have a designated use of shellfish propagation or harvesting. **Table 1** lists all designated use classifications for Florida surface waters.

Table 1. Designated use attainment categories for Florida surface waters

[1] Class I, I-Treated, and II waters additionally include all Class III uses.

Classification	Description
Class I[1]	Potable water supplies
Class I-Treated[1]	Treated potable water supplies
Class II[1]	**Shellfish propagation or harvesting**
Class III	**Fish consumption; recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife**
Class III-Limited	Fish consumption, recreation or limited recreation, and/or propagation and maintenance of a limited population of fish and wildlife
Class IV	Agricultural water supplies
Class V	Navigation, utility, and industrial use (*no current Class V designations*)

Class II waters in the BRL may be used for aquaculture. The WBIDs that are designated as Class II waters are listed in **Table 2**; however, there are no acres of aquaculture under certification with the FDACS Division of Aquaculture as of September 2020. If not listed, the remaining WBIDs are Class III waters.

Table 2. Class II waters in the BRL

Classification	WBID Number	WBID Name
Class II	2963B1	Indian River Above Melbourne Causeway
Class II	2963C1	Indian River Below 520 Causeway
Class II	3044A	Newfound Harbor
Class II	3044B	Sykes Creek / Barge Canal
Class II	3057A	Banana River Below 520 Causeway
Class II	3057B	Banana River Above 520 Causeway
Class II	3057C	Banana River Above Barge Canal
Class II	5003C1	South Indian River (Above Sr 60)
Class II	5003D1	South Indian River (Near St. Sebastian River)
Class II	5003DA	Coconut Point Sebastian Inlet

Section 303(d) of the federal Clean Water Act (CWA) requires that each state must identify its impaired waters every two years, including estuaries, lakes, rivers, and streams, that do not meet their designated uses. Florida Department of Environmental Protection (DEP) staff in the Division of Environmental Assessment and Restoration are responsible for assessing Florida's waters for inclusion on the Verified List of Impaired Waters (when a causative pollutant for the impairment has been identified) and Study List (when a causative pollutant for the impairment has not been identified and additional study is needed). These lists are then provided to the U.S. Environmental Protection Agency (EPA) as an update to the state's 303(d) list. In 2009, DEP adopted, by Secretarial Order, revisions to the Verified List of Impaired Waters for the BRL that identified several estuarine segments as impaired for dissolved oxygen (DO) and nutrients. The DO impairment was based on low DO concentrations measured in milligrams per liter (mg/L), and the nutrient impairment was based on an imbalance in flora and fauna because of decreases in seagrass distribution.

1.1.1. BRL TMDLs

TMDLs are water quality restoration goals establishing the maximum amount of a pollutant that a waterbody can assimilate without causing exceedances of water quality standards. The Indian River Lagoon (IRL) TMDLs focus on the water quality conditions necessary for seagrass regrowth at water depth limits where seagrass historically grew in the lagoon, based on a multiyear composite of seagrass coverage. The median depth limits of seagrass coverage in the IRL decreased over the years (see **Section 4.2**) because of changes in water quality conditions resulting from anthropogenic influences.

As polluted runoff reaches the lagoon, it contributes to conditions that prevent the seagrass from growing in deeper water because of elevated light attenuation. The full restoration depth-limit target for seagrass was established for each segment based on a deep edge boundary delineating the composite of 7 years of historical seagrass data for the period from 1943 to 1999. The restoration targets were set at depths where the deep edge of the seagrass beds previously grew and created a maximum depth limit for seagrass distribution. The TMDL targets allowed for a 10 % departure (shoreward) from the full restoration target seagrass depth. The 10 % departure in target depths was selected to be consistent with the water quality criteria in Chapter 62-302, Florida Administrative Code (F.A.C.), which allows for up to a 10 % reduction in the photo compensation point.

To determine nutrient targets and reductions needed to improve lagoon water quality in each subbasin, regression relationships were used between 4 years of loading levels and the same years' seagrass depth limit (the percent departure from the full restoration). Total nitrogen (TN) and total phosphorus (TP) targets were developed from the median concentrations observed where seagrass depth limits were within the 10 % departure (shoreward) from their full restoration levels. These targets should result in nutrient reductions that allow seagrass to grow almost to the depths previously seen in the area. **Table 3** lists the TMDLs and pollutant load allocations adopted by rule for the BRL.

Table 3. BRL TMDLs

NPDES = National Pollutant Discharge Elimination System.

WBID	Waterbody	NPDES Stormwater TN (% reduction)	NPDES Stormwater TP (% reduction)
3057C	Banana River above Barge Canal	67	72
3057A+3057B	Banana River below 520 Causeway + Banana River above 520 Causeway	59	64
3044A	Newfound Harbor	66	70

Additionally, there are adopted TMDLs for one tributary to the BRL, also addressed in this BMAP. As provided in **Table 4**, the reductions were based on the main stem nutrient TMDL for Segment BR6 in the BRL. The TMDL reductions in Sykes Creek/Barge Canal only apply to the existing nutrient loads from the immediate Sykes Creek–Newfound Harbor segment.

Table 4. IRL Tributary TMDLs

WBID	Waterbody	NPDES Stormwater TN (% reduction)	NPDES Stormwater TP (% reduction)
3044B	Sykes Creek/Barge Canal (the portion of WBID 3044B south of State Route 528 and WBID 3044A)	66	70

1.2 BRL Basin Management Action Plan (BMAP)

A BMAP is a framework for water quality restoration that contains local and state commitments to reduce pollutant loading through current and future projects and strategies. BMAPs contain a comprehensive set of solutions, such as permit limits on wastewater facilities, urban and agricultural best management practices, (BMPs), and conservation programs designed to achieve pollutant reductions established by a TMDL. These broad-based plans are developed with local stakeholders and rely on local input and commitment for development and successful implementation. BMAPs are adopted by DEP Secretarial Order and are legally enforceable.

The Florida Watershed Restoration Act (FWRA), Subparagraph 403.067(7)(a)1., Florida Statutes (F.S.), establishes an adaptive management process for BMAPs that continues until the TMDLs are met. This approach allows for incrementally reducing loadings through the implementation of projects and programs, while simultaneously monitoring and conducting studies to better understand water quality dynamics (sources and response variables) in each impaired waterbody. The BRL BMAP was first adopted in February 2013. An adaptive management process that is statutorily required, such as the changes made in this updated BMAP, will continue until the TMDLs are met.

This document serves as an update to the 2013 BMAP. **Figure 1** shows the BRL BMAP area.

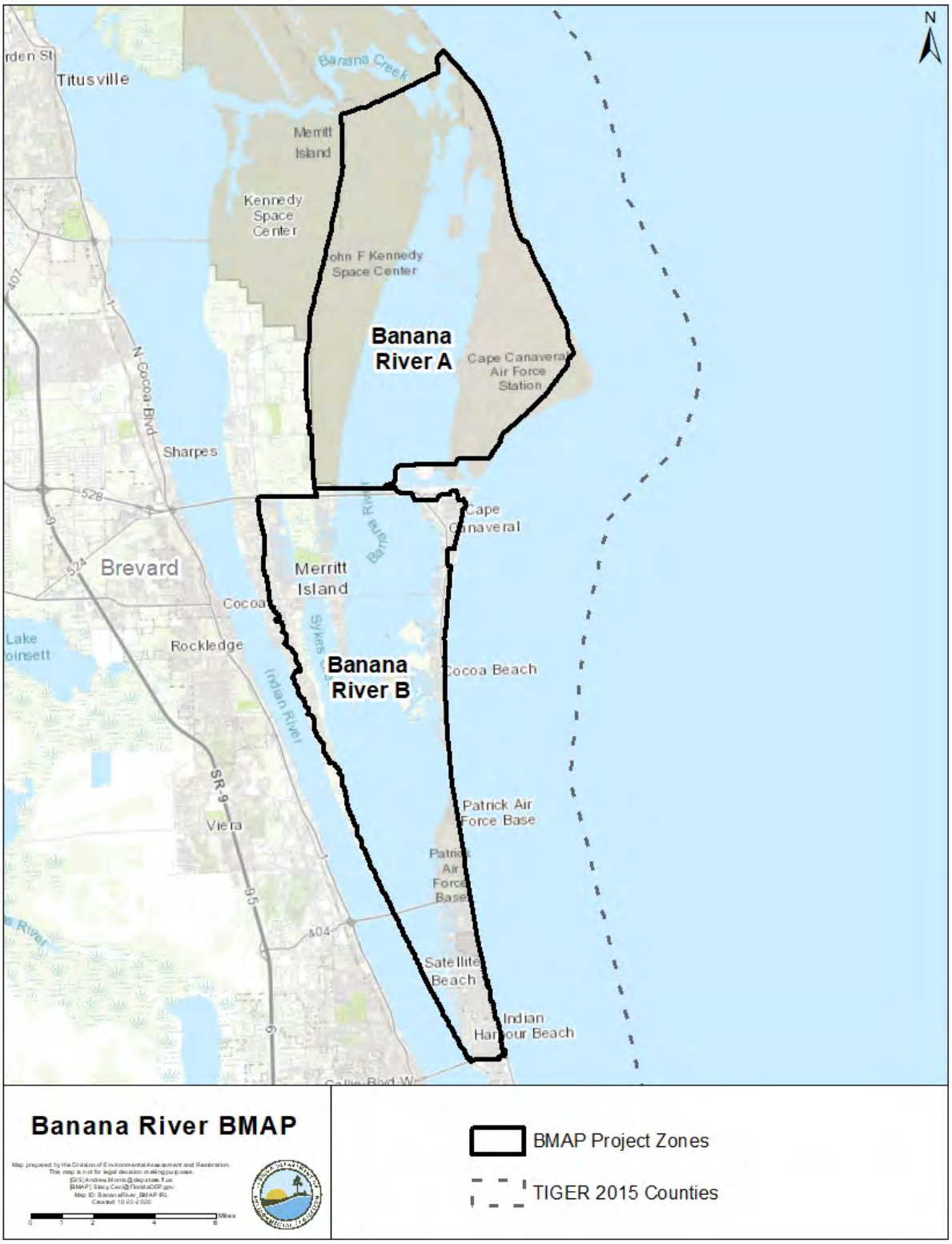

Figure 1. BRL BMAP area

1.2.1. Pollutant Sources

There are various sources of pollution in the BRL. Nonpoint (i.e., diffuse) sources in the watershed contribute the majority of TN and TP loads to the BRL and include urban and, to a lesser extent, agricultural runoff. For additional information on other sources not directly addressable through anthropogenic activities, please refer to **Section 1.2.4.** The Mosquito Lagoon, to the north, is being addressed through a reasonable assurance plan.

1.2.1.1. Agricultural Nonpoint Sources

Less than 1 % of the land in the BRL is used for agriculture. The primary agricultural land uses in the BRL BMAP area are grazing land and fallow lands. Because of urban encroachment, citrus health issues (freeze/disease), and the downturn in the economy, a majority of previously existing citrus operations have been destroyed or abandoned, have significantly lowered their production acreage, or have transitioned to another commodity. In recent years, some of this acreage may have also shifted to nonagricultural/urban uses.

Per Section 403.067, F.S., when DEP adopts a BMAP that includes agriculture, it is the agricultural landowner's responsibility either to implement BMPs adopted by the Florida Department of Agriculture and Consumer Services (FDACS) to help achieve load reductions, or to conduct water quality monitoring pursuant to Chapter 62-307, F.A.C. Landowners that do not enroll in the BMP Program or conduct water quality monitoring are referred to DEP for enforcement action. To date, the FDACS Office of Agricultural Water Policy (OAWP) has adopted BMP manuals by rule for cow/calf, citrus, vegetable and agronomic crops, nurseries, equine, sod, dairy, poultry, and specialty fruit and nut operations.

To enroll in the BMP Program, landowners first meet with OAWP to determine the BMPs that are applicable to that individual operation. The landowner must then submit to OAWP a Notice of Intent (NOI) to implement the BMPs on the checklist from the applicable BMP manual. Because many agricultural operations are diverse and are engaged in the production of multiple commodities, a landowner may be required to sign multiple NOIs for a single parcel.

OAWP is required to verify that landowners are properly implementing the BMPs identified in their NOIs. Rule 5M-1.008, F.A.C., outlines the procedures used to verify the implementation of agricultural BMPs. BMP implementation is verified through site visits conducted by OAWP staff at least every two years, as required by Subparagraph 403.067(7)(d)3, F.S. Producers not properly implementing BMPs according to the process outlined in Chapter 5M-1, F.A.C., are referred to DEP for enforcement action after attempts at corrective and remedial action are exhausted.

FDACS staff conduct site visits to verify that all BMPs are being properly implemented and to review nutrient and irrigation management records. In addition, OAWP verifies that cost-share items are being implemented correctly. Site visits are prioritized based on the date the NOI was signed, the date of the last BMP verification site visit, and whether the operation has received cost-share funding. FDACS undertakes these onsite inspections at least every two years and provides DEP with aggregated information on nutrient amounts being applied.

Where water quality problems are detected for agricultural nonpoint sources despite the appropriate implementation of adopted BMPs, a reevaluation of the BMPs shall be conducted pursuant to Subparagraph 403.067(7)(c)4., F.S.

> When water quality problems are demonstrated, despite the appropriate implementation, operation, and maintenance of best management practices and other measures required by rules adopted under this paragraph, the department, a water management district, or the Department of Agriculture and Consumer Services, in consultation with the department, shall institute a reevaluation of the best management practice or other measure. If the reevaluation determines that the best management practice or other measure requires modification, the department, a water management district, or the Department of Agriculture and Consumer Services, as appropriate, shall revise the rule to require implementation of the modified practice within a reasonable time period as specified in the rule.

Where monitoring indicates that progress towards established BMAP goals is not being attained, FDACS, DEP, and the water management districts may determine additional measures that can be implemented to achieve the desired goals, including the reevaluation of BMPs and other measures. Additional information on the evaluation of BMPs is provided in **Section 2.3.1**.

Under Paragraph 403.067(7)(c), F.S., the proper implementation of FDACS-adopted, DEP-verified BMPs, in accordance with FDACS rules, provides a presumption of compliance with state water quality standards for the pollutants addressed by the BMPs. For the BMAP, the implementation of agricultural BMPs will be documented based on participation in the FDACS BMP Program. **Table 5** summarizes the agricultural land use enrolled in BMP programs for the entire BRL BMAP area. Enrollment is as of July 2020, and the agricultural acreage in each basin is based on the Florida Statewide Agricultural Irrigation Demand (FSAID) VII Geodatabase. **Appendix C** provides more information on agricultural activities in the BRL BMAP area.

Table 5. Agricultural land use acreage enrolled summary in the BMP Program in the BRL BMAP area as of July 2020

Category	Acres
FSAID VII agricultural acres in the BMAP area	164
Total agricultural acres enrolled	0
% of FSAID VII agricultural acres enrolled	0

UNENROLLED AGRICULTURAL ACREAGE

Agricultural land use designation is not always indicative of current agricultural activity and consequently presents challenges to estimating load allocations accurately as well as enrolling every agricultural acre in an appropriate BMP manual. To characterize unenrolled agricultural acres, OAWP identified FSAID VII features outside the BMP enrollment areas using geographic information system (GIS) software (see **Appendix C** for details). **Table 6** summarizes the results of that analysis.

Table 6. Summary of unenrolled agricultural land use acreage in the BRL BMAP area

Note: Because of geometric variations between shapefiles used in the unenrolled agricultural lands analysis performed by OAWP, the unenrolled agricultural acres differ from subtraction of the FSAID VII Agricultural Acres in the BMAP and the Total Agricultural Acres Enrolled referenced in **Table 5.**

Category	Acres
Unenrolled agricultural acres	164
Acres identified within slivers of unenrolled agricultural areas	10
Lands without enrollable agricultural activity (e.g., tribal lands, residential development, and parcels with Florida Department of Revenue (DOR) use codes 70-98)	86
Total lands with potentially enrollable agricultural activities	**68**

As of July 2020, OAWP had not enrolled any agricultural acres in BMPs. Considering the results of the analysis shown in **Table 6**, the total acreage with the potential to have agricultural activities that can be enrolled in the FDACS BMP Program in the subbasin is 68 acres.

Analyzing land use data and parcel data is a valuable first step in identifying the agricultural areas that provide the greatest net benefits to water resources for enrollment in the FDACS BMP Program, as well as prioritizing implementation verification visits in a given basin. OAWP will continue to enroll agricultural lands in the BMP Program, focusing on agricultural parcels adjacent to waterways.

The next step to help prioritize the enrollment efforts could use the parcel loading information derived from the Spatial Watershed Iterative Loading (SWIL) Model. This effort could help FDACS identify specific parcels with the highest modeled nutrient loading. These parcels could then be targeted for the enrollment and implementation of BMPs, as well as the verification of BMP implementation.

AQUACULTURE

Under the CWA, aquaculture activities are defined as a point source. Since 1992, all aquaculture facilities have been regulated by DEP, the water management district, or both, through a general fish farm permit authorized by Section 403.814, F.S. In 1999, the Florida Legislature amended Chapter 597, F.S., Florida Aquaculture Policy Act, to create a program within FDACS requiring Floridians who commercially culture aquatic species to annually acquire an Aquaculture Certificate of Registration and implement Chapter 5L-3, F.A.C., Aquaculture BMPs. Permit holders must reapply to be certified every year.

However, as with agricultural land use in Florida, aquaculture facilities are frequently in and out of production. The facilities for which acreages were provided may no longer be in operation and there may be new companies in different parts of the watershed. In the BRL Subbasin, there are no acres of aquaculture under certification with the FDACS Division of Aquaculture as of September 2020. For the purposes of the BMAP, OAWP delineated the aquaculture facilities using parcel data.

1.1.1.1 *Municipal Separate Storm Sewer Systems (MS4s)*

Many of the municipalities in the watershed are regulated by the Florida National Pollutant Discharge Elimination System (NPDES) Stormwater Program. An MS4 is a conveyance or system of conveyances, such as roads with stormwater systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels, or storm drains.

If an MS4 permittee is identified as a contributor in the BMAP, the permitted MS4 must undertake projects specified in the BMAP. The BMAP projects required to be undertaken by MS4s are detailed for each project zone in **Chapter 3**. Phase I and Phase II MS4s are required to implement stormwater management programs (SWMPs) to reduce pollutants to the maximum extent practicable and address applicable TMDL allocations. Phase I MS4 permits include assessment practices to determine the effectiveness of SWMPs, which can include water quality monitoring. Both Phase I and Phase II MS4 permits include provisions for the modification of SWMP activities, at the time of permit renewal, for consistency with the assumptions and requirements of the adopted BMAP. There are no Phase I MS4 permittees in the BRL as of September 2020.

PHASE II MS4 STORMWATER PERMIT REQUIREMENTS

Table 7 lists the Phase II MS4s in the BRL as of September 2020. Under a generic permit, the operators of regulated Phase II MS4s must develop a SWMP that includes BMPs with measurable goals and a schedule for implementation to meet the following six minimum control measures:

- **Public Education and Outreach** – Implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on waterbodies and the steps that the public can take to reduce pollutants in stormwater runoff.

- **Public Participation/Involvement** – Implement a public participation/involvement program that complies with state and local public notice requirements.

- **Illicit Discharge Detection and Elimination** – Subsection 62-624.200(2), F.A.C., defines an illicit discharge as "…any discharge to an MS4 that is not composed entirely of stormwater…," except discharges under an NPDES permit, or those listed in rule that do not cause a violation of water quality standards. Illicit discharges can include septic/sanitary sewer discharge, car wash wastewater, laundry wastewater, the improper disposal of auto and household toxics, and spills from roadway accidents.

    - Develop, if not already completed, a storm sewer system map showing the location of all outfalls, and the names and location of all surface waters of the state that receive discharges from those outfalls.

- To the extent allowable under state or local law, effectively prohibit, through ordinance or other regulatory mechanism, nonstormwater discharges into the storm sewer system and implement appropriate enforcement procedures and actions.

- Develop and implement a plan to detect and address nonstormwater discharges, including illegal dumping, to the storm sewer system.

- Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper waste disposal.

- **Construction Site Runoff Control** –

  - Implement a regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to reduce pollutants in any stormwater runoff to the Phase II MS4 from construction activity that results in a land disturbance greater than or equal to an acre. Construction activity disturbing less than one acre must also be included if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more.

  - Develop and implement requirements for construction site operators to implement appropriate erosion and sediment control BMPs.

  - Implement requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.

  - Develop and implement procedures for site plan review that incorporate the consideration of potential water quality impacts.

  - Develop and implement procedures for receiving and considering information submitted by the public.

  - Develop and implement procedures for site inspection and the enforcement of control measures.

- **Postconstruction Runoff Control** – Implement and enforce a program to address the discharges of postconstruction stormwater runoff from areas with new development and redevelopment. (**Note**: In Florida, Environmental Resource Permits issued by water management districts typically serve as a Qualifying Alternative Program for purposes of this minimum control measure.)

- **Pollution Prevention/Good Housekeeping** – Implement an operations and maintenance (O&M) program that has the ultimate goal of preventing or reducing pollutant runoff from MS4 operator activities, such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, stormwater system maintenance, and staff training in pollution prevention.

The "NPDES Generic Permit for Discharge of Stormwater from Phase II MS4s," Paragraph 62-621.300(7)(a), F.A.C., also requires that if the permittee discharges stormwater to a waterbody with an adopted TMDL pursuant to Chapter 62-304, F.A.C., then the permittee must revise its SWMP to address the assigned wasteload in the TMDL. Additionally, in accordance with Section 403.067, F.S., if an MS4 permittee is identified in an area with an adopted BMAP or a BMAP in development, the permittee must comply with the adopted provisions of the BMAP that specify activities to be undertaken by the permittee.

DEP can designate an entity as a regulated Phase II MS4 if its discharges meet the requirements of the rule and are determined to be a significant contributor of pollutants to surface waters of the state in accordance with Rule 62-624.800, F.A.C. A Phase II MS4 can be designated for regulation when a TMDL has been adopted for a waterbody or segment into which the MS4 discharges the pollutant(s) of concern. If an MS4 is designated as a regulated Phase II MS4, it is subject to the conditions of the "NPDES Generic Permit for Stormwater Discharges from Phase II MS4s." A list of those permitted entities can be found in **Table 7**.

Table 7. Entities in the BRL designated as Phase II MS4s as of September 2020

Permittee	Permit Number
Brevard County	FLR04E052
City of Cape Canaveral	FLR04E003
City of Cocoa Beach	FLR04E062
City of Indian Harbour Beach	FLR04E026
City of Satellite Beach	FLR04E072
FDOT District 5	FLR04E024
Patrick Air Force Base	FLR04E074

1.1.1.2 *Septic Systems*

Based on data from the Florida Department of Health (FDOH) Florida Water Management Inventory (FLWMI), there are 8,153 known or likely septic systems (onsite sewage treatment and disposal systems [OSTDS]) located throughout the BRL (**Figure 2**).

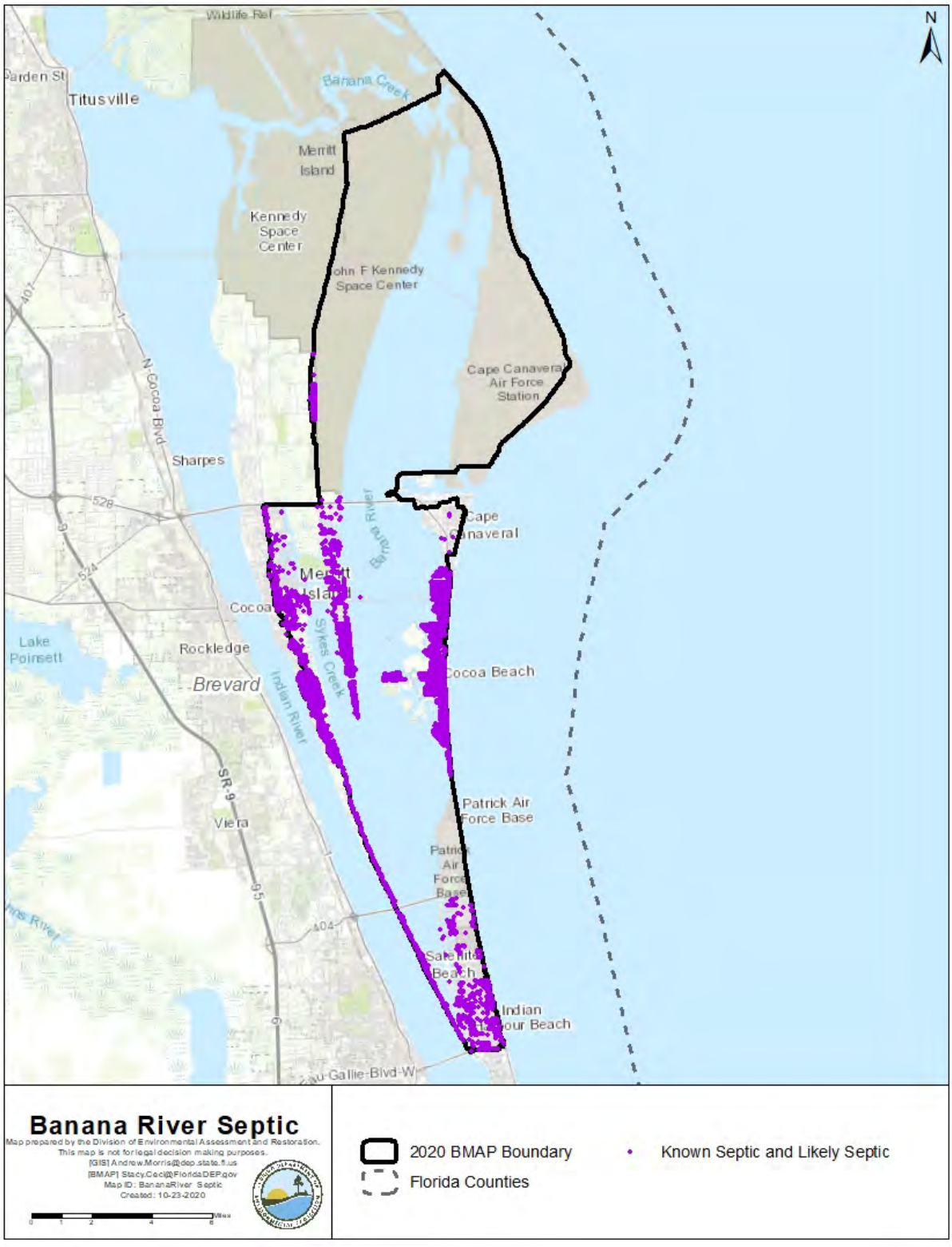

Figure 2. Location of septic systems in the BRL

1.1.1.3 *Urban Nonpoint Sources*

Subsubparagraph 403.067(7)(b)2.f., F.S., prescribes the pollutant reduction actions required for nonagricultural pollutant sources that are not subject to NPDES permitting. Non-MS4 sources must also implement the pollutant reduction requirements detailed in a BMAP and are subject to enforcement action by DEP or a water management district if they fail to implement their responsibilities under the BMAP. **Table 8** lists the urban nonpoint sources in the BRL.

Table 8. Urban nonpoint sources in the BRL

Type of Entity	Participant
Government Entities and Special Districts	**Kennedy Space Center** **Port Canaveral** **U.S. Air Force**

1.1.1.4 *Wastewater Treatment Facilities (WWTFs)*

As of September 2020, DEP identified three individually permitted wastewater facilities or activities in the BRL Subbasin. A list of wastewater facilities in the BRL as of September 2020 is provided in **Table 9**, and a map of their locations is shown in **Figure 3**.

Table 9. Wastewater facilities in the BRL as of September 2020

Facility ID	Facility Name
FL0020541	Cape Canaveral WRF
FL0021105	Cocoa Beach WRF
FL0102920	Cape Canaveral AFS Regional WWTF

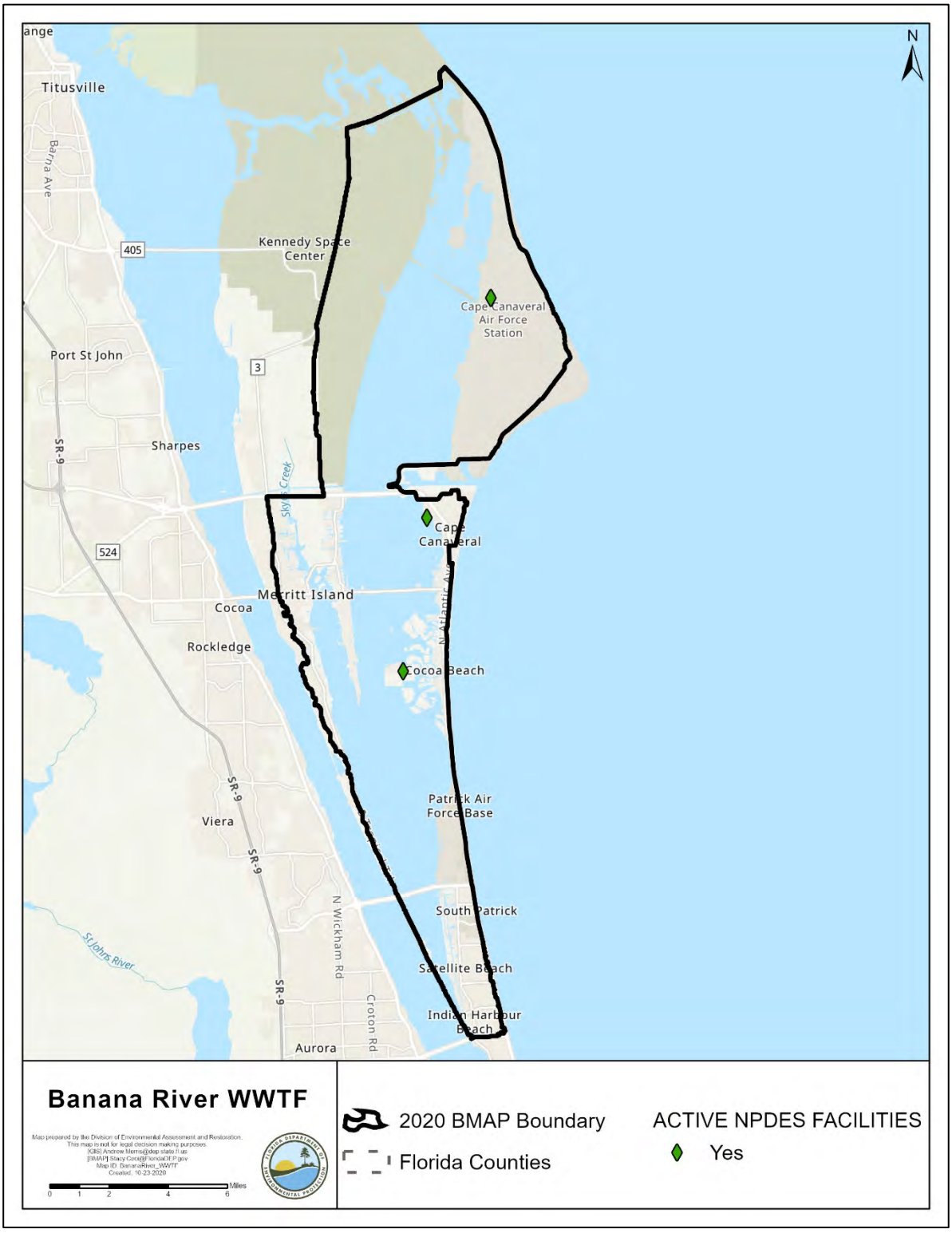

Figure 3. Map of wastewater facilities in the BRL

1.2.2. Milestones and Tracking Progress

The projects and activities in the BMAP are key to the overall goal of recovering seagrass in the lagoon. The estimated benefits of these implemented activities are tracked to show stakeholder efforts by determining a percentage towards the total required reductions to be achieved at each milestone. Additionally, stakeholders provide DEP with reasonable assurance that they have a plan to achieve the individually assigned reductions required in **Chapter 2**. Subparagraph 403.067(7)(a)6., F.S., indicates that an assessment of progress towards the BMAP milestones shall be conducted every five years, and plan revisions made as appropriate. To meet these requirements, DEP has established milestones for the years 2025, 2030, and 2035. The percent reductions in the milestones apply to the total BMAP required reductions, so as various entities implement their projects, the overall milestones are also being met.

The following percent reduction goals are proposed for each milestone and may be adjusted as the BMAP is adaptively managed through future phases:

- 5-year milestone in 2025: 50 % or 61,896 pounds per year (lbs/yr) of TN and 45% 7,773 lbs/yr of TP. Based on model revisions, reset 10-year and 15-year milestones, as needed.

- 10-year milestone in 2030: 80 % or 90,031 lbs/yr of TN and 75% 12,955 lbs/yr of TP.

- 15-year milestone in 2035: 100 % or 112,539 lbs/yr of TN and 17,273 lbs/yr of TP.

By the next milestone in 2025, at least 50 % of the TN and 45 % of the TP required reductions must be met. **Figure ES-2** and **Figure ES-3** show the milestones as well as the cumulative TN and TP reductions over time as projects are completed in each reporting period. The deadline established by this BMAP for achieving the full load reductions is 2035, which is 22 years after the initial adoption of the 2013 BMAP.

1.2.3. Assumptions

The water quality impacts of BMAP implementation are based on several fundamental assumptions about the pollutants targeted by the TMDLs, modeling approaches, waterbody response, and natural processes. The following assumptions were used during the BMAP process:

- Certain BMPs were assigned provisional nutrient reduction benefits for load reductions in this BMAP iteration while additional monitoring and research are conducted to quantify their effectiveness. These estimated reductions may change in future BMAP iterations as additional information becomes available.

- The nutrient reduction benefits of the stakeholders' projects were calculated using the best available methodologies. Project-specific monitoring, where available,

will be used to verify calculations, and reduction benefits may be adjusted as necessary.

- The TMDLs require TN and TP reductions from the watershed to improve water quality, allowing seagrass to grow at greater water depths. High watershed nutrient loadings result in high chlorophyll *a* concentrations in the lagoon, which may indicate algal growth and a reduction in light availability to the seagrass, thus limiting the depth at which seagrass can grow. Therefore, reducing nutrient loading to the BRL is an important factor in improving seagrass depth limits.

- The allocations do not require load reductions from areas identified as natural land use areas in the modeled land use/land cover information. These loads are considered uncontrollable, background sources, and the stakeholders are not required to make reductions on natural lands. The BMAP allocations focus on urban and agricultural stormwater sources and septic systems in the watershed.

- Water is exchanged between the BRL and other nearby waterbodies (the North Indian River Lagoon [NIRL], Central Indian River Lagoon [CIRL], and Mosquito Lagoon), and water quality conditions in the BRL may be influenced by conditions in nearby waters. To help address these nearby conditions, separate BMAPs have been adopted for these watersheds, and a reasonable assurance plan has been adopted for the Mosquito Lagoon.

1.2.4. Considerations

This BMAP requires stakeholders to implement their projects to achieve reductions within the specified period. However, the full implementation of this BMAP will be a long-term, adaptively managed process. While some of the BMAP projects and activities were recently completed or are currently ongoing, several projects require more time to design, secure funding, and construct. Regular followup and continued coordination and communication by the stakeholders will be essential to ensure the implementation of management strategies and assessment of incremental effects.

During the BMAP process, a number of items were identified that should be addressed in future watershed management cycles to ensure that future BMAPs use the most accurate information:

- **Harmful Algal Blooms (HABs) –** HABs cause shading that stresses seagrass in the IRL, adverse effects on wildlife, and in some cases, detrimental effects on human health. Intense and extensive algal blooms in the IRL began in 2011 and have returned periodically, with clear impacts on the extent, density, and depth where seagrasses grow; some fish kills; and, fortunately, little direct impact on human health. Compared with earlier blooms, the recent blooms have been dominated by smaller species of algae called nanoplankton and picoplankton. SJRWMD launched the Indian River Lagoon Protection Initiative in 2013,

including a multiyear investigation that increased the understanding of the blooms. This and other research indicate it is important to persevere with projects that decrease TN and TP loads to the IRL, because that approach will limit the severity of HABs and their impacts on the system.

- **Land Uses** – The loading estimates in the BMAP are based on land uses at a point in time, allowing the model to be calibrated. The loading estimates for this BMAP iteration were based on land use/land cover data from approximately 2015 from the water management district as well as property appraiser data. Land uses in the model will be updated during future model revisions based on the most recent and accurate data available; this may result in changes to loading estimates.

- **Basin Boundaries** – **Figure 4** shows the previous and updated BMAP boundary. Overall, 1,423 acres were added to the BMAP area and 632 acres removed, resulting in a net addition of 791 acres. When the 2013 basin boundary was developed, there was uncertainty about whether some areas drained to the IRL, to the Upper St. Johns River, or to other adjacent waterbodies. The boundaries were adjusted based on the best information available about the hydrology of the IRL, but future adjustments may be made because of flow diversions or updated information.

- **Jurisdictional Boundaries** – Entities may experience shifts in their jurisdictional boundaries over time that require allocation adjustments. Changes to the boundaries and/or allocations for these stakeholders may be made as necessary and reflected in future BMAP iterations.

- **SWIL Model** – The SWIL Model was initially developed through cooperative funding provided by Brevard County, all of its cities, and FDOT District 5, as well as support from the U.S. Air Force for purposes other than the BMAPs, and DEP will explore refinements that may help improve the future use of the SWIL for the IRL BMAPs. This effort could include updates to some of the SWIL Model input layers, the verification of watershed boundaries in some areas, revisions to the model period of record, and the validation of predicted flows in selected calibration basins. There are also several optional tasks that could streamline efforts during the load allocation and project calculation processes. DEP expects the SWIL Model enhancements to change the loading estimates and the BRL future allocations. Although the direction and magnitude of those changes are not certain, DEP anticipates that some may be higher, and some may be lower.

- **Community Development District (CDD) Responsibilities** – DEP has had several communications with the CDDs located in the CIRL and NIRL; there were no water quality-related CDDs found in the BRL. In the CIRL and NIRL,

CDDs were assigned allocations only if three criteria were met: (1) there is development—i.e., roads and infrastructure—in the CDD area; (2) the CDD does not discharge to an MS4; and (3) the CDD pays a stormwater fee and receives a refund of this fee. CDDs that did not receive an allocation in this BMAP iteration may receive allocations in future BMAP iterations.

- **Complexity of the Problem** – DEP acknowledges the complexity of the dynamics affecting the water quality of the BRL; therefore, this BMAP is designed to encompass a wide variety of projects and management strategies that will cumulatively act to significantly reduce nutrient loads. In estuarine-based systems, the interaction with ocean waters and freshwater inflows adds variability to the water quality conditions—including those associated with climate change and sea level rise. Other factors such as inconsistency in annual rainfall amounts, changing land uses and farming practices, and internal nutrient sources such as muck deposits also complicate measuring the benefits of projects and management strategies and understanding the relationship between nutrient loading and the biological response of the seagrass deep edge.

- **Sea Level Rise** – Sea level rise and changes in lagoon water depth over time affect the depth at which seagrass growth is measured for TMDL compliance and for assessing seagrass restoration. Improved depth estimates and seagrass deep edge assessment techniques are needed.

- **Previous Restoration Efforts** – DEP recognizes that stakeholders throughout the watershed have implemented stormwater management projects prior to the implementation of the TMDLs and that these efforts have benefited water quality. Projects completed in 2000 or later are considered for credits and inclusion in the BMAP.

- **Atmospheric Deposition –** Reductions in atmospheric deposition have occurred over time and are expected to continue. This BMAP and all subsequent nutrient reduction requirements and allowable loads factor only those inputs directly from the watershed. DEP will continue to monitor atmospheric deposition and may address it in future BMAP iterations as part of the adaptive management process.

- **Muck Deposition –** Muck deposits contain nutrients that flux into the water column, increasing the abundance of phytoplankton, drift macroalgae, and epiphytes that attenuate light and constrain seagrass growth and propagation. Most IRL muck originates from upland soils and vegetation. For this reason, stringent watershed soil-erosion control and soil/vegetation containment measures are needed. Without such measures in place, muck removal will need to be frequently repeated, which is neither cost-effective nor time efficient. Ideally, muck removal projects should be performed in conjunction with soil and vegetation retention programs, including public awareness activities, that limit

the amount of muck material deposited into the IRL. The SWIL Model does not automatically take this process into account; however, guidance documentation has been developed for crediting muck removal projects specifically from the lagoon.

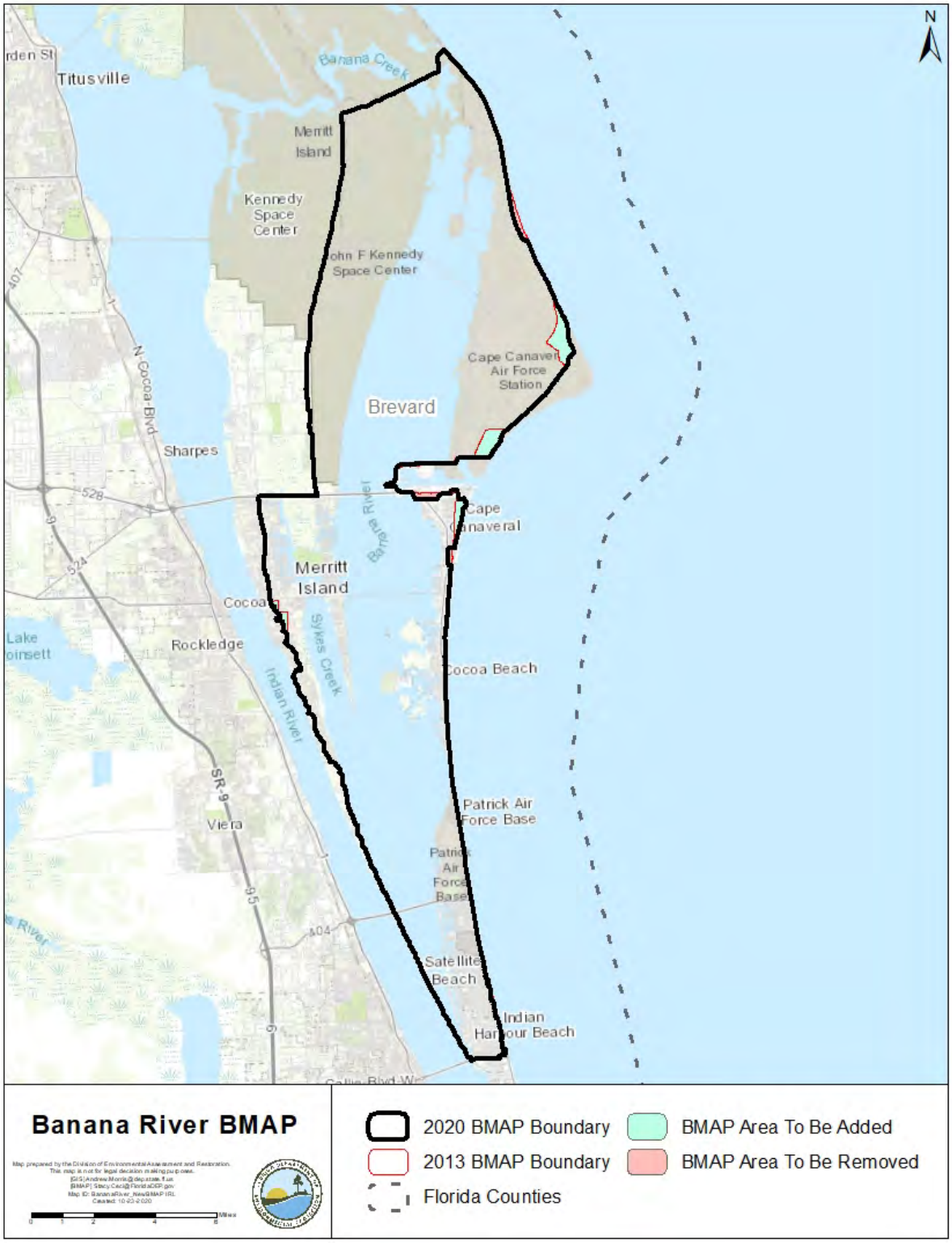

Figure 4. 2013 BMAP area boundary and 2020 BMAP area boundary

1.3 Economic Benefits of the IRL System

The IRL is a valuable ecological and economic asset for the state of Florida and the counties that border the lagoon and its tributaries. It is considered one of the most biologically diverse estuaries in North America and was recognized as part of the National Estuary Program (NEP) in 1990. The lagoon directly and indirectly supports a large part of the region's and the state's economy. The basin supports the multimillion-dollar Indian River citrus industry and boat and marine sales industries. Finfish and shellfish harvesting from the lagoon also contribute to local economies.

An economic study prepared by the East Coast Florida Regional Planning Council (ECFRPC) and Treasure Coast Regional Planning Council (TCRPC) (ECFRPC and TCRPC 2016) estimated the total annual value of the lagoon's benefits at $7.6 billion, measured in 2014 dollars. This does not include the estimated $934 million in annualized real estate value added for property located on or near the IRL (Hazen and Sawyer 2008). The study area spanned from Ponce de Leon Inlet in Volusia County to Jupiter Inlet in Palm Beach County, and included all of Brevard, Indian River, St. Lucie, and Martin counties. The economic analysis was primarily conducted using the Impact Analysis for Planning (IMPLAN) Regional Economic Input/Output Model. The Model estimates direct, indirect, and induced economic effects, as outlined in **Figure 5.**.

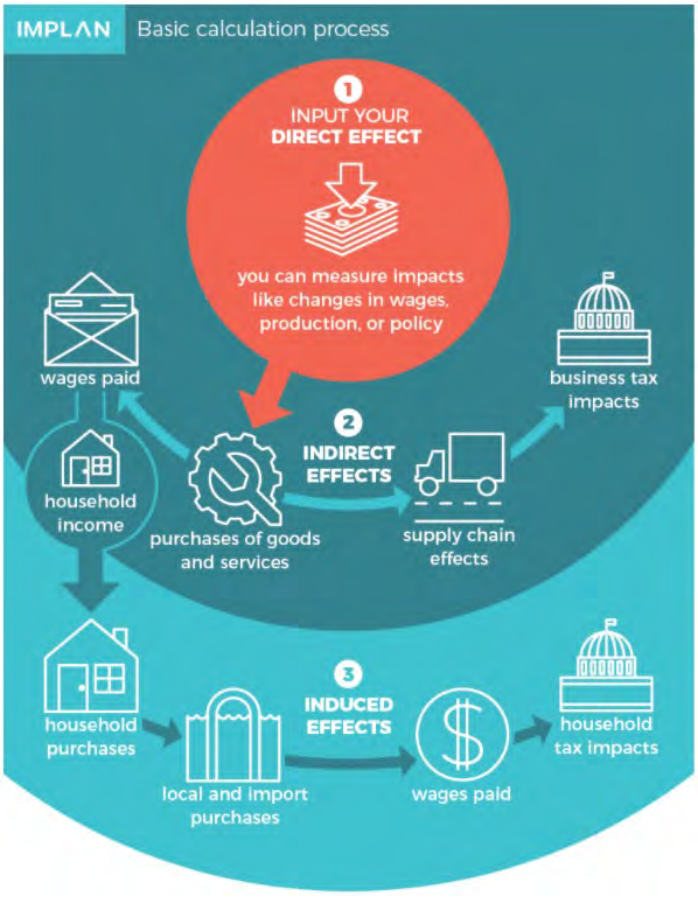

Figure 5. IMPLAN Model calculation process

The primary IRL-related industry groups identified in the study are Living Resources, Marine Industries, Recreation and Visitor-Related, Resource Management, and Defense and Aerospace. The breakdown of the monetary contribution to the IRL regional economy is shown in **Figure 6**.

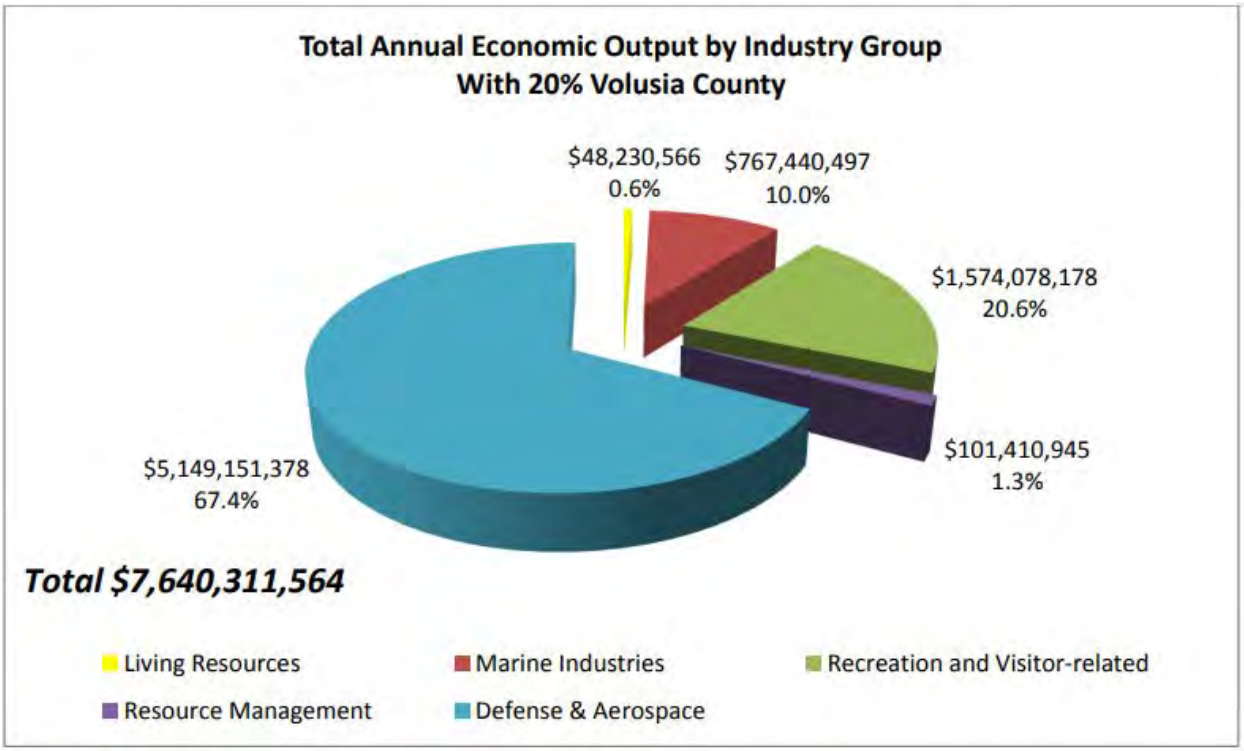

Figure 6. Total annual economic output by industry group in the IRL region, 2014

Money spent on recreation and visitor-related activities generated $1.57 billion of economic benefit. In 2014, over 7.4 million visitors traveled to the IRL region. Between 2.3 to 3.5 million visitors to the IRL region participate in IRL-related recreation, and each visitor spends an average of $162 a day. By 2025, the IRL region is anticipated to receive over 11 million visitors annually.

The study also estimated the cost of a sustainable IRL-based economy and return on investment for achieving water quality and seagrass restoration goals for the IRL. The annualized cost of achieving the nutrient load reductions required by the four BMAPs that span the entire area was estimated at $230 million. When compared with the $7.6 billion valuation of the region's average annual economic output, the return on investment from achieving water quality and seagrass restoration goals is 33 to 1. Therefore, investing in projects and programs to improve the lagoon's water quality and seagrass beds is not only important for environmental considerations but also to improve the regional economy.

Chapter 2. Modeling, Load Estimates, and Restoration Approach

2.1 BMAP Modeling

Nutrient loading estimates were originally calculated for the BMAP using the Pollutant Load Screening Model (PLSM), which was expanded by SJRWMD to represent year 2000 loading (Adkins et al. 2004) in most of the IRL Watershed (excluding the IRL south of the Indian River–St. Lucie County boundary). The seagrass depth limits were developed by SJRWMD based on a series of photo-interpreted seagrass coverages from 1943 through 2001. DEP reviewed these models and the seagrass depth limits and used them to develop the IRL TMDLs that were adopted by rule (Gao 2009).

Through cooperative local effects, all the MS4 permittees within the Brevard County section of the IRL (17 entities) partnered to fund a Study Team to create a new watershed model that would update and refine the information that was used in the PLSM and associated TMDLs for the IRL. One outcome of this study was the development of the SWIL Model, which is intended to incorporate more available data, more recent conditions, and more temporally fine datasets. SWIL is a custom ESRI ArcGIS toolset, originally designed to provide a continuous monthly simulation of runoff over a 16-year period (Applied Ecology 2019).

During 2017 and 2018, while DEP prepared to calculate allocations for the CIRL BMAP, the SWIL Model was proposed as an alternative to the previously used PLSM. Several options were presented for updating allocations during a public meeting in May 2017, and the options were discussed by DEP and stakeholders during and after the meeting. In November 2017, a presentation was made to the IRL National Estuary Program (NEP) Science, Technology, Engineering, and Mathematics (STEM) Committee to provide a technical overview of the SWIL. During the annual public meeting for the IRL BMAPs in December 2018, a proposed path forward was presented that included applying the SWIL to calculate allocations for the IRL BMAPs. A technical presentation was given by the model developer at a public webinar in January 2019 to provide stakeholders with an opportunity to discuss the model further. Finally, during the annual public meeting for the IRL BMAPs in December 2019, a summary of the allocation approach using SWIL was presented.

2.1.1. SWIL Modeling

The initial version of SWIL was developed for the IRL in 2012 (SWIL 1.0). To address several DEP comments and to improve execution and processing time, SWIL 2.0 was released in July 2014. SWIL 3.0 was released in April 2015 with improved model calibration to the measured available gauge data, including a revised method to derive baseflow volumes and loads. SWIL 3.0 also incorporated new evapotranspiration raster datasets. SWIL 4.0 was developed in support of the 3D numerical modeling effort led by the Florida Institute of Technology. Three major changes were performed for SWIL 4.0: (1) Expansion of the model extent to provide nutrient loadings from Ponce Inlet to Fort Pierce; (2) temporal expansion to include 2011 to 2015, for a total model period of 20 years (1995 to 2015); and (3) the addition of a third land use/treatment time step using data from 2015 (Applied Ecology 2019).

2.1.2. SWIL Calibration

The SWIL 3.0 version was used for calibration using flow data primarily from the CIRL. The five gauged stations included in the calibration are located in the following basins: Crane Creek, Hickory Creek, North and South prongs of the Sebastian River, and Fellsmere Canal. Few data were available in the NIRL and none in the BRL, and so the calibration is based primarily on the CIRL conditions. Also, during the calibration process, a change was made to the normalization process of the baseflow volumes by incorporating "groundwater storage depth," an area-weighted groundwater input variable (Applied Ecology 2015). The calibration was based on simulated 1995–2010 flow volumes compared against measured data at the gauged stations. Since the treatment layer inputs to the model simulation did not incorporate BMPs beyond permit requirements after the year 2000, most projects installed from 2000 onward were not included in the calibration and are not well represented in the SWIL Model loading estimates. Therefore, projects completed from 2000 onward are eligible for BMAP credit.

2.1.3. Allocation Process

To generate average annual TN and TP loads from the IRL Watershed, SWIL was run using rainfall inputs that were thought to be from a representative period covering various conditions from high to low rainfall years. The outputs from this model run were used to generate a GIS-based Load Estimation Tool (LET) that included annual average loads from the watershed and was the basis of the allocation calculations.

The LET based on the SWIL Model can produce polygon outputs with loading data included. The determination of each entity's loading was performed using the LET and a GIS process. Through a series of GIS steps, polygons were generated for each stakeholder. GIS data were used to clip the area within the BMAP boundary associated with each entity's jurisdictional boundary or the codes from the model land cover data related to natural and agricultural lands. The clipping process was done sequentially, as follows:

1. Dispersed Water Management (DWM) or Comprehensive Everglades Restoration Plan (CERP) projects.
2. Roads (FDOT and Florida's Turnpike Enterprise).
3. Water control districts (WCDs) and water improvement district canals and rights-of-way.
4. Natural lands (land use codes 3000 [not including 3300], 4000, 5000, and 6000).
5. Agriculture (land use codes 2000 and 3300).
6. CDDs, if they meet the criteria.
7. Municipalities.
8. Remaining area assigned to each county.

Loads within DWM or CERP project areas were not included in the total loads for the project zone, since these land uses are being converted to treatment projects. Loads from natural land uses were not assigned to any specific entity's starting load. FDOT, agriculture, CDDs, municipalities, and counties were assigned starting loads based on this sequential process.

2.1.4. Project Credit Process

The LET was used to calculate updated TN and TP baseloads from all existing project treatment areas in the BMAP. The August 2020 DEP BMP Efficiencies Guidance document was used to determine the appropriate credit calculations for the various project types. Some project types that have credits based on measured data or weighed material, such as street sweeping, did not need to be updated using the LET.

2.2 Calculation of Starting Loads and Allocations

This section describes the process used to calculate the load reductions needed to achieve the TMDLs and to allocate the load reduction requirements to the responsible stakeholders.

2.2.1. Starting Loads and Allocation of Load Reductions

DEP requested to use the SWIL 4.0 Model to update the load allocations for the second cycle of the IRL BMAPs. To develop the loads that represent updated current conditions, the SWIL Model was customized for this use with the following parameters (Applied Ecology 2018):

- A 50 x 50-meter (m) cell size was used, which is a much higher spatial resolution than any previously developed watershed loading models for the IRL.
- Land use corresponds to 2015 conditions and is derived from water management district land use data, property appraiser data, and local government natural communities land cover, where available.
- Treatment layer (stormwater BMPs) corresponds to development conditions in approximately 2015, excluding any retrofits implemented by the stakeholders in the IRL Watershed. Retrofit projects will need to be retroactively calculated and provided as credits to the stakeholders.
- Period of record rainfall that includes 2004 to 2017 data, which allows for a wide range of rainfall conditions to represent the variability in loading to the IRL.

The outputs of this modeling effort can be described as static feature classes that include more than 1.2 million 50 x 50-m cells (as features) each. Each individual cell is associated with an estimated volume and both nitrogen and phosphorus estimated loading for the selected mean period of record conditions (Applied Ecology 2018).

For land use and land cover, 2015 conditions were represented as derived from water management district data for nonurban land uses and from local property appraiser datasets for urban land uses. Natural community data from local governments were also incorporated, where available (Brevard County). In addition, field-validated 2015 land use datasets for Patrick Air Force Base, Cape Canaveral Air Force Station, and the Malabar Annex were used in lieu of water management district data (Applied Ecology 2018). Land covers were grouped to reflect the available event mean concentrations (EMCs) and C values that would be applied in the model (Listopad 2020).

DEP used the LET to develop the allocations (see **Figure 7** and **Figure 8**). The percent reduction from the TMDLs was applied to the applicable areas within the BMAP. The TMDL percent reductions are based on segmented areas of the lagoon defined by both DEP WBIDs, along with breaks in the hydrology of the lagoon as defined by SJRWMD. Areas where segments share hydrologic similarity and similar reduction percentages, as noted by the TMDLs, are defined as segment groups. Additionally, during the first phase of BMAP adoption, the hydrology defined by SJRWMD was used to define project zones in order to assess seagrass compliance. Both project zone and segment groups assist in calculating the required reduction and the allocation of each entity within the BMAP area. The total segment load from the LET was used, and the percent reduction from the TMDLs for that segment was applied to discern the total required reductions per segment. Natural lands had no reductions applied, and so the SWIL loads from natural land uses were held constant. The land cover codes considered to be "natural lands" include 3000 (upland nonforested; not including 3300), 4000 (upland forests), 5000 (water), and 6000 (wetlands). The allowable load in the segment was determined by subtracting the required reductions from the total segment load determined by the LET.

A test was performed to make sure that no reductions would be expected from natural land uses. The weighted average load per acre from natural lands for each segment was compared with the load per acre from the allowable load. If the allowable load per acre was less than the natural land load per acre, the allowable load was increased to equal the natural load per acre times the acres in the segment. This process was performed for both TN and TP loads in each segment. This adjustment was made for both TN and TP for Segment Groups BR1-2 and BR6.

Once the total required reductions for each segment were defined, the total anthropogenic load for the segment was examined. Each stakeholder's anthropogenic load was compared with the total anthropogenic load for the segment to determine its contribution to the total anthropogenic load. This percentage was considered to be representative of the stakeholder's loading contribution and that percentage of the segment's required reduction was applied to that stakeholder. If an entity was located in more than one segment area, the required reductions were added together to determine that entity’s total required reductions for the BMAP.

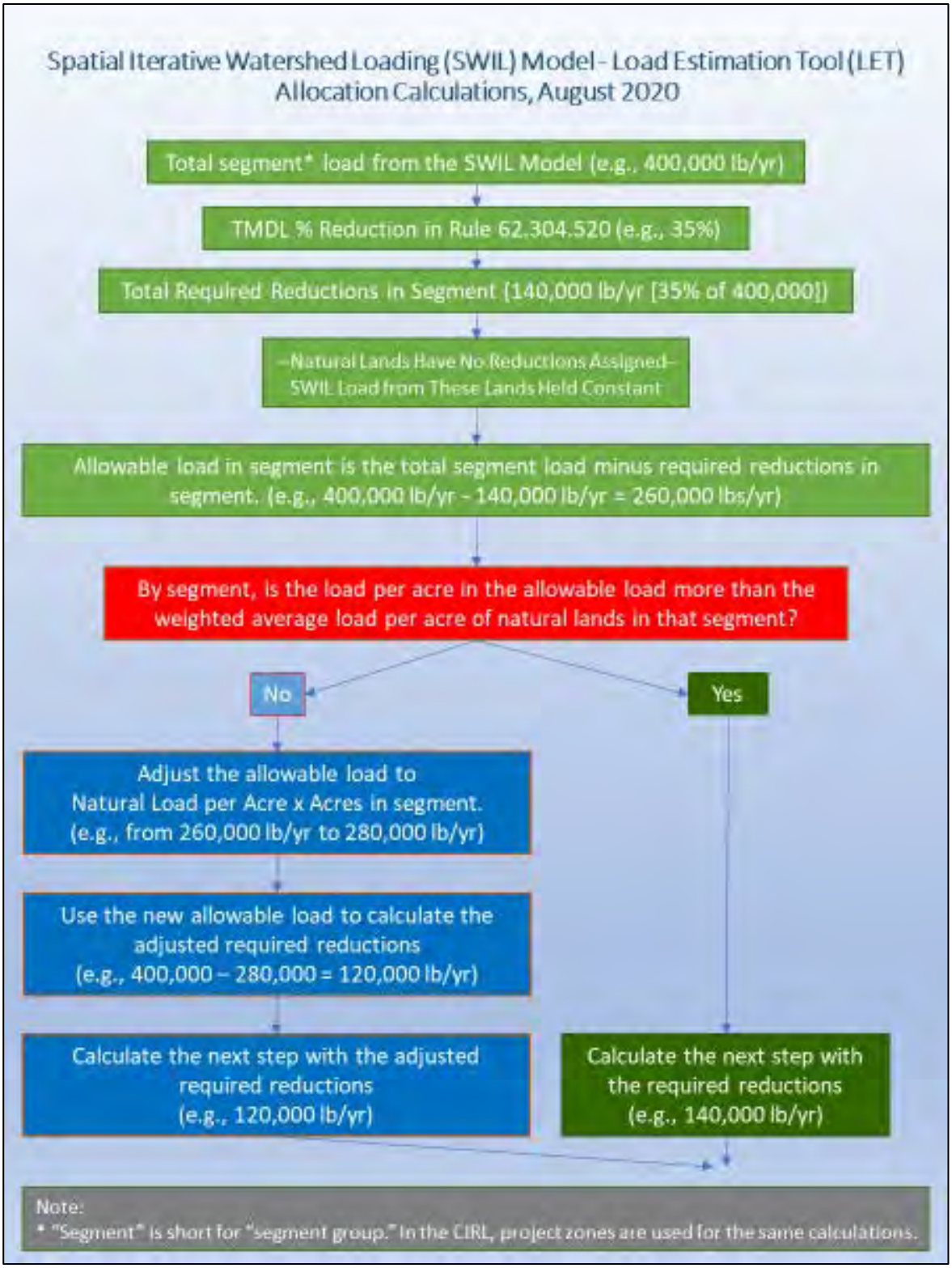

Figure 7. Flow chart of the allocation steps, page 1 of 2

Figure 8. Flow chart of the allocation steps, page 2 of 2

The SWIL Model starting loads are described in **Table 10**.

Table 10. SWIL Model starting loads

Starting TN Load (lbs/yr)	Starting TP Load (lbs/yr)
271,752	36,028

2.2.1.1. Low-Priority Ranking Determination

Several stakeholders contribute less than 0.30 % of both the TN and TP loading from the watershed to the BRL. The contribution to the overall nutrient loading from these stakeholders is low enough that reductions from these areas would have essentially no impact on the required reductions for the BMAP during this phase of implementation; therefore, these entities are currently considered a low priority for implementing reductions. Low-priority entities will be evaluated in future phases of BMAP implementation, as their contributions may change over time.

Table 11 summarizes the priority evaluation, and those stakeholders meeting the classification requirements for low priority are highlighted in grey. The stakeholder that met the low-priority classification is Port Canaveral. This entity is not required to meet the reduction targets for TN and TP in this phase of BMAP implementation but must continue to adhere to all requirements of its MS4 permit or other permits.

BMAP progress will be reviewed over time, and reduction requirements, including for those stakeholders with this low-priority status, will be modified in a future BMAP update as needed. TN and TP reductions may be needed from the low-priority entities in the future. Therefore, although they do not currently have a reduction responsibility, this does not exempt these stakeholders from such requirements in future BMAP updates. Any actions taken by these entities that result in TN and TP reductions will be documented for credit against any reduction requirements allocated in subsequent BMAP updates.

Table 11. Entity contributions to total TN and TP starting load with low priority ranking cutoff

*Indicates the stakeholder meets the requirements for low priority
N/A = Not applicable

Entity	TN Starting Load (lbs/yr)	Anthropogenic %of TN in BMAP	TP Starting Load (lbs/yr)	Anthropogenic % of TP in BMAP
Brevard County	54,981	34.82	8,078	35.37
U.S. Air Force	31,840	20.16	4,345	19.02
City of Cocoa Beach	16,412	10.39	2,500	10.95
City of Satellite Beach	14,576	9.23	2,160	9.46
City of Indian Harbour	10,891	6.90	1,675	7.34
Kennedy Space Center	11,507	7.29	1,504	6.59
City of Cape Canaveral	8,915	5.65	1,419	6.21
FDOT District 5	4,252	2.69	588	2.58
Agricultural Producers	4,130	2.62	516	2.26
Port Canaveral*	417	0.26	54	0.24
Total of Allocated Entities	**157,919**	**100.00**	**22,840**	**100.00**
Natural Lands	113,833	N/A	13,188	N/A
Total of BMAP	**271,752**	**N/A**	**36,028**	**N/A**

2.2.1.2. Required Reductions

The TN and TP reductions required by each entity are shown in **Table 12**.

Table 12. TN and TP load required reductions by entity (lbs/yr)

*Indicates the stakeholder meets the requirements for low priority.
** = Adjusted using the natural load per acre.
N/A = Not applicable

Entity	TN Reduction	TP Reduction
Agricultural Producers	2,924	387
Brevard County	45,425	7,009
City of Cape Canaveral	8,244	1,331
City of Cocoa Beach	15,177	2,345
City of Indian Harbour Beach	10,072	1,571
City of Satellite Beach	13,480	2,026
FDOT District 5	3,786	538
Kennedy Space Center	8,023	1,112
U.S. Air Force	24,117	3,442
Port Canaveral*	362	48
Total of Allocated Load	**131,248****	**19,761****

2.3 Basinwide Sources Approach

The basinwide sources approach involves tailoring management strategies to the primary sources of anthropogenic nutrient loading throughout the BRL Subbasin. The primary source categories included in this approach are agricultural runoff, septic systems, urban stormwater, and wastewater. For additional information on other sources not directly addressed through anthropogenic activities, please refer to **Section 1.2.4**.

2.3.1. Agriculture

When DEP adopts a BMAP that includes agriculture, it is the agricultural landowner's responsibility to properly implement BMPs adopted by FDACS to help achieve load reductions or demonstrate compliance through monitoring. FDACS is undertaking efforts to transmit enrollment notifications to producers and landowners on identified agricultural lands in the BMAP area (see **Appendix C**), which will drive increased enrollment or referral to DEP for water quality monitoring. A more detailed characterization of unenrolled agricultural lands is found in Appendix B. FDACS is responsible for verifying that all eligible landowners are enrolled in appropriate BMP programs. Subparagraph 403.067(7)(d)3, F.S., requires FDACS to perform regular onsite inspections, at least every two years, of all agricultural operations enrolled under a BMP manual to ensure that these practices are being properly implemented. Per the requirements of the statute, FDACS is prioritizing verification efforts in certain basins, including the IRL. From these inspections, FDACS will provide DEP with an annual summary of aggregated fertilizer use in the BMAP area, quantifying total applications and providing information on applications by project zone.

FDACS has committed to updating its existing BMP manuals to incorporate updated BMPs based on the latest scientific and technical research. Subparagraph 403.067(7)(f)1, F.S., requires FDACS to annually develop research plans and legislative budget requests for the following:

- Evaluate and suggest enhancements to the existing adopted agricultural BMPs to reduce nutrient runoff.
- Develop new BMPs that, if proven effective, may be adopted by rule.
- Develop agricultural nutrient runoff reduction projects that willing participants could implement on a site-specific, cooperative basis, in addition to BMPs.

FDACS also provides funding to some agricultural operations to add other practices beyond owner-implemented BMPs. Examples include drainage improvements, fencing, water control structures, precision agriculture technology, and fertigation. SJRWMD is implementing and/or funding projects that encourage low-input agriculture and the use of water quality improvement technologies.

If owner-implemented BMPs fail to achieve water quality improvements, a cooperative agricultural regional water quality improvement element may be developed for this BMAP, subject to the conditions outlined in Subparagraph 403.067(7)(e)1, F.S. DEP, FDACS, and agricultural producers

will cooperatively develop a regional water quality improvement element in the event of the following:

- Agricultural measures have been adopted by FDACS pursuant to Subparagraph 403.067(7)(c)2, F.S. and have been implemented and the waterbody remains impaired.

- Agricultural nonpoint sources contribute to at least 20 % of nonpoint source nutrient discharges.

- DEP determines that additional measures, in combination with state-sponsored regional projects and other management strategies included in the BMAP, are necessary to achieve the TMDLs.

Further nutrient reductions can be achieved through the implementation of additional agricultural projects or activities. Other reductions associated with the implementation and modification of BMPs may be realized through ongoing studies, data collection, and water management district initiatives. These additional projects and practices are to be implemented in conjunction with the BMP Program, which will aim to achieve full enrollment with verification to ensure that the BMAP goals are achieved.

2.3.2. Septic Systems

As required in Subsubparagraph 403.067(7)(a)9.b., F.S., local governments must develop an onsite sewage treatment and disposal system (OSTDS) remediation plan to be adopted as part of the BMAP no later than July 1, 2025. The OSTDS remediation plans must be developed by each local government in cooperation with DEP, FDOH, water management districts, and public and private domestic wastewater facilities.

The OSTDS remediation plan requires entities to identify and address the following:

- Cost-effective and financially feasible projects necessary to achieve the nutrient load reductions required for OSTDS (e.g., sewering, advanced septic system retrofits, prohibiting the installation of new conventional septic systems).

- An inventory of OSTDS based on the best information available.

- OSTDS that would be eliminated through connection to existing or future central domestic wastewater infrastructure in the jurisdiction or domestic wastewater service area of the local government.

- OSTDS that would be replaced with or upgraded to enhanced nutrient-reducing systems.

- Cost of improvements and sources of funding.

Based on data from FDOH, there are 8,182 known and likely septic systems located throughout the BRL Subbasin. **Figure 2** in **Section 1.1.1.2** shows the count of septic systems in the BMAP area.

Stakeholders will submit projects describing how septic loads are addressed as part of BMAP reporting and estimate the load reductions associated with each project. The estimated reductions to the lagoon from addressing these septic systems will be based on several factors, including how they are addressed (i.e., connecting to central sewer sends the wastewater to a treatment facility, which does not remove 100 % of the nutrient load) and the amount of attenuation that occurs as the effluent travels through the watershed to the lagoon.

2.3.3. Stormwater

Stormwater from urban areas is a considerable source of nutrient loading to the BRL, and many of these areas are already regulated under the NPDES Stormwater Program. MS4 permittees are required to develop and implement a stormwater management program. Urban areas located in the BMAP area that are not currently covered by an MS4 permit also significantly contribute, individually or in aggregate, to nutrient loading. Therefore, the NPDES Stormwater Program will, within 5 years of BMAP adoption, evaluate any entity located in the BMAP area that serves a minimum resident population of at least 1,000 individuals that is not currently covered by an MS4 permit and designate eligible entities as regulated MS4s, in accordance with Chapter 62-624, F.A.C.

In accordance with Subsection 373.4131(6), F.S., DEP and the water management districts are planning to update the stormwater design and operation requirements in Environmental Resource Permit rules. These revisions will incorporate the most recent scientific information available to improve nutrient reduction benefits.

2.3.4. Wastewater Treatment

DEP issues permits for facilities and activities to discharge wastewater to surface waters and groundwaters of the state. DEP is authorized by the EPA to issue permits for discharges to surface waters under the NPDES Program. Permits for discharges to groundwater are issued by DEP under state statutes and rules. These wastewater discharge permits establish specific limitations and requirements based on the location and type of facility or activity releasing industrial or domestic wastewaters from a point source.

As of September 2020, there were three individually permitted wastewater facilities or activities in the BRL Subbasin. All new or existing wastewater facilities that dispose of or discharge effluent in the BMAP area are subject to the BMAP provisions, regardless of whether the facility is listed in this BMAP. A preliminary list of wastewater facilities in the BRL as of September 2020 is provided in **Table 9**, and a map of their locations is shown in **Figure 3**.

In areas where there is anticipated growth in human population, adequate treatment capacity of domestic wastewater is essential. Domestic wastewater is treated through either wastewater treatment facilities (WWTFs) or OSTDS (septic systems). Where sewer lines are available, Florida

law (Section 381.00655, F.S.) requires a development or property owner to abandon the use of OSTDS and connect to sanitary sewer lines.

Florida law (Section 403.086, F.S., and Chapter 2020-150, Laws of Florida) requires all existing and new domestic wastewater facilities discharging to surface waters of the state within or connected to the IRL to meet advanced waste treatment requirements, as defined in Section 403.086, F.S., no later than July 1, 2025. Additionally, this BMAP requires all other individually permitted domestic wastewater facilities to meet the effluent limitations listed in **Table 13** and **Table 14**, unless the owner or operator can demonstrate reasonable assurance that the effluent would not cause or contribute to an exceedance of the TMDLs or water quality standards in groundwater.

To demonstrate reasonable assurance, the owner or operator must provide relevant water quality data, physical circumstances, or other site-specific credible information needed to show the facility would not cause or contribute to the nutrient loading in the BMAP area. This demonstration may include factors such as dilution; site-specific geological conditions; research/studies, including dye tracer tests; and modeling. If DEP concurs with the reasonable assurance demonstration, the effluent limitations established for discharges to groundwater may be modified or waived for the facility. New effluent limitations will take effect no later than July 1, 2025.

New and existing domestic wastewater facilities must meet the stringent nutrient wastewater limitations set forth in this BMAP. Any such new facilities (those commencing after the adoption of this BMAP) must be capable of meeting the requirements of this BMAP at the time of permit issuance. For existing domestic wastewater facilities, DEP shall modify the permit limitations and requirements to be consistent with this BMAP at the time of the next permit renewal. If the facility needs additional time to meet the new limits, the permit may include a compliance schedule with a completion date not to exceed four and a half years after the effective date of the permit.

Table 13 and **Table 14** list the TP and TN effluent limitations, respectively, adopted for this BMAP that apply to domestic wastewater facilities unless the owner or operator can demonstrate reasonable assurance as listed above. The effluent limitations for direct surface water discharges and reclaimed water pipelines apply to individually permitted NPDES facilities at the end-of-pipe. Because the limitations for direct surface water discharges are technically based advanced waste treatment limitations, mixing zones are not authorized for TN and TP. The effluent limitations for discharges to groundwater apply at the compliance well located at the edge of the zone of discharge. The owner or operator may elect to meet the groundwater limitations prior to the edge of the zone of discharge. These effluent limitations are applied as an annual average. For direct surface water discharges, the limitations in Paragraph 62-600.740(2)(b), F.A.C., will be applied in the permit.

Short-term or intermittent industrial discharges are not significant sources of TN or TP in the BRL Subbasin and are not subject to the limits in **Table 13** and **Table 14.** Intermittent, rainfall-driven, diffuse overflow releases of wastewater from ponds or basins designed to hold precipitation from a 25-year, 24-hour rainfall event or less frequent rainfall event and that infrequently reaches surface waters are considered insignificant sources of TN and TP, provided the ponds or basins are

maintained under normal conditions at or below established water levels. The owners or operators of cooling pond reservoirs must operate each spillway gate either during regular operation or on a test basis to protect the structural integrity of the reservoir. Because of the short duration and low volume of wastewater released during spillway gate testing, releases either on an annual or semiannual basis are considered insignificant sources of TN and TP.

Existing industrial wastewater facilities are not subject to the limits in **Table 13** and **Table 14**. However, these facilities must hold the line and shall not increase the nutrient load to receiving or downstream waters. New industrial wastewater facilities shall meet the limits in **Table 13** and **Table 14**. For industrial wastewater facilities that discharge to surface waters of the state must meet the numeric nutrient criteria in Rules 62-302.531 and 62-302.532, F.A.C.

Additionally, new or renewed wastewater permits in the BMAP area must require at least quarterly sampling of the effluent at the point of discharge or edge of the zone of discharge for TN and TP and the reporting of sampling results in the discharge monitoring reports submitted to DEP.

Table 13. TN effluent limits

mg/L = Milligrams per liter; mgd = Million gallons per day; RRLA = Rapid rate land application

Permitted Average Daily Flow (mgd)	TN Concentration Limits for Direct Surface Discharge (mg/L)	TN Concentration Limits for RRLA Effluent Disposal System (mg/L)	TN Concentration Limits for All Other Disposal Methods, Including Reuse (mg/L)
Greater than or equal to 0.5	3.0	3.0	10.0
Less than 0.5 and greater than or equal to 0.1	3.0	6.0	10.0
Less than 0.1	3.0	10.0	10.0

Table 14. TP effluent limits

Permitted Average Daily Flow (mgd)	TP Concentration Limits for Direct Surface Discharge (mg/L)	TP Concentration Limits for RRLA Effluent Disposal System (mg/L)	TP Concentration Limits for All Other Disposal Methods, Including Reuse (mg/L)
Greater than or equal to 0.5	1.0	1.0	6.0
Less than 0.5 and greater than or equal to 0.1	1.0	3.0	6.0
Less than 0.1	1.0	6.0	6.0

Pursuant to Subsubparagraph 403.067(7)(a)9., F.S., local governments in BMAP areas where DEP determines remediation is necessary to achieve the TMDL must develop wastewater treatment plans to be adopted as part of the BMAP no later than July 1, 2025, when all effluent is required to meet the TN and TP concentrations for Direct Surface Discharge cited in **Table 13** and **Table 14**.

The wastewater treatment plans must be developed by each local government, in cooperation with DEP, the water management district, and the public and private domestic wastewater treatment facilities within the jurisdiction of the local government. A local government is not responsible for a private domestic wastewater facility's compliance with the BMAP unless the facility is operated through a public-private partnership to which the local government is a party.

The wastewater treatment plan requires entities to identify and address the following:

- Provide construction, expansion, or necessary facility upgrades to achieve the TMDL applicable to the domestic WWTF.
- Include the permitted capacity in annual gallons per day for the domestic WWTF.
- Include the average nutrient concentration and the estimated average nutrient load of the domestic wastewater.
- Provide a project timeline of the date when the construction of any facility improvements will begin and be completed and the date when operations of the improved facility will begin.
- Estimate the cost of improvements.
- Identify the responsible parties.

2.4 Seagrass and Water Quality Monitoring Plan

This monitoring plan is designed to track seagrass distribution and to identify long-term water quality trends. Sampling stations, parameters, frequency, and other elements of this strategy may be modified as appropriate to match changing environmental conditions, funding resources, and understanding of the IRL system.

2.4.1. Objectives

The primary and secondary monitoring objectives are described as follows:

Primary Monitoring Objective

- Track seagrass depth extent responses to BMAP implementation.

Secondary Monitoring Objectives

- Track trends in ambient water quality in the BRL and its watershed, including major tributaries.
- Determine if watershed nutrient loading is decreasing and resulting in improved lagoon water quality, which will allow seagrass to grow to target depths.

Additional information about the seagrass depth and compliance with the TMDL targets is discussed in **Section 4.2**, including the most recent results based on the 2019 aerial mapping data. To read more about the process for analyzing the seagrass data and depth analysis, see **Appendix D**.

2.4.2. Monitoring Parameters, Frequency, and Network

To achieve the primary monitoring objective, the main parameter that will be tracked is the seagrass depth by project zone, which is identified through flyover mapping and aerial photography interpretation. DEP and SJRWMD are partnering to fund and conduct flyovers and mapping. In the past, SJRWMD and partners typically have contracted for seagrass mapping every two to three years, and DEP will continue to work with the district to maintain this frequency for the BMAP monitoring plan as long as resources remain available.

The aerial photography is taken in spring to early summer, during the seagrass growing season. Field sampling conducted around the time of the flights provides data for assessing the accuracy of the maps, and additional field sampling is conducted to address uncertainty regarding areas mapped as seagrass. Using the aerial photography, a map is created showing seagrass extent in the lagoon. These maps are used in evaluations to assess progress towards the TMDL seagrass depth targets for the BRL. Additional details on the seagrass assessment methodology are contained in **Appendix D**.

To achieve the secondary monitoring objective above, the existing SJRWMD monthly stations in the BRL BMAP will be monitored. On average, seagrass transects are 1 kilometer (km) away from a long-term water quality station. The monitoring strategy for these stations focuses on the following parameters:

- Total Kjeldahl Nitrogen.
- Nitrite/Nitrate.
- Ammonia.
- Total Nitrogen (TN).
- Total Phosphorus (TP).
- Orthophosphate.
- Chlorophyll *a* (corrected).
- Photosynthetically Active Radiation (PAR).
- True Color.
- Turbidity.
- Total Suspended Solids (TSS).

- Dissolved Oxygen.
- Specific Conductivity.
- pH.
- Salinity.
- Secchi Depth.
- Depth of Collection.
- Total Depth of Sample Site.
- Water Temperature.
- Field Conditions.
- Total Organic Carbon.
- Dissolved Organic Carbon.
- Silica.
- Alkalinity.
- Volatile Suspended Solids.

Table 15 lists the stations that SJRWMD currently samples in the BRL BMAP area, and a map of these station locations is shown in **Figure 9**.

Table 15. Water quality monitoring stations in the BRL BMAP area

Entity	Station ID	Project	Status	Latitude	Longitude	Frequency
SJRWMD	IRLB02	BRL	Active	28.4408	-80.6344	Monthly
SJRWMD	IRLB04	BRL	Active	28.3670	-80.6330	Monthly
SJRWMD	IRLB05	BRL	Active	28.3319	-80.6533	Monthly
SJRWMD	IRLB06	BRL	Active	28.2836	-80.6331	Monthly
SJRWMD	IRLB09	BRL	Active	28.1991	-80.6253	Monthly
SJRWMD	IRLNFH01S	BRL	Active	28.3307	-80.6744	Monthly
SJRWMD	IRLSCPW	BRL	Active	28.3684	-80.6822	Monthly

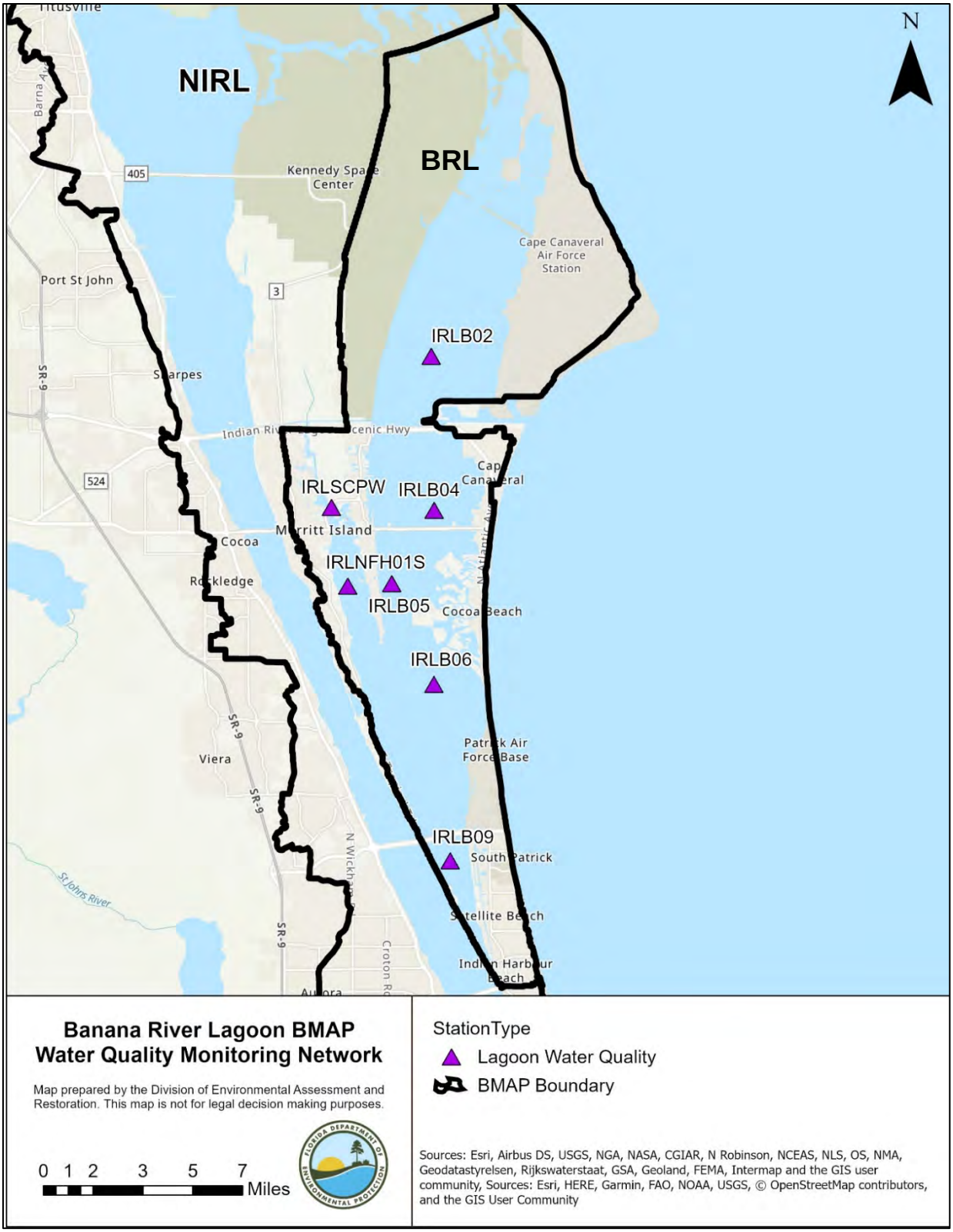

Figure 9. Monitoring network in the BRL

2.4.3. Data Management and Assessment

In 2017, the Florida Watershed Information Network (WIN) replaced the Florida Storage and Retrieval (STORET) Database. WIN now serves as the primary repository of ambient water quality data for the state of Florida. Water quality data from the WIN Database are used for Impaired Surface Waters Rule (IWR) assessments and TMDL development. Ambient water quality data collected as part of the BMAP will be uploaded into WIN for long-term storage and availability. All BMAP data providers have agreed to upload ambient water quality data to WIN at least quarterly, upon the completion of the appropriate quality assurance/quality control (QA/QC) checks.

Other data relevant to monitoring restoration efforts, such as the extent and abundance of seagrass coverages, groundwater quality, and storm events, may be collected. Stakeholders agree to provide these data to other BMAP partners upon request, and when appropriate, for inclusion in BMAP data analyses and adaptive management evaluations. Data used to assess the biological health of streams and lakes may be provided to DEP staff in the Watershed Assessment Section. For more information on submitting external biological data, visit the DEP website.

The water quality data will be analyzed periodically to determine trends in water quality in the lagoon. Specific statistical analyses were not identified during BMAP development; however, commonly accepted methods of data analysis will be used.

2.4.4. Quality Assurance/Quality Control

Stakeholders participating in the monitoring plan must collect water quality data in a manner consistent with the DEP standard operating procedures (SOPs) for QA/QC. The most current version of these procedures can be downloaded from the DEP website. For BMAP-related data analyses, entities should use National Environmental Laboratory Accreditation Council (NELAC) National Environmental Laboratory Accreditation Program (NELAP)–certified laboratories or other labs that meet the certification and other requirements outlined in the DEP SOPs. SJRWMD staff and contractors collect, process, and preserve samples according to SJRWMD's *Field Standard Operating Procedures for Surface Water Sampling*, Fiscal Year 2020.

2.5 Research Priorities

During the BMAP process, the stakeholders identified several research priorities they would like to pursue, if funding becomes available. The investments prompted by the 2011 superbloom generated research topics that include the following:

- Collecting data to update the bathymetry for the IRL Basin, which would be used in evaluations of seagrass depth limits.

- Continuing coordinated monitoring of phytoplankton, periphyton, drift algae, and macroalgae in the basin to gain insights into the cycling of nutrients as well as toxin production and release.

- Data analysis of storm event monitoring at the major outfalls.

- Refining load estimates delivered by baseflows and modeling the contributions of baseflows.

- Synthesizing data on nutrient flux/internal recycling of legacy nutrient loads held within IRL sediments and exchanged with the water column.

- Completing the development, calibration, and validation of a water quality model that can be used to design, site, and prioritize projects that reduce nutrient loads (e.g., Hydrologic Simulation Program FORTRAN [HSPF] or SWIL Model coupled with the Environmental Fluid Dynamics Code [EFDC] Model, or another model that generates predictions of conditions that may be favorable for seagrass growth).

The stakeholders will continue to work with DEP and IRL NEP to identify other research needs, prioritize these needs, and develop scopes of work to address research priorities as appropriate. This information may be organized in a more detailed research plan that could be used to guide future efforts, as funding becomes available. These research projects are not BMAP requirements but would provide valuable information for future assessments of the health of the BRL. There are reports and peer-reviewed articles that have been completed to address several of these research priorities. References are provided in **Chapter 5**.

Chapter 3. Projects

This chapter provides specific information on land use and projects in the BRL.

The projects and management strategies are ranked with a priority of high, medium, or low. Projects with a "completed" status were assigned a low priority. Projects classified as "underway" were assigned a medium priority because some resources have been allocated to these projects, but additional assistance may be needed for the projects to be completed. A high priority was assigned to projects listed as "planned," as well as certain "ongoing" projects (i.e., "street sweeping," "catch basin inserts/inlet filter clean out," "public education efforts," "fertilizer cessation," "fertilizer reduction," or "aquatic vegetation harvesting").

It should be noted that only projects completed in 2000 and beyond are eligible for BMAP credit. Since the treatment input data for the hydrology calibration was from an earlier period in the model simulation, most projects beyond permit requirements installed from 2000 onward were not included in the calibration and are not well represented in the SWIL Model loading estimates. Therefore, projects completed from 2000 onward are eligible for BMAP credit. Projects completed prior to 2000 are accounted for in the period of record used for calibration of the SWIL Model.

The BRL BMAP area covers more than 51,000 acres. As shown in **Table 16**, urban areas make up 33.7 % of the area, followed by upland prairie and shrublands with 23.9 %. Stakeholders in the BRL BMAP area are Brevard County, FDOT District 5 (FDOT5), City of Cape Canaveral, City of Cocoa Beach, City of Satellite Beach, City of Indian Harbour Beach, Patrick Air Force Base, Cape Canaveral Air Force Station, and Kennedy Space Center.

Table 16. Summary of land uses in the BRL Subbasin

Note: Land use code 5000 (water) acreage excludes lagoon water in this table.

Level 1 Land Use Code	Land Use Description	Acres	% Total
1000	Urban	17,207	33.7
2000	Agricultural	123	0.2
3000	Upland Prairie and Shrublands	12,215	23.9
4000	Upland Forested Areas	7,194	14.1
5000	Water	2,171	4.3
6000	Wetlands	10,182	19.9
7000	Disturbed Lands	28	0.1
8000	Transportation	1,963	3.8
Total		**51,085**	**100.0**

All projects identified as part of this BMAP are listed in **Table 17**. While this BMAP update does not specifically track reductions by project zone, the historical tracking by project zone remains. For projects that treat lands in multiple project zones, the nutrient

reductions provided in the table are only the estimated reductions for the project zone specified. To calculate the total benefits from these projects, credits from all project zones treated by the project should be summed. The table of existing and planned projects lists those projects submitted by stakeholders to help meet their obligations under the BMAP. Information in the tables was provided by the lead entity and is subject to change as the project develops and more information becomes available.

DEP asked stakeholders to provide information on management actions, including projects, programs, and activities, that may reduce nutrient loads to the CIRL. Management actions are included in the BMAP to address nutrient loads to the lagoon and have to meet several criteria to be considered eligible for credit. **Figure ES-2** and **Figure ES-3** show progress towards the required TN and TP load reductions allocated to the BMAP from projects completed through July 31, 2020.

Table 17. Existing and planned projects in the BRL

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	N/A	BC-01	Education Efforts	Florida Yards and Neighbors (FYN); landscape, irrigation, fertilizer, and pet waste ordinances; public service announcements (PSAs); pamphlets; website; Illicit Discharge Program.	Education Efforts	Ongoing	N/A	106.56	15.12	A	N/A	N/A	40000	Utility Fee	N/A	N/A
Brevard County	SJRWMD/ Environmentally Endangered Lands (EELS)	BC-02	Pine Island Phase I and II	Regional Stormwater Management System includes two wet ponds (80-acres & 23 acres) with gravity flow and pump station.	Regional Stormwater Treatment	Completed	2015	108.845	101.1678	A	15.3	3140824	19235	EPA/ DEP TMDL	1677079	G0288/ G0344
Brevard County	DEP	BC-03	Florida Blvd. Pond	Construction of a 2.3 acre wet detention pond to proivide treatment to a residential area in Merritt Island.	Wet Detention Pond	Completed	2013	190.705	49.44202	B	73.6	350384	Not provided	DEP	DEP - $350,384	WM744
Brevard County	DEP	BC-04	Hampton North (Riverside)	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	25.017	2.996052	B	15.3	27000	1500	DEP	DEP - $27,000	G0268
Brevard County	DEP	BC-05	Hampton South (Needle Blvd)	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	29.441	3.526215	B	18.1	29000	1500	DEP	DEP - $29,000	G0268
Brevard County	DEP	BC-06	Albatross	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	41.8075	5.048713	B	21.8	33000	1500	DEP	DEP - $33,000	G0268
Brevard County	DEP	BC-07	Surfside	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	41.3688	4.9702	B	22.8	31500	1500	DEP	DEP - $31,500	G0268
Brevard County	DEP	BC-08	West Scots	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	14.424	1.682994	B	9.7	41000	1500	DEP	DEP - $41,000	G0268

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	DEP	BC-09	Johns Circle	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	28.252	3.286223	B	19.5	31000	1500	DEP	DEP - $31,000	G0268
Brevard County	DEP	BC-10	Farrington Drive	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	13.9047	1.663195	B	7.8	37500	1500	DEP	DEP - $37,500	G0268
Brevard County	DEP	BC-11	Porpoise Street	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	13.4496	1.600294	B	7.8	42000	1500	DEP	DEP - $42,000	G0268
Brevard County	DEP	BC-12	Angler Street	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	17.8596	2.134099	B	10.2	30700	1500	DEP	DEP - $30,700	G0268
Brevard County	DEP	BC-13	Diana Shores	Installing a Vortech Unit to treat runoff form an old residential, multi family and commercial area.	Hydrodynamic Separators	Completed	2013	0	5.568004	B	38.6	102000	1500	DEP	DEP - $102,000	G0268
Brevard County	N/A	BC-14	Education Efforts	FYN; landscape, irrigation, fertilizer, and pet waste ordinances; public service announcements (PSAs); pamphlets; website; Illicit Discharge Program.	Education Efforts	Ongoing	N/A	3192.3	369.06	B	N/A	Not provided	Not provided	N/A	N/A	N/A
Brevard County	N/A	BC-15	Street Sweeping	Street sweeping on 786 miles eight times per year.	Street Sweeping	Ongoing	N/A	21	13.44	A	N/A	N/A	50000	N/A	N/A	N/A
Brevard County	DEP	BC-16	Fortenberry Pond	22.3 Acre Regional Stormwater Detention Pond designed to accommodate water quality treatment for pre-existing development as well as for future build-out of commercial properties through the purchase of stormwater credits.	Wet Detention Pond	Completed	2015	544.395	126.8934	B	164.5	1.1E+07	35000	DEP TMDL	DEP TMDL - $340,533	S0646

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	DEP	BC-17	Merritt Island Airport Pond	Redirection of run-off from a drainage basin with no treatment through a swale and to a pond that was expanded to provide water quality.	Wet Detention Pond	Completed	2013	513.931	125.4447	B	148.2	652056	Not provided	DEP	DEP - $652,056	S0439
Brevard County	Not provided	BC-18	Florida Boulevard	Installation of floating vegetation islands to remove nitrogen from an existing wet detention pond.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2013	39.2491	3.134559	B	73.6	40772	18295	Not provided	40772	Not provided
Brevard County	DEP	BC-19	Third Ave Baffle Box	Upgrading a 1st generation baffle box to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	97.4044	11.90803	B	53.1	31452	Not provided	DEP	DEP - $31,452	S0648
Brevard County	Not provided	BC-20	Bes Management Practice (BMP) Cleanout	Cleaning out the BMP such as baffle boxes, inlet baskets, and sediment basins.	BMP Cleanout	Ongoing	N/A	1	1	B	N/A	95069	55300	N/A	95069	N/A
Brevard County	DEP	BC-21	Fourth Place Baffle Box	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	93.7401	10.84379	B	57	34037	Not provided	DEP	DEP - $34,037	S0648
Brevard County	DEP	BC-22	Thrush 405 Baffle Box	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	7.06751	0.846084	B	4.3	12507	Not provided	DEP	DEP - $12,507	S0648
Brevard County	Not provided	BC-23	Fortenberry Pond MAPS	Installation of floating vegetation islands to remove nitrogen from an existing wet detention pond.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brevard County	DEP	BC-24	Merritt Ridge Pond 3A	Installation of floating vegetation islands to remove nitrogen from an existing wet detention pond.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	Prior to 2013	99.6728	14.74873	B	84.4	114914	25091	DEP	DEP - $114,914	G0430
Brevard County	Satellite Beach	BC-25	Cassia Phase 3	Landscape buffer/ drainage swale along the adjoining roadway. Improvements include the construction of a dry detention area within an existing ditch and construction of roadside swales in	On-line Retention BMPs	Completed	2013	943.355	131.243	B	18.4	100000	Not provided	DEP/ Satellite Beach/ Brevard County	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
				the location of the existing bike/ pedestrian lane.												
Brevard County	SJRWMD	BC-26	South Patrick Drive Baffle Box	2nd generation baffle box with denitrification bioreactor.	Baffle Boxes-Second Generation	Completed	2017	TBD	TBD	B	73.9	320256	2100	SJRWMD/ DEP	SJRWMD - $57,750/ DEP - $136,000	LP05111
Brevard County	Not provided	BC-27	Kelly Park Reuse	Not provided.	Stormwater Reuse	Completed	2013	TBD	TBD	B	32.9	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	Not provided	BC-28	Patrick Air Force Base Golf Course Pond Stormwater Reuse	Conversion of a retention pond into a reusue pond to irrigate the golf course.	Stormwater Reuse	Completed	2016	TBD	TBD	B	88.331	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	N/A	BC-30	Street Sweeping	Monthly street sweeping.	Street Sweeping	Ongoing	N/A	504	322.56	B	N/A	N/A	47064	N/A	N/A	N/A
Brevard County	Not provided	BC-31	BMP Cleanout	Quarterly baffle box/ sediment trap cleaning.	BMP Cleanout	Ongoing	N/A	0	0	A	N/A	N/A	52000	N/A	N/A	N/A
Brevard County	DEP	BC-32	Cocoa Beach Canal Dredging	Muck removal of 84,000 cubic yards of material.	Muck Removal/Restoration Dredging	Completed	2017	TBD	TBD	B	Not provided	2E+07	Not provided	DEP	DEP - $10,000,000	S0714
Brevard County	All Cities	BC-35	Education Efforts	Fertilizer video, rainbarrel workshops, Facebook page, bus wrap, and billboard.	Enhanced Public Education	Ongoing	N/A	N/A	N/A	B	N/A	N/A	42000	N/A	N/A	N/A
Brevard County	N/A	BC-36	Merritt Island Airport	Two wet detention ponds (80-acres & 23 acres) with gravity flow and pump station.	Wet Detention Pond	Completed	2011	N/A	N/A	B	184.2	672464	N/A	DEP TMDL	DEP TMDL - $307,333.86	S0439
Brevard County	DEP	BC-37	Artemis Blvd. - BB #979	Biosorption Activated Media installed within existing Merritt Island drainage ditch system to remove nitrogen from groundwater baseflow with phosphorus removal media.	Biosorption Activated Media (BAM)	Completed	2019	TBD	TBD	B	789	150000	2500	Legislative Funding	Legislative Funding - $35,000	LP0511A
Brevard County	DEP	BC-38	Oceana Drive - BB#997A	Biosorption Activated Media installed within existing Merritt Island drainage ditch system to remove nitrogen from groundwater baseflow.	Biosorption Activated Media (BAM)	Completed	2019	TBD	TBD	B	68	50000	1000	Legislative Funding	Legislative Funding - $35,000	LP0511A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	DEP	BC-39	Georgiana Drive - BB#997C	Biosorption Activated Media installed within existing Merritt Island drainage ditch system to remove nitrogen from groundwater baseflow.	Biosorption Activated Media (BAM)	Completed	2019	TBD	TBD	B	68	50000	1000	Legislative Funding	Legislative Funding - $35,000	LP0511A
Brevard County	DEP	BC-40	Savannah Drive - BB#997B	Biosorption Activated Media installed within existing Merritt Island drainage ditch system to remove nitrogen from groundwater baseflow.	Biosorption Activated Media (BAM)	Completed	2019	TBD	TBD	B	68	50000	1000	Legislative Funding	Legislative Funding - $35,000	LP0511A
Brevard County	DEP	BC-41	Needle Blvd. - BB #998	Biosorption Activated Media installed within existing Merritt Island drainage ditch system to remove nitrogen from groundwater baseflow.	Biosorption Activated Media (BAM)	Completed	2019	TBD	TBD	B	273	55000	1000	Legislative Funding	Legislative Funding - $35,000	LP0511A
Brevard County	N/A	BC-42	Piney Woods BB #1066	Biosorption Activated Media installed within existing Merritt Island drainage ditch system to remove nitrogen from baseflow.	Biosorption Activated Media (BAM)	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Brevard County	DEP/ SOIRL	BC-43	Seagull Drive Pond Pond BAM Train BB#1304 (D-4)	Media will be installed along side slope of existing pond and will include solar panels.	BMP Treatment Train	Underway	2020	TBD	TBD	Not provided	Not provided	96000	Not provided	LF/ SOIRL	125000	LP0511A
Brevard County	MIRA/ SJRWMD/ SOIRL/ DEP	BC-44	MIRA Phase 2 Septic to Sewer (S. Tropical Tr.)	Connect 80 commercial properties to sewer.	OSTDS Phase Out	Completed	2020	TBD	N/A	B	N/A	Not provided	Not provided	SJRWMD/ SOIRL/ DEP	Not provided	28731
Brevard County	SOIRL/ Brevard Zoo	BC-45	Bettinger Oyster Bar	Construct 120-linear foot oyster bar.	Creating/ Enhancing Oyster Reefs	Completed	2019	N/A	N/A	B	Not provided	101680	Not provided	Not provided	10680	N/A
Brevard County	SOIRL/ Brevard Zoo	BC-46	Gitlin Oyster Bar	Construct 180 linear foot oyster reef.	Creating/ Enhancing Oyster Reefs	Completed	2019	N/A	N/A	B	Not provided	16020	Not provided	SOIRL	16020	N/A
Brevard County	SOIRL/ Brevard Zoo	BC-47	Marina Isles Oyster Restoration	Construct 1500 linear foot oyster reef.	Creating/ Enhancing Oyster Reefs	Completed	2019	N/A	N/A	B	Not provided	26700	Not provided	SOIRL	26700	N/A
Brevard County	SOIRL/ MRC	BC-48	Cocoa Beach Living Shoreline	Plant 200 mangroves and 1000 spartina along shoreline of Cocoa Beach Country Club.	Creating/ Enhancing Living Shoreline	Completed	2018	TBD	TBD	B	Not provided	16080	Not provided	SOIRL	16080	N/A
Brevard County	SOIRL/ Cocoa Beach	BC-49	Cocoa Beach Muck Dredging Phase III	Remove 300,000 cubic yards of muck.	Muck Removal/ Restoration Dredging	Completed	2019	TBD	TBD	B	Not provided	2236566	Not provided	SOIRL/ DEP/ SJRWMD	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	SOIRL	BC-50	Education Efforts	Fertilizer, grass clippings, and septic system maintenance.	Enhanced Public Education	Ongoing	N/A	N/A	N/A	A	N/A	375000	Not provided	SOIRL	375000	N/A
Brevard County	SOIRL	BC-50a	Education Efforts	Fertilizer, grass clippings, and septic system maintenance.	Enhanced Public Education	Ongoing	N/A	N/A	N/A	B	N/A	375000	Not provided	SOIRL	375000	N/A
Brevard County	DEP	BC-51	Andrix Blvd. - BB#973	Biosorption Activated Media installed within existing Merritt Island drainage ditch system to remove nitrogen from groundwater baseflow.	Biosorption Activated Media (BAM)	Completed	2019	TBD	TBD	B	Not provided	55000	1500	Legislative Funding	35000	LP0511A
Brevard County	MIRA/ SJRWMD/ SOIRL/ DEP	BC-52	MIRA Phase 2 Bioswale Treatment Train (Merritt Ridge Pond)	Modification of existing wet pond to include bioswale with BAM.	BMP Treatment Train	Completed	2019	TBD	TBD	B	210	Not provided	Not provided	Not provided	Not provided	28731
Brevard County	MIRA/ SJRWMD/ SOIRL/ DEP	BC-53	MIRA Phase 3 Septic to Sewer (Cone Rd)	Connect 30+ commercial properties to sewer.	OSTDS Phase Out	Underway	2020	TBD	TBD	B	N/A	Not provided	Not provided	Not provided	Not provided	28731
Brevard County	SOIRL	BC-54	Grass Clippings Campaign Phase 1	Marketing and surveying.	Education Efforts	Ongoing	2019	N/A	N/A	A	N/A	6666.66	N/A	SOIRL	20000	N/A
Brevard County	SOIRL	BC-54a	Grass Clippings Campaign Phase 1	Marketing and surveying.	Education Efforts	Ongoing	2020	N/A	N/A	B	N/A	6667.66	N/A	SOIRL	20001	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-01	Nonuse of Fertilizer/ Fertilizer Ordinance	No fertilizer is used at station.	Education Efforts	Ongoing	N/A	234.09	31.86	A	N/A	N/A	N/A	U.S. Air Force (USAF)	N/A	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-02	Street Sweeping	Removed 24.03 tons of sediment and disposed of it at a landfill.	Street Sweeping	Ongoing	N/A	27	17	A	N/A	Not provided	715	USAF	Not provided	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-03	Dry Detention Ponds after 2000	Identified 36 ERPs that were not included in the PLSM model that provide treatment.	Dry Detention Pond	Completed	Prior to 2013	119.836	16.11168	A	477	N/A	12000	USAF	N/A	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-04	Online Wet Retention Ponds after 2000	Providing 3.187 inches of additional treatment within 5 ERP drainage basins that were not included in the PLSM model.	On-line Retention BMPs	Completed	Prior to 2013	862.819	116.0041	A	157	N/A	2000	USAF	N/A	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-05	TMDL Monitoring and Data Collection	Collected stormwater and baseflow nutrient concentrations and rainfall data at 3 monitoring stations; collected baseflow and	Monitoring/Data Collection	Completed	2018	N/A	N/A	A	N/A	1850000	370000	USAF	USAF - $1,850,000	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
				stormwater runoff flow volume data and groundwater elevation data at 6 monitoring stations.												
Cape Canaveral Air Force Station	N/A	CCAFS-06	WWTF Upgrade Feasibility Study	Pilot study to improve removal rates of nitrates, total nitrogen, and ammonia in plant effluent. Pilot study was successful and will result in permanent changes that will be requested in RWWTF Permits.	Study	Completed	2017	N/A	N/A	A	N/A	46000	N/A	USAF	USAF - $46,000	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-07	Invasive Vegetation Management	Enhancement to wetlands at CCAFS occurs through invasive vegetation management including annual exotic vegetation removal.	Exotic Vegetation Removal	Underway	TBD	N/A	N/A	A	N/A	Not provided	Not provided	USAF	Not provided	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-08	Sanitary Sewer Infiltration and Inflow Study	Conduct infiltration and inflow study of station's sanitary sewer system.	Study	Underway	2019	N/A	N/A	A	N/A	TBD	N/A	USAF	TBD	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-09	Public Education	Three outreach events were held that removed 30 tons of debris through beach cleanups	Enhanced Public Education	Completed	2017	N/A	N/A	A	N/A	Not provided	N/A	USAF	Not provided	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-10	Wetlands as Filters	Station has many canals and functional culvert openings that allow connection with the Banana River Lagoon at an estimated 11 surface acres: 65 surface acres of the Army wharf that connect with the Atlantic Ocean, and 106 surface acres of the Trident wharf that connect with the Atlantic Ocean, totaling 182 surface acres of jurisdictional wetlands.	Natural Wetlands as Filters	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Cape Canaveral Air Force Station	N/A	CCAFS-11	WWTF Upgrade	Improved removal rates of nitrates, total nitrogen, and ammonia in plant effluent.	WWTF Upgrade	Completed	2018	10319.6	N/A	A	N/A	N/A	N/A	USAF	N/A	N/A
Cape Canaveral Air Force Station	N/A	CCAFS-12	Shoreline Stabilization	2 Projects: 4 miles on both sides of Titan Road and ITL Causeway and 1,000 ft near the South Gate Entrance.	Shoreline Stabilization	Planned	2019	TBD	TBD	A	N/A	4000000	N/A	USAF	N/A	N/A
City of Cape Canaveral	Cape Canaveral/ Save Our Indian River Lagoon (SOIRL)	BC-33	Central Blvd Baffle Box	2nd generation baffle box, SOIRL-13.	Baffle Boxes- Second Generation	Completed	2017	TBD	TBD	B	213.4	41700	41700	SOIRL/ DEP	34700	NF025
City of Cape Canaveral	SJRWMD	CC-01	Holman Road Baffle Box	First generation baffle box installation near Holman Road outfall.	Baffle Boxes- First Generation	Completed	2006	1.64969	1.276949	B	32.821	75000	1200	SJRWMD/ City	SJRWMD - $45,000/ City - $30,000	N/A
City of Cape Canaveral	SJRWMD	CC-02	Center Street Baffle Box	First generation baffle box installation near Center Street outfall.	Baffle Boxes- First Generation	Completed	2006	4.54857	3.291458	B	96.232	75000	1200	SJRWMD/ City	SJRWMD - $45,000/ City - $30,000	N/A
City of Cape Canaveral	SJRWMD	CC-03	International Drive Baffle Box	First generation baffle box installation near International Drive outfall.	Baffle Boxes- First Generation	Completed	2006	8.61019	6.444325	B	181	75000	1200	SJRWMD/ City	SJRWMD - $45,000/ City - $30,000	N/A
City of Cape Canaveral	SJRWMD	CC-04	Angel Isles Baffle Box	First generation baffle box installation near Angel Isles outfall.	Baffle Boxes- First Generation	Completed	2006	1.50744	1.020814	B	40.024	75000	1200	SJRWMD/ City	SJRWMD - $45,000/ City - $30,000	N/A
City of Cape Canaveral	N/A	CC-05	WWTP Baffle Box	First generation baffle box installation at WWTP.	Baffle Boxes- First Generation	Completed	2004	0.38266	0.247001	B	11.626	15000	1200	City	City - $15,000	N/A
City of Cape Canaveral	SJRWMD	CC-06	West Central Boulevard Baffle Box	First generation baffle box installation at West Central Boulevard outfall to Central Ditch.	Baffle Boxes- First Generation	Completed	2005	12.4026	9.145794	B	273.03	75000	1200	SJRWMD/ City	SJRWMD - $45,000/ City - $30,000	N/A
City of Cape Canaveral	DEP	CC-07	Central Ditch Baffle Box (3 count)	Second generation baffle box installations (3) in northern portion of Central Ditch.	Baffle Boxes- Second Generation	Completed	2009	175.711	22.36014	B	119.13	443003	3600	City/ DEP	DEP - $263,402/ City - $179,601	G0136
City of Cape Canaveral	N/A	CC-08	Street Sweeping	Sweeping of streets/pedways.	Street Sweeping	Ongoing	N/A	353.062	226.0882	B	N/A	12322	N/A	City	City - $12,322	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Cape Canaveral	N/A	CC-09	Shorewood Drainage Subbasin	Basin with no stormwater discharge.	100% On-site Retention	Completed	Prior to 2013	314.599	45.15485	B	42.691	Not provided	0	Private Developer	Not provided	N/A
City of Cape Canaveral	N/A	CC-10	Education Efforts	FYN (Blue Life); landscape, irrigation, fertilizer, and pet waste ordinances; public service announcements (PSAs); pamphlets; website; Illicit Discharge Program.	Education Efforts	Ongoing	N/A	534.9	85.14	B	N/A	3100	500	City	City - $3,100	N/A
City of Cape Canaveral	N/A	CC-11	Manatee Park Stormwater Improvements	Wet detention pond and swales.	Wet Detention Pond	Completed	2013	3.36292	0.730254	B	11.882	193000	5000	City	City - $193,000	N/A
City of Cape Canaveral	N/A	CC-12	Banana River Park Stormwater Improvements	Stormwater swales.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	10.2376	1.465005	B	5.5893	38000	2500	City	City - $38,000	N/A
City of Cape Canaveral	N/A	CC-13	Exfiltration on North Atlantic Ave	Stormwater swales.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2016	39.4808	5.986995	B	36.541	436000	5000	City	City - $436,000	N/A
City of Cape Canaveral	DEP	CC-14	Exfiltration at Canaveral City Park	Stormwater/ wastewater vault system.	Exfiltration Trench	Completed	2017	108.898	18.32461	B	31.094	1820500	3500	City/ DEP	DEP - $1,162,662/ City - $657,838	WW050500 / LP05052
City of Cape Canaveral	TBD	CC-15	Stormwater Pond on West Central Blvd	Wet detention pond and swales.	Wet Detention Pond	Planned	2022	232.341	66.18408	B	61.321	3130200	10000	TBD	TBD	TBD
City of Cape Canaveral	N/A	CC-16	Clean Out of Baffle Boxes	Maintenance of baffle boxes.	BMP Cleanout	Ongoing	N/A	88.1879	53.89603	B	N/A	4500	1500	City	City - $4,500	N/A
City of Cape Canaveral	N/A	CC-17	Central Ditch Dredging Project	Dredging of southern portion of Central Ditch.	Muck Removal/Restoration Dredging	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Cape Canaveral	N/A	CC-18	Exfiltration Piping Installations	Exfiltration piping installations – 8 locations.	Exfiltration Trench	Completed	2014	N/A	N/A	B	4500	0	N/A	City	City - $4,500	N/A
City of Cape Canaveral	SJRWMD	CC-19	Reclaimed Water Tank	Reclaimed water system improvements (2.5 million gallon reclaimed water tank).	WWTF Upgrade	Completed	2016	2151	158	B	N/A	3030000	10000	SJRWMD/ City	SJRWMD - $75,000/ City - $2,955,000	WW050500
City of Cape Canaveral	DEP/ Brevard County/ SOIRL	CC-20	Central Boulevard Baffle Box Upgrade	Baffle box upgrade to 2nd generation - Central Ditch Baffle Box	Baffle Boxes- Second Generation	Completed	2017	327.794	42.8846	B	186.86	43700	1200	DEP/ City/ County	DEP - $41,700/ City - $2,000	NF025

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City of Cape Canaveral	Brevard County/ SOIRL	CC-21	Holman Road Swale	Swales and biosorption activated media (BAM).	BMP Treatment Train	Canceled	2021	N/A	N/A	N/A	N/A	28000	500	City/ County	N/A	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-22	Cocoa Palms LID	Exfiltration and BAM wall.	BMP Treatment Train	Canceled	2021	N/A	N/A	N/A	N/A	85000	1000	City/ County	N/A	N/A
City of Cape Canaveral	N/A	CC-23	Cherrie Down Park	Swale with biosorption activated media (BAM).	BMP Treatment Train	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-24	Carver Cove Swale	Swale with biosorption activated media (BAM).	BMP Treatment Train	Canceled	2021	N/A	N/A	N/A	N/A	20340	1000	City/ County	N/A	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-25	Cape Shores Swales (3 count)	Swale with biosorption activated media (BAM).	BMP Treatment Train	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Cape Canaveral	FDOT	CC-26	International Drive	Wet detention pond as part of SR A1A Streetscape Project.	Wet Detention Pond	Planned	2022	TBD	TBD	B	93.922	708450	2500	FDOT	FDOT - $708,450	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-27	Justamere Road Swale	Dry detention swale without blocks or raised culverts and media filter.	BMP Treatment Train	Canceled	2021	N/A	N/A	N/A	N/A	7800	1000	City/ County	N/A	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-28	Hitching Post Berm	Berm and associated grass swale without blocks or raised culverts and media filter.	BMP Treatment Train	Canceled	2021	N/A	N/A	N/A	N/A	40300	1000	City/ County	N/A	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-29	Center Street Pond	Wet detention pond.	Wet Detention Pond	Planned	2021	TBD	TBD	B	84.715	277850	2500	City/ County	TBD	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-30	Holman Road Pond	Wet detention pond.	Wet Detention Pond	Canceled	2022	N/A	N/A	N/A	N/A	235630	2500	City/ County	N/A	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-31	Costa Del Sol Pond	Dry detention swale without blocks or raised culverts and media filter.	Dry Detention Pond	Canceled	2021	N/A	N/A	N/A	N/A	58120	2500	City/ County	N/A	N/A
City of Cape Canaveral	Brevard County/ SOIRL	CC-32	Costa del Sol Denitrificaiton Wall	Exfiltration and BAM wall.	BMP Treatment Train	Canceled	2021	N/A	N/A	N/A	N/A	18800	1000	City/ County	N/A	N/A
City of Cape Canaveral	N/A	CC-33	WWTF SHORELINE RESTORATION	Armor shoreline at WWTF.	Shoreline Stabilization	Completed	2018	N/A	N/A	B	N/A	193850	1000	City	City - $193,850	N/A
City of Cape Canaveral	N/A	CC-34	BEEMATS INSTALLATION (4 COUNT)	Beemats installation.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Underway	TBD	0.0263	0.003657	B	1	15000	2500	City	City - $15,000	N/A

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City of Cape Canaveral	N/A	CC-35	OXIDATION DITCH REFURBISHMENT	Oxidation Ditch rehab.	BMP Cleanout	Ongoing	2018	TBD	TBD	B	N/A	N/A	N/A	N/A	N/A	N/A
City of Cape Canaveral	N/A	CC-36	LS #2 SEWER LINE REPLACEMENT	Replacement of sewer line for LS #2.	WWTF Upgrade	Completed	2018	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
City of Cape Canaveral	N/A	CC-37	FORCE MAIN #3 REPLACEMENT	Replacement and relocation of Force Main #3.	WWTF Upgrade	Completed	2018	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
City of Cape Canaveral	N/A	CC-38	CANAVERAL CITY PARK EXFILTRATION SYSTEM EXPANSION	Improvements for discharge of reuse water (same as CC-14).	WWTF Disposal Site	Underway	TBD	TBD	TBD	B	N/A	N/A	N/A	N/A	N/A	N/A
City of Cape Canaveral	SJRWMD	CC-39	ESTUARY PROPERTY RESTORATION	Habitat and water quality improvements.	Exotic Vegetation Removal	Underway	2021	TBD	TBD	B	10	TBD	TBD	SJRWMD/ City	TBD	N/A
City of Cape Canaveral	DEP	CC-40	PARKS SHORELINE RESTORATION	Armor shorelines at two City parks.	Creating/ Enhancing Living Shoreline	Completed	2016	N/A	N/A	B	1	232664	1000	City/ DEP	DEP - $65,600/ City - $167,064	NF012
City of Cape Canaveral	N/A	CC-41	Carbon (Micro C) Feed System Installation	WWTF Effluent Polishing System.	WWTF Upgrade	Underway	2021	TBD	TBD	B	N/A	TBD	TBD	City	TBD	N/A
City of Cocoa Beach	DEP	BC-29	Ocean Boulevard	Upgrading a 1st generation to a 2nd generatrion baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	TBD	TBD	B	6	12507	2000	DEP	DEP - $12,507	S0648
City of Cocoa Beach	Not provided	CB-01	Maritime Hammock Preserve Alum Pond	Wet detention pond with alum.	Stormwater - Alum Injection System	Completed	2013	749.355	214.2147	B	150.7	960000	20000	Not provided	960000	N/A
City of Cocoa Beach	DEP	CB-02	Ocean Beach Blvd. Bioretention/ Exfiltration	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	70.9821	11.16489	B	57.963	1150000	18000	DEP	DEP - $1,150,000	G0170
City of Cocoa Beach	Not provided	CB-03	2nd Street South PCD	Not provided.	Baffle Boxes-Second Generation	Completed	2013	122.62	17.04389	B	63.837	181974	1200	Not provided	181974	N/A
City of Cocoa Beach	Not provided	CB-04	Cottage Row Parking Facilities Lot	Not provided.	Exfiltration Trench	Completed	2013	29.5598	3.928484	B	2.7003	Not provided	500	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-05	Shepard Park Improvements	Not provided.	Dry Detention Pond	Completed	2013	1.59421	0.246968	B	1.4401	Not provided	3000	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-06	Burris Way (alley) Exfiltration	Not provided.	Exfiltration Trench	Completed	2013	9.31024	1.229373	B	0.8197	Not provided	1200	Not provided	Not provided	N/A

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City of Cocoa Beach	Not provided	CB-07	Brevard Ave. Exfiltration	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0.91475	0.126715	B	0.4804	Not provided	300	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-08	50 Danube River Exfiltration	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	B	2.7417	Not provided	300	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-09	12 Bougainvillea Dr. Exfiltration	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	B	1.7493	Not provided	300	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-10	9th St S & Brevard Ave. Exfiltration	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	B	1.8982	Not provided	300	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-11	321 Jack Dr. Exfiltration	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	B	2.0288	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-12	125 Cedar Ave. Exfiltration	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	B	1.4014	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-13	Meade Bioretention	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	B	0.0076	Not provided	300	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-14	Osceola E Bioretention	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0.14009	0.020874	Outside Model Boundary	0.7807	Not provided	Not provided	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-15	4th St. N Bioretention	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0.41603	0.067129	B	0.2143	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-16	4th St. S Bioretention	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0.04321	0.007697	B	0.9025	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-17	3rd St. South N Bioretention	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0.03407	0.005973	Outside Model Boundary	0.7903	Not provided	Not provided	Not provided	Not provided	N/A

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City of Cocoa Beach	Not provided	CB-18	3rd St. South S Bioretention	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	Outside Model Boundary	2.9543	Not provided	Not provided	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-19	Holiday Lane Bioretention	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	12.0524	1.623526	B	5.654	Not provided	1200	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-20	S Banana/St. Lucie Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	2.24444	0.419701	B	4.7217	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-21	S Banana/St. Lucie Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	3.00297	0.520808	B	2.1677	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-22	Banana River Retention	Not provided.	Dry Detention Pond	Completed	2013	1.23428	0.237261	B	1.1427	Not provided	1500	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-23	Banana River Retention	Not provided.	Dry Detention Pond	Completed	2013	1.46537	0.279671	B	1.3634	Not provided	1500	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-24	Minutemen/ Country Club Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	1.43962	0.242806	B	3.2061	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-25	Palm Ave. Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	4.19629	0.66179	B	1.178	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-26	Minutemen/ CBHS	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	9.49255	1.271613	B	1.3224	Not provided	500	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-27	Minutemen/ PW Complex Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0.47513	0.065254	B	1.9313	Not provided	3000	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-28	Tom Warriner/ PW Complex Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	1.43753	0.196971	B	0.9131	Not provided	3000	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-29	Shepard Drive Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	4.23481	0.703193	B	3.1595	Not provided	120	Not provided	Not provided	N/A

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City of Cocoa Beach	Not provided	CB-30	Shepard Drive Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	2.56006	0.367729	B	4.5651	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-31	W Gadsden/ Banana Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Cocoa Beach	Not provided	CB-32	W Pasco/ Banana Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	B	1.0789	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-33	W Pasco/ Banana Swale	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	0	0	B	2.2522	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-34	32 Inlet Baskets	Not provided.	BMP Cleanout	Ongoing	2013	32	10.3	B	N/A	Not provided	1200	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-35	Dino Museum/ Store, 250 W CB Causeway	Not provided.	Dry Detention Pond	Completed	2013	1.02913	0.151419	B	1.2371	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-36	332-334 N Orlando	Not provided.	Dry Detention Pond	Completed	2013	1.9076	0.318772	B	1.7456	Not provided	120	Not provided	Not provided	N/A
City of Cocoa Beach	Not provided	CB-37	Street Sweeping	Not provided.	Street Sweeping	Ongoing	N/A	84	54	B	N/A	38405	38405	Not provided	38405	N/A
City of Cocoa Beach	N/A	CB-38	Education Efforts	FYN; landscape, irrigation, fertilizer, and pet waste ordinances; public service announcements (PSAs); pamphlets; website; Illicit Discharge Program.	Education Efforts	Ongoing	N/A	984.72	150	B	N/A	5000	5000	Not provided	5000	N/A
City of Cocoa Beach	EPA/ DEP/ SJRWMD	CB-39	Minutemen Corridor Stormwater Improvement/ LID	Tree canopy, rain gardens/ rain tanks/ previous pavers/ BAM.	BMP Treatment Train	Completed	2016	166.674	23.02777	B	17.481	2975671	12000	TMDL/ EPA/ Legislative/ SJRWMD	779464	G0412
City of Cocoa Beach	Not provided	CB-40	Convair Cove SW LID	Tree canopy, rain gardens/ rain tanks/ previous pavers/ BAM.	BMP Treatment Train	Planned	2020	TBD	TBD	B	11	276000	3000	TBD	TBD	TBD
City of Cocoa Beach	Not provided	CB-41	1st Street N./ Brevard SW LID	Tree canopy, rain gardens/ rain tanks/ previous pavers/ BAM.	BMP Treatment Train	Planned	2020	TBD	TBD	B	12.6	250000	3000	TBD	TBD	TBD

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City of Indian Harbour Beach	Save Our Indian River Lagoon	BC-34	Gleason Park Reuse	Increasing reuse from an existing facility, SOIRL-16. Reported as IHB-19.	Stormwater Reuse	Completed	2017	TBD	TBD	B	128.9	11000	Not provided	SOIRL	4224	N/A
City of Indian Harbour Beach	Not provided	IHB-01	N. Osceola Drive	Exfiltration trench of 783 lf retrofitted with a 18" perforated pipe with gravel	Exfiltration Trench	Completed	2013	38.8044	5.688832	B	8.6162	60000	500	Not provided	60000	N/A
City of Indian Harbour Beach	Not provided	IHB-02	Datura Drive	Exfiltration trench of 300 lf retrofitted with a 12" perforated pipe with graveld.	Exfiltration Trench	Completed	2013	4.57108	0.662174	B	0.7266	50000	300	Not provided	50000	N/A
City of Indian Harbour Beach	Not provided	IHB-03	Coquina Palms Subdivision	100% storage of the subdivision for the 25-year storm	100% Onsite Retention	Completed	2013	75.5732	11.71247	B	6.3	N/A	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-04	Education Efforts	Landscape, irrigation, fertilizer, and pet waste ordinances; pamphlets, illicit discharge program.	Education Efforts	Ongoing	N/A	653.46	100.5	B	N/A	2900	2900	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-05	Inlet Cleaning	Ongoing inlet cleaning	BMP Cleanout	Ongoing	N/A	7.12	4.37	B	Not provided	N/A	N/A	Not provided	Not provided	N/A
City of Indian Harbour Beach	N/A	IHB-06	Street Sweeping	Ongoing street sweeping	Street Sweeping	Ongoing	N/A	149.71	95.99	B	N/A	9800	9800	Not provided	9800	N/A
City of Indian Harbour Beach	Not provided	IHB-07	Gleason Park Phase 1	Diversion of an existing pipe at Bay Dr. to the existing Gleason wet pond to increase the treatment drainage of the wet detention pond	Wet Detention Pond	Completed	2013	353.9	109.4843	B	128.88	135000	200	City of IHB Stormwater Utility	135000	N/A
City of Indian Harbour Beach	Not provided	IHB-08	Atlantic Ave. Swale	Swale cut in the median of Atlantic Ave	Grass Swales without Swale Blocks or Raised Culverts	Completed	2013	4.36199	0.641013	B	0.96	N/A	N/A	City of IHB Stormwater Utility	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-09	Gleason Park Irrigation	Initial effort to reuse about 58,200 gallons a week from the Gleason wet pond	Stormwater Reuse	Completed	Prior to 2013	19.1605	3.018771	B	128.88	N/A	N/A	City of IHB Stormwater Utility	Not provided	N/A

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City of Indian Harbour Beach	Not provided	IHB-10	Indian Harbour Beach Condo Pond	(Previously named Lift Station Pond)	Dry Detention Pond	Completed	2016	2.54352	0.477308	B	2.35	13277	N/A	City of IHB Stormwater Utility	13277	N/A
City of Indian Harbour Beach	Not provided	IHB-11	Fire Station Dry Pond	Dry detention pond with 2" of retention in the intersection of Pinetree Dr and Banana River Dr. Previously called "Fire Station Exfiltration"	Dry Detention Pond	Completed	2013	2.43938	0.34057	B	2.8	11481	N/A	City of IHB Stormwater Utility	11481	N/A
City of Indian Harbour Beach	Not provided	IHB-12	School Road at Park Drive	Exfiltration with 0.065" of retention in Park Dr	Exfiltration Trench	Completed	2013	0	0	B	15.8	59810.2	N/A	City of IHB Stormwater Utility	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-13	Yuma Drive Exfiltration	Exfiltration with 0.064" of retention in Yuma Dr.	Exfiltration Trench	Completed	2014	0	0	B	11.15	167838	N/A	City of IHB Stormwater Utility	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-14	Lime Bay Exfiltration	Exfiltration with 0.014" of retention in Lime Bay subdivision	Exfiltration Trench	Completed	2014	0	0	B	31.22	88739.6	N/A	City of IHB Stormwater Utility	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-15	Andros Lane Exfiltration	Exfiltration with 0.066" of retention in Andros Lane	Exfiltration Trench	Completed	2014	0	0	B	8.73	20120	N/A	City of IHB Stormwater Utility	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-16	Indian Harbour Beach Condo Pond	N/A	Dry Detention Pond	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	City of IHB Stormwater Utility	N/A	N/A
City of Indian Harbour Beach	Not provided	IHB-17	Fire Station Exfiltration	Exfiltration with 0.38" of retention, implemented prior to IHB-11	Exfiltration Trench	Completed	2016	16.417	2.292034	B	2.7948	33767.3	N/A	City of IHB Stormwater Utility	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-18	Inwood Lane Exfiltration	Exfiltration with 0.091" of retention in Inwood Lane	Exfiltration Trench	Completed	2016	31.5351	4.629902	B	7.7236	43925.6	N/A	City of IHB Stormwater Utility	Not provided	N/A
City of Indian Harbour Beach	SOIRL	IHB-19	Gleason Park Irrigation Expansion	Expansion of irrigation in Gleason Park.	Stormwater Reuse	Completed	2017	TBD	TBD	B	128.88	11000	N/A	City of IHB Stormwater Utility & SOIRL	SOIRL - $4,224	N/A
City of Indian Harbour Beach	N/A	IHB-20	Oars and Paddles Dry Pond	Dry detention with BAM.	Dry Detention Pond	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Indian Harbour Beach	Not provided	IHB-21	FDOT Pond #3 Beemats	Beemats (6,700 sq. feet).	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Planned	TBD	37.1178	5.245634	B	137.89	20000	TBD	City of IHB Stormwater Utility	TBD	N/A
City of Indian Harbour Beach	TBD	IHB-22	Kristi & Pinetree Dr. Swale	1000' long swale along Pinetree Dr.; swales with blocks or raised culverts.	Grass swales with swale blocks or raised culverts	Planned	TBD	38.9289	6.332488	B	3.623	20000	TBD	TBD	TBD	N/A
City of Indian Harbour Beach	TBD	IHB-23	Wimico Drive Swale	Retention swale, perhaps with BAM, along Wimico Dr.; swales with blocks or raised culverts.	Grass swales with swale blocks or raised culverts	Planned	TBD	22.9814	3.375194	B	2.5127	50000	TBD	TBD	TBD	N/A
City of Indian Harbour Beach	TBD	IHB-24	Crispino Wet Pond	Construction of 2.9 acre wet pond in Crispino Park (city-owned).	Wet Detention Pond	Planned	TBD	TBD	TBD	B	34.239	600000	TBD	TBD	TBD	N/A
City of Indian Harbour Beach	SOIRL	IHB-25	Big Muddy Canal Baffle Box at Cynthia	Baffle box installed at major outfall to Big Muddy Canal.	Baffle Boxes-Second Generation	Underway	2020	60.777	8.107376	B	63.8	409522	2500	SOIRL, City of IHB Stormwater Utility	SOIRL - $26,637	N/A
City of Indian Harbour Beach	Not provided	IHB-26	Cheyenne Dr./ Marion Baffle	Baffle Box installed at a major outfall to Big Muddy Canal.	Baffle Boxes-Second Generation	Planned	TBD	TBD	TBD	B	TBD	Not provided	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-27	Beach Funeral Home Pervious Parking	Provide retention using pervious parking.	Pervious Pavement Systems	Planned	TBD	TBD	TBD	B	TBD	Not provided	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-28	Townhouse Estates Exfiltration	Exfiltration or dry pond in residential neighborhood.	Exfiltration Trench	Planned	TBD	TBD	TBD	B	4.9433	30000	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-29	Palm Springs Swale	Swale in entire median (2,200 feet) of Palm Springs Blvd.; swales with blocks or raised culverts.	Grass swales with swale blocks or raised culverts	Planned	TBD	43.685	7.39103	B	4.8116	50000	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-30	Alhambra Exfiltration	Indian Head (master plan) exfiltration with 1,330 ft. exfiltration pipe.	Exfiltration Trench	Planned	TBD	71.9455	11.00184	B	15.577	500000	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-31	Ronnie Exfiltration Extension	Extension of Project IHB-29; additional 500 ft. exfiltration pipe.	Exfiltration Trench	Planned	TBD	18.1689	3.017129	B	2.1745	200000	Not provided	Not provided	Not provided	N/A

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City of Indian Harbour Beach	Not provided	IHB-32	Atlantic Exfiltration East	Jamestown Phase 1 (master plan)with 4,600 ft exfiltration.	Exfiltration Trench	Planned	TBD	239.461	35.6032	B	37.623	1400000	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-33	Atlantic Exfiltration West	Jamestown Phase 2 (master plan) exfiltration with weirs, etc.	Exfiltration Trench	Planned	TBD	145.1	21.33859	B	31.995	1200000	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-34	Pinetree Streetscaping	LID features including planters, rain garden, porous pavement, and BAM.	BMP Treatment Train	Planned	TBD	TBD	TBD	B	90.973	Not provided	Not provided	Not provided	Not provided	N/A
City of Indian Harbour Beach	Not provided	IHB-35	Muck Dregding	Muck dredging along major canals, including Grand Canal.	Muck Removal/Restoration Dredging	Underway	TBD	TBD	TBD	B	N/A	1E+07	Not provided	SOIRL and State Legislature	Not provided	N/A
City of Indian Harbour Beach	N/A	IHB-36	Save Our Lagoon Park	Wet detention pond, perhaps other LID features.	Wet Detention Pond	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Indian Harbour Beach	TBD	IHB-37	Gleason Park Irrigation Phase 3	Expansion of irrigation in Gleason Park to cover SE area of park.	Stormwater Reuse	Completed	2019	TBD	TBD	B	129	12000	Not provided	City of IHB Stormwater Utility	N/A	N/A
City of Satellite Beach	Not provided	SB-01	Jackson Exfiltration	Exfiltration pipe	Exfiltration Trench	Completed	2013	0	0	B	24.7	Not provided	Not provided	Not provided	Not provided	N/A
City of Satellite Beach	Not provided	SB-02	Jackson Exfiltration	Exfiltration pipe	Exfiltration Trench	Completed	2013	TBD	TBD	B	8.2	Not provided	Not provided	Not provided	Not provided	N/A
City of Satellite Beach	Not provided	SB-03	Jackson Exfiltration	Exfiltration pipe	Exfiltration Trench	Completed	2013	33.1942	4.548206	B	8.6	Not provided	Not provided	Not provided	Not provided	N/A
City of Satellite Beach	Not provided	SB-04	Avocado Continuous Deflective Separation (CDS) Unit	CDS Unit downstream of Jackson Exfiltration	Hydrodynamic Separators	Completed	2013	0	0.920689	B	8.6	Not provided	Not provided	Not provided	Not provided	N/A
City of Satellite Beach	Not provided	SB-05	Jackson Exfiltration	Exfiltation Trench	Exfiltration Trench	Completed	2013	51.0046	7.725755	B	11.7	Not provided	Not provided	Not provided	Not provided	N/A
City of Satellite Beach	DEP	SB-06	Coconut Exfiltration	Existing exfiltration pipe upstream of Desoto Exfiltration Pipe	Exfiltration Trench	Completed	2013	TBD	TBD	B	39.7	Not provided	Not provided	DEP	Not provided	G0082
City of Satellite Beach	DEP	SB-07	Desoto Exfiltration	Existing exfiltration pipe at east end of Desoto pipes (wrapped pipe)	Exfiltration Trench	Completed	2013	0	0	B	108.2	Not provided	Not provided	DEP	Not provided	G0082

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City of Satellite Beach	DEP	SB-08	Desoto Exfiltration	Existing exfiltration pipe in middle of Desoto Treatment Train	Exfiltration Trench	Completed	2013	TBD	TBD	B	7.8	Not provided	Not provided	DEP	Not provided	G0082
City of Satellite Beach	DEP	SB-09	Jamaica Blvd. Ponds	Wet pond	Wet Detention Pond	Completed	2013	527.047	165.3157	B	216.2	Not provided	Not provided	DEP	Not provided	WM840
City of Satellite Beach	DEP	SB-10	Jamaica Pond Reuse	Reuse	Stormwater Reuse	Completed	2013	163.072	23.81579	B	216.2	Not provided	Not provided	DEP	Not provided	WM840
City of Satellite Beach	DEP	SB-11	Desoto Exfiltration	Baffle boxes located near the stormwater park and residental finger canal.	Exfiltration Trench	Completed	2013	16.6686	2.449739	B	3.5	Not provided	Not provided	DEP	Not provided	G0082
City of Satellite Beach	DEP	SB-12	Desoto Baffle Boxes	Type 2 Baffle Box	Baffle Boxes-Second Generation	Completed	2013	104.751	12.53834	B	57.8	Not provided	Not provided	DEP	Not provided	G0081
City of Satellite Beach	DEP	SB-13	Cassia Phase 1-22	Type 2 Baffle Box	Baffle Boxes-Second Generation	Completed	2013	59.4464	7.333489	B	32.5	1796800	Not provided	DEP	DEP - $1,796,800	G0162
City of Satellite Beach	DEP	SB-14	Cassia Phase 1-23	Not provided.	Baffle Boxes-Second Generation	Completed	2013	25.6335	3.624787	B	12.9	Not provided	Not provided	DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-15	Cassia Phase 1-24	Part of SB-13.	Exfiltration Trench	Completed	2013	0	0	B	12.8	Not provided	Not provided	DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-16	Cassia Phase 1-25	Part of SB-13.	Exfiltration Trench	Completed	2013	0	0	B	19.7	Not provided	Not provided	DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-17	Cassia Phase 1-26	Part of SB-13.	Exfiltration Trench	Completed	2013	0	0	B	14.1	Not provided	Not provided	DEP	Not provided	G0162
City of Satellite Beach	Not provided	SB-18	North Basin Stormwater Retrofit	Not provided.	On-line Retention BMPs	Completed	2013	4.42343	0.630965	B	97.9	Not provided	Not provided	Not provided	Not provided	N/A
City of Satellite Beach	Not provided	SB-19	Street Sweeping	Quaterly Street Sweeing	Street Sweeping	Ongoing	N/A	47	30	B	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Satellite Beach	Not provided	SB-20	Education Efforts	FYN; landscape, irrigation, fertilizer, and pet waste ordinances; public service announcements (PSAs); pamphlets; website; Illicit Discharge Program.	Education Efforts	Ongoing	N/A	874.56	129.6	B	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Satellite Beach	DEP	SB-21	Cassia Phase 3 - C3A	Retention swales.	Online Retention BMPs	Completed	2013	1.56784	0.219225	B	0.24	Not provided	Not provided	City/ DEP	Not provided	G0162

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City of Satellite Beach	DEP	SB-22	Cassia Phase 3 - C3B	Retention swales.	On-line Retention BMPs	Completed	2013	1.14118	0.157231	B	0.15	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-23	Cassia Phase 3 - C3C	Retention swales.	On-line Retention BMPs	Completed	2013	1.1807	0.161664	B	0.16	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-24	Cassia Phase 3 - C3D	Retention swales.	On-line Retention BMPs	Completed	2013	1.36491	0.18737	B	0.2	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-25	Cassia Phase 3 - C3E	Retention swales.	On-line Retention BMPs	Completed	2013	1.30234	0.17754	B	0.2	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-26	Cassia Phase 3 - C3F	Retention swales.	On-line Retention BMPs	Completed	2013	3.92396	0.535548	B	2	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-27	Cassia Phase 3 - C3G	Retention swales.	On-line Retention BMPs	Completed	2013	3.49014	0.476124	B	1.3	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-28	Cassia Phase 3 - C5A	Retention swales.	On-line Retention BMPs	Completed	2013	1.4821	0.21006	B	0.2	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-29	Cassia Phase 3 - C5B	Retention swales.	On-line Retention BMPs	Completed	2013	9.80942	1.392091	B	5.9	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-30	Cassia Phase 3 - C7A	Retention swales.	On-line Retention BMPs	Completed	2013	2.44272	0.359045	B	0.4	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-31	Cassia Phase 3 - C7B	Retention swales.	On-line Retention BMPs	Completed	2013	22.6741	3.332336	B	4.1	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-32	Cassia Phase 3 - C9A	Retention swales.	On-line Retention BMPs	Completed	2013	4.33073	0.63778	B	0.5	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-33	Cassia Phase 3 - C9B	Retention swales.	On-line Retention BMPs	Completed	2013	17.4373	2.551927	B	2.1	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-34	Cassia Phase 3 - C13A	Retention swales.	On-line Retention BMPs	Completed	2013	3.22956	0.469688	B	1.2	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-35	Cassia Phase 3 - C13B	Retention swales.	On-line Retention BMPs	Completed	2013	0.75233	0.133588	B	0.1	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-36	Cassia Phase 3 - C13C	Retention swales.	On-line Retention BMPs	Completed	2013	5.73478	0.987938	B	3.1	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-37	Cassia Phase 3 - C13D	Retention swales.	On-line Retention BMPs	Completed	2013	4.2846	0.747484	B	0.5	Not provided	Not provided	City/ DEP	Not provided	G0162

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City of Satellite Beach	DEP	SB-38	Cassia Phase 3 - C13E	Retention swales.	On-line Retention BMPs	Completed	2013	5.71656	1.031547	B	0.9	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-39	Cassia Phase 3 - C13F	Retention swales.	On-line Retention BMPs	Completed	2013	6.69753	1.275128	B	1.6	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	DEP	SB-40	Cassia Phase 3 - C13G	Retention swales.	On-line Retention BMPs	Completed	2013	5.62337	1.003138	B	3.3	Not provided	Not provided	City/ DEP	Not provided	G0162
City of Satellite Beach	Not provided	SB-41	Roosevelt Avenue	Off-line retention swales.	Off-line Retention BMPs	Completed	2016	TBD	TBD	B	32	43482	Not provided	Not provided	43482	N/A
City of Satellite Beach	Not provided	SB-42	Roosevelt Avenue	Off-line retention pipes.	Exfiltration Trench	Completed	2016	TBD	TBD	B	3	34350	Not provided	Not provided	34350	N/A
City of Satellite Beach	DEP	SB-43	Desoto Park	Wet detention pond that also features stormwater reuse and biosorption activated media (BAM).	Wet Detention Pond	Completed	2018	201.162	172.1985	B	293	950000	Not provided	City/ DEP	703000	NF011
City of Satellite Beach	TBD	SB-44	Lori Laine Trunk Replacement	Replace Main Lori Laine Trunk	BMP Treatment Train	Planned	2023	TBD	TBD	B	N/A	2195137	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-45	Lori Laine Outfall Treatment	Treat Stormwater at Lori Laine Outfall	Baffle Boxes-Second Generation	Planned	2023	TBD	TBD	B	184	173707	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-46	Elwood/Temple Facility Upgrade	Change existing dry pond to wet detention pond and divert stormwater to pond	Wet Detention Pond	Planned	2023	TBD	TBD	B	35.06	43580	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-47	Jackson Ct. Treatment Facility	Construct Wet Detention Pond	Wet Detention Pond	Planned	2024	TBD	TBD	B	12.13	232156	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-48	Schechter Community Center Bioretention	Add Bioretention to Parking lot area	LID- Rain Gardens	Planned	2024	TBD	TBD	B	1.94	116840	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-49	Robert Way Diversion/Library Dry Retention	Divert Robert Way into dry detention pond	Dry Detention Pond	Planned	2024	TBD	TBD	B	14.1	150960	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-50	Robin Way Diversion/Library Dry Retention	Divert Robin Way into dry detention pond	Dry Detention Pond	Planned	2025	TBD	TBD	B	19.13	151026	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-51	Roosevelt BAM Filter	Add BAM Filter to Roosevelt outfall Baffle Box	Baffle Boxes-Second Generation with Media	Planned	2025	TBD	TBD	B	240	93696	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-52	South Ditch BAM Swales	Add BAM Swales along South Ditch Trunkline	Biosorption Activated Media (BAM)	Planned	2026	TBD	TBD	B	16.91	148580	Not provided	TBD	TBD	N/A

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City of Satellite Beach	TBD	SB-53	Sports Park Treatment	Install In-Ditch BAM	Biosorption Activated Media (BAM)	Planned	2026	TBD	TBD	B	157	102292	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-54	Glenwood Road Narrowing	Adding Roadside Swales to Glenwood	Grass Swales without Swale Blocks or Raised Culverts	Planned	2027	TBD	TBD	B	6	241868	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-55	North Drainage BAM Filter	Add BAM filter to North Drainage Baffle Box	Baffle Boxes-Second Generation with Media	Planned	2028	TBD	TBD	B	TBD	138661	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-56	Emerald Court Inlet Baskets	Insert Inlet Trap at the end of Emerald Court	Catch Basin Inserts/Inlet Filter Cleanout	Planned	2028	TBD	TBD	B	2	20815	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-57	City Hall Pond Beemats/Living Shoreline	Install BeeMats and living shoreline along City Hall Pond area	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Planned	2028	TBD	TBD	B	N/A	40480	Not provided	TBD	TBD	N/A
City of Satellite Beach	TBD	SB-58	Jamacia Pond Outfall BAM Filter	Adding BAM filters to Jamaica Pond outfalls	Biosorption Activated Media (BAM)	Planned	2028	TBD	TBD	B	TBD	69575	Not provided	TBD	TBD	N/A
FDOT District 5	N/A	FDOT-01	Street Sweeping	Street sweeping.	Street Sweeping	Ongoing	N/A	49	31	A	Not provided	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-02	Education Efforts	Pamphlets, illicit discharge program.	Education Efforts	Ongoing	N/A	0.35	0.04	A	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-03	Fertilizer Cessation	Elimination of fertilizer application in rights-of-way.	Fertilizer Cessation	Completed	2005	102	0	A	103	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-04	FM: 237139 D5_70120-3518-01	Pond 7.	Wet Detention Pond	Completed	2013	34.5512	4.623333	B	4.7	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-05	FM: 237454 D5_70100-3553-01	French drains. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	On-line Retention BMPs	Canceled	Prior to 2013	N/A	N/A	B	5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-06	FM: 237447 D5_70008-3505-02	Pond 2. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	Wet Detention Pond	Canceled	Prior to 2013	N/A	N/A	B	3.4	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-07	FM: 237447 D5_70008-3505-03	Pond 3. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	On-line Retention BMPs	Canceled	Prior to 2013	N/A	N/A	B	2.8	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-08	FM: 237447 D5_70008-3505-04	French drains. Project canceled. Start date prior to 2000. BMP is	On-line Retention BMPs	Canceled	Prior to 2013	N/A	N/A	B	3.8	Not provided	Not provided	Florida Legislature	Not provided	N/A

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				accounted for in new model.												
FDOT District 5	N/A	FDOT-09	FM: 237482 D5_70060-3533-01	French drains. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	On-line Retention BMPs	Canceled	Prior to 2013	N/A	N/A	B	0.4	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-10	FM: 237453 D5_70008-3507-01	Pond 1. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	Wet Detention Pond	Canceled	Prior to 2013	N/A	N/A	B	8.7	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-11	FM: 237453 D5_70008-3507-02	Pond 2. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	Wet Detention Pond	Canceled	Prior to 2013	N/A	N/A	B	10.7	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-12	FM: 237712 D5_70060-3519-01	French drains.	On-line Retention BMPs	Completed	2013	54.1892	8.651191	B	2.5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-13	FM: 422691-01 D5_422691-01	French drains.	On-line Retention BMPs	Completed	2013	11.661	1.615439	B	1.3	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-14	Street Sweeping	Street sweeping.	Street Sweeping	Ongoing	N/A	354	193	B	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-15	Education Efforts	Pamphlets, illicit discharge program.	Education Efforts	Ongoing	N/A	42.18	5.84	B	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-16	Fertilizer Cessation	Fertilizer cessation.	Fertilizer Cessation	Completed	2005	1544	56	B	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
Kennedy Space Center	Not provided	KSC-01	KSC Landscape Fertilizer Reduction	Not provided.	Fertilizer Reduction	Completed	2009	1872	265.4	A	200	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-02	KSC Citrus Grove Termination Jerome Rd. East	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	49.4	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-03	KSC Citrus Grove Termination TEL-IV	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	20.5	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-04	Vertical Processing Facility M7-1469	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	2.3	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-05	Spacecraft Assembly Encapsulation Facility 2 M7-1210	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	1.2	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-06	Central Heat Plant M6-595	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	0.2	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-07	Utility Shops K6-1246	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	0.3	N/A	N/A	N/A	N/A	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Kennedy Space Center	Not provided	KSC-08	Fire Station 2 K6-1198	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	0.4	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-09	Vehicle Loading Ramp M7-0651	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	0	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-10	Hypergol Module Storage East M7-1412	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	0.5	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-11	Hypergol Module Storage West M7-1410	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	0.6	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-12	Regional Stormwater Management System	Not provided.	Wet Detention Pond	Completed	2014	1459.14	319.7145	A	593.2	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-13	ARF Stormwater System	Not provided.	On-line Retention BMPs	Completed	2014	174.038	20.87092	A	55.4	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-14	VAB South Wetland Treatment System	Not provided.	Constructed Wetland Treatment	Completed	2014	372.045	87.80741	A	188.5	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-15	Schwartz Road Landfill	Not provided.	100% On-site Retention	Completed	2014	792.271	104.7731	A	122.5	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-16	Closed Basin 4 (Spoil Site - Static Test Road)	Not provided.	100% On-site Retention	Completed	2014	438.385	43.29213	A	68.2	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-17	Impounded Areas	Not provided.	100% On-site Retention	Completed	2014	8024.18	782.6909	A	1655.3	62406	Not provided	Not provided	62406	N/A
Kennedy Space Center	Not provided	KSC-18	Depressional Storage (22nd St. to 28th St.)	Not provided.	100% On-site Retention	Completed	2014	3441.43	268.696	A	1008.1	491976	Not provided	Not provided	491976	N/A
Kennedy Space Center	Not provided	KSC-19	Depressional Storage (Jerome Rd. to 22nd St.)	Not provided.	100% On-site Retention	Completed	2014	3056.45	279.0203	A	982	477506	Not provided	Not provided	477506	N/A
Kennedy Space Center	Not provided	KSC-20	Demolition of Facilities M7-1521 and M7-1522	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	0.5	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-21	Demolition of Facility M6-0339	Not provided.	Land Use Change	Completed	2014	TBD	TBD	A	0.5	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-22	Demolition of Facility M7-0862	Not provided.	Land Use Change	Completed	2015	TBD	TBD	A	0.02	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-23	Demolition of Facility M7-1012	Not provided.	Land Use Change	Completed	2015	TBD	TBD	A	0.007	N/A	N/A	N/A	N/A	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Kennedy Space Center	Not provided	KSC-24	Demolition of Facility M7-1061	Not provided.	Land Use Change	Completed	2015	TBD	TBD	A	1.3	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-25	Demolition of Facility M7-1112	Not provided.	Land Use Change	Completed	2015	TBD	TBD	A	0.11	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-26	Demolition of Facility M7-0961	Not provided.	Land Use Change	Completed	2015	TBD	TBD	A	1.04	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-27	Demolition of Facility K7-2468	Not provided.	Land Use Change	Completed	2015	TBD	TBD	A	0.1	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-28	Cut 13 Dredging	Maintenance dredging.	Muck Removal/Restoration Dredging	Underway	2017	TBD	TBD	A	37	1.4E+07	Not provided	Not provided	1.4E+07	N/A
Patrick Air Force Base	Not provided	PAFB-01	Youth Center Bldg. 3656	Added on-line retention.	On-line Retention BMPs	Completed	2013	3.58376	0.478524	B	1.7539	Not provided	Not provided	Not provided	Not provided	N/A
Patrick Air Force Base	Not provided	PAFB-02	Building 543 Replace Main Gate	Added on-line retention.	On-line Retention BMPs	Completed	2013	3.01659	0.398519	B	1.1881	Not provided	Not provided	Not provided	Not provided	N/A
Patrick Air Force Base	USACE	PAFB-03	Basin 6B No Discharge	No discharge.	100% On-site Retention	Completed	Prior to 2013	21.3398	2.847788	B	3.2305	Not provided	Not provided	USAF	Not provided	N/A
Patrick Air Force Base	USACE	PAFB-04	Basin 6C No Discharge	No discharge.	100% On-site Retention	Completed	Prior to 2013	74.7876	9.850627	B	11.314	Not provided	Not provided	USAF	Not provided	N/A
Patrick Air Force Base	Not provided	PAFB-05	Education Efforts	In addition to no fertilizer use on base, 212 personnel/ residents received initial stormwater awareness training in the monthly newcomers meetings; additional 347 personnel received stormwater awareness using the ESOHTN website or in-person training; 204 Illicit Discharge Detection and Elimination (IDDE) informational brochures were distributed to residents, businesses and base personnel in 2017. Two stormwater-related articles were published for	Education Efforts	Ongoing	N/A	505.86	69.54	B	N/A	Not provided	Not provided	USAF	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
				distribution through the base newpaper and website in 2017.												
Patrick Air Force Base	Not provided	PAFB-06	Golf Course Pond Stormwater Reuse	Golf course pond stormwater reuse for irrigation.	Stormwater Reuse	Completed	2013	2475.56	347.0917	B	434.98	850000	Not provided	USAF	850000	N/A
Patrick Air Force Base	Not provided	PAFB-07	Street Sweeping	Removed 8.5 tons of sediment and disposed of it at a landfill.	Street Sweeping	Ongoing	N/A	11	7	B	N/A	Not provided	119000	USAF	Not provided	N/A
Patrick Air Force Base	Not provided	PAFB-08	Demo AFTEC Bldg.	Demolition/ loss of impervious area.	Land use change	Completed	2016	TBD	TBD	B	TBD	N/A	N/A	N/A	N/A	N/A
Patrick Air Force Base	Not provided	PAFB-09	Fuel Farm Baffle Box	PAFB 2nd generation baffle box located north of the Fuel Farm - Subbasins 13A and 13B.	Baffle Boxes-Second Generation	Completed	2016	136.17	15.22563	B	86.814	Not provided	Not provided	USAF	Not provided	N/A
Patrick Air Force Base	Not provided	PAFB-10	South Patrick Drive Baffle Box	No longer a PAFB project.	Baffle Boxes-Second Generation	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Patrick Air Force Base	Not provided	PAFB-11	Canal/ Basin Clean Out	170 inlets/ pipes/ swales/ ponds were inspected and 89 maintenance operations of stormwater systems were performed in 2017.	BMP Cleanout	Ongoing	2017	71	29	B	N/A	134500	134500	USAF	134500	N/A
Patrick Air Force Base	USACE	PAFB-12	Ponds Without Discharge	Documenting no discharge from existing retention ponds. Subbasins 11A, 18A, and 18B.	Impoundment	Completed	2017	TBD	TBD	B	87.349	Not provided	Not provided	USAF	Not provided	N/A
Patrick Air Force Base	USACE	PAFB-13	Dry Detention Ponds after 2000	Documenting treatment from existing completed ERP projects that were not included in the PLSM model.	Dry Detention Pond	Completed	2016	106.068	14.51815	B	143.36	Not provided	Not provided	USAF	Not provided	N/A
Patrick Air Force Base	USACE	PAFB-14	Golf Course MAPS Install	Install 4 MAPS at the golf course within the retention ponds.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Underway	2018	TBD	TBD	B	3	Not provided	2000	USAF	Not provided	N/A
Patrick Air Force Base	USACE	PAFB-15	TMDL Monitoring and Data Collection	Collected stormwater and baseflow nutrient concentrations and rainfall data from 5 monitoring stations; collected baseflow and stormwater runoff flow	Monitoring/Data Collection	Completed	2018	N/A	N/A	B	N/A	1850000	370000	USAF	1850000	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
				volume data and groundwater elevation data from 9 monitoring stations.												
Patrick Air Force Base	FEMA/ Installation Restoration Program (IRP)/ U.S. Air Force Civil Engineering Center (AFCEC)	PAFB-16	Shoreline Stabilization Projects	6 Projects: West of Runway 11: 490 LF of riprap, 780 LF of marsh sill barrier (living shoreline), and planting native marsh grasses between the existing shoreline and breakwater. Eastern Portion of Landfill No. 5 along Survival Canal: 2,570 LF of riprap, 256 LF of living shoreline, and plantings of native species in the upland areas. North Housing: repair and supplement existing rock rip-rap with the installation of 20 marsh sills Fuel Farm to Runway 11: repair and supplement existing rock rip-rap with the installation of 17 marsh sills FamCamp: supplement existing open sand areas with the installation of 26 marsh sills Airfield: install 280 feet of new rock rip-rap, supplemental sand placement along the shoreline, fill 0.58 acre of shoreline, and installation of 56 marsh sills	Shoreline Stabilization	Underway	2019	TBD	TBD	B	249	1.2E+07	TBD	USAF/ Air Force Environmental Restoration Account (AFERA)	1.2E+07	N/A
Patrick Air Force Base	Not provided	PAFB-17	Public Education	Six outreach events were held: Annual Spring Beach Cleanup; PAFB Riverside Cleanup; Earth Day Memorial Tree	Enhanced Public Education	Completed	2017	N/A	N/A	B	N/A	Not provided	N/A	USAF	Not provided	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Project Zone	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
				Planting; Earth Day Outreach at the BX; Space Wing Family Day; and PAFB Fall Beach Cleanup.												
Patrick Air Force Base	Not provided	PAFB-18	Manatee Cove Marina entrance Dredging Project	Removed 2,500 cubic yards of sand from the Manatee Cove Marina entrance.	Muck Removal/ Restoration Dredging	Completed	2017	TBD	TBD	B	N/A	Not provided	Not provided	USAF	TBD	N/A
Patrick Air Force Base	N/A	PAFB-19	Wetlands as Filters	Jurisdictional wetlands consist of four canals that directly connect to the Banana River totaling 35.7 surface acres.	Natural Wetlands as Filters	Canceled	N/A	N/A	N/A	N/A	TBD	N/A	N/A	N/A	N/A	N/A

Chapter 4. Compliance and Adaptive Management

4.1 Future Growth

To ensure that this BMAP effort can achieve and ultimately maintain the goal of meeting TMDL requirements, the overall restoration strategy must include actions and planning for future growth and development. Any new development would likely fall into two general source categories: (1) urban and (2) agricultural. Nutrient impacts from new development will be addressed through a variety of mechanisms as well as other provisions of Florida law.

While the majority of the restoration projects and programs listed in this BMAP address current loading, the need to plan and implement sound management strategies to address additional population growth in the BMAP area must be considered. DEP has included in this BMAP specific elements to address all current and future WWTF effluent, septic systems, and stormwater sources. Broader laws—such as local land development regulations, comprehensive plans, ordinances, incentives, Environmental Resource Permit requirements, and consumptive use permit requirements—all provide additional mechanisms and avenues for protecting water resources and reducing the impact of new development and other land use changes as they occur. As more information becomes available, the modeling efforts used for determining loading to the lagoon will continue to be refined.

The recommendations presented in **Chapter 2** should be considered by local governments during master planning and land use decision-making efforts. It should also be noted that any additional loading, such as from land use changes from low to high density, or any increase in intensity of use (that may include additional nutrient loadings), will be evaluated during future BMAP review efforts. If an increase in loading has occurred, additional restoration actions will be required to remediate impacts. DEP recommends that all local governments revise their planning and land use ordinance(s) to adequately address all future growth, and consider limitations on growth in sensitive areas, such as lands with a direct hydrologic connection to impaired waterbodies, wetland areas, or coastal areas.

4.2 Compliance

4.2.1. TMDL Compliance

The intent of the TMDLs is to recover the deeper water seagrass habitats with the biological response of the seagrass being the most important factor in evaluating the success of achieving TMDL targets. To assess progress for the IRL Basin towards the median seagrass depth limit target, a two-step process was used in the A and B Project Zones. For the 2013 BMAP, DEP conducted this two-step evaluation using seagrass data from 2003, 2005, 2006, 2007, and 2009, which were the latest datasets available at the time of the analysis. For the BRL, Project Zone A was determined to be compliant with both Step 1 and Step 2 in 2013. Therefore, stakeholders in Project Zone A were not required to make additional reductions at the time and were not assigned detailed allocations in the first iteration of the BMAP. Project Zone B was not

compliant and stakeholders in this zone were assigned detailed allocations in the first iteration of the BMAP.

Since the 2013 BMAP, further evaluations of the seagrass depth limits in the BRL have been conducted to reassess whether the BRL project zones have continued to be compliant. **Table 18** and **Table 19** list the results of both steps of these evaluations since 2013, including the number of years that passed Step 2 of the evaluation. In 2020, the evaluation was conducted using the 2013, 2015, 2017, and 2019 seagrass mapping data, which were the latest datasets available at that time. **Figure 10** and **Figure 11** show the results of both steps of the 2020 evaluation for Project Zones A and B, respectively. Neither of the project zones was compliant. As indicated in the 2013 BMAP, DEP assigns detailed allocations in project zones where compliance is not maintained.

Table 18. Summary of seagrass compliance results, Step 1

Step 1	Banana A	Banana B
2007 – 2013	Pass	Fail
2009 – 2015	Pass	Fail
2011 – 2017	Fail	Fail
2013 – 2019	Fail	Fail

Table 19. Summary of seagrass compliance results, Step 2

Note: Parentheses indicate number of years passing of those assesed for the compliance period of record.

Step 2	Banana A	Banana B
2007 – 2013	Fail (2 of 4)	Fail (0 of 4)
2009 – 2015	Fail (1 of 4)	Fail (0 of 4)
2011 – 2017	Fail (0 of 4)	Fail (0 of 4)
2013 – 2019	Fail (0 of 4)	Fail (0 of 4)

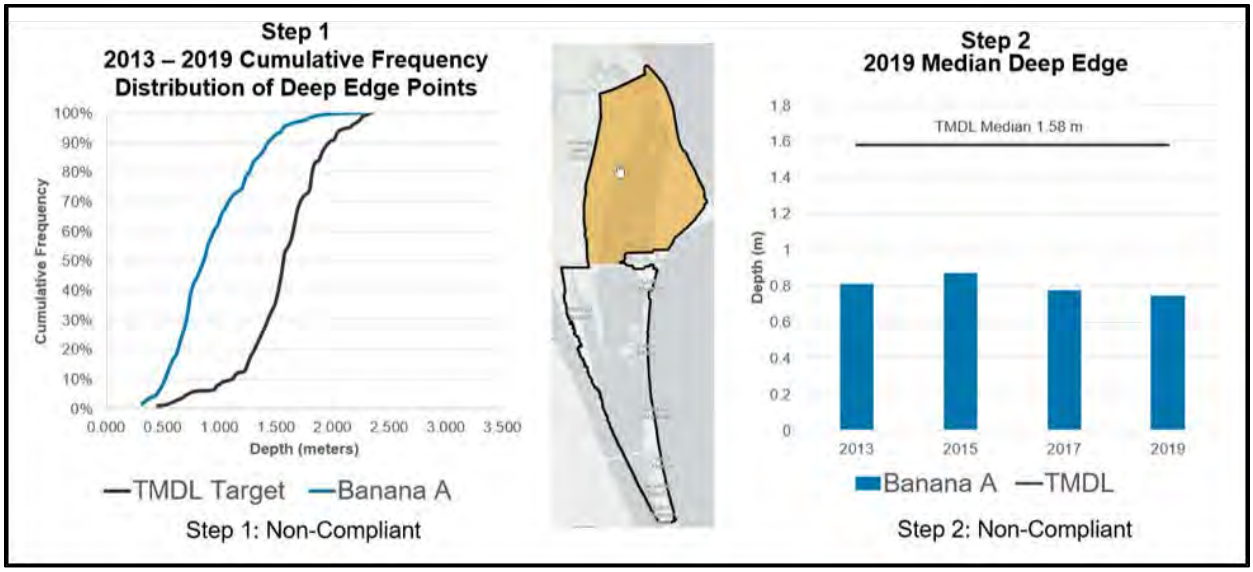

Figure 10. BRL Project Zone A seagrass evaluation results for Compliance Step 1 and Step 2

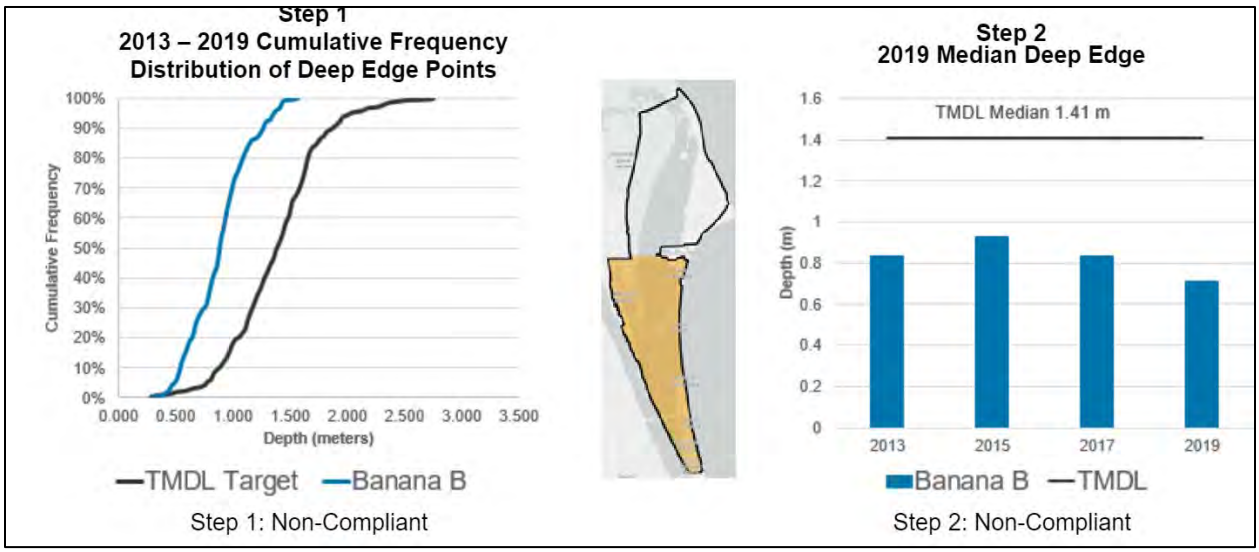

Figure 11. BRL Project Zone B seagrass evaluation results for Compliance Step 1

4.2.1. BMAP Compliance

In addition to IRL TMDL compliance and the measurement of seagrass deep edge recovery, there are other compliance elements related to the BMAP. DEP has set BMAP TN and TP reduction milestones for the years 2025 and 2030 to ensure that significant progress will be made in each five-year increment prior to the 2035 total reduction deadline. The percent reductions in the milestones apply to the total BMAP required reductions; so as various entities implement

their projects, the overall milestones are also being met. Individual entities must achieve compliance by meeting their own required reductions by the 2035 deadline, as well as show progress towards the BMAP milestones by planning and implementing projects.

Chapter 5. References

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Appendices

Appendix A. BMAP Projects Supporting Information

The project table (**Table 17**) in this BMAP lists the implementation status of the BMAP projects as of July 31, 2020. The table lists the TN and TP reductions in lbs/yr attributable to each individual project. These projects were submitted to DEP by responsible entities with the understanding that the projects and activities would be included in the BMAP, thus setting the expectation for each entity to implement the proposed projects and activities to achieve the assigned load reduction estimates in the specified time.

However, the list of projects is meant to be flexible enough to allow for changes that may occur over time. During the annual review of BMAP implementation efforts, project-specific information may be revised and updated, resulting in changes to the estimated reductions for those projects. The revisions may increase or decrease estimated reductions, and DEP will work with stakeholders to address revisions as they are identified.

The project status column is standardized into the following five categories:

- **Canceled:** Project or activity that was planned but will no longer take place. This category includes the cessation of ongoing activities.
- **Completed:** Project, activity, or task that is finished. This category includes fully implemented activities (i.e., ongoing activities) that must continue to maintain assigned credits indefinitely (such as street sweeping, BMP cleanout, catch basin cleanout, public education, fertilizer cessation/reduction, and vegetation harvesting).
- **Planned:** Project or activity that is conceptual or proposed.
- **Underway:** Project or activity that has commenced or initiated but is not completed and is not yet reducing nutrient loads from the treated area.
- **Ongoing:** The lead entity is performing actions each year. This status is used when a project is typically nonstructural and continuous. Ongoing projects are not a continuation of a reduction for a structural project.

Prior to reporting project information, DEP contacts each lead entity to gather new information on projects and confirm previously reported information. The terms used throughout the project tables are defined as follows:

- **Not provided:** Denotes that information was requested by DEP but was not provided by the lead entity.

- **TBD:** To be determined. Denotes that information is not currently available but will be provided by the stakeholder when it is available.

- **N/A:** Not applicable. Denotes that information for that category is not relevant to that project.

- **0: Zero.** Denotes the numeric value for that category as zero.

The project tables are based on current information, and project details may be updated as further information becomes available.

This BMAP requires stakeholders to implement their projects to achieve reductions as soon as practicable. However, the full implementation of the BMAP will be a long-term process. While some of the projects and activities listed in the BMAP were recently completed or are currently ongoing, several projects require more time to design, secure funding, and construct. Unlike the existing and planned projects, these future projects are not yet considered commitments of the entities but rather are intended for future BMAP credit, pending the availability of funding and other resources.

Although BMAP implementation is a long-term process, the goal of this BMAP is to achieve the TMDLs by the 2035 milestone. It is understood that all waterbodies can respond differently to the implementation of reduced loadings to meet applicable water quality standards. Continued coordination and communication by the stakeholders will be essential to ensure that management strategies continue to meet the implementation milestones.

Appendix B. BRL Allocation Calculations

The first step in the allocation process was to establish the total TN and TP load, by segment group, from the SWIL Model. This is an important step because the watershed loads to each segment are based on the updated information and model refinements incorporated in the model. **Table B-1** lists the TN and TP starting loads from the SWIL Model for each segment group and the associated acres of watershed in that segment.

Table B-1. BRL Segment Group starting loads from model

Segment Group	Area (Acres)	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
BR1-2	52,371	125,738	15,268
BR3-5, BR-7	35,630	102,105	14,867
BR-6	9,928	43,909	5,893

The TMDLs for the IRL (Rule 62.304.520, F.A.C.) include a percent reduction from the starting load, by segment group, for TN and TP. In some cases, the segment groups represent one WBID, while other segment groups include multiple WBIDs. **Table B-2** describes the TMDL rule percent reduction for each segment group and lists the WBIDs and project zone to which the segment group belongs.

Table B-2. BRL BMAP Segment Group TMDL required reduction percentage

Note: Project zones were retained in this table only for quick reference to seagrass analysis

WBID	Project Zone	Segment Group	% TN Reduction	% TP Reduction
3057C	A	BR1-2	67	72
3057A & 3057B	B	BR3-5, BR-7	59	64
3044A & 3044B	B	BR-6	66	70

The second step in the allocation calculations was to apply the segment group TMDL percent reduction (**Table B-2**) for TN and TP to the starting load (**Table B-1**). **Table B-3** lists the TN and TP reductions needed to meet the TMDL based on these calculations. The allowable load after the reductions are met is called the allocation. To calculate the TN allocation and the TP allocation in the table, the TN reduction or TP reduction is subtracted from the TN or TP starting load listed in **Table B-1.**

Table B-3. BRL Segment Group load reduction and allowable load (allocation) before adjustments

Segment Group	TN Reduction (lbs/yr)	TN Allocation (lbs/yr)	TP Reduction (lbs/yr)	TP Allocation (lbs/yr)
BR1-2	84,245	41,494	10,993	4,275
BR3-5, BR-7	60,242	41,863	9,515	5,352
BR-6	28,980	14,929	4,125	1,768

Now that the total reductions are calculated with the TMDL percent reductions, a test is completed to ensure there are no requirements to make reductions from natural land uses. To test whether the calculated reductions would go beyond reductions for converted land uses (anthropogenic land uses), DEP calculated the weighted average load per acre of natural lands (natural load per acre) in each segment group. The natural load per acre values were calculated from loads associated with natural lands in the initial model output. Any land use adjustments that were later incorporated into the allocation process were not accounted for in the natural load per acre calculations. **Table B-4** outlines the data that were used to calculate the natural load per acre for TN and TP. The acreage and the weighted average loading from only the natural lands were calculated from the SWIL Model, by segment group. Then the loading for TN and TP was divided by the acres of natural lands, respectively, to derive the natural load per acre and the values were rounded. These natural loads per acre were compared with the allowable loads per acre, as shown in **Table B-5**.

Table B-4. BRL allowable load per acre from model natural loading

Lbs/ac/yr = Pounds per acre per year

Segment Group	Natural Lands Area (Acres)	TN Natural Lands Load (lbs/yr)	TP Natural Lands Load (lbs/yr)	Natural TN Load (lbs/ac/yr)	Natural TP Load (lbs/ac/yr)
BR1-2	45,736	85,134	9,834	1.86	0.22
BR3-5, BR-7	25,704	16,442	2,033	0.64	0.08
BR-6	6,146	12,296	1,326	2.00	0.22

DEP then calculated the allowable load per acre for each segment group. This is the allocation load divided by the acres in the in the segment group. The allowable load is calculated for both TN and TP and compared with the weighted average load per acre of natural lands (natural load per acre) in that segment group. If the allowable load per acre is less than the natural load per acre, an adjustment is made. In **Table B-5**, the allowable load per acre for TN and TP are shown and "True" is entered if the allowable load per acre is less than the natural load per acre. When the test is "True," an adjustment is made for the TN reduction, TP reduction, or both.

Table B-5. BRL allowable load per acre from the total allocation

Segment Group	Allowable TN Load Per Acre	Natural TN Load Per Acre (LPA)	Is Allowable TN LPA Less than Natural TN LPA?	Allowable TP Load Per Acre	Natural TP Load Per Acre	Is Allowable TP LPA Less than Natural TP LPA?	Result
BR1-2	0.79	1.86	True	0.08	0.22	TRUE	Use adjustment for both
BR3-5, BR-7	1.17	0.64	False	0.15	0.08	FALSE	No adjustment for either
BR-6	1.50	2.00	True	0.18	0.22	TRUE	Use adjustment for both

When an adjustment was indicated, the reductions were then adjusted by taking the starting loads from **Table B-1** and subtracting the adjusted allowable load and adjusting the reductions listed

previously in **Table B-3**. Only those reductions noted as needing an adjustment (see **Table B-5**) were adjusted. A summary of the TN and TP reductions (adjusted, if appliable) and the TN and TP allocations are listed in **Table B-6**.

Table B-6. Adjusted BRL Segment Group load reduction and allowable load (allocation)

Segment Group	Adjusted TN Reduction (lbs/yr)	Adjusted TN Allocation (lbs/yr)	Adjusted TP Reduction (lbs/yr)	Adjusted TP Allocation (lbs/yr)
BR1-2	28,328	97,410	3,746	11,522
BR-6	24,053	19,856	3,709	2,184

After the reductions are calculated for each segment group, the relative starting load in the segment group for each stakeholder is used to assign the entity reductions. The natural lands are separated from each entity's area to assess the relative anthropogenic contributions, so that stakeholders would not be asked to reduce loads from natural lands in their jurisdiction. In **Table B-7**, **Table B-8**, and **Table B-9**, the natural lands are separated from the starting loads, and so only the anthropogenic loadings are included in the entity loads.

Table B-7. BRL Segment BR1-2 entity starting loads from model, natural lands separated

Segment Group	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
BR1-2	Natural Lands	85,215	9,846
BR1-2	Agricultural Producers	3,695	462
BR1-2	Brevard County	1,776	252
BR1-2	FDOT District 5	35	4
BR1-2	Kennedy Space Center	11,507	1,504
BR1-2	Port Canaveral	101	13
BR1-2	U.S. Air Force	23,409	3,186
BR1-2	Total	125,738	15,268

Table B-8. BRL Segment BR3-5, BR-7 entity starting loads from model, natural lands separated

Segment Group	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
BR3-5, BR-7	Natural Lands	16,342	2,020
BR3-5, BR-7	Agricultural Producers	101	13
BR3-5, BR-7	Brevard County	22,747	3,410
BR3-5, BR-7	City of Cape Canaveral	8,915	1,419
BR3-5, BR-7	City of Cocoa Beach	16,412	2,500
BR3-5, BR-7	City of Indian Harbour Beach	10,891	1,675
BR3-5, BR-7	City of Satellite Beach	14,576	2,160
BR3-5, BR-7	FDOT District 5	3,375	471
BR3-5, BR-7	Port Canaveral	315	41
BR3-5, BR-7	U.S. Air Force	8,431	1,159
BR3-5, BR-7	**Total**	**102,105**	**14,867**

Table B-9. BRL Segment BR-6 entity starting loads from model, natural lands separated

Segment Group	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
BR-6	Natural Lands	12,275	1,323
BR-6	Agricultural Producers	334	41
BR-6	Brevard County	30,457	4,416
BR-6	FDOT District 5	842	113
BR-6	**Total**	**43,909**	**5,893**

After the natural lands were separated from the entity loading estimates based on the SWIL Model, the relative contribution of each entity to the total segment group anthropogenic load was calculated. **Table B-10**, **Table B-11**, and **Table B-12** show the percent contribution within the segment group to anthropogenic TN and TP, respectively, by entity. The TN contribution percentage is calculated by dividing the entity anthropogenic TN load by the total anthropogenic TN segment load and then a similar calculation is performed for each entity's TP loads.

Table B-10. BRL Segment BR1-2 entity anthropogenic starting loads from model, natural lands separated

Segment Group	Entity	Anthropogenic TN (lbs/yr)	Anthropogenic TP (lbs/yr)	% Contribution to Anthropogenic TN	% Contribution to Anthropogenic TP
BR1-2	Natural Lands	0	0	0.00	0.00
BR1-2	Agricultural Producers	3,695	462	9.12	8.52
BR1-2	Brevard County	1,776	252	4.38	4.65
BR1-2	FDOT District 5	35	4	0.09	0.08
BR1-2	Kennedy Space Center	11,507	1,504	28.40	27.74
BR1-2	Port Canaveral	101	13	0.25	0.24
BR1-2	U.S. Air Force	23,409	3,186	57.77	58.77
BR1-2	**Total**	**40,523**	**5,422**	**100.00**	**100.00**

Table B-11. BRL Segment BR3-5, BR-7 entity anthropogenic starting loads from model, natural lands separated

Segment Group	Entity	Anthropogenic TN (lbs/yr)	Anthropogenic TP (lbs/yr)	% Contribution to Anthropogenic TN	% Contribution to Anthropogenic TP
BR3-5, BR-7	Natural Lands	0	0	0.00	0.00
BR3-5, BR-7	Agricultural Producers	101	13	0.12	0.10
BR3-5, BR-7	Brevard County	22,747	3,410	26.52	26.54
BR3-5, BR-7	City of Cape Canaveral	8,915	1,419	10.39	11.04
BR3-5, BR-7	City of Cocoa Beach	16,412	2,500	19.14	19.46
BR3-5, BR-7	City of Indian Harbour Beach	10,891	1,675	12.70	13.04
BR3-5, BR-7	City of Satellite Beach	14,576	2,160	17.00	16.81
BR3-5, BR-7	FDOT District 5	3,375	471	3.94	3.66
BR3-5, BR-7	Port Canaveral	315	41	0.37	0.32
BR3-5, BR-7	U.S. Air Force	8,431	1,159	9.83	9.02
BR3-5, BR-7	**Total**	**85,762**	**12,848**	**100.00**	**100.00**

Table B-12. BRL Segment BR-6 entity anthropogenic starting loads from model, natural lands separated

Segment Group	Entity	Anthropogenic TN (lbs/yr)	Anthropogenic TP (lbs/yr)	% Contribution to Anthropogenic TN	% Contribution to Anthropogenic TP
BR-6	Natural Lands	0	0	0.00	0.00
BR-6	Agricultural Producers	334	41	1.06	0.89
BR-6	Brevard County	30,457	4,416	96.28	96.64
BR-6	FDOT District 5	842	113	2.66	2.47
BR-6	**Total**	**31,634**	**4,570**	**100.00**	**100.00**

For the unadjusted Segment Group BR3-5, BR-7, each entity's reduction was calculated by multiplying the total segment group starting load (**Table B-1)** by the segment group required reduction (**Table B-2**) and by the entity's percent contribution to anthropogenic loading, as defined in **Table B-11** and **Table B-12**. The calculations for the entity reductions were performed separately for TN and TP. The entity TN and TP allowable loading (allocations) was then computed by subtracting the entity required reductions in **Table B-13** and **Table B-8** from the entity anthropogenic starting loads (**Table B-11** and **Table B-12**).

Table B-13. BRL Segment BR3-5, BR-7 entity reduction and allowable loading (allocation)

Segment Group	Entity	Entity TN Reduction (lbs/yr)	Entity TP Reduction (lbs/yr)	Entity TN Allocation (lbs/yr)	Entity TP Allocation (lbs/yr)
BR3-5, BR-7	Natural Lands	0	0	16,342	2,020
BR3-5, BR-7	Agricultural Producers	71	10	30	3
BR3-5, BR-7	Brevard County	15,978	2,525	6,769	884
BR3-5, BR-7	City of Cape Canaveral	6,262	1,051	2,653	368
BR3-5, BR-7	City of Cocoa Beach	11,528	1,851	4,884	648
BR3-5, BR-7	City of Indian Harbour Beach	7,650	1,241	3,241	435
BR3-5, BR-7	City of Satellite Beach	10,238	1,600	4,337	560
BR3-5, BR-7	FDOT District 5	2,371	349	1,004	122
BR3-5, BR-7	Port Canaveral	222	30	94	11
BR3-5, BR-7	U.S. Air Force	5,922	858	2,509	301
BR3-5, BR-7	**Total**	**60,242**	**9,515**	**41,863**	**5,352**

For Segment Groups BR1-2 and BR-6, the entity reductions and allowable loads were calculated differently to incorporate the natural load per acre adjustment. Here, the segment group allocation was calculated by multiplying the acres in the segment group (**Table B-1**) by the segment group natural load per acre (**Table B-4**). Next, the entity allocation was computed by multiplying the adjusted segment group allocation (**Table B-6**) by the entity percent contribution to anthropogenic loading (**Table B-10** and **Table B-12**). Once the entity allocation was known, then the entity reduction was calculated by subtracting the entity allocation from the entity starting load. The reductions and allocations are listed in **Table B-14** and **Table B-15**.

Table B-14. BRL Segment BR1-2 entity reduction and allowable loading at natural load per acre adjustment (allocation)

Segment Group	Entity	Adjusted TN Reduction (lbs/yr)	Adjusted TP Reduction (lbs/yr)	Adjusted TN Allocation (lbs/yr)	Adjusted TP Allocation (lbs/yr)
BR1-2	Natural Lands	0	85,215	0	9,846
BR1-2	Agricultural Producers	2,576	1,119	341	121
BR1-2	Brevard County	1,238	538	186	66
BR1-2	FDOT District 5	24	11	3	1
BR1-2	Kennedy Space Center	8,023	3,484	1,112	393
BR1-2	Port Canaveral	71	31	10	3
BR1-2	U.S. Air Force	16,321	7,088	2,355	832
BR1-2	**Total**	**28,253**	**97,485**	**4,007**	**11,260**

Table B-15. BRL Segment BR-6 entity reduction and allowable loading at natural load per acre adjustment (allocation)

Segment Group	Entity	Adjusted TN Reduction (lbs/yr)	Adjusted TP Reduction (lbs/yr)	Adjusted TN Allocation (lbs/yr)	Adjusted TP Allocation (lbs/yr)
BR-6	Natural Lands	0	12,275	0	1,323
BR-6	Agricultural Producers	254	80	33	7
BR-6	Brevard County	23,150	7,307	3,625	791
BR-6	FDOT District 5	640	202	93	20
BR-6	**Total**	**24,044**	**19,865**	**3,751**	**2,142**

As described above, the entity calculations were performed by segment group. Once these were complete, the information was summarized by entity. In **Table B-16**, the starting loads for each entity are totaled across all the segment groups in which they have a land area. Also listed are their relative percentage of anthropogenic load for TN and TP, respectively, in the BMAP area.

One stakeholder contributes less than 0.30 % of both the TN and TP loading from the watershed to the BRL. The contribution to the overall nutrient loading from this stakeholder is low enough that reductions from these areas would have essentially no impact on the required reductions for the BMAP during this phase of implementation; therefore, the entity is currently considered a low priority for implementing reductions. Low-priority entities will be evaluated in future phases of BMAP implementation, as their contributions may change over time.

Table B-16. BRL entity starting load and percent contribution from anthropogenic loads

*Indicates the stakeholder meets the requirements for low priority.
**Adjusted using the natural load per acre

Entity	Starting TN Load (lbs/yr)	Anthropogenic % TN in BMAP	Starting TP Load (lbs/yr)	Anthropogenic % TP in BMAP
Brevard County	54,981	34.82	8,078	35.37
U.S. Air Force	31,840	20.16	4,345	19.02
City of Cocoa Beach	16,412	10.39	2,500	10.95
City of Satellite Beach	14,576	9.23	2,160	9.46
City of Indian Harbour Beach	10,891	6.90	1,675	7.34
Kennedy Space Center	11,507	7.29	1,504	6.59
City of Cape Canaveral	8,915	5.65	1,419	6.21
FDOT District 5	4,252	2.69	588	2.58
Agricultural Producers	4,130	2.62	516	2.26
Port Canaveral*	417	0.26	54	0.24
Total of Allocated Entities	**157,919**	**100.00**	**22,840**	**100.00**
Natural Lands	113,833	N/A	13,188	N/A
Total of BMAP	**271,752**	**N/A**	**36,028**	**N/A**

Table B-17 breaks down the TN and TP reductions for each entity across the BMAP area.

Table B-17. BRL reductions by entity

*Indicates the stakeholder meets the requirements for low priority.
**Adjusted using the natural load per acre

Entity	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Agricultural Producers	2,924	387
Brevard County	45,425	7,009
City of Cape Canaveral	8,244	1,331
City of Cocoa Beach	15,177	2,345
City of Indian Harbour Beach	10,072	1,571
City of Satellite Beach	13,480	2,026
FDOT District 5	3,786	538
Kennedy Space Center	8,023	1,112
U.S. Air Force	24,117	3,442
Port Canaveral*	362	48
Total	**131,248****	**19,761****

Appendix C. Agricultural Enrollment and Reductions

(Language in this appendix was provided by FDACS.)

All agricultural nonpoint sources in the BRL BMAP area are statutorily required either to implement FDACS-adopted BMPs or to conduct water quality monitoring prescribed by DEP or the applicable water management district. Under Paragraph 403.067(7)(c), F.S., the proper implementation of FDACS-adopted, DEP-verified BMPs, in accordance with FDACS rules, provides a presumption of compliance with state water quality standards for the pollutants addressed by the BMPs.

FDACS Role in BMP Implementation and Follow-up

When DEP adopts a BMAP that includes agriculture, it is the agricultural landowner's responsibility to enroll in the FDACS BMP Program and implement all applicable FDACS-adopted BMPs to help achieve load reductions. To date, the FDACS OAWP has adopted BMP manuals by rule[1] for cow/calf, citrus, vegetable and agronomic crops, nurseries, equine, sod, dairy, poultry, and specialty fruit and nut operations. All OAWP BMP manuals are periodically revised, updated, and subsequently reviewed and preliminarily verified by DEP before readoption. OAWP intends to update BMP manuals every five years.

To enroll in the FDACS BMP Program, landowners must meet with an OAWP representative to determine the BMPs that are applicable to their operation. The landowner must submit an NOI to implement the BMPs on the checklist from the applicable BMP manual to an OAWP representative. Because many agricultural operations are diverse and are engaged in the production of multiple commodities, a landowner may sign multiple NOIs for a single parcel.

FDACS is required to conduct implementation verification site visits every two years to verify that landowners are implementing BMPs identified in their NOIs. BMP verification site visits are conducted to verify that all BMPs are being implemented properly, to review nutrient and irrigation management records, and to collect records FDACS is required to retain. In addition, FDACS verifies that cost-share items are being appropriately utilized. Procedures used to verify the implementation of agricultural BMPs are outlined in Rule 5M-1.008, F.A.C. Producers not implementing BMPs according to the process outlined in Title 5M-1, F.A.C., are referred to DEP for enforcement action after attempts at remedial action are exhausted.

Section 403.067, F.S., requires that, where water quality problems persist despite the proper implementation of adopted agricultural BMPs, FDACS must reevaluate the practices, in consultation with DEP, and modify them if necessary. Continuing water quality problems will be detected through the monitoring component of the BMAP and other DEP and SJRWMD activities. If a reevaluation of the BMPs is needed, FDACS will also include SJRWMD and other partners in the process pursuant to Subsection 403.067(7), F.S.

[1] https://www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Best-Management-Practices

Adopted BMAP Agricultural Land Use and Enrollment

Land use data are helpful as a starting point for estimating agricultural acreage, determining agricultural nonpoint source loads, and developing strategies to reduce those loads in a BMAP area, but there are inherent limitations in the available data. The time of year when land use data are collected (through aerial photography) affects the accuracy of photo interpretation. Flights are often scheduled during the winter months because of better weather conditions and reduced leaf canopies. While these are favorable conditions for capturing aerial imagery, they make photo interpretation for determining agricultural land use more difficult. Agricultural lands are often fallow in the winter months and can lead to inappropriate analysis of the photo imagery.

There is also a significant variation in the frequency with which various sources of data are collected and compiled, and older data are less likely to capture the frequent changes that often typify agricultural land use. In addition, it is not always apparent that an agricultural activity is being conducted on the land. Consequently, DEP relies on local stakeholder knowledge and coordination with FDACS to verify agricultural acreage and BMP implementation.

FDACS uses the FSAID Geodatabase to estimate agricultural acreages statewide. FSAID is derived from water management district land use data, and is refined using county property appraiser data, OAWP BMP enrollment data, U.S. Department of Agriculture data for agriculture, such as the Cropland Data Layer and Census of Agriculture, FDACS Division of Plant Industry citrus data, water management district water use and permitting data, as well as field verification performed by USGS, the water management districts, and OAWP. Ongoing mapping and ground-truthing efforts of the FSAID dataset provide the best available data on the status of agricultural lands in Florida.

In terms of NOIs, enrolled acreage fluctuates when parcels are sold, when leases end or change hands, or when production areas downsize or production ceases, among other reasons. OAWP BMP enrollments are delineated in GIS using county property appraiser parcels. Nonproduction areas such as forest, roads, urban structures, and water features are often included within the parcel boundaries. Conversely, agricultural lands in the FSAID only include areas identified as agriculture. To estimate the agricultural acres enrolled in the BMP Program, OAWP overlays FSAID and BMP enrollment data within GIS to calculate the acres of agricultural land in an enrolled parcel.

To address the greatest resource concerns, OAWP utilizes a phased approach based on commodity type and agricultural acreage, while ensuring that all entities identified as agriculture will be notified. **Table C-1** lists the agricultural acreage based on FSAID VII in the BRL BMAP area. At present, none of the identified agricultural lands are enrolled. **Figure C-1** shows the identified agricultural lands in the BRL BMAP area; however, compliance with Section 403.067, F.S. is based on the NOIs and site visits described in **Section 2.3.1.**

Table C-1. Agricultural land use acreage enrolled summary in the BMP Program in the BRL BMAP area as of July 2020

Category	Acres
FSAID VII agricultural acres in the BMAP area	164
Total agricultural acres enrolled	0
% of FSAID VII agricultural acres enrolled	0

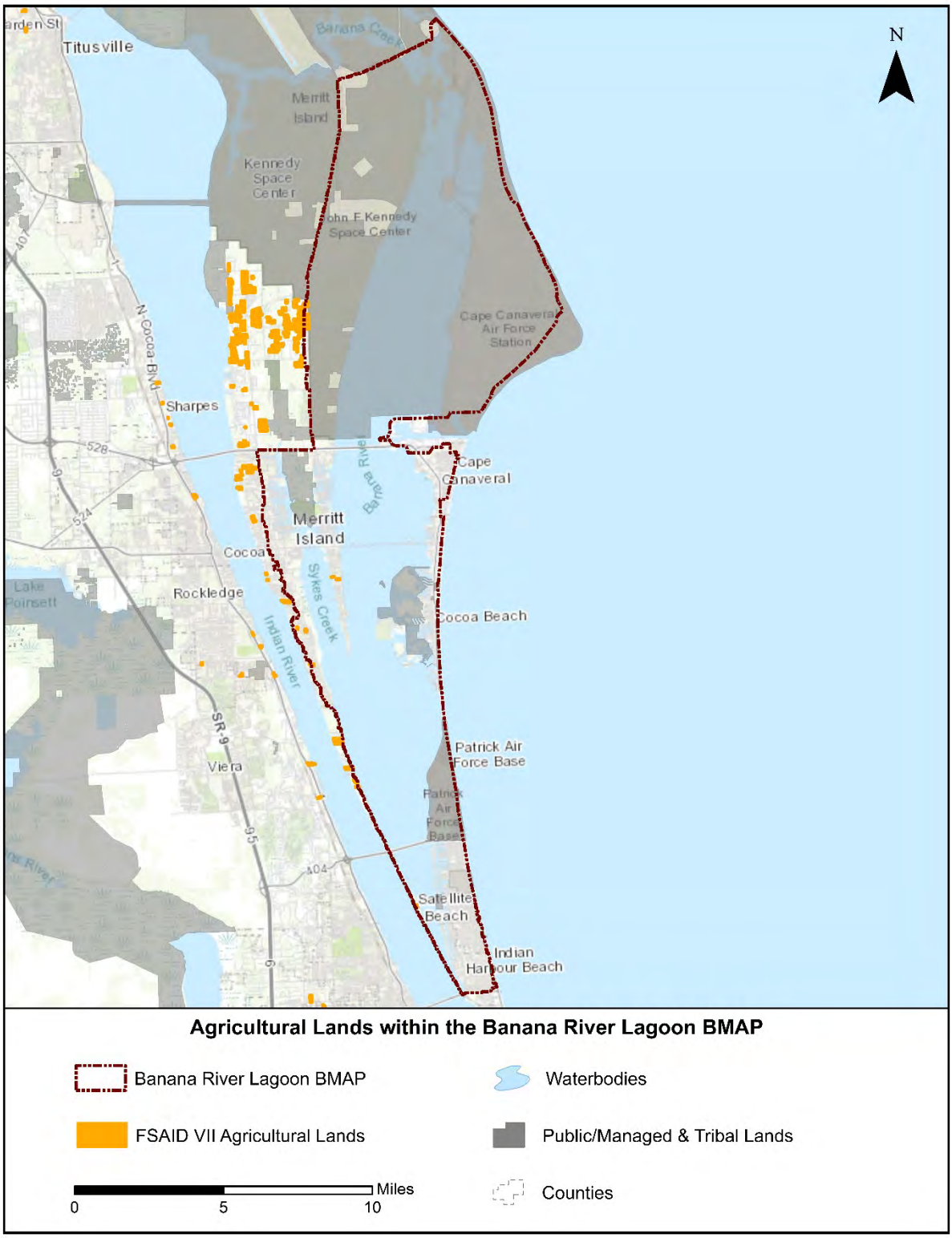

Figure C-1. Agricultural lands in the BRL BMAP area as of July 2020

Unenrolled Agricultural Acreage

FDACS continues to increase enrollment in all BMAPs to meet the BMAP goal of enrolling 100% of the enrollable agricultural acres in the BMP Program. To achieve that goal, land use analyses are conducted to ensure that areas containing commercial agricultural land uses are prioritized, while lands classified as agriculture where the ability to implement agricultural BMPs under the BMP Program is limited, such as smaller rural homesteads.

General Considerations

Although land use data have been used as the basis for prioritizing FDACS enrollment efforts, many land use issues not captured by these databases affect enrollment efforts. Parcels at the urban/rural boundary experience rapid land use changes. Agricultural lands are regularly converted to residential, industrial, commercial, or multiuse properties, but still appear in various databases as pasture or other rural lands. While these lands are likely to be developed in the near future, the agricultural land use classifications require these properties to comply with the BMP enrollment requirements.

Additionally, the counties' methods of classifying small acreages as agricultural lands can affect the BMP enrollment process. Along with these changes, there are also large agricultural parcels being subdivided but remaining classified as "agriculture." These rural homesteads—also called residential agriculture, rural residential, rural estates, equine communities, ranchettes and other descriptive names for homes with some acreage and agricultural zoning—present a particular challenge for FDACS. The current BMP manuals and the measures they contain target commercial agricultural production practices and, in many cases, cannot be scaled down to appropriately enroll activities on these smaller, non-commercial agricultural properties.

Characterization of Unenrolled Agricultural Lands

To characterize unenrolled agricultural acres, OAWP identified FSAID VII features outside the BMP enrollment areas and overlaid these features with property appraiser parcels within GIS. OAWP then identified the number of parcels that encompass the unenrolled agricultural lands and the number of agricultural acres present within the parcels. The parcel owner information, other parcel details, and aerial imagery were used identify parcels that are unlikely to contain agricultural activity. As previously mentioned, OAWP BMP enrollments are initially delineated based on county property appraiser parcel data, even if the entire parcel is not agriculture, to allow BMPs to be tied to the specific parcels where agricultural activities are occurring. FSAID agricultural lands are delineated based on land use features identified as agriculture and represent a more refined analysis of those areas actually in agricultural production.

Because of differences in the spatial geometries between the OAWP BMP enrollment, FSAID, and property appraiser parcels when they are combined or compared, the boundaries often do not align precisely, creating "slivers." Slivers are not enrollable because they are an artifact of the geospatial analysis and do not represent lands with active agricultural practices. For example, a sliver can represent the area between the boundary of a parcel and the beginning of a road, canal, easement, etc. A sliver can also represent a small portion of an FSAID feature outside the BMP

enrollment areas that is slightly overlapped by a property appraiser parcel. Slivers are often associated with previously enrolled agricultural operations but because of the delineation differences, these slivers are not captured within the enrolled parcel during geoprocessing. When characterizing unenrolled agricultural lands, slivers are excluded. **Figure C-2** shows an example of a sliver created when performing geospatial analysis.

Figure C-2. GIS example of a sliver

Large areas that are identified as agricultural land use but are unlikely to have enrollable agricultural activities include lands owned by the state (Board of Trustees of the Internal Improvement Trust Fund) and water management districts (SJRWMD). It is possible that these lands, in whole or in part, may be leased to other entities that conduct agricultural activities, but such leasing is infrequent. If leasing occurs, the leasing entity will be required to enroll in the

BMP Program. Ongoing coordination between FDACS, DEP Division of State Lands, and SJRWMD is needed to ensure that any public lands that are leased for the purposes of agricultural activities are required to implement and enroll in the FDACS BMP Program as a condition of the lease.

Other smaller parcels that have been identified as nonagricultural but have features that cause them to be identified as agricultural lands in various databases, include those lands associated with utilities, telecommunication companies, churches, FDOT rights-of-way, and airports. The Florida Department of Revenue (DOR) uses code numbers 70 through 98 to identify these types of lands.

Table C-2 lists the total acreage associated with the identified slivers and the lands that are not likely to have enrollable agricultural activities, along with the remaining total of unenrolled agricultural acres in the BMAP area. **Figure C-3** summarizes the agricultural acres distributed by agricultural acreage found on each parcel. **Figure C-4** shows the types of agricultural land use based on FSAID VII. These figures do not include acreages or parcels associated with slivers or lands that are not likely to have enrollable agricultural activities.

Table C-2. Summary of unenrolled agricultural land use acreage in the BRL BMAP area

Category	Acres
Unenrolled agricultural acres	164
Acres identified within slivers of unenrolled agricultural areas	10
Lands without enrollable agricultural activity (e.g., tribal lands, residential development, and parcels with DOR use codes 70-98)	86
Total lands with potentially enrollable agricultural activities	**68**

Future Efforts

To address resource concerns, FDACS continues enhancing coordination with producers, agencies and stakeholders to increase enrollment in the BMP Program. OAWP is sending correspondence to agricultural landowners within BMAPs that are not currently enrolled in the BMP Program to increase enrollment rates and verify land uses where additional focus may be required to achieve resource protection. This effort is utilizing a phased approach and targeting priority land uses and then using the amount of agricultural acreage for the remaining unenrolled lands, while ensuring that all entities identified as agriculture will be notified. Additionally, OAWP continues to coordinate with industry groups and outreach partners to educate and inform agricultural producers about the BMP Program.

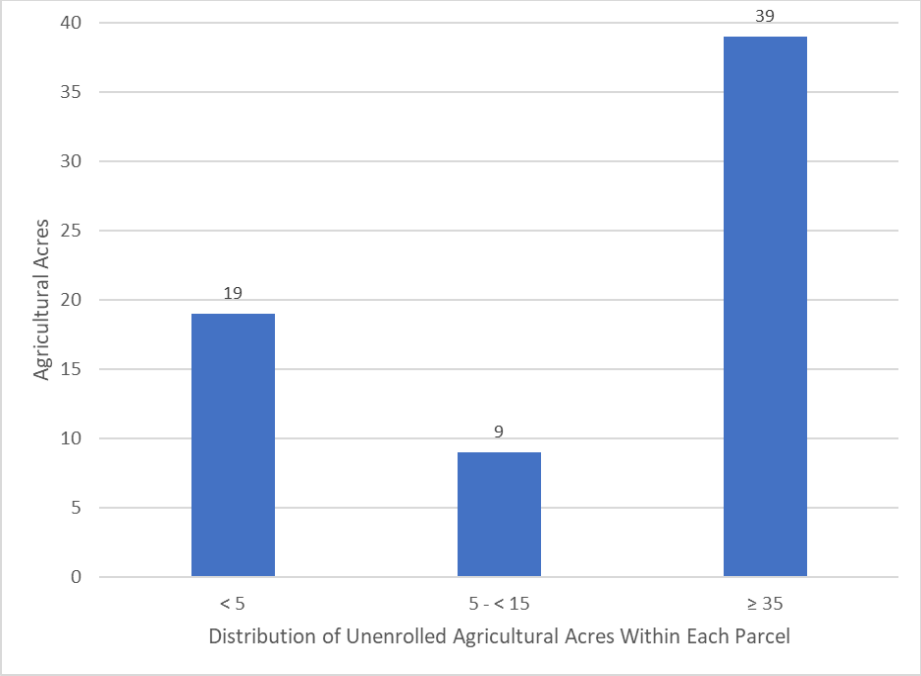

Figure C-3. Distribution of agricultural acreage on parcels with potential agricultural activity in the BRL BMAP area

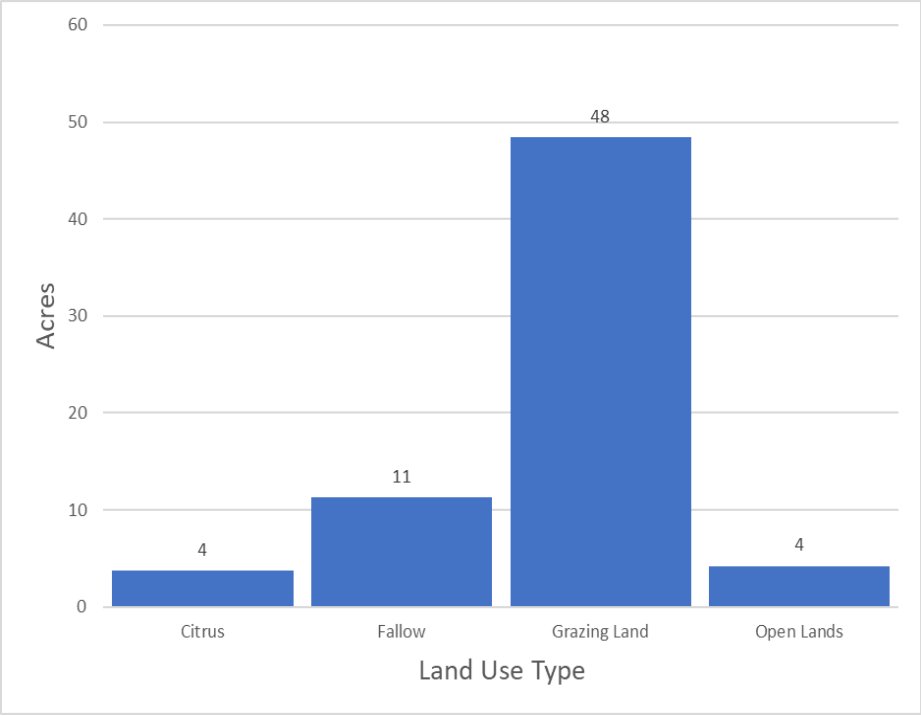

Figure C-4. Agricultural land uses on parcels with potential agricultural activity in the BRL BMAP area

Recommended Updates to Land Use

BMAP loads and allocations, as well as water supply projections, are based primarily on land use data. Maintaining the most accurate agricultural land use dataset is critical to planning and policy decisions. Although crop changes, technology advances, and land ownership/lessee changes related to agricultural operations create dynamic environments and difficulties in estimating impacts from specific operations, FDACS and DEP continue to coordinate and develop ways to improve accuracy.

DEP and OAWP recognize that land use–related issues that consistently occur during BMAP development and/or updates. One of these issues is the differentiation between what is classified as an agricultural land use in the TMDL or BMAP model that is no longer an agricultural land use by the time the BMAP is adopted or an update occurs.

OAWP has developed a methodology to identify agricultural land use changes to make adjustments in subsequent models and reports. Using GIS, OAWP compared the SWIL model land use with the latest FSAID land use and BMP enrollment data. OAWP identified areas classified as agriculture by the BMAP modeled land use that do not overlap with the latest FSAID or BMP enrollment data. OAWP reviewed the output of this overlay analysis by using county appraiser data and aerial imagery to determine if the nonoverlapping areas were still in production. OAWP identified 993 acres, classified as agriculture in the SWIL land use, that now consist of other land use types such as residential, industrial, or commercial (see **Table C-3**). DEP evaluated the land use changes identified by OAWP and apportioned the associated acres and loads to the appropriate entities after a discussion with each entity.

Often the analyses show changes that have occurred more rapidly than any land use data can capture, such as the transition to residential development. The land use changes are provided to DEP as a GIS shapefile with a description of the information in the county property appraiser database and aerial imagery reflected for the refinement of the acreage and loading allocated to agriculture in a BMAP area.

Table C-3. Agricultural land use change by project zone

Project Zone	Acres
A	974
B	19
Total	**993**

In addition to identifying land use changes in the BMAP area modeled land use, OAWP regularly reviews FSAID data, at times daily or weekly, as it performs other job functions. Any edits or changes are reviewed and considered for inclusion in the next iteration of the FSAID.

Potential Site-Specific Nutrient Management Measures in Addition to BMPs

Beyond enrolling producers in the FDACS BMP Program and verifying implementation, OAWP will also work with producers to identify a suite of agricultural projects and research agricultural technologies that could be implemented on properties where they are deemed technically feasible and if funding is made available. FDACS executes contracts with soil and water conservation districts and other partners to administer cost-share funds and provide technical and administrative support for these districts and other partners. Cost-share funding is being used to implement higher level BMPs, innovative technologies, and regional projects to provide the next added increment of improving and protecting water quality.

Appendix D. Seagrass Analysis

Process to Conduct the Seagrass Depth Limit Compliance Evaluation

The goal of the IRL Basin TMDLs is to recover the deeper seagrass habitats. The seagrass response is the most important factor in evaluating the success of the nutrient TMDLs. Even if the relationship among nutrient loads and seagrass recovery is not as predicted by the regression model, the load reduction requirements themselves will not determine TMDL success. The assessment of success is based on whether the seagrass grows at sufficient depths.

The TMDL seagrass depth limit targets are based on a union coverage of the seagrass mapping data from 1943, 1986, 1989, 1992, 1994, 1996, and 1999. The SJRWMD created this union coverage when it set pollutant load reduction goals for the IRL Basin. The TMDL targets are not based on the full restoration of seagrass depths represented by this union coverage; instead, they were set at 90 % of the full restoration estimate. These targets allow for seagrass growth almost to the depths previously seen in the lagoon, while accounting for the fact that changes have been made to the lagoon system that may limit seagrass growth in some areas, such as dredged areas similar to the Intracoastal Waterway.

Compliance with the TMDL seagrass depth limit targets is assessed on a project zone scale using the latest four consecutive data sets of seagrass mapping data. For the assessment years to be compliant with the TMDL seagrass depth limit targets, the data must meet the requirements of a two-step evaluation process.

The first step is a comparison of the TMDL union coverage cumulative frequency distribution curve with the assessment years' union cumulative frequency distribution curve. The cumulative distribution curves show what percentage of the seagrass deep edge is located at different depths. To be compliant, at least 50 % of the assessment years' curve, including the median, must be on or to the right of the TMDL curve.

The second step in the evaluation process is a comparison of the TMDL union coverage median value with each assessment year's median value. To be compliant in the second step, at least three of the four assessment year medians must be equal to or greater than the TMDL median. If the seagrass data from the four assessment years are compliant with both steps of the test, the project zone is achieving the TMDL depth limit target.

A series of GIS steps must be conducted to obtain the data necessary to complete the two-step evaluation process. These steps are as follows:

- Start with the seagrass GIS shapefiles for the four latest assessment years and edit these files to include only Categories 9113 and 9116, which represent seagrass. Other categories in the GIS shapefiles represent algae cover, which should not be included in this assessment. The seagrass shapefiles only represent the location of the seagrass beds.

- Use the dissolve function in GIS to create the union file of the assessment years. This union file results in a coverage of where seagrass beds were located during all four assessment years.

- Transform the polygons to a polyline in the assessment years' union file. This polyline represents the edges of the seagrass beds.

- Draw a 15.8-m buffer around the seagrass polyline that is 7.9 m inside and 7.9 m outside the seagrass bed. The bathymetry layer was created by the SJRWMD in 1996, and the bathymetry was measured every 15.2 m. The 15.8-m buffer around the seagrass polyline ensures that 1 bathymetry point will be captured in the GIS analysis.

- Intersect the updated bathymetry shapefile with the seagrass coverage file that was transformed into a polyline. This intersection correlates the depth data with the seagrass locations so that depths along the seagrass bed edge can be determined.

- Intersect the deep edge file to each project zone (BRL A, BRL B, North A, North B, Central A, Central SEB, and Central B).

- Use the select by location function to identify and note points within dredged areas. The dredged areas are removed from this coverage because seagrass is not expected to grow in areas that have been dredged.

- Identify and note points that fall below 0.3 m and above 3.5 m from the coverage. This step is needed because seagrass growing at depths less than 0.3 m are likely not light-limited, and seagrass are not expected to grow at depths greater than 3.5 m.

- Identify and note points from the intersections of holes or bare areas, which do not represent the deep edge of the seagrass bed.

- These steps are also followed separately for each assessment year so that the median value can be calculated.

The final points that represent the seagrass deep edge boundary for the assessment years' union coverage are then exported from GIS into Excel to conduct the two-step evaluation. The depth points are sorted from highest to lowest, and the count of the number of points at each depth is determined. The cumulative count is determined by taking the count for the shallowest depth and adding it to the count for the next shallowest point until the counts for all the depths are added together to yield the total number of depth points. The cumulative count at each depth is divided by the total points to determine the percentage of the seagrass points at each depth. These points are then plotted as a curve on a graph for comparison with the TMDL cumulative distribution

curve. For the Step 2 evaluation, the median depth point is calculated for each assessment year using Excel. These medians are then compared with the TMDL median to determine compliance.

The maps in **Figure D-1** and **Figure D-2** include the locations of ground truthing conducted before and during aerial surveys. Additionally, the transect locations where SJRWMD conducts seasonal monitoring are shown. For more information on how SJRWMD and partners conduct seagrass surveys, SJRWMD's SOP is referenced in **Chapter 5**.

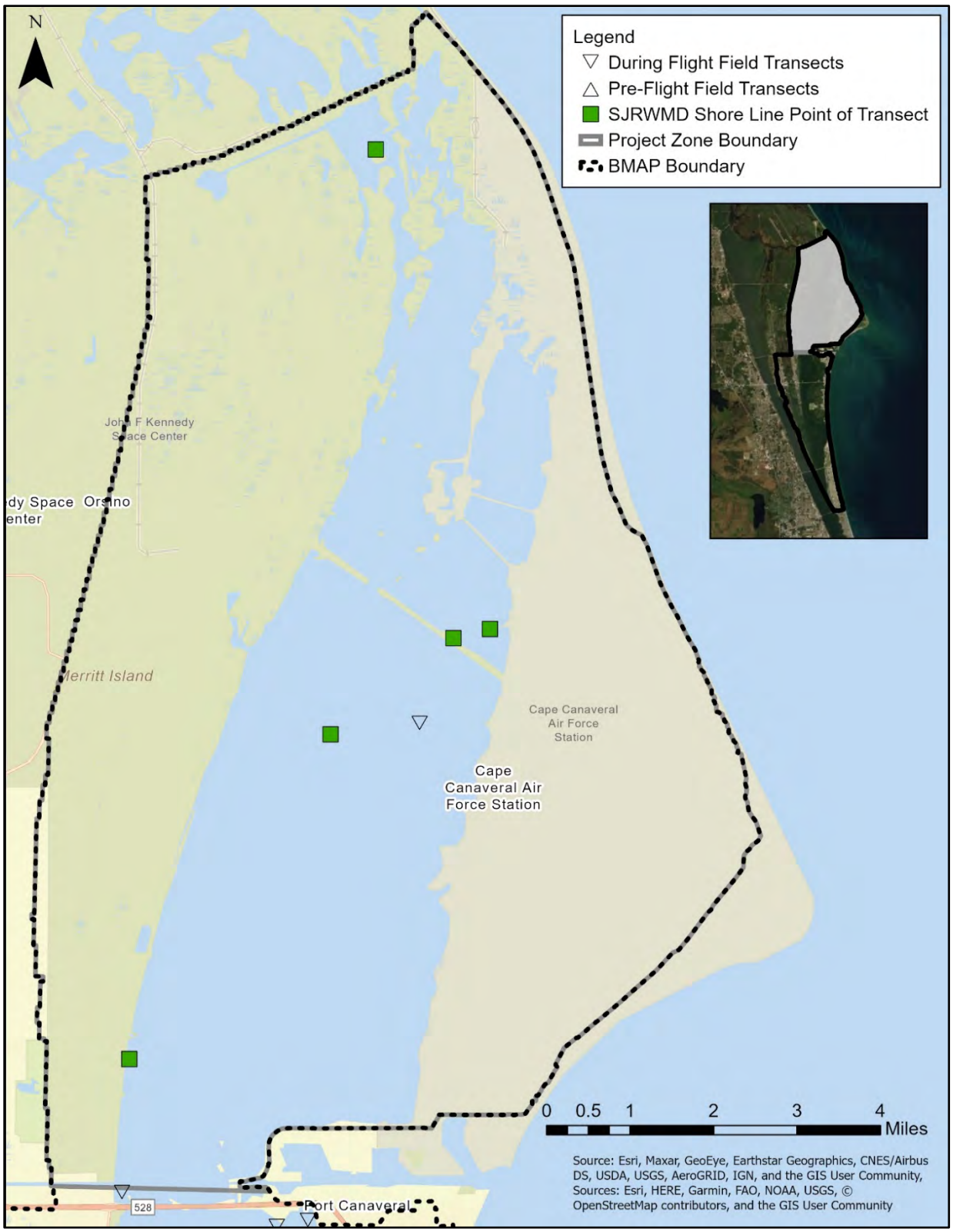

Figure D-1. Map of the seagrass transects in BRL A

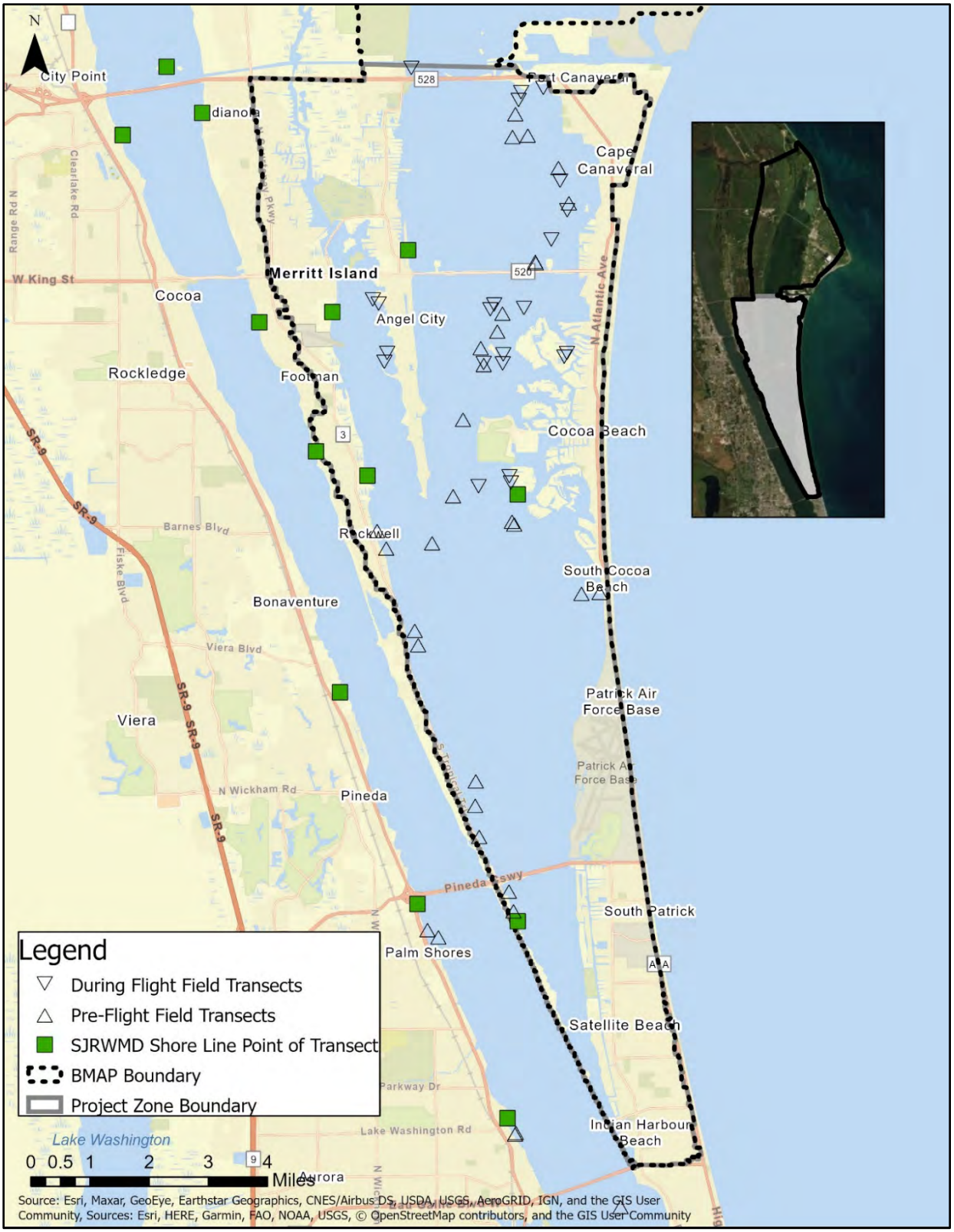

Figure D-2. Map of the seagrass transects in BRL B