

Indian River Lagoon Basin North Indian 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
North Indian River Indian River Lagoon Stakeholders

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Acknowledgments

The *North Indian River Lagoon (NIRL) 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 NIRL stakeholders identified below.

Type of Governmental or Private Entity	Participant
Local Governments	Brevard County Volusia County City of Cocoa City of Edgewater City of Melbourne City of Oak Hill City of Rockledge City of Titusville Town of Indialantic Town of Palm Shores
Federal Agencies	Kennedy Space Center
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

BAM	Biosorption Activated Media
BCC	Brevard Community College
BCUD	Brevard County Utility District
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
CWA	Clean Water Act
DEP	Florida Department of Environmental Protection
DO	Dissolved Oxygen
DOR	Florida Department of Revenue
DWM	Dispersed Water Management
EFDC	Environmental Fluid Dynamics Code
EMC	Event Mean Concentration
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FCT	Florida Communities Trust
FDACS	Florida Department of Agriculture and Consumer Services
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
FIND	Florida Inland Navigation District
FLWMI	Florida Water Management Inventory
FPL	Florida Power and Light
FRDAP	Florida Recreation Development Assistance Program
F.S.	Florida Statutes
FSAID	Florida Statewide Agricultural Irrigation Demand (Geodatabase)
ft	Foot
FWRA	Florida Watershed Restoration Act
GIS	Geographic Information System
HSPF	Hydrological Simulation Program–Fortran
IDDE	Illicit Discharge Detection and Elimination
IRL	Indian River Lagoon
IRL-S	Indian River Lagoon-South
IWR	Impaired Surface Waters Rule
kg	Kilogram
km	Kilometer
lbs	Pounds
lbs/yr	Pounds Per Year

LET	Load Estimation Tool
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
NELAC	National Environmental Laboratory Accreditation Council
NELAP	National Environmental Laboratory Accreditation Program
NEP	National Estuary Program
NIRL	North Indian River Lagoon
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
O&M	Operations and Maintenance
OAWP	Office of Agricultural Water Policy
OSTDS	Onsite Sewage Treatment and Disposal System
PAR	Photosynthetically Active Radiation
PLSM	Pollutant Load Screening Model
PMC	Parrish Medical Center
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
RRLA	Rapid Rate Land Application
RV	Recreational Vehicle
SCTPO	Space Coast Transportation Planning Organization
SJRWMD	St. Johns River Water Management District
SOP	Standard Operating Procedure
SR	State Road
STORET	STorage and RETrieval (Database)
SWET	Soil and Water Engineering Technology
SWIL	Spatial Watershed Iterative Loading
SWMP	Stormwater Management Program
TBD	To Be Determined
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
USGS	U.S. Geological Survey
VC	Volusia County
WBID	Waterbody Identification (number)
WCD	Water Control District
WIN	Watershed Information Network (Database)

WMD Water Management District
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 NIRL Subbasin. The main stem of the NIRL Subbasin extends from Turnbull Creek in Volusia County to the Melbourne Causeway in Brevard County (**Figure ES-1**).

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 two tributaries to the NIRL, now addressed in this BMAP. For Addison Creek (waterbody identification [WBID] number 3028), no further nutrient load reductions were requested beyond those already established for the main stem seagrass nutrient TMDLs. For the Eau Gallie River (WBID 3082), the total nitrogen (TN) and total phosphorus (TP) target loads defined in the TMDLs are different from the main stem. The

tidal portion of the Eau Gallie River consistently showed high annual average chlorophyll *a* concentrations, and so the loading targets for the Eau Gallie are the natural background nutrient condition, which require a 51 % TN reduction and a 58 % TP reduction of nonpoint source loads based on the Hydrological Simulation Program–Fortran Model for the period from 1996 to 2005.

NIRL BMAP

In addition to dividing the overall IRL Watershed into subbasins, the NIRL 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. The NIRL Subbasin was split into two project zones, as follows:

- **North A** – Turnbull Creek to NASA Causeway (State Road 405).
- **North B** – NASA Causeway to Melbourne Causeway (U.S. Highway 192).

DEP first adopted the NIRL 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 CIRL. 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 NIRL. 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. The estimated reductions of activities completed to date are provided in **Table ES-1**. **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.

Table ES-1. Progress to date in the NIRL BMAP area by project zone

lbs/yr = Pounds per year

Project Zone	TN Reduction (lbs/yr)	% Achieved towards TN Target	TP Reduction (lbs/yr)	% Achieved towards TP Target
A	41,071	34.6	7,845	39.9
B	65,340	48.8	14,709	57.6
Total	106,411	42.1	22,554	49.9

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 NIRL 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 contributor of TN and TP loading to the NIRL. Since the adoption of the NIRL BMAP in 2013, some agricultural producers have enrolled in the Florida Department of Agriculture and Consumer Services (FDACS) Best Management Practices (BMP) Program. However, the current enrollment is 6 % of agricultural acres identified in the BMAP. Sufficient agricultural BMP enrollment and implementation verification will be necessary to achieve the TMDLs. FDACS continues to work to improve enrollment percentages in the basin and will be undertaking implementation verification site visits to enrolled producers at least

every two years to carry out its statutory authority and fulfill its statutory obligations to facilitate 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 NIRL 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.

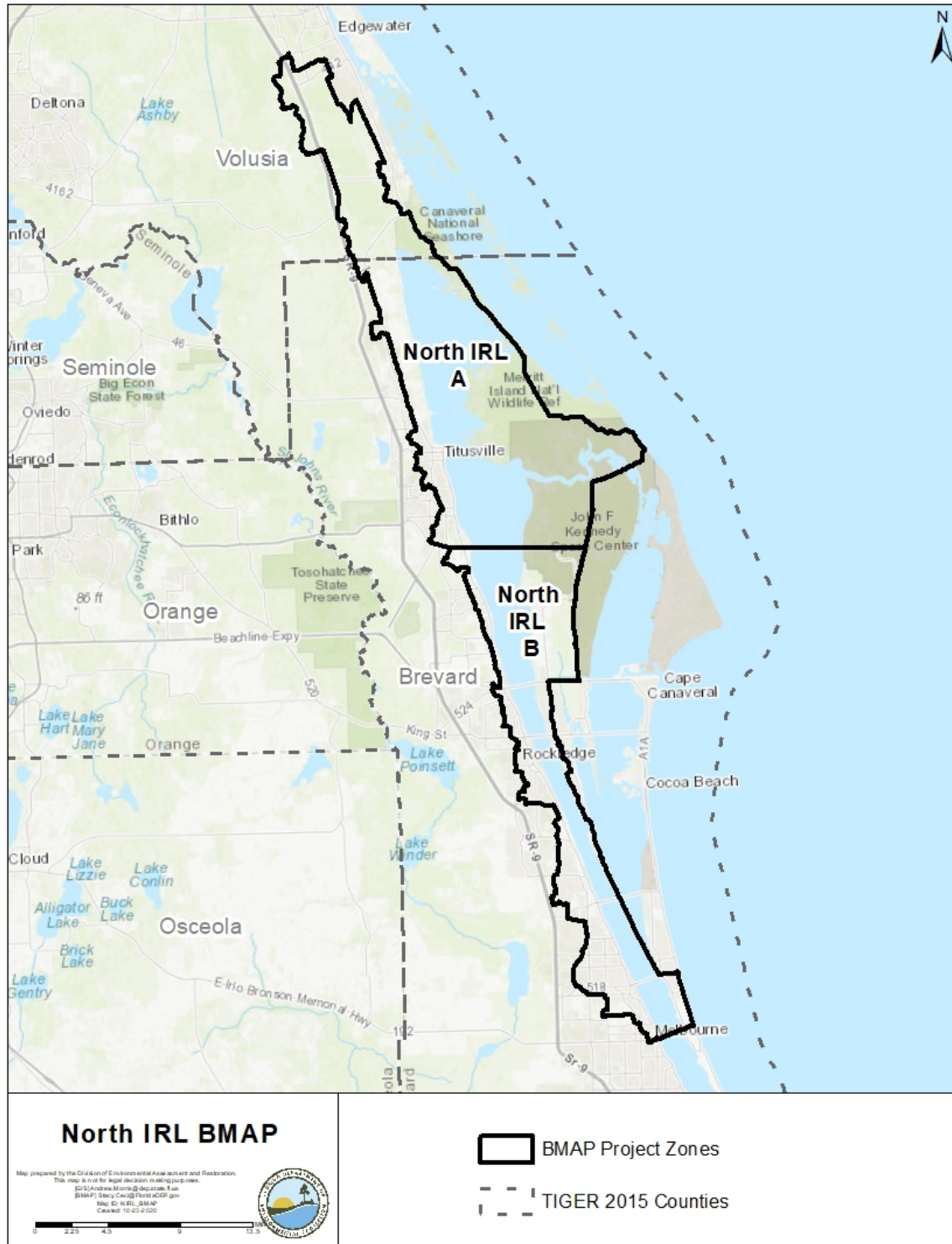


Figure ES-1. NIRL BMAP area and project zones

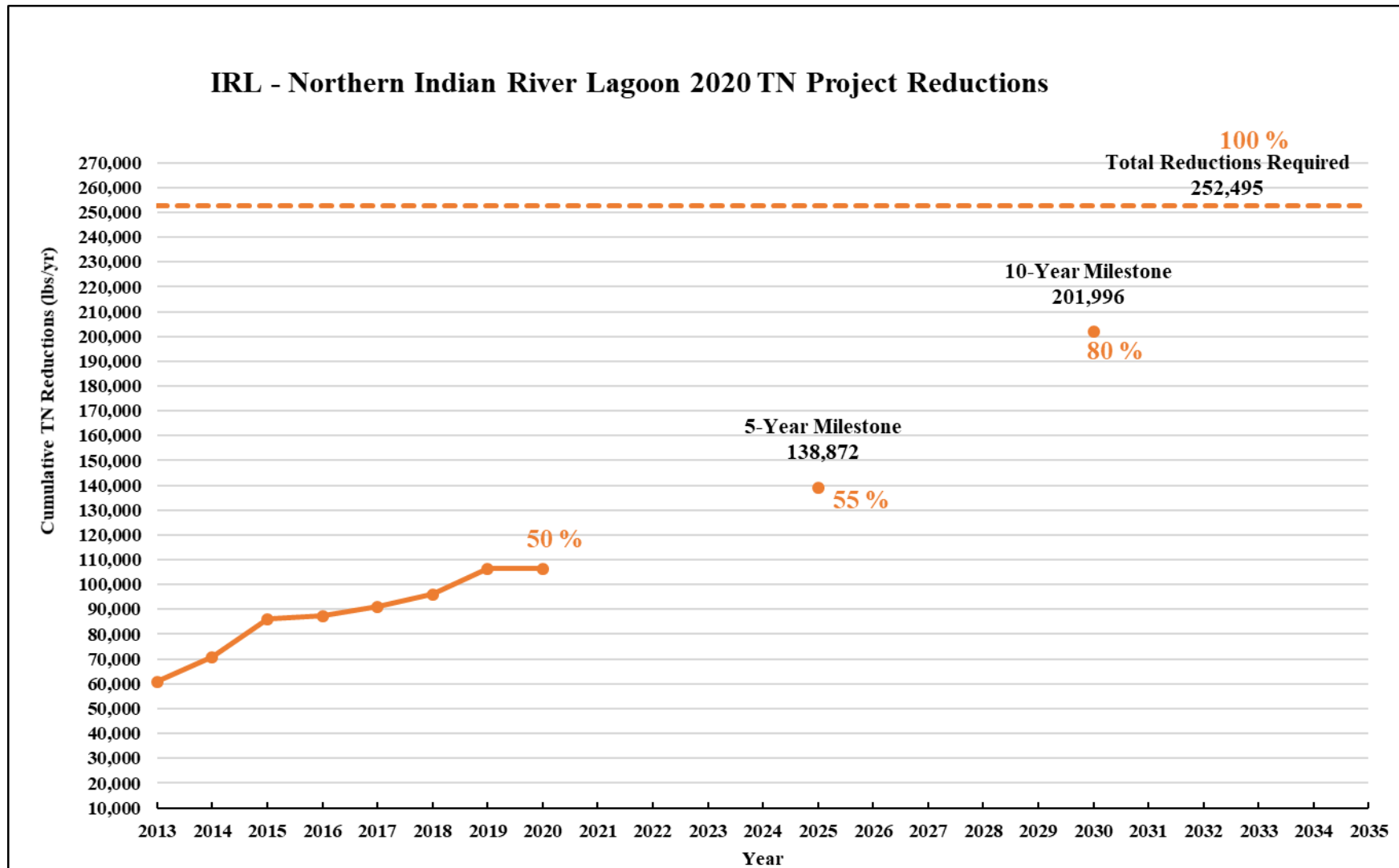


Figure ES-2. Estimated progress towards the NIRL BMAP TN milestones with projects completed through July 31, 2020

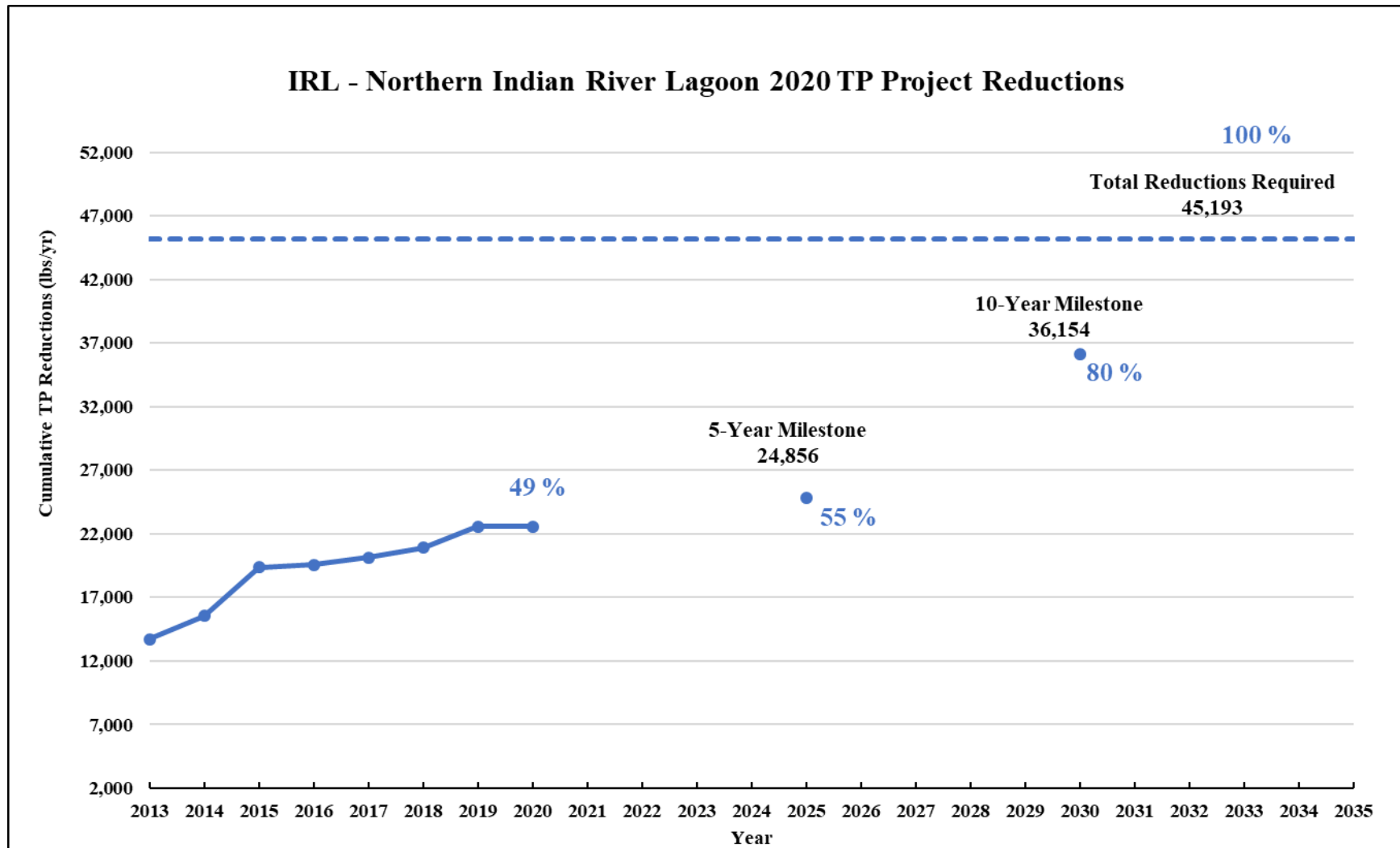


Figure ES-3. Estimated progress towards meeting the NIRL BMAP TP milestones with projects completed through July 31, 2020

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 North Indian River Lagoon (NIRL), 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 (<i>no current Class V designations</i>)

Class II waters in the NIRL may be used for aquaculture. The WBIDs that are designated as Class II waters are listed in **Table 2**. If not listed, the remaining WBIDs are Class III waters.

Table 2. Class II waters in the NIRL

Classification	WBID Number	WBID Name
Class II	2924	Mosquito Lagoon
Class II	2942A	Turnbull Creek (Marine Segment)
Class II	2963A1	Indian River Above Sebastian Inlet
Class II	2963B1	Indian River Above Melbourne Causeway
Class II	2963C1	Indian River Below 520 Causeway
Class II	2963D1	Indian River Above 520 Causeway
Class II	2963EA	Indian River Above Nasa Causeway
Class II	2963F2	Big Flounder Creek
Class II	2963F3	Indian River Above Max Brewer Causeway
Class II	3057A	Banana River Below 520 Causeway

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 NIRL 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. NIRL 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 NIRL.

Table 3. NIRL TMDLs

NPDES = National Pollutant Discharge Elimination System.

WBID	Waterbody	NPDES Stormwater TN (% reduction)	NPDES Stormwater TP (% reduction)
2963F	Indian River above Max Brewer	35	47
2963E	Indian River above NASA Causeway	35	47
2963D	Indian River above 520 Causeway	36	53
2963B+2963C	Indian River above Melbourne Causeway	36	48

Additionally, this BMAP addresses adopted TMDLs for two tributaries to the NIRL. A summary of reductions for the NIRL Tributaries appears in **Table 4**. For Addison Creek (WBID 3028), no further nutrient load reductions were requested beyond those already established for the main stem seagrass nutrient TMDLs. For the Eau Gallie River (WBID 3082), the TN and TP target loads defined in the TMDLs are different from the main stem; there is also a biochemical oxygen demand (BOD) TMDL for the Eau Gallie River. The tidal portion of the Eau Gallie River consistently showed high annual average chlorophyll *a* concentrations, and so the loading targets for the Eau Gallie are the natural background nutrient condition, which require a 51 % TN reduction and a 58 % TP reduction of nonpoint source loads based on the Hydrological Simulation Program–Fortran (HSPF) Model for the period from 1996 to 2005.

Table 4. NIRL Tributary TMDLs

WBID	Waterbody	NPDES Stormwater TN (% reduction)	NPDES Stormwater TP (% reduction)	Project Zone
3028	Addison Creek	35	47	A
3082	Eau Gallie River	51	58	B

1.2 NIRL 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 NIRL 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 NIRL BMAP area.

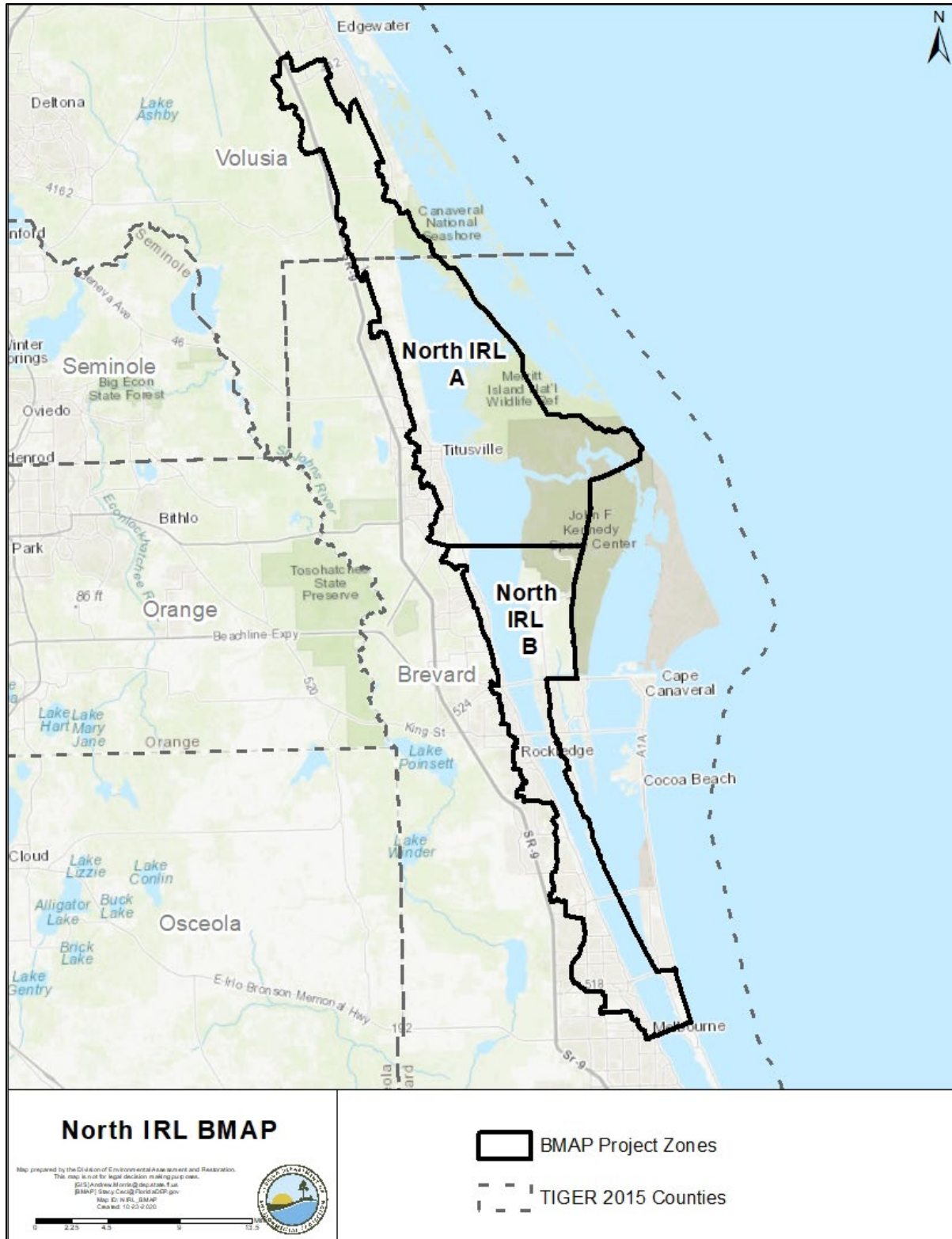


Figure 1. NIRL BMAP area

1.2.1. Pollutant Sources

There are various sources of pollution in the NIRL. Nonpoint (i.e., diffuse) sources in the watershed contribute the majority of TN and TP loads to the NIRL and include urban and 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

The primary agricultural land uses in the NIRL BMAP area are fallow, grazing lands, and citrus. Other agricultural land uses include nurseries, field/row crops, and horse farms/specialty farms. Most of the horse farms are small, noncommercial hobby farms. 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** and **Table 6** summarize the agricultural land use enrolled in BMP programs for the entire NIRL BMAP area and by project zone, respectively. 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 NIRL BMAP area.

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

Category	Acres
FSAID VII agricultural acres in the BMAP area	7,256
Total agricultural acres enrolled	401
% of FSAID VII agricultural acres enrolled	6

Table 6. Agricultural land use acreage enrolled in the BMP Program in the NIRL BMAP area by project zone

Project Zone	Total FSAID VII Agricultural Acres	Agricultural Acres Enrolled	% of Agricultural Acreage Enrolled
A	5,683	327	6
B	1,573	74	5
Total	7,256	401	6

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 7** summarizes the results of that analysis.

Table 7. Summary of unenrolled agricultural land use acreage in the NIRL 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	6,855
Acres identified within slivers of unenrolled agricultural areas	164
Lands without enrollable agricultural activity (e.g., tribal lands, residential development, and parcels with Florida Department of Revenue (DOR) use codes 70-98)	1,515
Total lands with potentially enrollable agricultural activities	5,176

As of July 2020, OAWP had enrolled 401 agricultural acres in BMPs. Considering the results of the analysis shown in **Table 7**, the total acreage with the potential to have agricultural activities that can be enrolled in the FDACS BMP Program in the watershed is 5,577 acres. Using this adjusted agricultural acreage, 7 % of agricultural acres have been enrolled.

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 intensive operations, including irrigated acreage, dairies and nurseries, parcels greater than 50 acres in size, and 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 NIRL subbasin, 85 acres of aquaculture are estimated to be 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. Since the acreages were not delineated to just the tank, pond, or pool areas, in most cases these calculations overestimate the acreages of aquaculture activity.

1.2.1.2. 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 NIRL as of September 2020.

PHASE II MS4 STORMWATER PERMIT REQUIREMENTS

Table 8 lists the Phase II MS4s in the NIRL 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.

- o Develop and implement requirements for construction site operators to implement appropriate erosion and sediment control BMPs.
- o 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.
- o Develop and implement procedures for site plan review that incorporate the consideration of potential water quality impacts.
- o Develop and implement procedures for receiving and considering information submitted by the public.
- o 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 8**.

Table 8. Entities in the NIRL designated as Phase II MS4s as of September 2020

Permittee	Permit Number
Brevard County	FLR04E052
Volusia County	FLR04E033
City of Cocoa	FLR04E032
City of Edgewater	FLR04E016
City of Melbourne	FLR04E027
City of Oak Hill	FLR04E130
City of Rockledge	FLR04E047
City of Titusville	FLR04E079
Town of Indialantic	FLR04E030
Florida Department of Transportation (FDOT) District 5	FLR04E024

1.2.1.3. Septic Systems

Based on data from the Florida Department of Health (FDOH) Florida Water Management Inventory (FLWMI), there are 16,171 known or likely septic systems (onsite sewage treatment and disposal systems [OSTDS]) located throughout the NIRL (**Figure 2**). **Table 9** summarizes the number of septic systems by project zone.

Table 9. Septic system counts by project zone

NIRL Project Zone	Total Number of Septic Systems
A	1,998
B	14,173
Total	16,171

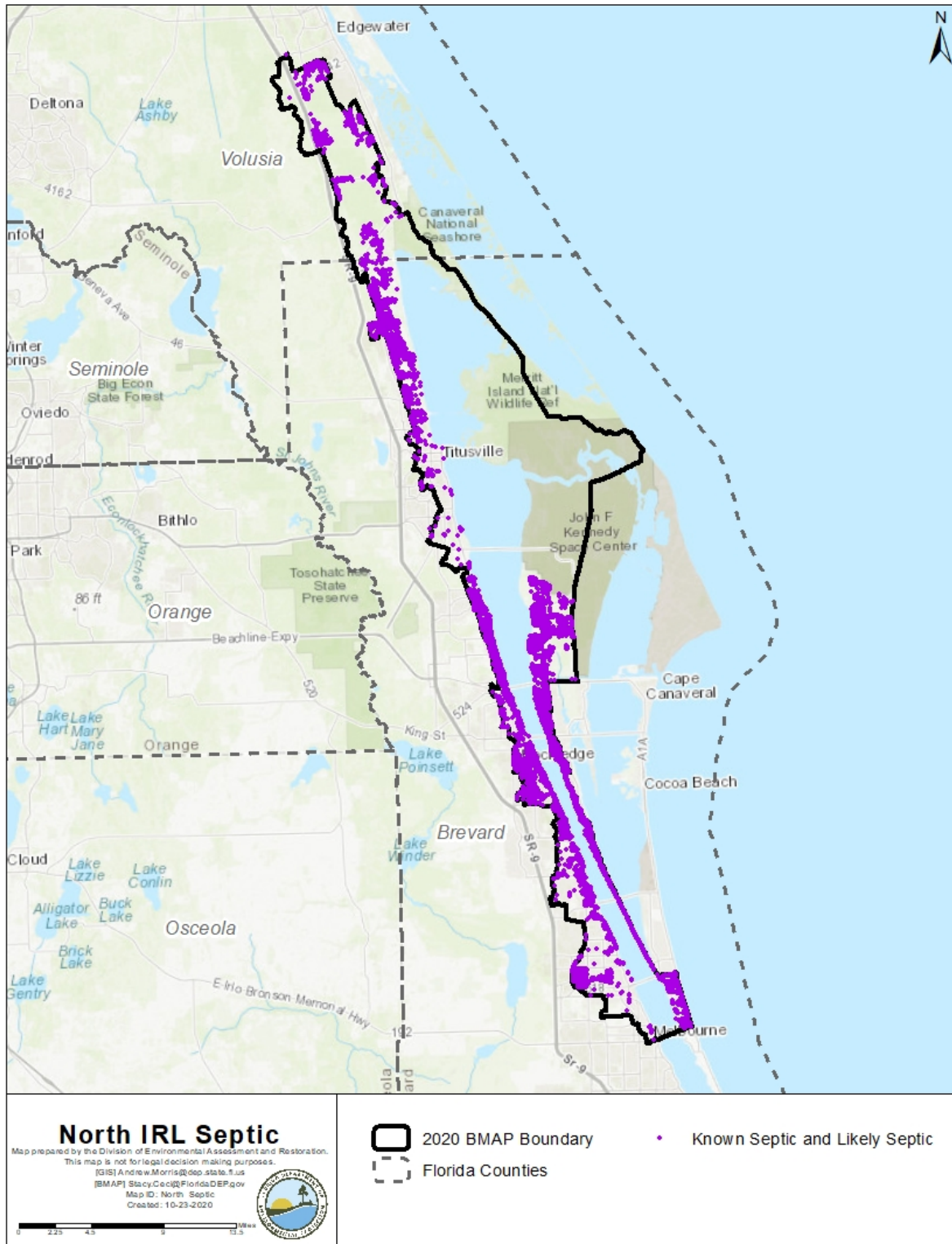


Figure 2. Location of septic systems in the NIRL

1.2.1.4. 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 10** lists the urban nonpoint sources in the NIRL.

Table 10. Urban nonpoint sources in the NIRL

Type of Entity	Participant
Government Entities and Special Districts	Kennedy Space Center

1.2.1.5. Wastewater Treatment Facilities (WWTFs)

As of September 2020, DEP identified 18 individually permitted wastewater facilities or activities in the NIRL Subbasin. A list of wastewater facilities in the NIRL as of September 2020 is provided in **Table 11**, and a map of their locations is shown in **Figure 3**.

Table 11. Wastewater facilities in the NIRL as of September 2020

FPL = Florida Power and Light; RV = Recreational vehicle; VC = Volusia County; BCUD = Brevard County Utility District

Facility ID	Facility Name
FL0001473	FPL - Cape Canaveral Power Plant
FL0021521	Cocoa, City of - Cocoa Water Reclamation Facility
FL0021571	Rockledge, City Of
FL0103268	Titusville, City of - North - Osprey WWTF
FLA010264	Housing Authority of Brevard County WWTF
FLA010323	David B Lee Wastewater Treatment Plant
FLA010336	Orlando Utilities Commission - Indian River Plant
FLA010354	Canebreaker Condo
FLA010355	Tropical Trail Village WWTF
FLA010358	Willow Lakes RV Park WWTF
FLA010361	River Forest Mobile Home Park WWTF
FLA010365	Palm Harbor Mobile Home Park WWTF
FLA010375	Oak Point Mobile Home Park WWTF
FLA010377	Merritt Island Utility Company WWTF
FLA010383	Riverview Mobile Home & RV Park
FLA011175	Magnolia Village WWTF
FLA017413	VC/Southeast WWTF-7
FLA102695	BCUD/Sykes Creek Regional WWTF

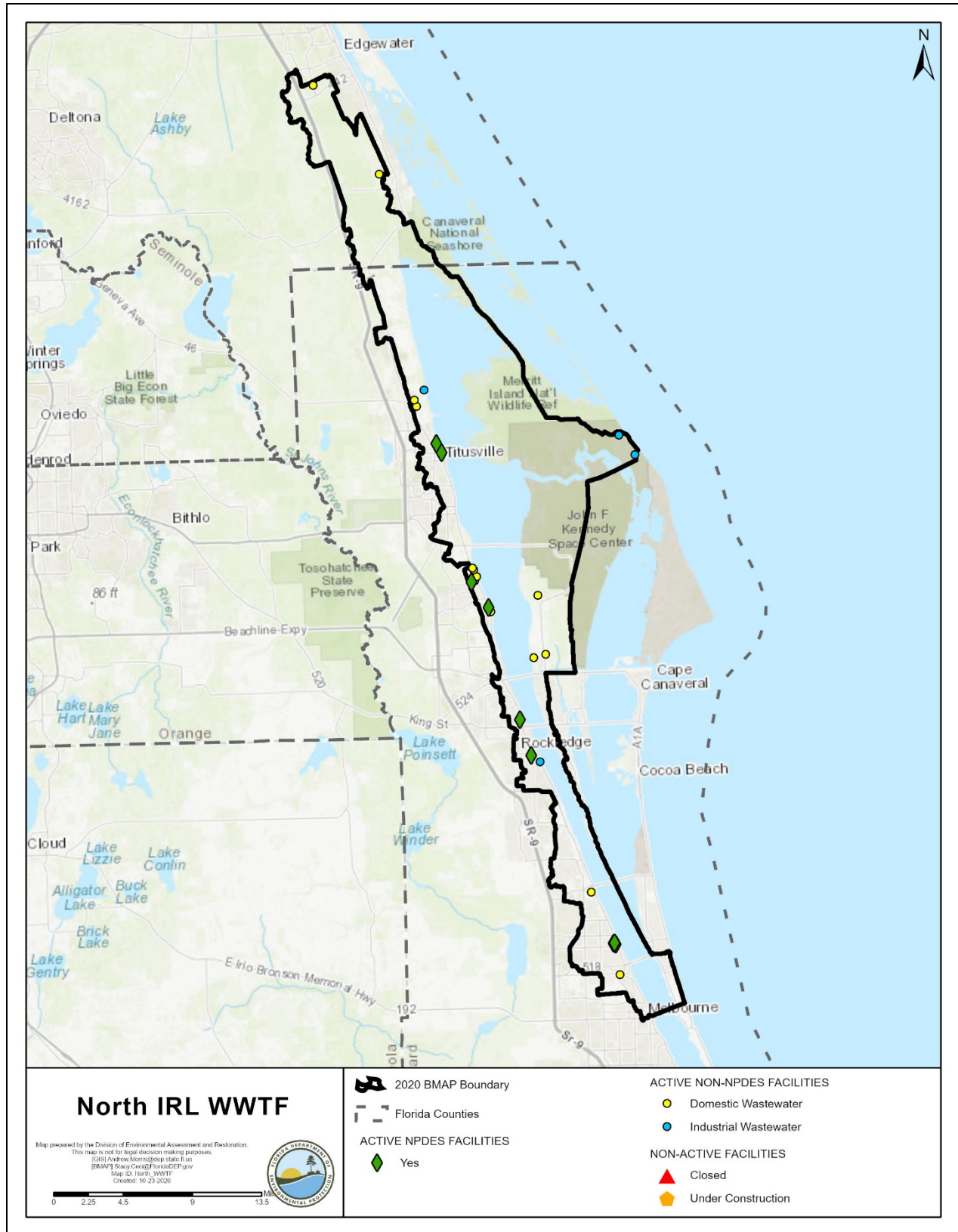


Figure 3. Map of wastewater facilities in the NIRL

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: 55 % or 138,872 pounds per year (lbs/yr) of TN and 24,856 lbs/yr of TP. Based on model revisions, reset 10-year and 15-year milestones, as needed.
- 10-year milestone in 2030: 80 % or 201,996 lbs/yr of TN and 36,154 lbs/yr of TP.
- 15-year milestone in 2035: 100 % or 252,495 lbs/yr of TN and 45,193 lbs/yr of TP.

By the next milestone in 2025, at least 55 % of the TN and 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 NIRL 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 NIRL and other nearby waterbodies (the Banana River Lagoon [BRL], Central Indian River Lagoon [CIRL], and Mosquito Lagoon), and water quality conditions in the NIRL 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 follow-up 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, 6,516 acres were added to the BMAP area and 904 acres removed, resulting in a net addition of 5,692 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 NIRL 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 NIRL. In the 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 NIRL; 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.

- **Tributary Water Quality Impairments** – DEP has identified nutrient and DO impairments in many of the NIRL tributaries but has not yet set water quality targets with TMDLs. These waters include Turnbull Creek marine (WBID 2942A), Turnbull Creek freshwater (WBID 2942B), and Horse Creek (WBID 3081). The relationship between the tributary loads and the targets set for the lagoon proper will be defined as tributary TMDLs are developed. As a general principle, when DEP establishes upstream TMDLs, downstream water quality targets are considered. In this case, when DEP establishes NIRL tributary TMDLs, meeting the lagoon's seagrass depth targets will be considered. Future tributary TMDLs may allow the targeting of specific watersheds for nutrient load reductions.

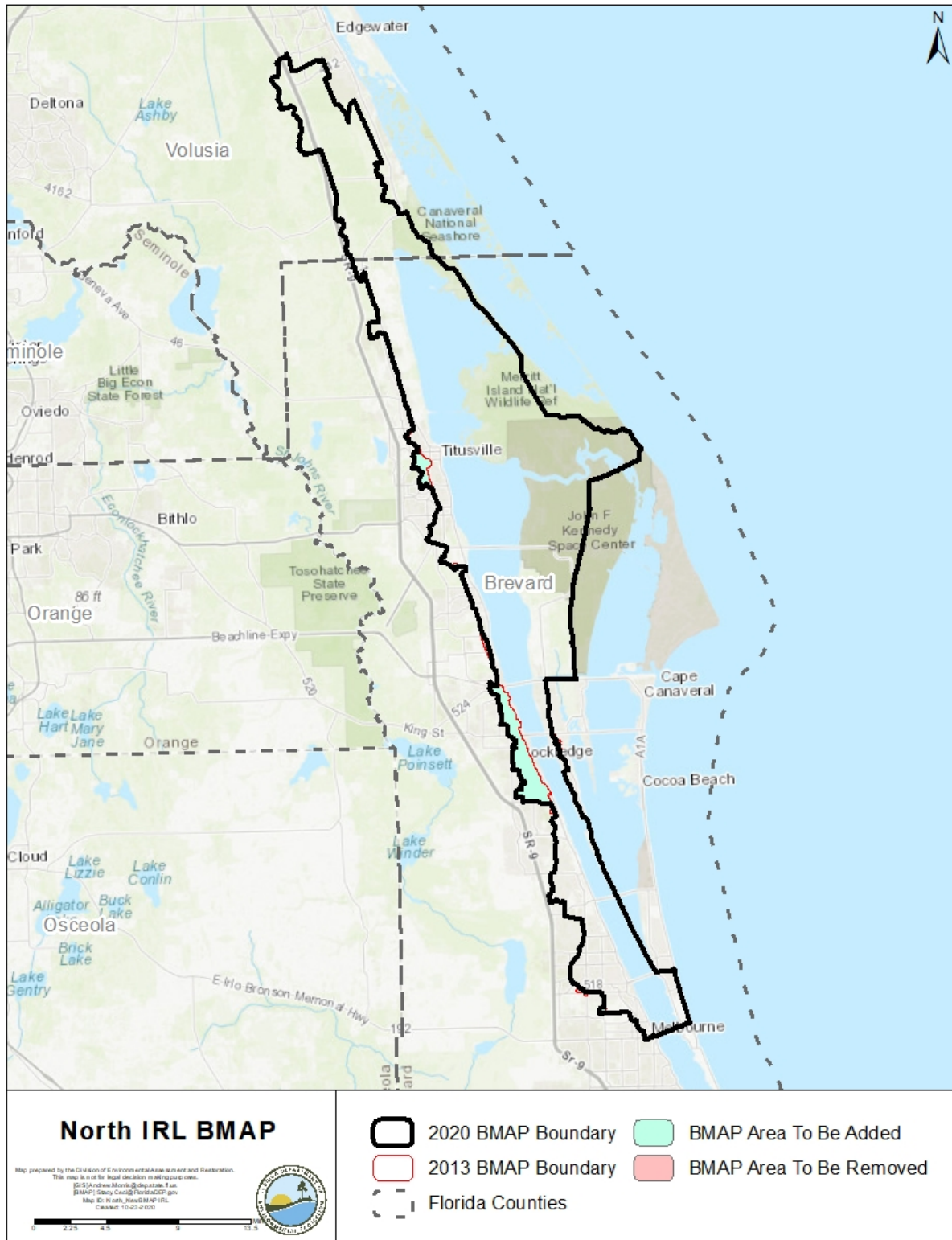


Figure 4. 2013 BMAP area boundary and 2020 BMAP area boundary

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**.

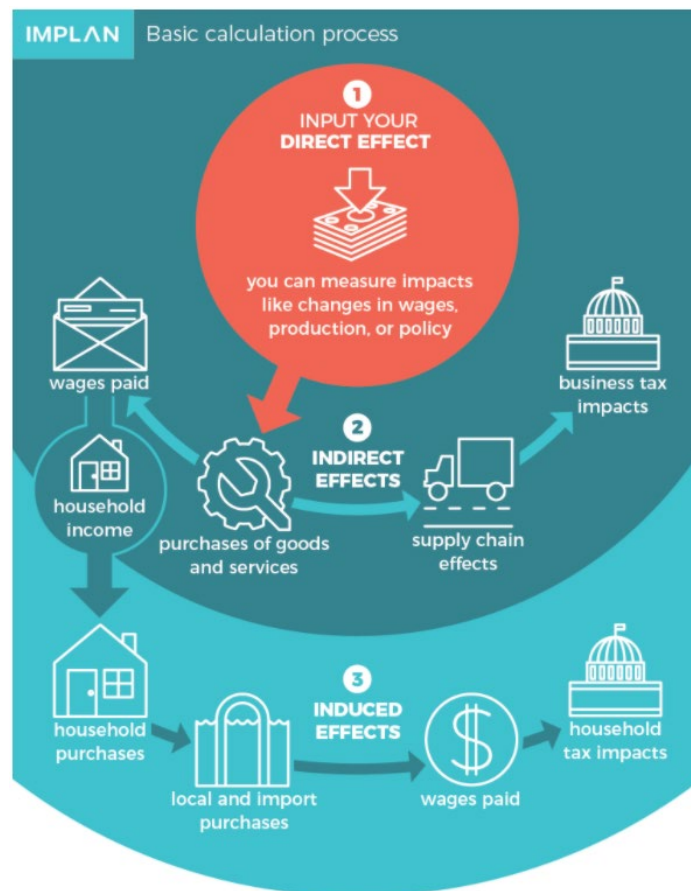


Figure 5. IMPLAN Model calculation process

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**.

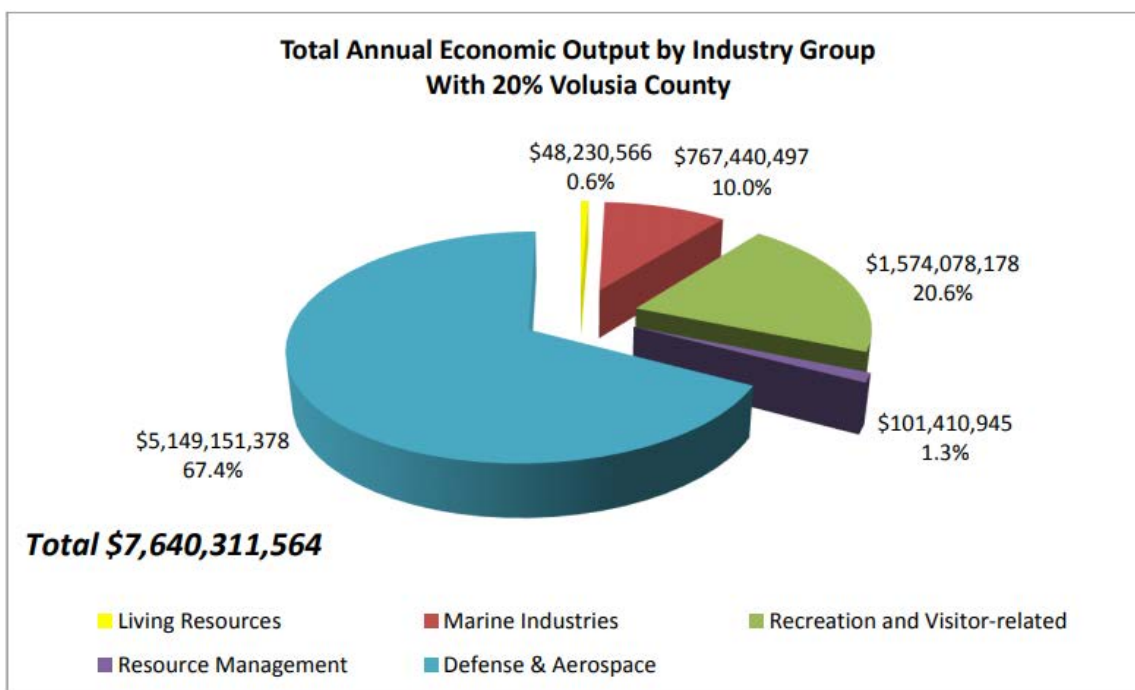


Figure 6. Total annual economic output by industry group in the IRL region, 2014

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 efforts, 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 Central IRL 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, CDD's, 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 IR1-5 and IR1-8 EauGallie.

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 BMAP area, the required reductions were added together to determine that entity's total required reductions for the project zone.

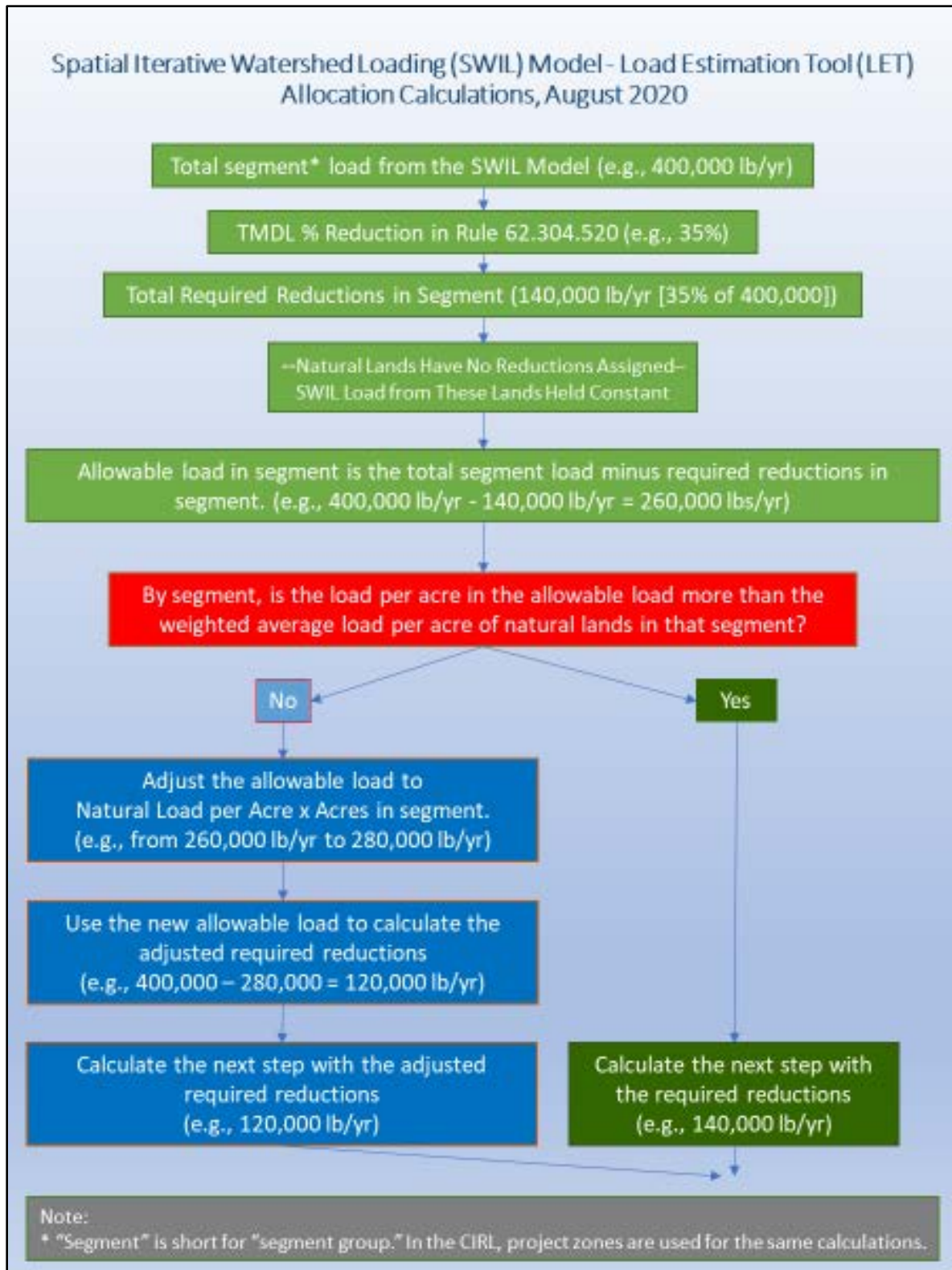


Figure 7. Flow chart of the allocation steps, page 1 of 2



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

The SWIL Model starting loads for each project zone are described in **Table 12**.

Table 12. SWIL Model starting loads (lbs/yr)

Project Zone	Starting TN Load	% Total Load TN	Starting TP Load	% Total Load TP
A	399,161	53	46,021	48
B	359,923	47	50,203	52
Totals	759,084	100.00	96,224	100.00

Low-Priority Ranking Determination

Several stakeholders contribute less than 0.30 % of both the TN and TP loading from the watershed to the NIRL. 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 13 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 the City of Oak Hill. 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 13. Entity contributions to total TN and TP starting loads with low priority ranking cutoff

*Indicates the stakeholder meets the requirements for low priority.

N/A = Not applicable

Entity	Starting TN Load (lbs/yr)	Anthropogenic % TN in BMAP	Starting TP Load (lbs/yr)	Anthropogenic % TP in BMAP
Brevard County	178,194	38.86	26,588	39.70
City of Melbourne	77,791	16.97	11,420	17.05
City of Titusville	56,775	12.38	8,264	12.34
Agricultural Producers	38,099	8.31	5,750	8.59
City of Rockledge	27,669	6.03	3,982	5.95
Volusia County	23,029	5.02	3,309	4.94
City of Cocoa	18,189	3.97	2,645	3.95
Kennedy Space Center	18,271	3.98	2,251	3.36
FDOT District 5	13,893	3.03	1,825	2.73
City of Edgewater	2,704	0.59	361	0.54
Town of Palm Shores	1,924	0.42	276	0.41
Town of Indialantic	1,623	0.35	244	0.36
City of Oak Hill*	371	0.08	49	0.07
Total of Allocated Entities	458,532	100.00	66,964	100.00
Natural Lands	300,552	N/A	29,259	N/A
Total of BMAP	759,084	N/A	96,224	N/A

2.2.2.2 Required Reductions

The TN and TP reductions required by each entity are shown in **Table 14** and **Table 15**, respectively.

Table 14. TN 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	Project Zone A	Project Zone B	Total
Brevard County	27,759	64,506	92,265
City of Melbourne	0	34,378	34,378
City of Titusville	37,334	2,619	39,953
Agricultural Producers	20,550	4,714	25,264
City of Rockledge	0	11,322	11,322
Volusia County	16,679	0	16,679
Kennedy Space Center	9,730	2,423	12,153
City of Cocoa	0	8,837	8,837
FDOT District 5	4,325	3,640	7,965
City of Edgewater	1,959	0	1,959
Town of Palm Shores	0	787	787
Town of Indialantic	0	664	664
City of Oak Hill*	269	0	N/A
Total	118,604**	133,891**	252,226

Table 15. 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	Project Zone A	Project Zone B	Total
Brevard County	4,809	12,667	17,476
City of Melbourne	0	6,292	6,292
City of Titusville	6,224	474	6,698
Agricultural	3,522	958	4,480
City of Rockledge	0	2,135	2,135
Volusia County	2,724	0	2,724
Kennedy Space	1,422	353	1,775
City of Cocoa	0	1,726	1,726
FDOT District 5	631	641	1,272
City of Edgewater	297	0	297
Town of Palm Shores	0	148	148
Town of Indialantic	0	131	131
City of Oak Hill*	40	0	0
Total	19,669**	25,524**	45,154

2.3 Basinwide Sources Approach

The basinwide sources approach involves tailoring management strategies to the primary sources of anthropogenic nutrient loading throughout the NIRL 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. Enrollment is 6 % of agricultural acres identified in the BMAP (see **Appendix C**). FDACS is undertaking efforts to transmit enrollment notifications to producers and landowners on identified agricultural lands within the BMAP area, 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 C**. 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.

It is anticipated that additional enrollment in agricultural BMPs, along with more frequent implementation verification site visits by FDACS, will increase nutrient reductions from agricultural nonpoint sources. However, further reductions, beyond the implementation of required owner-implemented BMPs currently required by the FDACS manuals, may be necessary to achieve the TMDLs. 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., sewerage, 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 16,171 known and likely septic systems located throughout the NIRL Subbasin **Table 9** summarizes the count of septic systems by project zone.

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 NIRL, 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 18 individually permitted wastewater facilities or activities in the NIRL 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 NIRL as of September 2020 is provided in **Table 11**, 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 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 16** and **Table 17**, 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 16 and **Table 17** 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 NIRL Subbasin and are not subject to the limits in **Table 16** and **Table 17**. Intermittent, rainfall-driven, diffuse overflow releases of wastewater from ponds or basins designed to hold precipitation from, 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 16** and **Table 17**. 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 16** and **Table 17**. 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 16. 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 17. 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 16** and **Table 17**.

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 NIRL 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 NIRL. 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 NIRL 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.

In addition to the SJRWMD water quality monitoring stations, Volusia County collects water quality data at three stations in the NIRL, and the U.S. Geological Survey (USGS) collects flow data at two stations. **Table 18** lists the stations that SJRWMD, Volusia County, and USGS currently sample in the NIRL BMAP; these stations are shown by project zone in **Figure 9** and **Figure 10**. Generally data are collected from three types of stations: flow stations where volume is primarily determined; tributary water quality stations near the junction of tributaries where parameters are sampled as these waters mix with the lagoon; and lagoon water quality stations that measure parameters in the lagoon itself.

Table 18. Water quality monitoring stations in the NIRL BMAP area

Entity	Station ID	Project Zone	Status	Latitude	Longitude	Station Type	Frequency
SJRWMD	IRLBFRR	NIRL-A	Active	28.7553	-80.8461	Tributary	Monthly
SJRWMD	IRLI02	NIRL-A	Active	28.7370	-80.8007	Lagoon	Monthly
SJRWMD	IRLI06	NIRL-A	Active	28.6358	-80.8020	Lagoon	Monthly
SJRWMD	IRLI07	NIRL-A	Active	28.6035	-80.7984	Lagoon	Monthly
SJRWMD	IRLI09E	NIRL-A	Active	28.5564	-80.7416	Lagoon	Monthly
USGS	02248380	NIRL-A	Active	28.7362	-80.7546	Flow	Continuous
Volusia	ODIX	NIRL-A	Active	28.8051	-80.8604	Tributary	Bi-monthly
SJRWMD	IRLTBC	NIRL-A	Active	28.8209	-80.8601	Tributary	Monthly
Volusia	TC2	NIRL-A	Active	28.8252	-80.8572	Tributary	Bimonthly
SJRWMD	IRLEGU	NIRL-B	Active	28.1243	-80.6308	Tributary	Monthly
SJRWMD	IRLI10	NIRL-B	Active	28.5012	-80.7686	Lagoon	Monthly
SJRWMD	IRLI13	NIRL-B	Active	28.3931	-80.7359	Lagoon	Monthly
SJRWMD	IRLI15	NIRL-B	Active	28.3353	-80.7131	Lagoon	Monthly
SJRWMD	IRLI16	NIRL-B	Active	28.2778	-80.6767	Lagoon	Monthly
SJRWMD	IRLI18	NIRL-B	Active	28.1949	-80.6487	Lagoon	Monthly
SJRWMD	IRLI21	NIRL-B	Active	28.1253	-80.6165	Lagoon	Monthly
SJRWMD	IRLUPEGWR	NIRL-B	Active	28.1270	-80.6454	Tributary	Monthly
SJRWMD	IRLUPHC	NIRL-B	Active	28.1612	-80.6554	Tributary	Monthly
USGS	02249007	NIRL-B	Active	28.1270	-80.6454	Flow	Continuous

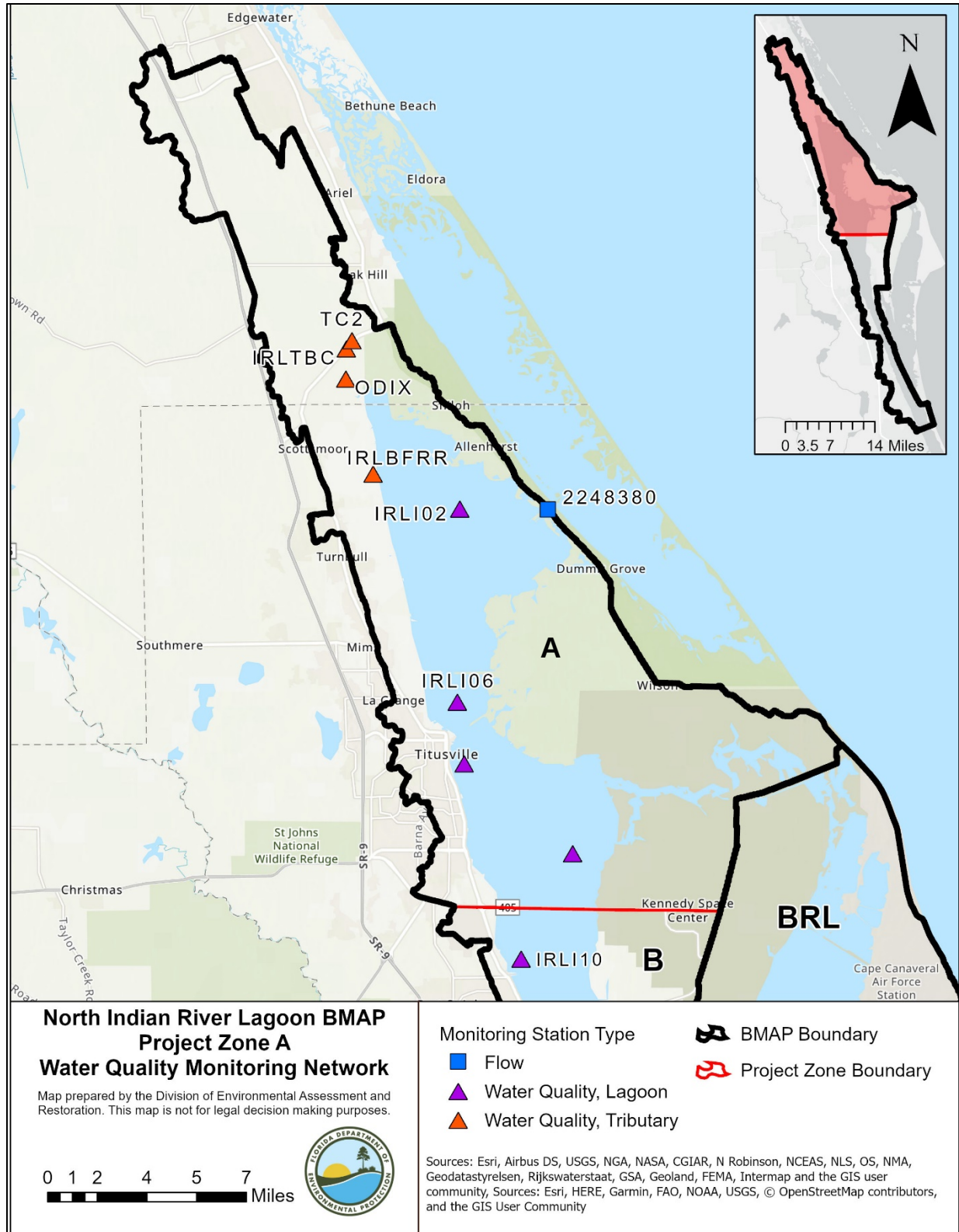


Figure 9. Monitoring network in NIRL Project Zone A

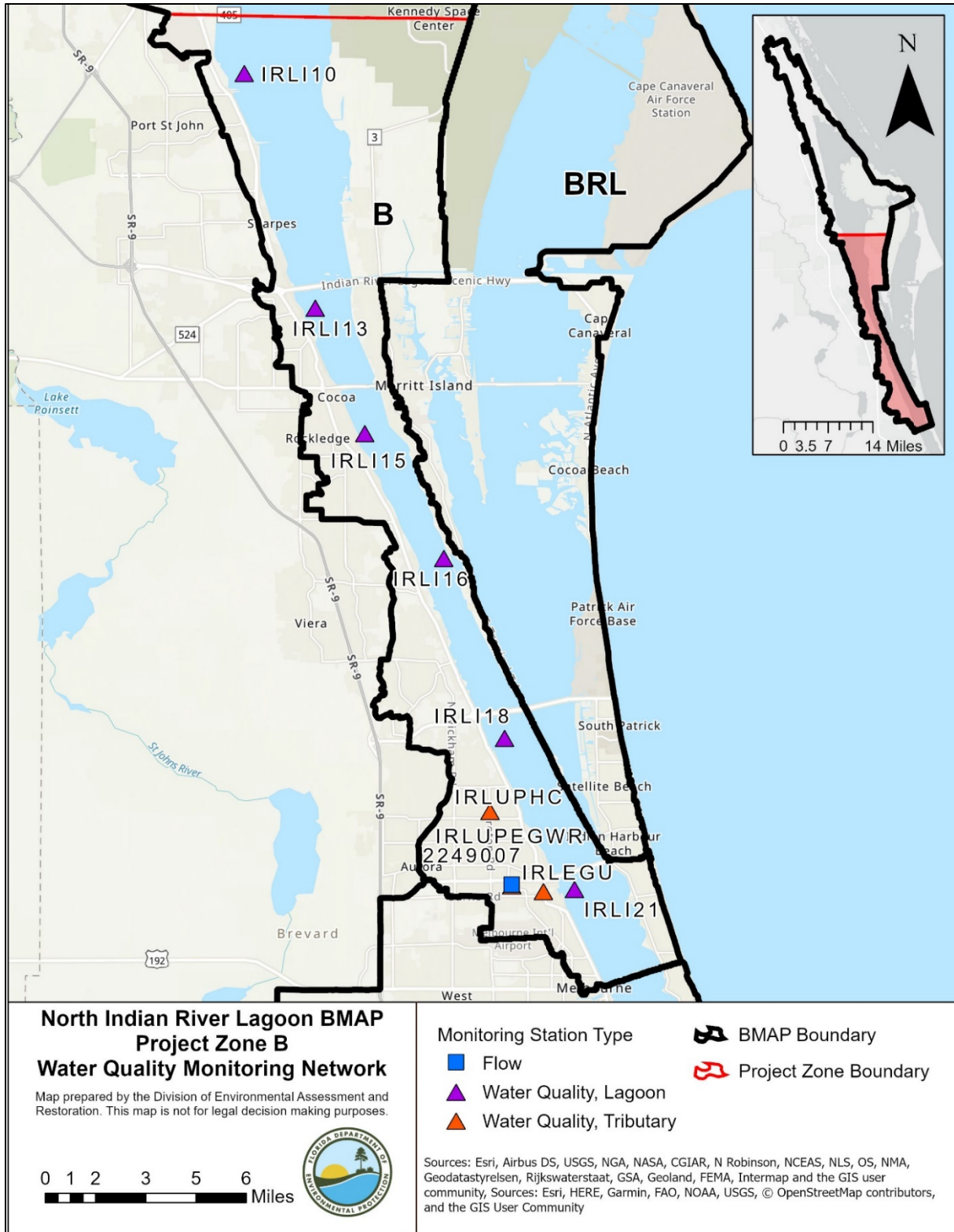


Figure 10. Monitoring network in NIRL Project Zone B

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 on 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 NIRL. 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. Project Zones

Section 3.1 and **Section 3.2** provide specific land use and project information on the two project zones in the NIRL. All projects identified as part of this BMAP are listed by project zone. 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.

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 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").

3.1 Project Zone A

Project Zone A covers more than 91,000 acres of the NIRL BMAP area. As shown in **Table 19**, wetlands make up 47.9 % of the project zone, followed by urban areas with 15.0 %. Stakeholders in Project Zone A are Volusia County, Brevard County, FDOT District 5, City of Edgewater, City of Oak Hill, City of Titusville, and Kennedy Space Center.

Table 19. Summary of land uses in Project Zone A

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	13,707	15.0
2000	Agricultural	5,223	5.7
3000	Upland Prairie and Shrublands	12,752	13.9
4000	Upland Forested Areas	9,363	10.2
5000	Water	4,453	4.9
6000	Wetlands	43,880	47.9

Level 1 Land Use Code	Land Use Description	Acres	% Total
7000	Disturbed Lands	715	0.8
8000	Transportation	1,464	1.6
Total		91,557	100.0

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 11** and **Figure 12** show progress towards the required TN and TP load reductions allocated to Project Zone A from projects completed through July 31, 2020.

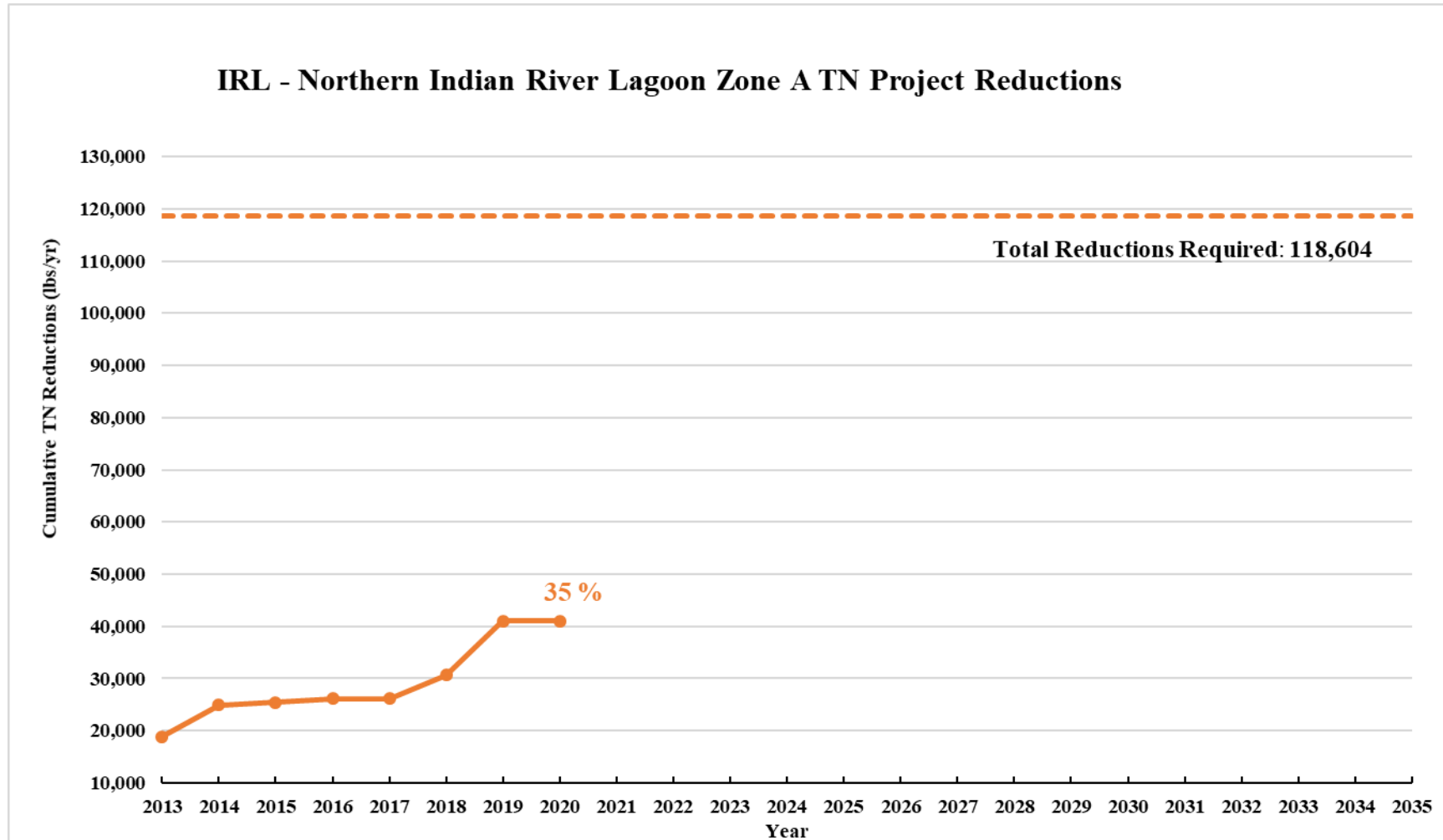


Figure 11. Estimated progress towards meeting the required TN reductions allocated to NIRL Project Zone A with projects completed through July 31, 2020

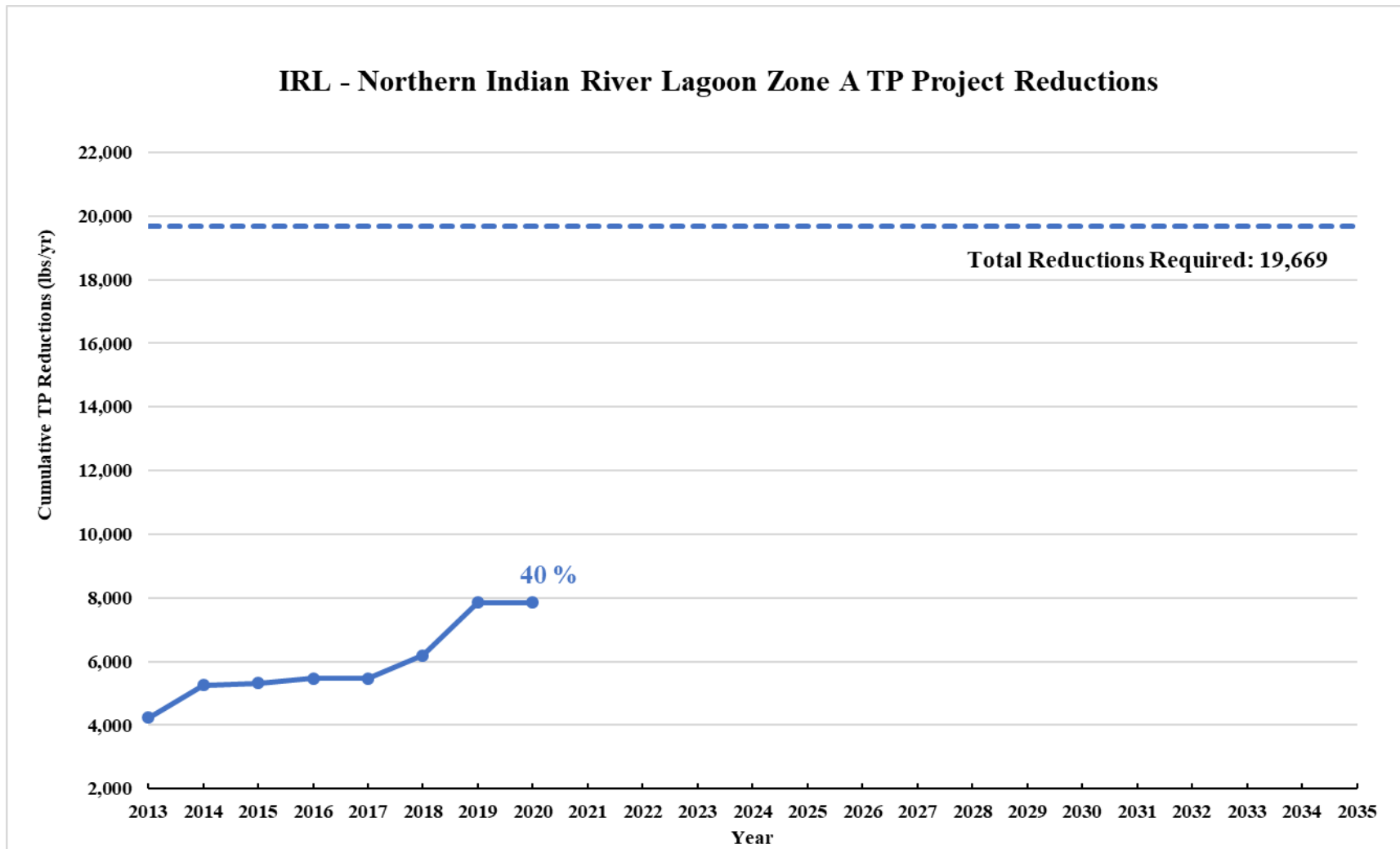


Figure 12. Estimated progress towards meeting the required TP reductions allocated to NIRL Project Zone A with projects completed through July 31, 2020

3.1.1. NIRL Project Zone A Existing and Planned Projects

Table 20 summarizes the existing and planned projects provided by the stakeholders for Project Zone A.

Table 20. Existing and planned projects in Project Zone 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
FDACS	N/A	FDACS-01	Credit for Changes in Land Use	Credit for changes in land use. Project canceled in 2020 since land use changes were incorporated into the load estimation tool (LET).	Land Use Change	Canceled	N/A	N/A	N/A	A	N/A	N/A	N/A	N/A	N/A	N/A
FDACS	Agricultural Producers	FDACS-03	BMP Implementation and Verification	Enrollment and verification of BMPs by agricultural producers. Acres treated based on FDACS OAWP July 2020 Enrollment and FSAID VII. Reductions based on SWIL Model-LET.	Agricultural BMPs	Ongoing	N/A	199.2484	28.57038	A	211.2176	TBD	TBD	FDACS	TBD	N/A
FDACS	Not provided	FDACS-05	FDACS Cost Share Projects	Cost-share projects paid for by FDACS. Acres treated based on FDACS OAWP July 2020 Enrollment. Reductions based on SWIL Model-LET.	Agricultural BMPs	Ongoing	N/A	0	0	A	TBD	TBD	TBD	FDACS	TBD	N/A
Brevard County	N/A	BC-001	Old Dixie Highway 601	Sediment trap.	BMP Cleanout	Ongoing	2014	Not provided	Not provided	A	Not provided	2000	2000	County	County - \$2,000	N/A
Brevard County	DEP/ Titusville	BC-002	Chain of Lakes Pond	Wet detention Regional Pond.	Wet Detention Pond	Completed	2010	3530.485	945.2629	A	1072.5	2051405	Not provided	DEP	Not provided	WM804

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	West Melbourne/ Grant-Valkaria/ Malabar/ Melbourne/ Cocoa/ Indian Harbour Beach (IHB)/ Satellite Beach/ Cocoa Beach/ Cape Canaveral	BC-003	Education Efforts	FYN; landscape, irrigation, fertilizer, and pet waste ordinances; PSAs; pamphlets; website, Illicit Discharge Program.	Education Efforts	Ongoing	N/A	2299.68	350.52	A	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	TBD	BC-004	Scottsmeer I	Advanced denitrification and baffle box treatment train.	BMP Treatment Train	Underway	TBD	1602.542	435.2317	A	530.9	601664	1000	Legislative Funds	Legislative Funds - \$286,648	LP05118
Brevard County	DEP/ City of Titusville	BC-005	Chain of Lakes Southern Expansion Phase 1	Completion of additional detention.	Wet Detention Pond	Completed	2014	284.4301	317.1718	A	575.2	3200000	1000	DEP	Not provided	S0620
Brevard County	Not provided	BC-006	Chain of Lakes Reuse	Installing reuse from the pond.	Stormwater Reuse	Completed	2005	TBD	TBD	A	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	TBD	BC-007	Scottsmeer C	Advanced denitrification and baffle box treatment train.	BMP Treatment Train	Underway	2019	1008.8	265.2656	A	463	TBD	1000	Legislative Funds	Legislative Funds - \$33,7043	LP05114
Brevard County	Not provided	BC-058	Street Sweeping	Monthly street sweeping.	Street Sweeping	Ongoing	N/A	110	71	A	N/A	N/A	21000	County	N/A	N/A
Brevard County	N/A	BC-059	Baffle Box/Sediment Trap Cleaning	Quarterly baffle box/sediment trap cleaning.	BMP Cleanout	Ongoing	2015	Not provided	Not provided	A	N/A	250000	250000	County	County - \$250,000	N/A
Brevard County	DEP	BC-060	Huntington Road	Installation of vegetative floating island into an exiting detention pond.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2016	248.562	37.9331	A	354.6415	45788	9997.5	DEP/County	Not provided	G0430
Brevard County	SOIRL	BC-074	Flounder Creek Pond Denitrification Retrofit	Stormwater traditional BMP.	Biosorption Activated Media (BAM)	Planned	TBD	TBD	TBD	A	320	157500	12307.5	Not provided	Not provided	N/A
Brevard County	Not provided	BC-075	Huntington Creek Pond Denitrification Retrofit	Not provided.	Biosorption Activated Media (BAM)	Planned	TBD	TBD	TBD	A	355	180000	16662.5	Not provided	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	All Cities	BC-081	Education Efforts	Fertilizer video, rain barrel workshops, Facebook page, bus wrap, and billboard.	Education Efforts	Ongoing	N/A	N/A	N/A	A	N/A	50000	TBD	SOIRL	SOIRL - \$50,000	N/A
Brevard County	N/A	BC-092	Baffle Box/Sediment Trap Cleaning	Increasing cleanout frequency to quarterly.	BMP Cleanout	Ongoing	N/A	1	1	A	N/A	Not provided	276303.3	County	Not provided	N/A
Brevard County	SOIRL	BC-094	Johns Rd Pond BAM - BB#62 (Actually located in 51)	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	A	Not provided	172000	Not provided	LF/SOIRL	58030	N/A
Brevard County	SOIRL	BC-095	Burkholm Rd BAM - BB#100	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	A	Not provided	161000	Not provided	LF/SOIRL	99390	N/A
Brevard County	SOIRL	BC-096	Carter Rd BAM- BB#115	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	A	Not provided	176000	Not provided	LF/SOIRL	97510	N/A
Brevard County	SOIRL	BC-097	Wiley Rd BAM - BB#193	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	A	Not provided	179000	Not provided	LF/SOIRL	117735	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-098	Broadway Pond BAM - BB#832	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	A	Not provided	290000	Not provided	LF/SOIRL	77864	N/A
Brevard County	SOIRL/ MRC	BC-101	Grass Clippings Campaign Phase 1	Not provided.	Enhanced Public Education	Ongoing	2019	N/A	N/A	A	N/A	6667	N/A	SOIRL	SOIRL - \$20,000	N/A
Brevard County	SOIRL	BC-102	Education Efforts	Fertilizer, grass clippings, and septic system maintenance.	Enhanced Public Education	Ongoing	N/A	N/A	N/A	A	Not provided	375000	Not provided	SOIRL	SOIRL - \$375,000	N/A
Brevard County	SOIRL	BC-103	Mims Muck Removal: Outflow Water Nutrient Removal	Not provided.	Muck Removal/Restoration Dredging	Underway	TBD	TBD	TBD	A	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	LF/ SOIRL	BC-104	Countyline Ditch Road - BB#10	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	A	Not provided	200000	Not provided	LF/SOIRL	107773	N/A
Brevard County	LF/ SOIRL	BC-105	BB#141	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	A	Not provided	164000	Not provided	LF/SOIRL	104174	N/A
Brevard County	LF	BC-106	Huntington Road BAM - BB#22	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	A	Not provided	TBD	Not provided	LF/SOIRL	35000	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	Not provided	BC-107	Sunste Ave BAM - BB#26	Adding a media to remove nitrogen by denitrification. The media will be added to the side slope of the pond or the bottom of the swale.	Biosorption Activated Media (BAM)	Underway	2021	TBD	TBD	A	Not provided	TBD	Not provided	Not provided	Not provided	N/A
City of Titusville	SOIRL	BC-83	Stormwater Project - NIRL - Titusville - St. Teresa Basin	SOIRL-19.	Baffle Boxes-Second Generation	Completed	2019	TBD	TBD	A	758.0605	375250	Not provided	DEP TMDL	DEP TMDL - \$272,800	N/A
City of Titusville	SOIRL	BC-84	Stormwater Project - NIRL - Titusville - South St Basin	SOIRL-20.	Baffle Boxes-Second Generation	Completed	2019	TBD	TBD	A	202.25	475125	Not provided	DEP TMDL	DEP TMDL - \$86,856	NF025
City of Titusville	SOIRL	BC-85	Stormwater Project - NIRL - Titusville - La Paloma Basin	SOIRL-21.	Baffle Boxes-Second Generation	Completed	2019	TBD	TBD	A	554.8	375250	Not provided	DEP TMDL	DEP TMDL - \$208,296	N/A
City of Titusville	SOIRL	BC-89	Wastewater Treatment Facility Upgrade- NIRL-Titusville	SOIRL-02.	WWTF Upgrade	Planned	2022	TBD	N/A	A	Not provided	8000000	Not provided	SOIRL/ City	8000000	N/A
City of Titusville	SOIRL	BC-99	Coleman Pond MAPS	Installation of floating islands within a 1 acre City owned pond located within the Chain of Lakes basin.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2019	TBD	TBD	A	750	35000	Not provided	SOIRL	SOIRL - \$11,437.5	N/A
City of Edgewater	Not provided	EW-1	Education Efforts	FYN; landscape, irrigation, fertilizer, and pet waste ordinances; PSAs; pamphlets; website, Illicit Discharge Program.	Education Efforts	Ongoing	N/A	162.2	21.7	A	N/A	Not provided	15000	Not provided	Not provided	N/A
FDOT District 5	N/A	FDOT-01	Education Efforts	IDDE training, brochures, and NDPEs flyer.	Education Efforts	Ongoing	N/A	59.72	7.66	A	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-02	Street Sweeping	Street Sweeping	Street Sweeping	Ongoing	N/A	185	119	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 use along the rights-of-way.	Fertilizer Cessation	Completed	2005	595	0	A	N/A	Not provided	Not provided	Florida Legislature	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
FDOT District 5	N/A	FDOT-23	FM 406869-4 79000-4068694-02 Pond 12B	Six lane Brevard C/L to SR44	Wet Detention Pond	Completed	2016	0.351767	0.082338	A	TBD	N/A	N/A	Florida Legislature	N/A	N/A
FDOT District 5	N/A	FDOT-24	FM 406869-4 79000-4068694-04 Swales	Six lane Brevard C/L to SR44	Grass swales without swale blocks or raised culverts	Completed	2016	136.2083	17.02499	A	TBD	N/A	N/A	Florida Legislature	N/A	N/A
FDOT District 5	N/A	FDOT-25	FM240812 79210-3505-01 WRA B	Add lanes/reconstruct from I-95 to Air Park Rd.	Wet Detention Pond	Completed	2006	8.766934	2.479871	A	TBD	N/A	N/A	Florida Legislature	N/A	N/A
FDOT District 5	N/A	FDOT-26	FM240812 79210-3505-02 Pond C	Add lanes/reconstruct from I-95 to Air Park Rd.	Dry Detention Pond	Completed	2006	8.235103	0.96799	A	TBD	N/A	N/A	Florida Legislature	N/A	N/A
FDOT District 5	N/A	FDOT-27	FM240812 79210-3505-03 Pond D	Add lanes/reconstruct from I-95 to Air Park Rd.	Dry Detention Pond	Completed	2006	9.86142	1.197754	A	TBD	N/A	N/A	Florida Legislature	N/A	N/A
FDOT District 5	N/A	FDOT-28	FM240811 79210-3504-01 Pond 1	Add lanes/reconstruct from Air Park Rd to US 1.	Wet Detention Pond	Completed	2006	4.535713	1.60398	A	TBD	N/A	N/A	Florida Legislature	N/A	N/A
Kennedy Space Center	Not provided	KSC-01	Landscape Fertilizer Reduction	Fertilizer use reduced from 60 tons/year in 2000 to 20 tons/year in 2010; formula changed from rapid nitrogen release 16-4-8 to slow nitrogen release, phosphate-free 15-0-15.	Fertilizer Reduction	Completed	2009	312	44.2	A	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-02	Citrus Grove Termination Roberts Road	Grove lease termination resulted in abandonment of previously fertilized areas.	Land Use Change	Completed	2010	TBD	TBD	A	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-03	Citrus Grove Termination Schwartz Road	Grove lease termination resulted in abandonment of previously fertilized areas. Accounted for in 2020 BMAP update.	Land Use Change	Canceled	2010	N/A	N/A	A	Not provided	Not provided	Not provided	Not provided	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
Kennedy Space Center	N/A	KSC-04	Storage Building L5-0734	Demolition of facility resulted in loss of impervious area and change of land use.	Land Use Change	Completed	2010	TBD	TBD	A	N/A	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	N/A	KSC-05	Support Building L5-0683	Demolition of facility resulted in loss of impervious area and change of land use.	Land Use Change	Completed	2010	TBD	TBD	A	0.2	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-06	Shuttle Landing Facility - missing from model	Runoff is captured and treated before discharging to the lagoon.	Wet Detention Pond	Completed	Prior to 2013	1598.265	341.0494	A	617.8	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-07	Launch Pad 39A	This area is a closed basin.	Non-contributing Basin	Completed	2014	1296.061	164.5454	A	456.5	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-08	Launch Pad 39B	This area is a closed basin.	Non-contributing Basin	Completed	2014	2587.278	287.3302	A	549	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-09	Schwartz Road Drainage System - missing from model	Closed system that ultimately drains to the northwest before discharging to an impoundment area adjacent to the lagoon.	Impoundment	Completed	2014	1714.045	228.7809	A	1614.1	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-10	Warehouse/Processing Area - missing from model	Receives treatment from permitted stormwater treatment systems.	Wet Detention Pond	Completed	2014	35.56989	7.777276	A	15.2	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-17a	NASA Parkway West	Missing from Model. Ditch along south side of NASA Parkway West, ends before the lagoon.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2014	48.71653	10.31643	A	23.87923	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	N/A	KSC-18	Demolition of Facility J6-2377	Demolition of facility resulted in loss of impervious area and change of land use.	Land Use Change	Completed	2014	TBD	TBD	A	0.1	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
Town of Indialantic	DEP	TI-04	Lily Park	Stormwater treatment.	Wet Detention Pond	Completed	2016	TBD	TBD	A	1.93	173000	500	DEP	DEP - \$65,000	LP05120
City of Titusville	Brevard County	TV-01	Area 1 Stormwater Improvements	Upsize existing storm pipes and enclose the Florida Ditch; water directed to TV-02.	Wet Detention Pond	Completed	2010	1334.346	365.1335	A	432.2	2151510	4797	City/ Brevard County	City - \$1,410,072/ County - \$470,000	N/A
City of Titusville	Brevard County/ Parrish Medical Center (PMC)/ Brevard Community College (BCC)/ SJRWMD	TV-02	Chain of Lakes Regional Stormwater Pond	Construction of a regional park featuring wetlands, treatment ponds, and recreational features.	Wet Detention Pond	Completed	2010	759.2001	191.2186	A	339.8	3521489	15620	City/ Brevard County/ SJRWMD/ PMC/ BCC	City - \$1,210,013/ County - \$1,910,709/ SJRWMD - \$577,145/ PMC - \$350,000/ BCC - \$217,500	N/A
City of Titusville	DEP/ SJRWMD	TV-03	Draa Field Stormwater Park	Water quality treatment for Area 2 drainage basin.	Wet Detention Pond	Completed	2016	394.4124	103.4624	A	105.0747	1810000	15000	DEP/ SJRWMD/ Florida Legislature/ City	DEP - \$388,825/ SJRWMD - \$366,000/ Florida Legislature - \$800,000/ City - \$255,000	G0416
City of Titusville	DEP/ SJRWMD	TV-04	St. Johns Basin Stormwater Improvements	Construction of a 3.5-acre wet detention pond to treat runoff from mixed use lands prior to discharge to the lagoon.	Wet Detention Pond	Completed	2014	81.53559	10.20378	A	882.1	2024000	8000	DEP/ Brevard County/ City	DEP - \$681,563/ County - \$141,655/ City - \$1,314,625	S0338
City of Titusville	DEP/ SJRWMD	TV-05	St. Johns Basin Stormwater Improvements	Installation of a baffle box downstream of the pond to treat runoff from mixed use lands prior to discharge to the lagoon.	Baffle Boxes- Second Generation	Completed	2011	1553.253	175.7318	A	882.1	167343	8000	DEP/ City	DEP - \$100,000/ City - \$67,343	S0338

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 Titusville	DEP/ SJRWMD/ FCT/ Florida Recreation Development Assistance Program (FRDAP)/ FDOT	TV-06	Spaceview Park	Alum treatment.	Stormwater - Alum Injection System	Completed	2007	571.3578	142.9964	A	110.6	2727394	15000	DEP/ SJRWMD/ FCT/ FRDAP/ FDOT/ City	DEP - \$981,151/ SJRWMD - \$83,600/ FCT - \$228,375/ FRDAP - \$103,956/ FDOT - \$72,195/ City - \$1,258,116	G0053
City of Titusville	N/A	TV-07	Education Efforts	Irrigation, fertilizer, pet waste management, and landscaping ordinances; pamphlets, presentations, website, Illicit Discharge Program.	Education Efforts	Ongoing	N/A	3092.94	495.84	A	N/A	N/A	5000	City	N/A	N/A
City of Titusville	N/A	TV-08	Street Sweeping	Approximately 2,006,375 lbs. of debris were removed in North A during the reporting period.	Street Sweeping	Ongoing	N/A	1130	724	A	N/A	188120	63106	City	Not provided	N/A
City of Titusville	N/A	TV-11	Senior Center Pond Floating Islands	Floating islands within a wet detention pond.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2015	447.3607	58.35909	A	624	52536	43720	City	City - \$52,536	N/A
City of Titusville	DEP	TV-12	Senior Center Ponds Littoral Zone Plantings	Littoral vegetation plantings around an already existing wet detention pond.	BMP Treatment Train	Completed	2016	N/A	N/A	A	413.6	50000	2000	DEP/ City	DEP - \$21,144/ City - \$14,721	G0433
City of Titusville	DEP	TV-13	Royal Oak Littoral Zone Plantings	Littoral vegetation plantings around an already existing wet detention pond.	BMP Treatment Train	Completed	2016	N/A	N/A	A	123.1	50000	2000	DEP/ City	DEP - \$21,144/ City - \$14,721	G0433
City of Titusville	DEP	TV-14	Main Street Baffle Box with BAM	2nd generation baffle box with media.	Baffle Boxes- Second Generation with Media	Completed	2018	2136.693	337.6215	A	295.96	393363	4000	DEP/ City	DEP - \$176,376/ City - \$216,987	G0442

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 Titusville	DEP	TV-15	Sycamore Street Baffle Box with BAM	2nd generation baffle box with media.	Baffle Boxes-Second Generation with Media	Completed	2018	2051.967	329.0023	A	300.07	570517.7	4000	DEP/ City	DEP - \$176,376/ City - \$394,142	G0442
City of Titusville	N/A	TV-16	Knox Mc Rae Baffle Box	2nd generation baffle box with media.	Baffle Boxes-Second Generation with Media	Completed	2018	308.4667	51.6468	A	37.9	225000	4000	Florida Legislature/ City	Florida Legislature - \$105,000/ City - \$120,000	LP05031
City of Titusville	Brevard County	TV-17	Coleman Basin TMDL Improvements	Managed aquatic plant system within a one acre pond.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2019	636.7672	93.96413	A	107	11437.5	12000	County	County - \$11,438	N/A
City of Titusville	SJRWMD/ Brevard County	TV-18	South Street Basin TMDL Improvements	Three 2nd generation baffle boxes with media.	Baffle Boxes-Second Generation with Media	Completed	2019	1482.313	234.8645	A	235	450000	12000	City/ SJRWMD/ County	City - \$254,144/ SJRWMD - \$110,000/ County - \$86,856	N/A
City of Titusville	Brevard County	TV-19	St. Theresa Basin TMDL Improvements	2nd generation baffle box with media.	Baffle Boxes-Second Generation with Media	Completed	2019	4728.512	761.7081	A	314	375000	4000	City/ County	City - \$102,200/ County - \$272,800	N/A
City of Titusville	Brevard County	TV-20	La Paloma Basin TMDL Improvements	2nd generation baffle box with media.	Baffle Boxes-Second Generation with Media	Completed	2019	3533.862	562.5211	A	488	375000	4000	City/ County	City - \$166,704/ County - \$208,296	N/A
City of Titusville	TBD	TV-21	THS Basin TMDL Improvements	Future project.	Baffle Boxes-Second Generation with Media	Planned	2020	1498.178	235.5219	A	239.65	TBD	TBD	TBD	TBD	N/A
City of Titusville	TBD	TV-22	Brevard Street Basin TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	17.71	TBD	TBD	TBD	TBD	N/A
City of Titusville	TBD	TV-23	St. Johns 2nd Baffle Box TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	882.1	TBD	TBD	TBD	TBD	N/A
City of Titusville	Brevard County/ SOIRL	TV-24	Marina Basin TMDL Improvements - Osprey Pond MAPS	Osprey Pond MAPS	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Planned	2021	259.7038	37.84802	A	271.17	60000	30000	County	County - \$60,000	N/A
City of Titusville	TBD	TV-25	Grace Basin TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	17.73	TBD	TBD	TBD	TBD	N/A
City of Titusville	Private Development	TV-26	Miracle City Basin TMDL Improvements	2nd generation baffle box.	Baffle Boxes-Second Generation	Completed	2018	10.91436	1.194394	A	2.448	TBD	4000	Private Development	TBD	N/A
City of Titusville	TBD	TV-27	South Marina Basin TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	322.88	TBD	TBD	TBD	TBD	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 Titusville	TBD	TV-28	S.R. 50 Basin TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	131.09	TBD	TBD	TBD	TBD	N/A
City of Titusville	TBD	TV-29	Commons Basin TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	4.37	TBD	TBD	TBD	TBD	N/A
City of Titusville	TBD	TV-30	Broad Street Basin TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	13.44	TBD	TBD	TBD	TBD	N/A
City of Titusville	TBD	TV-31	Riverview Street Basin TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	7.32	TBD	TBD	TBD	TBD	N/A
City of Titusville	TBD	TV-32	THS 2 Basin TMDL Improvements	Future project.	BMP Treatment Train	Planned	TBD	TBD	TBD	A	26.54	TBD	TBD	TBD	TBD	N/A
City of Titusville	Brevard County	TV-33	Osprey Water Reclamation Nutrient Removal Upgrade	Nitrogen effluent reduction of reclaimed water from 17.9 mg/l to 6 mg/l.	WWTF Nutrient Reduction	Planned	2022	TBD	TBD	A	N/A	8000000	TBD	City/ County	TBD	N/A
City of Titusville	Brevard County	TV-34	Draa Field Pond MAPS	Managed aquatic plant system within a 3 acre pond.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Planned	2020	TBD	TBD	A	105	60000	40000	City/ Brevard County	City - \$28,719 / County - \$31,281	N/A
City of Titusville	Brevard County	TV-35	Draa Field Vegetation Harvesting	Aquatic vegetation harvesting of a 3 acre pond.	Aquatic Vegetation Harvesting	Planned	2020	TBD	TBD	A	3	50000	0	City/ Brevard County	TBD	N/A
Volusia County	Not provided	VC-01	Education Efforts	Irrigation, fertilizer, pet waste management, and landscaping ordinances; pamphlets, presentations, website, illicit discharge program.	Education Efforts	Ongoing	N/A	1381.74	198.54	A	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Volusia County	Not provided	VC-02	Roadside Ditch Cleaning	Roadside ditch cleaning.	BMP Cleanout	Ongoing	2016	Not provided	Not provided	A	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Volusia County	Not provided	VC-03	Open Channel Cleaning	Open channel cleaning; digging sediment out of open channels.	BMP Cleanout	Ongoing	2016	Not provided	Not provided	A	Not provided	Not provided	Not provided	Not provided	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
Volusia County	N/A	VC-04	Fertilizer Ordinance	Fertilizer restrictions including summer ban on nitrogen and phosphorus. Reductions included in VC-01.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	N/A	N/A	A	N/A	Not provided	Not provided	Volusia County	N/A	N/A

3.2 Project Zone B

Project Zone B covers more than 49,000 acres of the NIRL BMAP area. As shown in **Table 21**, urban areas make up the majority of the project zone with 59.3 % of the area, followed by wetlands with 16.5 %. Stakeholders in Project Zone B are Brevard County, FDOT District 5, City of Titusville, City of Cocoa, City of Rockledge, City of Melbourne, Town of Palm Shores, Town of Indian River, and Kennedy Space Center.

Table 21. Summary of land uses in Project Zone B

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	29,544	59.3
2000	Agricultural	2,310	4.6
3000	Upland Prairie and Shrublands	2,159	4.3
4000	Upland Forested Areas	2,570	5.2
5000	Water	1,815	3.6
6000	Wetlands	8,198	16.5
7000	Disturbed Lands	256	0.5
8000	Transportation	2,963	5.9
Total		49,816	100.0

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 13** and **Figure 14** show progress towards the required TN and TP load reductions allocated to Project Zone B from projects completed through July 31, 2020.

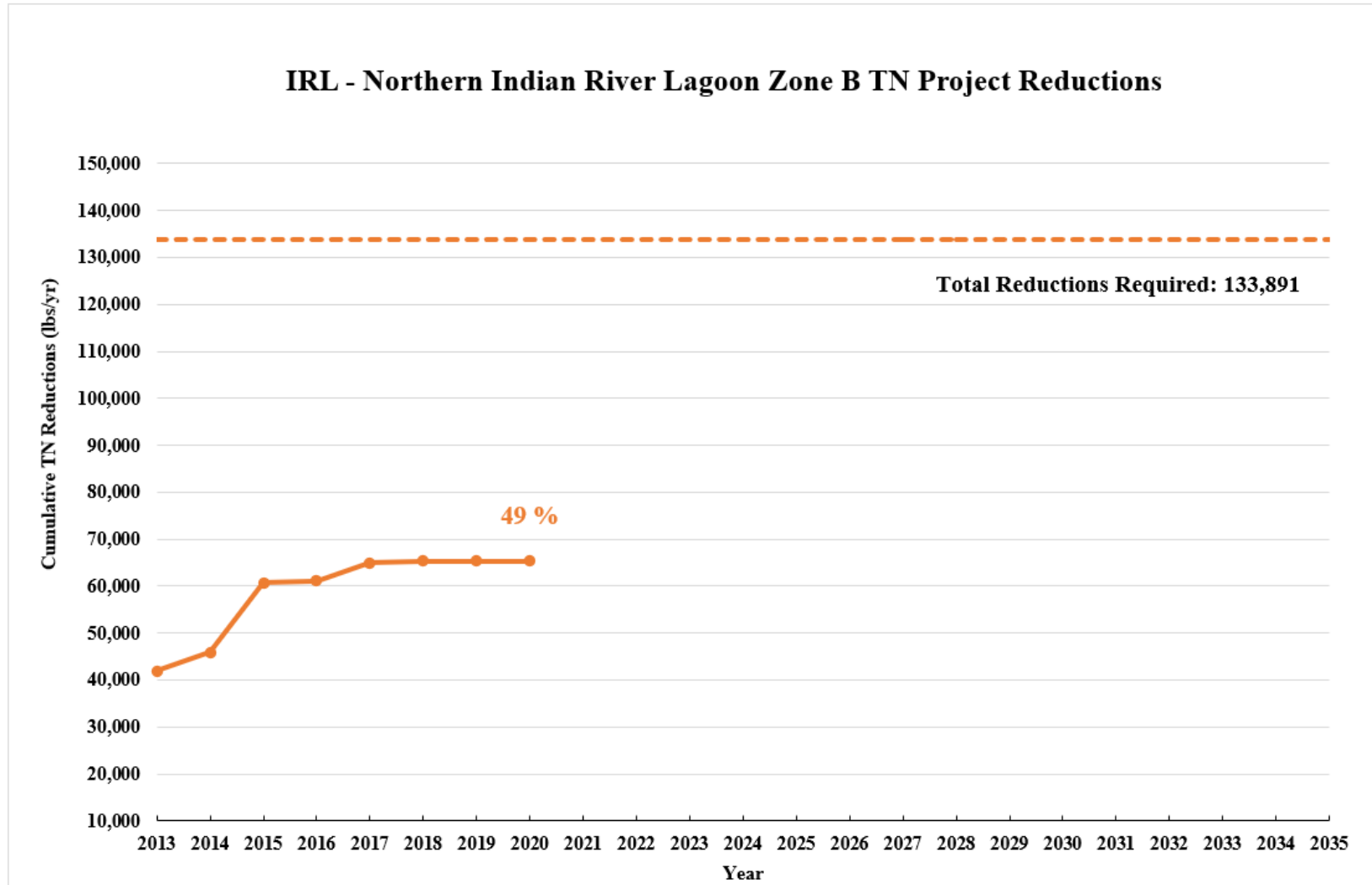


Figure 13. Estimated progress towards meeting the required TN reductions allocated to NIRL Project Zone B with projects completed through July 31, 2020

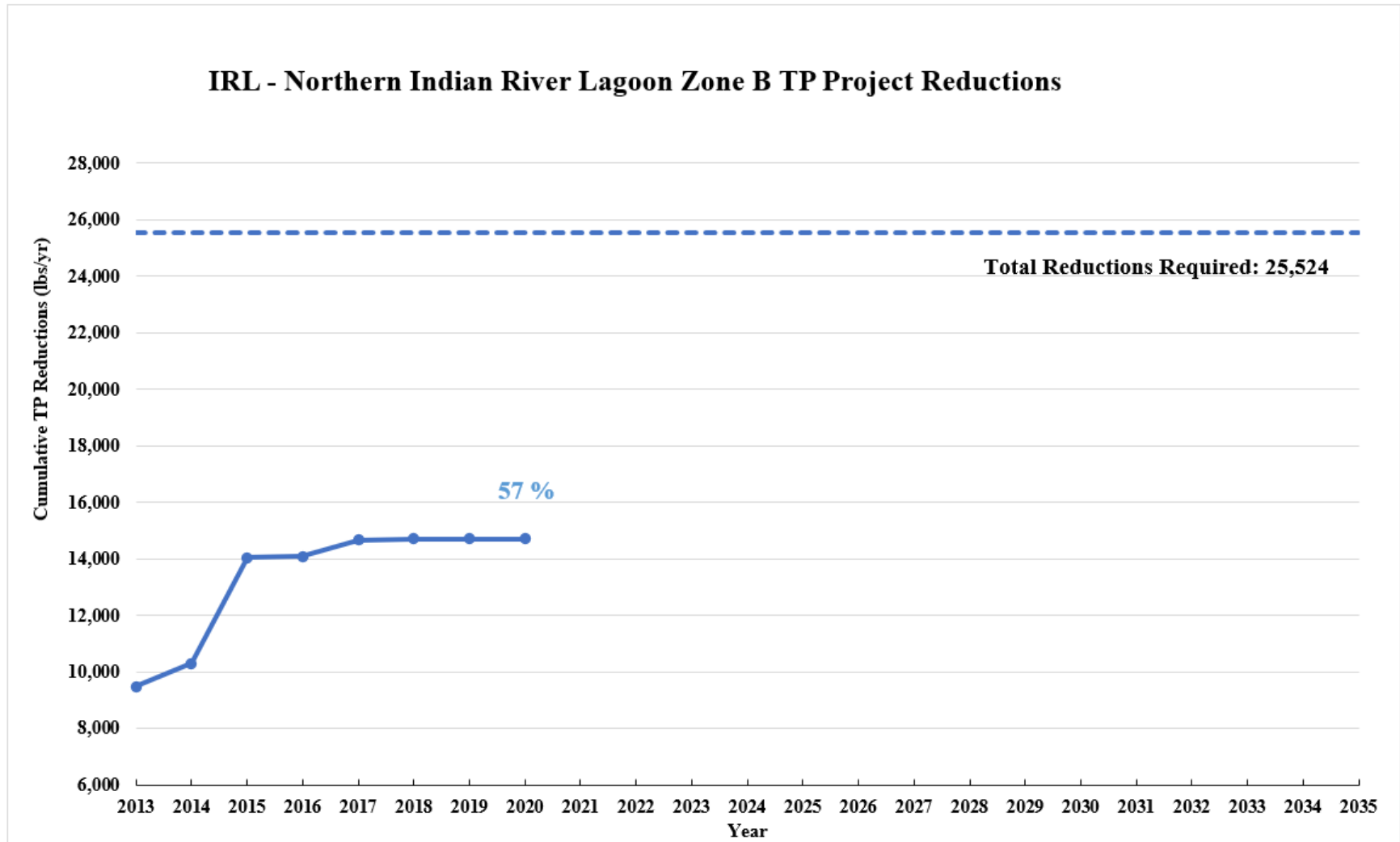


Figure 14. Estimated progress towards meeting the required TP reductions allocated to NIRL Project Zone B with projects completed through July 31, 2020

3.2.1. NIRL Project Zone B Existing and Planned Projects

Table 22 summarizes the existing and planned projects provided by the stakeholders for Project Zone B.

Table 22. Existing and planned projects in Project Zone B

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
FDACS	N/A	FDACS-02	Credit for Changes in Land Use	Credit for changes in land use. Project canceled in 2020 since land use changes were incorporated into the load estimation tool (LET).	Land Use Change	Canceled	N/A	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
FDACS	Agricultural Producers	FDACS-04	BMP Implementation and Verification	Enrollment and verification of BMPs by agricultural producers. Acres treated based on FDACS OAWP July 2020 Enrollment and FSAID VII. Reductions based on SWIL Model-LET.	Agricultural BMPs	Ongoing	N/A	33.24878	6.02843	B	35.47696	TBD	TBD	FDACS	TBD	N/A
FDACS	Not provided	FDACS-06	FDACS Cost Share Projects	Cost-share projects paid for by FDACS. Acres treated based on FDACS OAWP July 2020 Enrollment. Reductions based on SWIL Model-LET.	Agricultural BMPs	Ongoing	N/A	0.084929	0.563334	B	TBD	TBD	TBD	FDACS	TBD	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
SJRWMD	DEP/ FIND/ Brevard County/ City of Melbourne	SJRWMD-01	Eau Gallie River Muck Dredging	Dredging commenced in January 2017 and was completed in 2019. Approximately 633,000 cubic yards of muck were removed, reducing nitrogen and phosphorus from the legacy loads in this tributary.	Muck Removal/ Restoration Dredging	Completed	2019	TBD	TBD	B	N/A	23750000	Not provided	Ad Valorem/ DEP/ FIND/ Brevard County/ City of Melbourne	Not provided	27974
Brevard County	Not provided	BC-008	Twin Lakes North	Construction of a baffle box.	Baffle Boxes- First Generation	Completed	2014	0.323739	0.209861	B	7.7	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	Not provided	BC-009	Twin Lakes South	Construction of a baffle box.	Baffle Boxes- First Generation	Completed	2014	0.36242	0.23567	B	8.5	20082	Not provided	Not provided	Not provided	N/A
Brevard County	DEP	BC-010	Lucas Place 640 Baffle Box	Construction of a baffle box. Baffle box was replaced by a second generation baffle box and is credited in BC-33.	Baffle Boxes- First Generation	Canceled	2003	N/A	N/A	B	5.2	36835	1000	DEP/ County	Not provided	S0620
Brevard County	DEP	BC-011	Rockledge Drive 2055	Construction of a baffle box.	Baffle Boxes- First Generation	Completed	2008	0.109712	0.075499	B	2.4	61094	1000	DEP	Not provided	S0620
Brevard County	Not provided	BC-012	Rockledge and Riverwoods Baffle Box	Construction of a baffle box. Baffle box was replaced by a second generation baffle box and is credited in BC-38.	Baffle Boxes- First Generation	Canceled	2000	N/A	N/A	B	3.8	47686	1000	Not provided	Not provided	N/A
Brevard County	DEP	BC-013	Anchor Lane	Construction of a baffle box.	Baffle Boxes- First Generation	Completed	2000	1.358613	0.918662	B	29.4	49560	1000	DEP	Not provided	S0620
Brevard County	Not provided	BC-014	Kelmore Baffle Box	Construction of a baffle box.	Baffle Boxes- First Generation	Completed	2003	5.475097	3.771069	B	9.7	21817	1000	Not provided	Not provided	N/A
Brevard County	DEP	BC-015	Puesta Del Sol 735 Baffle Box	Construction of a baffle box.	Baffle Boxes- First Generation	Completed	2003	0.105045	0.07101	B	2.2	24953	1000	DEP	Not provided	S0620
Brevard County	SJRWMD	BC-016	Tequesta Harbor Baffle Box	Construction of a baffle box.	Baffle Boxes- First Generation	Completed	2009	0.639115	0.431646	B	13.1	27582	1000	Not provided	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	NRCS	BC-017	Broadway Boulevard Pond	Construction of a detention pond to treat runoff.	Wet Detention Pond	Completed	2000	304.1263	95.3932	B	85.7	553169	14972.5	Not provided	Not provided	N/A
Brevard County	Not provided	BC-018	Fairglen Elementary School Pond	Construction of a detention pond to treat runoff.	Wet Detention Pond	Completed	2003	214.5747	56.9956	B	80.2	730869	Not provided	Not provided	Not provided	N/A
Brevard County	DEP	BC-019	Lake George	Construction of a detention pond to treat runoff.	Wet Detention Pond	Completed	2010	1409.133	441.5093	B	719	347255	17750	DEP	Not provided	LP8952
Brevard County	Not provided	BC-020	Merritt Island Courthouse Pond	Construction of a detention pond to treat runoff.	Wet Detention Pond	Completed	2003	4.69317	0.616847	B	7	95584	Not provided	Not provided	Not provided	N/A
Brevard County	Not provided	BC-021	Parkway Drive Phase 2 Pond	Construction of a detention pond to treat runoff.	Wet Detention Pond	Completed	2004	7148.169	1920.565	B	1796.9	1817720	Not provided	Not provided	Not provided	N/A
Brevard County	Not provided	BC-022	Street Sweeping	Monthly Street Sweeping 786 curb lane miles.	Street Sweeping	Ongoing	N/A	636	408	B	N/A	106665	Not provided	Not provided	Not provided	N/A
Brevard County	Not provided	BC-023	Education Efforts	FYN; landscape, irrigation, fertilizer, and pet waste ordinances; PSAs; pamphlets; website, Illicit Discharge Program.	Education Efforts	Ongoing	N/A	8391.96	1244.76	B	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	DEP	BC-024	Pine Island Phase I and II	Two Wet Detention Ponds (80-acres & 23 acres) with Gravity Flow and Pump Station.	Wet Detention Pond	Completed	2015	13153.59	3504.234	B	6232.9	4131255	34705	DEP TMDL/ EPA 319	DEP TDML/ EPA 319 - \$1,677,079	G0288/ G0344
Brevard County	N/A	BC-025	Merritt Island Airport	N/A	Wet Detention Pond	Canceled	N/A	1.860414	0.422764	B	N/A	N/A	N/A	N/A	N/A	N/A
Brevard County	DEP	BC-026	Pines Industrial	Construction of a pond to treat runoff where no treatment was provided.	Wet Detention Pond	Underway	2020	TBD	TBD	B	71	822000	TBD	DEP	Not provided	NF003

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-027	Johnson Junior High	Discharge regulation, phosphorus reduction, and denitrification. Biosorption activated media added.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2017	1416.869	200.4724	B	133.4	499416.4	Not provided	DEP	DEP - \$489,200	G0430
Brevard County	DEP	BC-028	Florida Boulevard	Installation of floating vegetative islands for Nutrient uptake.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2014	57.20182	5.019217	B	88.4	40772	18295	DEP	Not provided	G0430
Brevard County	DEP	BC-029	Fairglen Elementary	Installation of floating vegetative islands for Nutrient uptake.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2017	37.81732	3.123288	B	80.2	34996	15703	DEP	Not provided	G0430
Brevard County	DEP	BC-030	Port St. John B	Installation of floating vegetative islands for Nutrient uptake.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	Prior to 2013	57.05205	8.353006	B	57.9	16308	7315	DEP	Not provided	G0430
Brevard County	DEP	BC-031	Wickham Park North	Installation of floating vegetative islands for Nutrient uptake.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2017	TBD	TBD	B	1796.9	75428	24175	DEP	Not provided	G0430
Brevard County	DEP	BC-032	West Avenue 6600	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes- Second Generation	Completed	2017	98.12982	11.50099	B	50.7	15000	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-033	Lucas Place	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes- Second Generation	Completed	Prior to 2013	9.394442	1.160118	B	2.7	12507	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-034	Indian River Isles	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes- Second Generation	Completed	Prior to 2013	68.21853	7.315461	B	7.3	30844	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-035	Granada Street 1030 East	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes- Second Generation	Completed	Prior to 2013	145.8459	17.21973	B	38.6	15000	2140	DEP	DEP - \$275,000	S0648

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Brevard County	DEP	BC-036	Haverhill Avenue	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	89.00115	10.50584	B	47.5	35857	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-037	Manth Avenue	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	125.6019	15.11945	B	69.1	12507	2140	DEP	DEP - \$275,000	S0648
Brevard County	Not provided	BC-038	Rockledge and Riverwoods Boulevard Rockledge	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	5.981847	0.702575	B	3.8	15000	2140	Not provided	Not provided	N/A
Brevard County	DEP	BC-039	Alamanda Indian Harbour Beach	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	5.075029	0.606811	B	2.8	12507	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-040	River Shore 1848 Indialantic	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	4.87445	0.582884	B	2.7	31751	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-041	River Shore 1925 Indialantic	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	34.66021	4.452528	B	7.4	12507	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-042	Cedar Lane Indialantic	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	6.65755	0.797401	B	3.8	12507	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-043	Riverview 9856 Indialantic	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	TBD	TBD	B	5.7	15000	2140	DEP	DEP - \$275,000	S0648

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Brevard County	DEP	BC-044	Riverview 9864 Indialantic	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	TBD	TBD	B	98.5	15000	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-045	Oak Ridge Indialantic	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	Prior to 2013	219.2554	25.80792	B	126.5	15000	2140	DEP	DEP - \$275,000	S0648
Brevard County	SOIRL	BC-046	Kingsmill-Aurora Phase 2	Expansion of a Wet Detention Pond and adding Denitrification to pond slope.	Wet Detention Pond	Planned	2022	3354.058	915.9812	B	1220.4	1600000	1000	SOIRL	TBD	N/A
Brevard County	N/A	BC-047	Sediment Trap, Grated Inlet Basket, Inlet Weir Cleaning	Annual maintenance, removing captured debris from structures.	BMP Cleanout	Ongoing	Prior to 2013	TBD	TBD	B	N/A	392105	250000	N/A	N/A	N/A
Brevard County	DEP	BC-048	Merritt Ridge 3A	Alum pond.	Floating Islands/Managed Aquatic Plant Systems (MAPS)	Completed	Prior to 2013	3.81868	0.566291	B	32.1	100362	41817.5	DEP/County	Not provided	G0430
Brevard County	DEP	BC-049	Lake George	Construction of a regional wet detention pond. Wet pond credited in BC-19.	Floating Islands/Managed Aquatic Plant Systems (MAPS)	Completed	2017	282.2497	27.2907	B	719	51200	Not provided	DEP/County	Not provided	LP852
Brevard County	Not provided	BC-050	Wickham Park	The provided treatment volume is .17 ac-lt.	Stormwater Reuse	Completed	2010	TBD	TBD	B	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	Not provided	BC-051	Ellington Park	Construction of a wet detention pond.	Stormwater Reuse	Completed	2005	532.4965	76.27736	B	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	Not provided	BC-052	Rockledge Barton Park Reuse	Barton Park Pond was constructed by Rockledge. Brevard Parks withdraws water for irrigation for Rockledge Park.	Stormwater Reuse	Completed	2009	274.8434	38.51213	B	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	Not provided	BC-053	Florida Boulevard Pond	Construction of a wet detention pond.	Wet Detention Pond	Completed	2002	175.6096	29.96473	B	88.4	350384	Not provided	Not provided	Not provided	N/A

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Brevard County	DEP	BC-054	McGiver South	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	5.188995	0.5991	B	2.8	12507	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-055	651 Franklyn	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2013	24.96365	2.985472	B	13.7	12507	2140	DEP	DEP - \$275,000	S0648
Brevard County	Not provided	BC-056	Fountainhead	Removing vegetation from a wet detention pond.	Aquatic Vegetation Harvesting	Completed	2014	401	64.7	B	125.458	39274	Not provided	Not provided	Not provided	N/A
Brevard County	DEP	BC-057	Fiske	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2014	138.0553	16.15228	B	126.2	12507	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-061	Port St. John C	Installation of vegetative floating island into an existing detention pond.	Floating Islands/Managed Aquatic Plant Systems (MAPS)	Completed	2016	18.56176	2.720649	B	19.98812	14062	3070.5	DEP/County	Not provided	G0430
Brevard County	DEP	BC-062	Shoreview Circle	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	5.707652	0.682577	B	Not provided	11270	2140	DEP	DEP - \$275,000	S0648
Brevard County	DEP	BC-063	Granada West	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	15.10811	1.809408	B	Not provided	11220	2140	DEP	DEP - \$275,000	S0649
Brevard County	DEP	BC-064	Shoreview Lane	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	11.62614	1.389388	B	Not provided	24543.44	2140	DEP	DEP - \$275,000	S0650

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Brevard County	DEP	BC-065	Sunset Park North	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	42.15312	5.038728	B	Not provided	11170	2140	DEP	DEP - \$275,000	S0651
Brevard County	DEP	BC-066	Oak Street	Upgrading a 1st Generation to a 2nd generation baffle box by adding the nutrient separating screen. Project accounted for in CIRL-BC-02 and is outside the NIRL boundary.	Baffle Boxes-Second Generation	Canceled	2015	N/A	N/A	B	Not provided	10895	2140	DEP	DEP - \$275,000	S0652
Brevard County	DEP	BC-067	Fountainhead Advanced Denitrification	Phosphorus reduction & denitrification.	Denitrification Walls	Underway	2020	TBD	TBD	B	234.65	381000	Not provided	DEP	Not provided	LP05115
Brevard County	DEP	BC-069	Multiple Ditch Outfall Denitrification D4 (replace by individual Basin #s/names)	Providing base flow/groundwater treatment in open drainage basins.	Biosorption Activated Media (BAM)	Planned	2019	TBD	TBD	B	Not provided	2140000	Not provided	DEP	Not provided	LP0511A
Brevard County	Not provided	BC-070	Otter Creek Basin D4	Providing base flow/groundwater treatment in open drainage basins.	Biosorption Activated Media (BAM)	Planned	2019	TBD	TBD	B	Not provided	130000	Not provided	Not provided	Not provided	N/A
Brevard County	SJRWMD	BC-071	Suntree In-Channel Denitrification D4	Providing base flow/groundwater treatment in open drainage basins.	Biosorption Activated Media (BAM)	Planned	2018	TBD	TBD	B	Not provided	71000	Not provided	SJRWMD	Not provided	N/A
Brevard County	DEP	BC-072	Multiple Ditch Outfall Denitrification D5 (replace by individual Basin#s/names)	Providing base flow/groundwater treatment in open drainage basins.	Biosorption Activated Media (BAM)	Underway	2019	TBD	TBD	B	Not provided	100000	Not provided	DEP	DEP - \$100,000	LP0511A
Brevard County	SOIRL	BC-073	EauGallie Area Muck Dredging	Not provided.	Muck Removal/Restoration Dredging	Completed	2017	TBD	TBD	B	Not provided	26250000	N/A	SOIRL	SOIRL - \$26,250,000	N/A
Brevard County	Not provided	BC-077	Merritt Ridge 2B D2	Not provided.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2016	3.072829	0.452165	B	2	45000	Not provided	Not provided	Not provided	N/A

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Brevard County	Not provided	BC-078	Merritt Ridge 2E D2	Wet detention pond construction.	Wet Detention Pond	Planned	TBD	289.5378	73.04627	B	Not provided	720000	Not provided	Not provided	Not provided	N/A
Brevard County	N/A	BC-080	Wickham Park Solar Bee	Installing a mixer to reduce the amount of algae and cyanobacteria on an existing pond.	BMP Treatment Train	Planned	TBD	TBD	TBD	B	TBD	TBD	TBD	TBD	TBD	N/A
Brevard County	All Cities	BC-081a	Education Efforts	Fertilizer video, rain barrel workshops, Facebook page, bus wrap, and billboard.	Education Efforts	Ongoing	N/A	N/A	N/A	B	N/A	Not provided	TBD	SOIRL	Not provided	N/A
Brevard County	N/A	BC-088	Septic Removal - NIRL -MIRA	SOIRL-44.	OSTDS Phase Out	Underway	2020	TBD	N/A	B	Not provided	2130852	Not provided	SOIRL	SOIRL - \$2,130,852	N/A
Brevard County	N/A	BC-093	N. Wickham Road Upflow Filter - BB#1298	Upflow filter with Biosorption Activated Media installed within existing detention pond system to remove nitrogen from baseflow.	Biosorption Activated Media (BAM)	Underway	2019	TBD	TBD	B	170	125000	2500	Legislative Funding	Legislative Funding - \$35,000	LP0511A
Brevard County	SOIRL/ Brevard Zoo	BC-100	Bomalaski Oyster Bar	Construct 100 linear foot oyster reef.	Creating/ Enhancing Oyster Reefs	Completed	2018	N/A	N/A	B	Not provided	8900	Not provided	SOIRL	SOIRL - \$8,900	N/A
Brevard County	SOIRL/ MRC	BC-101a	Grass Clippings Campaign Phase 1	Not provided.	Enhanced Public Education	Ongoing	2019	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
Brevard County	SOIRL	BC-102a	Education Efforts	Fertilizer, grass clippings, and septic system maintenance.	Enhanced Public Education	Ongoing	N/A	N/A	N/A	B	Not provided	N/A	N/A	N/A	N/A	N/A
Brevard County	SOIRL/ SJRWMD	BC-108	MIRA Phase 1 Septic to Sewer	Connect approximately 11 properties to a central sewer system.	OSTDS Phase Out	Completed	2017	TBD	N/A	B	N/A	320000	Not provided	SOIRL/ SJWMD	Not provided	N/A
Brevard County	N/A	BC-109	Denitrification Basin - 1329	Upflow filter through a BAM media to treat baseflow.	Biosorption Activated Media (BAM)	Underway	2020	TBD	TBD	B	Not provided	155113	Not provided	LF/ SOIRL	70000	LP0511A
City of Rockledge	SOIRL	BC-79	Breeze Swept Septic to Sewer	Hood up to sewer - SOIRL-01.	Wastewater Service Area Expansion	Completed	2017	TBD	TBD	B	Not provided	3400000	Not provided	City/ SOIRL	880530	N/A

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City of Cocoa	SOIRL	BC-82	Stormwater Project - NIRL - Cocoa - Church St Type II Baffle Box	SOIRL-14. See CC-17.	Baffle Boxes-Second Generation	Completed	2018	TBD	TBD	B	75.2033	233455	Not provided	DEP TMDL	DEP TMDL - \$20,856	NF025
City of Melbourne	SOIRL	BC-86	Stormwater Project - NIRL - Melbourne - Cliff Creek Baffle Box	SOIRL-34.	Baffle Boxes-Second Generation	Underway	2019	TBD	TBD	B	515.41	347781	Not provided	SOIRL/ City	347781	N/A
City of Melbourne	SOIRL	BC-87	Stormwater Project - NIRL - Melbourne - Thrush Dr Baffle Box	SOIRL-35.	Baffle Boxes-Second Generation	Planned	2019	TBD	TBD	B	422.9518	322200	Not provided	SOIRL/ City	322200	N/A
City of Melbourne	SOIRL	BC-90	Stewart Rd Dry Retrofit	Stormwater Project - CIRL - Melbourne, SOIRL-39.	Dry Detention Pond	Planned	2020	TBD	TBD	B	Not provided	18344	Not provided	SOIRL/ City	18344	N/A
City of Cocoa	SJRWMD	CC-01	Bracco Pond B	SOIRL-01.	Wet Detention Pond	Completed	2014	1608.641	491.0925	B	630.168	35000	12000	City/ SJRWMD	City - \$250,000/ SJRWMD - \$250,000	N/A
City of Cocoa	SJRWMD	CC-02	Bracco Expansion Area	Provide the community with a park along the ponds.	Wet Detention Pond	Completed	2014	103.7369	28.34129	B	880.6833	570762	5000	City/ SJRWMD	City - \$262,500/ SJRWMD - \$262,500	N/A
City of Cocoa	EPA/ SJRWMD	CC-03	Cocoa Village Park	Subsurface detention storage that is part of a redevelopment project of the Cocoa Village Park and Riverwalk Esplanade areas.	Dry Detention Pond	Completed	2018	13.81442	1.829297	B	13.5	330000	35000	City/ SJRWMD	City - \$1,250,000/ SJRWMD - \$1,250,000	WM736
City of Cocoa	Rockledge/ SOIRL	CC-04	Morris Pond	Joint project with the City of Rockledge to accommodate previously untreated runoff.	Wet Detention Pond	Completed	2014	59.60025	16.45238	B	16.2	247480	N/A	City of Rockledge	N/A	N/A
City of Cocoa	N/A	CC-05	North Brevard Avenue Stormwater Treatment Facility	Hydrodynamic separators that remove sediment, trap debris and separate floating oils from runoff.	Hydrodynamic Separators	Completed	2014	N/A	1.82407	B	11.3	N/A	N/A	City of Titusville	N/A	N/A

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City of Cocoa	SJRWMD	CC-06	North Fiske Stormwater Retention Facility	Wet detention pond to reduce the discharge of stormwater runoff into surface waters in the state by complete on-site storage.	100% On-site Retention	Completed	2014	16.28465	2.158203	B	33.9	330000	5000	City	City - \$250,000/ SJRWMD - \$250,000	N/A
City of Cocoa	N/A	CC-07	Suntree Baffle Box #1 on 2116 IRD	Capture previously untreated runoff.	Baffle Boxes- Second Generation	Completed	2014	10.96489	1.333427	B	5.9	80000	3500	City	City - \$40,000	N/A
City of Cocoa	N/A	CC-08	Street Sweeping	Pavement cleaning by sweeping, vacuum, or cleaning.	Street Sweeping	Ongoing	N/A	405	260	B	N/A	80000	100000	City	N/A	N/A
City of Cocoa	N/A	CC-09	Bracco Supplemental Water Supply	Joint project with the WWTP to provide reclaimed water.	WWTF Diversion to Reuse	Completed	2014	1102.896	107.7542	B	N/A	1200000	N/A	City	City - \$250,000	N/A
City of Cocoa	Community Development Block Grant (CDBG)	CC-10	Diamond Square Stormwater Improvements	Retrofit existing storm sewer in Dimond Square, including the construction of a wet detention pond.	Wet Detention Pond	Completed	2011	41.03529	4.216735	B	98.69961	210000	2500	City	City - \$450,000	N/A
City of Cocoa	N/A	CC-11	Education Efforts	Fertilizer ordinance.	Education Efforts	Ongoing	N/A	636.615	92.575	B	N/A	N/A	N/A	City	N/A	N/A
City of Cocoa	Space Coast Transportation Planning Organization (SCTPO)/ FDOT	CC-12	Peachtree St. Reconstruction	Roadway and stormwater improvements.	Stormwater System Rehabilitation	Completed	2016	N/A	N/A	B	3	1700000	N/A	City/ FDOT	City - \$161,250/ FDOT - \$1,387,500	N/A
City of Cocoa	N/A	CC-13	Cocoa Riverfront Park	Amphitheatre and stormwater improvements. Same as Project Number CC-03 where information is captured. Recommend removing from list.	Stormwater System Rehabilitation	Completed	2016	N/A	N/A	B	12	162000	N/A	City	N/A	N/A

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City of Cocoa	N/A	CC-14	Control Gate	Flood control gate installed at Bracco pond outfall.	Control Structure	Completed	2016	TBD	TBD	B	N/A	Not provided	N/A	City	City - \$50,000	N/A
City of Cocoa	SCTPO/ FDOT	CC-15	Florida Avenue Improvements	Infiltration through pervious pavers and then ultimately to the AT&T pond.	BMP Treatment Train	Completed	2017	TBD	TBD	B	6.9	3344222	1500	City/ FDOT	City - \$2,587,000/ FDOT - \$913,000	N/A
City of Cocoa	SJRWMD	CC-16	AT&T Detention Pond Retrofit	Incoming inlets will have 2nd generation baffle boxes.	BMP Treatment Train	Completed	2017	391.2669	53.90877	B	75.09657	297877	1500	City/ SJRWMD	City - \$199,578/ SJRWMD - \$98,299	N/A
City of Cocoa	SJRWMD/ SOIRL	CC-17	Church Street Baffle Box	The goal of this project is to capture and treat stormwater that flows untreated and directly into the Indian River Lagoon.	Baffle Boxes- Second Generation with Media	Completed	2018	323.0418	41.54147	B	75	173620	1500	City/ SJRWMD/ SOIRL	City - \$116,326/ SJRWMD - \$50,000/ SOIRL - \$20,000	N/A
City of Cocoa	N/A	CC-18	John Garren Street Realignment & Parking	Roadway and stormwater improvements.	BMP Treatment Train	Canceled	N/A	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
City of Cocoa	N/A	CC-19	Brevard Ave. Bioretention and Tree Preservation	Roadway and stormwater improvements.	BMP Treatment Train	Canceled	N/A	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
City of Cocoa	TBD	CC-20	U.S. 1 and Forrest Ave. Stormwater Treatment Facility	Develop a dry detention stormwater facility adjacent to U.S. 1.	Dry Detention Pond	Underway	2021	TBD	TBD	B	16.39	TBD	TBD	City	TBD	N/A
City of Cocoa	SJRWMD	CC-21	Broadmoor Acres and Fiske Blvd. Drainage Improvements	Roadway and stormwater improvements.	Stormwater System Rehabilitation	Planned	2020	N/A	N/A	B	7	TBD	TBD	City/ SJRWMD	TBD	TBD
City of Cocoa	TBD	CC-22	Cocoa Waterfront Stormwater Study	Stormwater Study for the Cocoa waterfront.	Study	Completed	2019	N/A	N/A	B	N/A	TBD	N/A	City	N/A	N/A

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City of Cocoa	Brevard County	CC-23	Septic to Sewer Indian River Drive	Design and Install new sewer along Indian River to provide sewer service and remove septic tank use.	OSTDS Phase Out	Underway	2021	TBD	TBD	B	N/A	3000000	N/A	City/SOIRL Tax	N/A	N/A
City of Cocoa	N/A	CC-24	Annual Sewer Inspection	Annual sewer inspection and maintenance.	Sanitary Sewer Inspections	Ongoing	N/A	N/A	N/A	B	N/A	N/A	335000	City	N/A	N/A
City of Cocoa	N/A	CC-25	Diamond Square Stormwater PS Feasibility Study	PS study for pumping stormwater across US 1 to Church Street baffle box.	Study	Underway	2020	N/A	N/A	B	N/A	26620	N/A	City	N/A	N/A
FDOT District 5	N/A	FDOT-04	70010-3517-01 French Drains	Missing from Model. French Drain system along State Road 5 from University Boulevard to Aurora Road. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	BMP Missing from Model	Canceled	Prior to 2013	N/A	N/A	B	21.3	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-05	70100-3544-01 French Drains	Missing from Model. Add lanes East of H. Humphrey Bridge to Sykes Creek Parkway. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	BMP Missing from Model	Canceled	Prior to 2013	N/A	N/A	B	7	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-06	70020-3501-01 Pond 1	Missing from Model. State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road.	Wet Detention Pond	Completed	2004	0.034169	0.005201	B	17.1	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-07	70020-3501-02A Pond 2A	Missing from Model. State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road.	Wet Detention Pond	Completed	2004	0	0	B	12.6	Not provided	Not provided	Florida Legislature	Not provided	N/A

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FDOT District 5	N/A	FDOT-08	70020-3501-02B Pond 2B	Missing from Model. State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road.	Wet Detention Pond	Completed	2004	0	0	B	4.8	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-09	70020-3501-03 Pond 3	Missing from Model. State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road.	Wet Detention Pond	Completed	2004	0.180339	0.030943	B	8.4	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-10	70020-3501-04 Pond 4	Missing from Model. State Road 5 -Add lanes and reconstruct from Aurora Road to Post Road.	Dry Detention Pond	Completed	2004	0.005296	0.000722	B	7.9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-11	70020-3549-01 Pond 1	Missing from Model. State Road 5 - Add lanes and reconstruct from Post Road to State Road 404.	Wet Detention Pond	Completed	2005	0.206761	0.046868	B	9.9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-12	70020-3549-02 Pond 2	Missing from Model. State Road 5 - Add lanes and reconstruct from Post Road to State Road 404.	Wet Detention Pond	Completed	2005	0.731734	0.217515	B	18.9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-13	70020-3549-03 Pond 3	Missing from Model. State Road 5 - Add lanes and reconstruct from Post Road to State Road 404.	Wet Detention Pond	Completed	2005	0	0	B	11.2	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-14	70020-3549-04 Pond 4	Missing from Model. State Road 5 - Add lanes and reconstruct from Post Road to State Road 404.	Wet Detention Pond	Completed	2005	0.666256	0.268816	B	3.4	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-15	70020-3549-05 Pond 5	Missing from Model. State Road 5 - Add lanes and reconstruct from Post Road to State Road 404.	Wet Detention Pond	Completed	2005	0.064628	0.014893	B	3.4	Not provided	Not provided	Florida Legislature	Not provided	N/A

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FDOT District 5	N/A	FDOT-16	70140-3514-01 Pond A	Missing from Model. State Road 3 - Replace Christa McAuliffe Bridge.	BMP Missing from Model	Completed	Prior to 2013	1.317169	0.298326	B	1.5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-17	70140-3514-02 Pond B	Missing from Model. State Road 3 - Replace Christa McAuliffe Bridge.	BMP Missing from Model	Completed	Prior to 2013	0.045317	0.007279	B	5.9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-18	70120-3518-01 Pond 7	Missing from Model. State Road 518 at State Road 513. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	BMP Missing from Model	Canceled	Prior to 2013	N/A	N/A	B	9.9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-19	70008-3505-01 Pond 1	Missing from Model. From south of State Road 518 (Eau Gallie Causeway) to Banana River Drive. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	BMP Missing from Model	Canceled	Prior to 2013	N/A	N/A	B	2.3	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-20	Education Efforts	IDDE training, stormwater brochures, NDPES flyer.	Education Efforts	Ongoing	N/A	79.21	10.59	B	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-21	Street Sweeping	Street sweeping.	Street Sweeping	Ongoing	N/A	466	254	B	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOT-22	Fertilizer Cessation	Elimination of fertilizer use along the rights-of-way.	Fertilizer Cessation	Completed	2005	2785	426	B	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A

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Kennedy Space Center	Not provided	KSC-11	Landscape Fertilizer Reduction	Fertilizer use reduced from 60 tons/year in 2000 to 20 tons/year in 2010; formula changed from rapid nitrogen release 16-4-8 to slow nitrogen release, phosphate-free 15-0-15.	Fertilizer Reduction	Completed	Prior to 2013	312	44.2	B	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-12	Citrus Grove Termination Jerome Road West	Grove lease termination resulted in abandonment of previously fertilized areas. Accounted for in 2020 BMAP update.	Land Use Change	Canceled	2010	N/A	N/A	B	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	N/A	KSC-13	KARS II Racquetball Court M6-0328A	Demolition of facility resulted in loss of impervious area and change of land use.	Land Use Change	Completed	2010	TBD	TBD	B	0.1	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	N/A	KSC-14	Visitor Center Storage Building M6-0503	Demolition of facility resulted in loss of impervious area and change of land use.	Land Use Change	Completed	2010	TBD	TBD	B	0.1	N/A	N/A	N/A	N/A	N/A
Kennedy Space Center	Not provided	KSC-15	Causeway Wetland Mitigation	Missing from Model. Existing permitted stormwater treatment pond.	Wet Detention Pond	Completed	2014	22.29577	4.904328	B	12.6	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-16	Visitors Complex/ NASA Badging Center	Missing from Model. Existing permitted stormwater treatment pond.	Wet Detention Pond	Completed	2014	228.457	47.51404	B	131.7	Not provided	Not provided	Not provided	Not provided	N/A
Kennedy Space Center	Not provided	KSC-17	NASA Parkway West	Missing from Model. Ditch along south side of NASA Parkway West, ends before the lagoon.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2014	175.3956	32.40774	B	109.4268	Not provided	Not provided	Not provided	Not provided	N/A

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Kennedy Space Center	N/A	KSC-19	Demolition of Facility M5-1546	Demolition of facility resulted in loss of impervious area and change of land use.	Land Use Change	Completed	2014	TBD	TBD	B	5	N/A	N/A	N/A	N/A	N/A
City of Melbourne	N/A	MEL-01	Fee and Apollo Drainage Improvements	No treatment is provided within the existing development; complete a water quality addition.	Wet Detention Pond	Completed	2010	17.05262	23.97905	B	43.6	525161	Not provided	City	Not provided	N/A
City of Melbourne	N/A	MEL-02	Dove Street Pond	No treatment is provided within the existing development; complete a water quality addition.	Wet Detention Pond	Completed	2003	39.24446	10.43259	B	14.9	156164	Not provided	City	Not provided	N/A
City of Melbourne	N/A	MEL-03	Charles Drive Pipe Replacement	Replaced failing stormwater pipe and created wet detention pond; little to no treatment is provided within existing developments.	Wet Detention Pond	Completed	2010	149.5285	89.87712	B	143.3	462644	Not provided	City	Not provided	N/A
City of Melbourne	N/A	MEL-04	Wickham Park Pond	Ponds along with piping upgrades help eliminate flooding within the area along with treatment.	Wet Detention Pond	Completed	2004	4180.671	1111.084	B	1796.9	250000	Not provided	City	City - \$250,000	N/A
City of Melbourne	N/A	MEL-05	Babcock Street Realignment	Additional treatment was provided for the adjacent drainage basins.	On-line Retention BMPs	Completed	2005	133.9586	18.87824	B	42.3	1757186	Not provided	City	Not provided	N/A
City of Melbourne	N/A	MEL-06	Garfield Street Ponds - Lot 12 (North)	Two small dry detention ponds within an existing subdivision (with MEL-7).	Dry Detention Pond	Canceled	N/A	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A
City of Melbourne	N/A	MEL-07	Garfield Street Ponds - Lot 24 (South)	Two small dry detention ponds within an existing subdivision (with MEL-6).	Dry Detention Pond	Canceled	N/A	N/A	N/A	B	N/A	N/A	N/A	N/A	N/A	N/A

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City of Melbourne	N/A	MEL-08	Education Efforts	FYN, Irrigation, fertilizer, pet waste management, and landscaping ordinances; pamphlets, presentations, website, Illicit Discharge Program.	Education Efforts	Ongoing	N/A	4667.46	685.2	B	N/A	Not provided	Not provided	City	Not provided	N/A
City of Melbourne	N/A	MEL-09	Street Sweeping	Street sweeping in the basin and debris removal.	Street Sweeping	Ongoing	N/A	701	378	B	N/A	N/A	162500	City	Not provided	N/A
City of Melbourne	DEP	MEL-10	Autumn Woods	Construction of a wet detention pond for water quality treatment.	Wet Detention Pond	Completed	2016	0	0	B	56.90956	879220	Not provided	City/ DEP	Not provided	LP05094
City of Melbourne	N/A	MEL-11	Participation in FYN	Future participation in FYN Program. Credited in MEL-08.	Education Efforts	Canceled	N/A	N/A	N/A	B	N/A	Not provided	Not provided	City	Not provided	N/A
City of Melbourne	DEP	MEL-12	South Croton Baffle Box	Dry retention and baffle box.	BMP Treatment Train	Completed	2017	TBD	TBD	B	14.8	487296	Not provided	City/ DEP	191100	LP05092
City of Melbourne	DEP	MEL-13	Bell Street Baffle Box	Construction of a new baffle box.	Baffle Boxes-Second Generation with Media	Completed	2017	994.6079	171.8716	B	127.2	300000	Not provided	City/ DEP	517050	LP05093
City of Melbourne	N/A	MEL-14	Paradise Baffle Box	Retrofit existing baffle box to upgrade to second generation.	Baffle Boxes-Second Generation with Media	Completed	2016	TBD	TBD	B	125.6	19000	Not provided	City	City - \$19,000	N/A
City of Melbourne	DEP	MEL-15	Garfield North Baffle Box	Construction of a new baffle box.	Baffle Boxes-Second Generation with Media	Completed	2017	501.2342	80.29042	B	67	350000	Not provided	City/ DEP	Not provided	LP05093
City of Melbourne	DEP	MEL-16	Garfield South Baffle Box	Construction of a new baffle box.	Baffle Boxes-Second Generation with Media	Completed	2017	92.08779	14.67222	B	11.8	150000	Not provided	City/ DEP	Not provided	LP05093
City of Melbourne	DEP	MEL-17	Sherwood Stormwater Quality Project	Construction of a new wet detention pond for a subdivision without any treatment.	Wet Detention Pond	Underway	2020	TBD	TBD	B	246.1714	2168800	Not provided	City/ DEP	400000	NS013

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City of Melbourne	SJRWMD	MEL-18	Croton Road (Lime) Baffle Box	Installation of baffle box.	Baffle Boxes-Second Generation with Media	Completed	2016	98.05499	16.87653	B	70	260660	Not provided	City/SJRWMD	72752	Not provided
City of Melbourne	N/A	MEL-19	Young Street Existing Baffle Box Upgrade	Upgrade existing 1st generation baffle boxes to 2nd generation baffle boxes with BAM.	Baffle Boxes-Second Generation with Media	Completed	2016	TBD	TBD	B	7.04	20000	Not provided	City	City - \$20,000	N/A
City of Melbourne	SOIRL	MEL-20	Thrush Drive Baffle Box	Baffle Box - 2nd generation with media filter.	Baffle Boxes-Second Generation with Media	Underway	TBD	TBD	TBD	B	422	450000	Not provided	City/SOIRL	322200	N/A
City of Melbourne	SOIRL	MEL-21	Cliff Creek Baffle Box	Baffle Box - 2nd generation with media filter.	Baffle Boxes-Second Generation with Media	Underway	TBD	TBD	TBD	B	515	450000	Not provided	City/SOIRL	347781	N/A
City of Melbourne	SOIRL	MEL-22	Riverside Drive Septic to Sewer Conversion	Providing for 12 lots to be converted to municipal sewer.	Wastewater Service Area Expansion	Underway	TBD	TBD	TBD	B	TBD	215000	Not provided	City/SOIRL	265960	N/A
City of Melbourne	SOIRL	MEL-23	Leewood Forest Wetland and Baffle Box	The proposed project consists of construction a wetland treatment area and baffle box to provide stormwater quality treatment.	Constructed Wetland Treatment	Planned	TBD	TBD	TBD	B	149.5	2590000	Not provided	City/SOIRL	TBD	N/A
City of Melbourne	N/A	MEL-24	South Sarno Drainage Improvements	Retrofit existing ditch system to include dry detention shelves.	Dry Detention Pond	Completed	2015	1238.746	173.3101	B	1475	2227000	Not provided	City	City - \$2,227,000	N/A
City of Melbourne	N/A	MEL-25	Sarno Road Turn Lane	Dry detention above needs for turn lane construction.	Dry Detention Pond	Completed	2018	7.201077	1.035737	B	6.79	560000	Not provided	City	City - \$560,000	N/A
City of Melbourne	SOIRL	MEL-26	Apollo/GA Baffle Box	2nd generation baffle box with BAM.	Baffle Boxes-Second Generation with Media	Planned	2019	TBD	TBD	B	854	825000	Not provided	City/SOIRL	297522	N/A
City of Melbourne	SOIRL	MEL-27	Stewart Road WQ Project	Installation of BAM filter box on existing culvert.	Biosorption Activated Media (BAM)	Planned	2020	TBD	TBD	B	36	435000	Not provided	City/SOIRL	18344	N/A
City of Melbourne	SOIRL	MEL-28	Cherry Street Baffle Box	2nd generation baffle box with BAM.	Baffle Boxes-Second Generation with Media	Underway	2020	1017.391	161.0921	B	1307	550000	Not provided	City/SOIRL	92120	N/A
City of Melbourne	SOIRL	MEL-29	Spring Creek Baffle Box	2nd generation baffle box with BAM.	Baffle Boxes-Second Generation with Media	Underway	2020	812.9534	123.1028	B	110	450000	Not provided	City/SOIRL	99358	N/A

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City of Melbourne	SOIRL	MEL-30	Brevard County Partnership Projects	Project approved by the SOIRL Project Plan not built by the City of Melbourne.	BMP Treatment Train	Underway	TBD	TBD	TBD	B	TBD	TBD	N/A	SOIRL	TBD	N/A
City of Melbourne	SOIRL/ SRF Loan	MEL-31	Grant Street Water Reclamation Facility Improvements	Improvements include rehabilitation of major treatment elements and structures of facility.	WWTF Nutrient Reduction	Planned	TBD	TBD	TBD	B	TBD	10038000	Not provided	City/ SOIRL/ SRF	5415600	N/A
City of Melbourne	TBD	MEL-32	Dove Street Pond Retrofit	Retrofitting of existing pond to enhance treatment potential.	BMP Treatment Train	Planned	TBD	TBD	TBD	B	TBD	TBD	Not provided	TBD	TBD	N/A
City of Melbourne	TBD	MEL-33	Melbourne Cemetery Baffle Box	2nd generation baffle box with BAM.	Baffle Boxes- Second Generation with Media	Planned	TBD	TBD	TBD	B	TBD	TBD	Not provided	TBD	TBD	N/A
City of Melbourne	TBD	MEL-34	Funeral Home Baffle Box	2nd generation baffle box with BAM.	Baffle Boxes- Second Generation with Media	Planned	TBD	TBD	TBD	B	TBD	TBD	Not provided	TBD	TBD	N/A
City of Melbourne	TBD	MEL-35	Melbourne High Baffle Box	2nd generation baffle box with BAM.	Baffle Boxes- Second Generation with Media	Planned	TBD	TBD	TBD	B	TBD	TBD	Not provided	TBD	TBD	N/A
Town of Palm Shores	Not provided	PS-01	Education Efforts	Fertilizer and landscaping ordinances, pamphlets, and presentations.	Education Efforts	Ongoing	N/A	28.86	4.14	B	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Rockledge	SOIRL	ROCK-01	Orange Avenue Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes- Second Generation	Completed	2009	18.66393	2.32657	B	10.4	8600	2555	Not provided	Not provided	N/A

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City of Rockledge	SOIRL	ROCK-02	Barton Avenue Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2009	50.74786	6.624264	B	27.1	9350	2555	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-03	Hardee Circle Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2009	26.37994	3.156715	B	14.59948	43420	2555	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-04	Rockledge Avenue Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2004	69.96821	8.45365	B	40.97382	21448	3682	Not provided	Not provided	N/A

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City of Rockledge	Not provided	ROCK-05	Bougainvillea Drive Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2000	58.02128	6.704771	B	35.73918	29495	2566	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-06	Park Avenue Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2007	23.47041	2.769965	B	13.18246	52529	2555	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-07	Little John Lane Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2004	21.59321	2.562747	B	11.86976	60000	2555	Not provided	Not provided	N/A

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City of Rockledge	Not provided	ROCK-08	Fernwood Drive Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	Prior to 2013	23.37143	2.850717	B	12.8809	55750	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-09	Valencia Drive Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2008	41.62701	4.966122	B	22.8785	58960	2555	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-10	Knollwood Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2002	44.15473	5.279585	B	24.3	68248	3682	Not provided	Not provided	N/A

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City of Rockledge	Not provided	ROCK-11	Sutton Street Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2011	14.99895	1.943021	B	8	Not provided	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-12	River Groves Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2011	13.12516	1.568483	B	7.4	Not provided	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-13	Summer Place Baffle Box	The second generation (nutrient separating) baffle box includes a wire mesh box that captures vegetative debris, litter, and other materials from settling in the water in the bottom of the box, thereby preventing leaching of the nutrients.	Baffle Boxes-Second Generation	Completed	2011	17.1487	2.021108	B	9.8	35000	Not provided	Not provided	Not provided	N/A

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City of Rockledge	Not provided	ROCK-14	Sweet Street Swale	Swales are designed to infiltrate a defined quantity of runoff (the treatment volume) through the permeable soils of the swale floor and side slopes into the shallow ground water aquifer immediately following a storm event.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2011	27.78534	4.103821	B	8	10000	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-15	Community Park of Rockledge Regional Facility Phase 1	"Wet detention" means the collection and temporary storage of stormwater in a permanently wet impoundment in such a manner as to provide for treatment through physical, chemical, and biological processes with subsequent gradual release of the stormwater.	Wet Detention Pond	Completed	2004	13.50891	1.689118	B	25.6	50000	23974	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-16	Pineland Park Unit Three	"Wet detention" means the collection and temporary storage of stormwater in a permanently wet impoundment in such a manner as to provide for treatment through physical, chemical, and biological processes with subsequent gradual release of the stormwater.	Wet Detention Pond	Completed	2009	0.450827	0	B	54.3	100000	6234	Not provided	Not provided	N/A

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City of Rockledge	DEP	ROCK-17	Barton Park Regional Detention System	"Wet detention" means the collection and temporary storage of stormwater in a permanently wet impoundment in such a manner as to provide for treatment through physical, chemical, and biological processes with subsequent gradual release of the stormwater.	Wet Detention Pond	Completed	2010	2597.514	670.0999	B	757	2600000	40000	DEP	Not provided	S0538
City of Rockledge	Not provided	ROCK-18	Florida Avenue Stormwater Facility	"Wet detention" means the collection and temporary storage of stormwater in a permanently wet impoundment in such a manner as to provide for treatment through physical, chemical, and biological processes with subsequent gradual release of the stormwater.	Wet Detention Pond	Completed	2010	37.69719	18.37597	B	25.2	435000	40950	Not provided	Not provided	N/A

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City of Rockledge	Not provided	ROCK-19	Police Department Pond	"Wet detention" means the collection and temporary storage of stormwater in a permanently wet impoundment in such a manner as to provide for treatment through physical, chemical, and biological processes with subsequent gradual release of the stormwater.	Wet Detention Pond	Completed	2010	12.72484	2.517782	B	39.1	350000	7035	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-20	Huntington Lakes I	"Wet detention" means the collection and temporary storage of stormwater in a permanently wet impoundment in such a manner as to provide for treatment through physical, chemical, and biological processes with subsequent gradual release of the stormwater.	Wet Detention Pond	Completed	2014	15.40124	3.901349	B	36.9	950000	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-21	Street Sweeping	Pavement cleaning by sweeping, vacuum, or washing.	Street Sweeping	Ongoing	N/A	794	337	B	N/A	Not provided	54000	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-22	Treatment Missing from Model	Wet detention ponds – missing from model. Project canceled after model update.	BMP Missing from Model	Canceled	Prior to 2013	N/A	N/A	B	383.2	Not provided	Not provided	Not provided	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
City of Rockledge	Not provided	ROCK-23	Education Efforts	Irrigation, fertilizer, pet waste management, and landscaping ordinances; pamphlets, presentations, website, illicit discharge program. Video "Know Your Waterways".	Education Efforts	Ongoing	N/A	1660.14	238.92	B	N/A	7385	0	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-24	Huntington Lakes II	Project provides treatment to some of the basin that leads into ROCK-17.	Wet Detention Pond	Completed	2016	298.4588	34.24327	B	133.5	900000	15000	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-25	Aquatic Harvesting	Data is collected by location in yards; determining method to convert to dry weight.	Aquatic Vegetation Harvesting	Completed	2015	TBD	TBD	B	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-26	Breeze Swept Septic Phase-out	Estimates will be calculated using the latest version of ArcNLET for the septic tank phase out.	Wastewater Service Area Expansion	Completed	2017	TBD	TBD	B	39.6	3700000	20000	DEP, SJRWMD, 1/2 cent Lagoon Tax	2580000	N/A
City of Rockledge	Not provided	ROCK-27	River Ridge Non Discharge	Nondischarge dry retention basin.	100% On-site Retention	Completed	2015	304.8869	44.00242	B	35.25983	Not provided	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-28	Southwest Gus Hipp Conveyance	Add BAM for denitrification to major canal in the city.	BMP Treatment Train	Underway	2019	TBD	TBD	B	TBD	17000	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-29	Gus Hipp Pond	Conversion of borrow pit to a wet detention pond.	Wet Detention Pond	Planned	TBD	TBD	TBD	B	TBD	335000	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-30	Public Works Pond 1	Enlarge current retention area.	Dry Detention Pond	Completed	2017	5.042222	0.705844	B	5.687929	5000	600	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-31	Public Works Pond 2	Enlarge current retention area.	Dry Detention Pond	Completed	2017	6.510994	0.878181	B	6.96163	10000	600	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-32	School Triangle Pond	Create dry detention pond on city-owned land.	Dry Detention Pond	Completed	2017	1.023658	0.144694	B	1.219959	20300	1000	Not provided	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
City of Rockledge	Not provided	ROCK-33	Barton Park Irrigation	Use wet pond (Barton Lake) for irrigation.	Stormwater Reuse	Planned	TBD	TBD	TBD	B	TBD	TBD	TBD	TBD	TBD	N/A
City of Rockledge	Not provided	ROCK-34	Winchester Cove Non Discharge	Nondischarge dry retention basin.	100% On-site Retention	Completed	2015	17.94158	2.638036	B	1.9	Not provided	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-35	Florida Ave and Dixie Lane Swale	Grass swale with blocks or culverts.	Grass swales with swale blocks or raised culverts	Completed	2018	94.89466	12.96	B	9.6	5000	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-36	WWTP EQ Basin Nutrient Uptake	Modification of WWTP Process.	WWTF Upgrade	Planned	TBD	TBD	TBD	B	TBD	Not provided	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-37	WWTP Biosolids	Modification of WWTP Process.	WWTF Upgrade	Planned	TBD	TBD	TBD	B	TBD	Not provided	Not provided	Not provided	Not provided	N/A
City of Rockledge	Not provided	ROCK-38	Rockled Indian River Dr	Septic to Sewer.	Wastewater Service Area Expansion	Planned	TBD	TBD	TBD	B	TBD	Not provided	Not provided	Not provided	Not provided	N/A
Town of Indialantic	Not provided	TI-01	Swales North of U.S. 192 Causeway	Swales provide treatment as a part of TI-02 and all reductions are accounted for below.	Grass Swales without Swale Blocks or Raised Culverts	Completed	2001	N/A	N/A	B	29.2	Not provided	Not provided	Not provided	Not provided	N/A
Town of Indialantic	Not provided	TI-02	100% On-Site Retention	Not provided.	100% On-site Retention	Completed	2001	1280.45	190.0857	B	3.5	Not provided	Not provided	Not provided	Not provided	N/A
Town of Indialantic	Not provided	TI-03	Education Efforts	Pamphlet, website, and fertilizer ordinance.	Education Efforts	Ongoing	N/A	64.92	9.76	B	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Titusville	N/A	TV-09	Education Efforts	Irrigation, fertilizer, pet waste management, and landscaping ordinances; pamphlets, presentations, website, illicit discharge program.	Education Efforts	Ongoing	N/A	313.56	42.18	B	N/A	N/A	5000	City	N/A	N/A
City of Titusville	N/A	TV-10	Street Sweeping	Approximately 205,725 lbs of debris removed from North B during the reporting period.	Street Sweeping	Ongoing	N/A	116	74	B	N/A	188120	63106	City	Not provided	N/A
Brevard County	DEP	BC-068	Multiple Ditch Outfall Denitrification D1	Providing base flow/groundwater treatment in open drainage basins.	Biosorption Activated Media (BAM)	Canceled	2019	N/A	N/A	N/A	N/A	900000	N/A	Florida Legislature/ Brevard County	900600	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-068a	Multiple Ditch Outfall Denitrification D1	Providing base flow/groundwater treatment in open drainage basins.	Biosorption Activated Media (BAM)	Canceled	2019	N/A	N/A	N/A	N/A	N/A	N/A	DEP	Not provided	LP0511A
Brevard County	SOIRL	BC-091	Kingsmill Aurora Phase II	Construction of 5 ac pond with weirs, drop structures, etc. Duplicate with BC-46.	Wet Detention Pond	Canceled	N/A	N/A	N/A	N/A	N/A	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 NIRL, Project Zones A and B were not compliant, and stakeholders in both zones were assigned detailed allocations in the first BMAP iteration.

Since the 2013 BMAP, further evaluations of the seagrass depth limits in the NIRL have been conducted to reassess whether the NIRL project zones have continued to be compliant. **Table 23** and **Table 24** 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 15** and **Figure 16** 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 23. Summary of seagrass compliance results, Step 1

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

Table 24. Summary of seagrass compliance results, Step 2

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

Step 2	North A	North B
2007 – 2013	Fail (0 of 4)	Fail (0 of 4)
2009 – 2015	Fail (0 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)

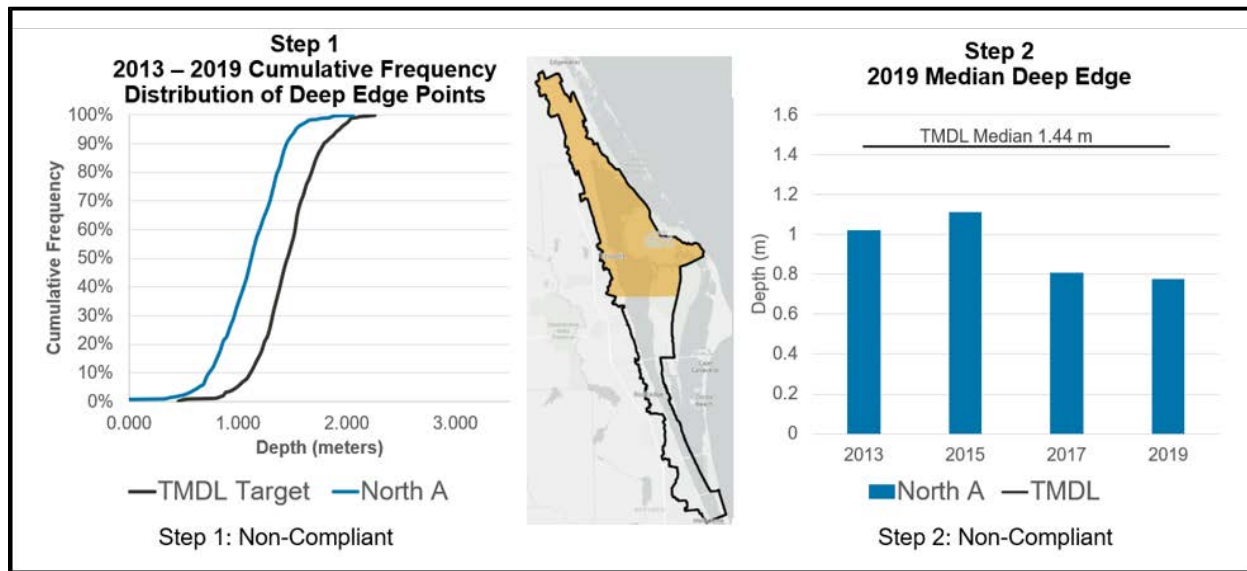


Figure 15. NIRL Project Zone A seagrass evaluation results for Compliance Step 1 and Step 2

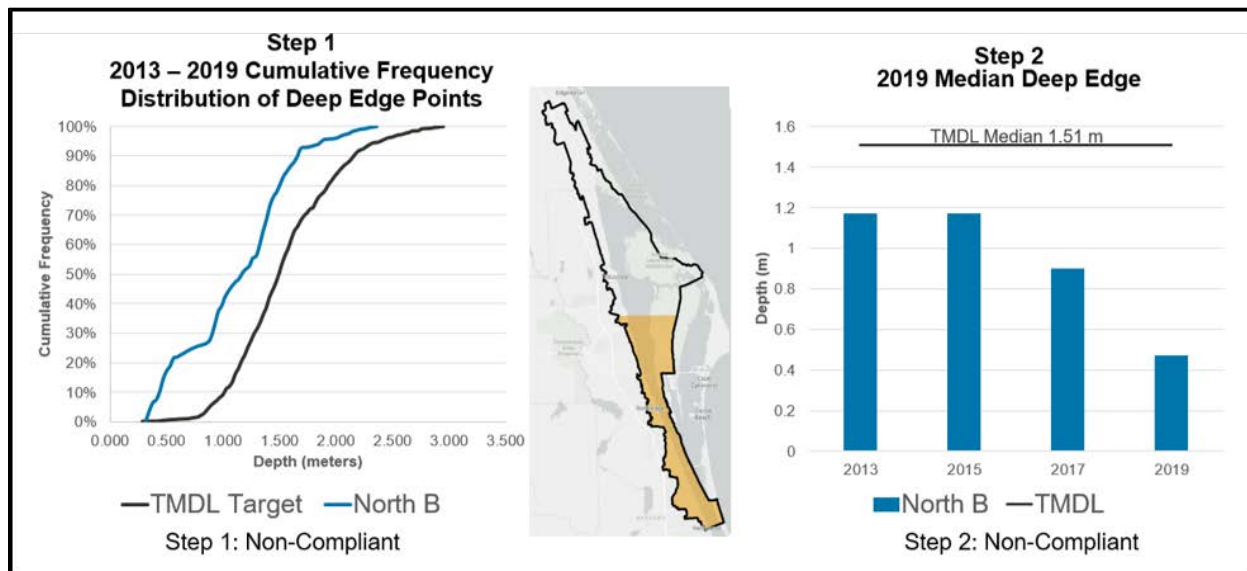


Figure 16. NIRL Project Zone B seagrass evaluation results for Compliance Step 1 and Step 2

4.2.2. 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 tables in this BMAP (**Table 20** and **Table 22**) list the implementation status of the BMAP projects as of July 31, 2020. The tables list 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. North IRL 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. North IRL Segment Group starting loads from model

Segment Group	Area (Acres)	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
IR1-5	135,169	399,161	46,021
IR6-7	40,022	152,737	20,424
IR8-11	37,291	167,774	23,971
IR8-11, EauGallie	4,608	39,412	5,808

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. North IRL BMAP Segment Group TMDL required reduction percentage

WBID	Project Zone	Segment Group	% TN Reduction	% TP Reduction
2963F & 2963E	A	IR1-5	35	47
2963D & 3028	B	IR6-7	36	53
2963B & 2963C	B	IR8-11	36	48
3082	B	IR8-11, EauGallie	51	58

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**).

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-3**.

Table B-3. North IRL 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)
IR1-5	139,706	259,455	21,630	24,391
IR6-7	54,985	97,751	10,825	9,599
IR8-11	60,399	107,375	11,506	12,465
IR8-11, EauGallie	20,100	19,312	3,369	2,439

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-3**.

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

lbs/ac/yr = Pounds per acre per year

Segment Group	Land Type	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)
IR1-5	Natural Lands	113,157	234,870	22,061	2.08	0.19
IR6-7	Natural Lands	26,352	43,044	4,380	1.63	0.17
IR8-11	Natural Lands	19,700	20,337	2,527	1.03	0.13
IR8-11, EauGallie	Natural Lands	438	1,986	248	4.54	0.57

DEP then calculated the allowable load per acre for each segment group. This is the allocation load divided by the acres 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 loads 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. North IRL allowable load per acre from the total allocation

Segment Group	Allowable TN Load Per Acre	Natural TN Load (lbs/ac/yr)	Is Allowable TN Load Per Acre (LPA) Less than Natural TN LPA?	Allowable TP Load Per Acre	Natural TP Load (lbs/ac/yr)	Is Allowable TP LPA Less than Natural TP LPA?	Result
IR1-5	1.92	2.08	True	0.18	0.19	TRUE	Use adjustment for both
IR6-7	2.44	1.63	False	0.24	0.17	FALSE	No adjustment for either
IR8-11	2.88	1.03	False	0.33	0.13	FALSE	No adjustment for either
IR8-11, EauGallie	4.19	4.54	True	0.53	0.57	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 applicable) and the TN and TP allocations are listed in **Table B-6**.

Table B-6. Adjusted North IRL 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)
IR1-5	118,009	281,152	20,339	25,682
IR8-11, EauGallie	18,492	20,920	3,181	2,627

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**, **Table B-9**, and **Table B-10**, the natural lands are separated from the starting loads, and so only the anthropogenic loadings are included in the entity loads.

Table B-7. North IRL Segment IR1-5 entity starting loads from model, natural lands separated

Segment Group	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
IR1-5	Natural Lands	235,399	22,127
IR1-5	Agricultural Producers	28,374	4,278
IR1-5	Brevard County	38,328	5,842
IR1-5	City of Edgewater	2,704	361
IR1-5	City of Oak Hill	371	49
IR1-5	City of Titusville	51,549	7,561
IR1-5	FDOT District 5	5,972	766
IR1-5	Kennedy Space Center	13,435	1,728
IR1-5	Volusia County	23,029	3,309
IR1-5	Total	399,161	46,021

Table B-8. North IRL Segment IR6-7 entity starting loads from model, natural lands separated

Segment Group	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
IR6-7	Natural Lands	43,012	4,381
IR6-7	Agricultural Producers	7,923	1,218
IR6-7	Brevard County	72,774	10,872
IR6-7	City of Cocoa	15,169	2,219
IR6-7	City of Titusville	5,226	703
IR6-7	FDOT District 5	3,796	508
IR6-7	Kennedy Space Center	4,836	524
IR6-7	Total	152,737	20,424

Table B-9. North IRL Segment IR8-11 entity starting loads from model, natural lands separated

Segment Group	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
IR8-11	Natural Lands	20,166	2,505
IR8-11	Agricultural Producers	1,723	242
IR8-11	Brevard County	60,227	8,864
IR8-11	City of Cocoa	3,020	427
IR8-11	City of Melbourne	47,884	6,960
IR8-11	City of Rockledge	27,669	3,982
IR8-11	FDOT District 5	3,539	472
IR8-11	Town of Indialantic	1,623	244
IR8-11	Town of Palm Shores	1,924	276
IR8-11	Total	167,774	23,971

Table B-10. North IRL Segment IR8-11, EauGallie entity starting loads from model, natural lands separated

Segment Group	Entity	TN Starting Load (lbs/yr)	TP Starting Load (lbs/yr)
IR8-11, EauGallie	Natural Lands	1,976	247
IR8-11, EauGallie	Agricultural Producers	78	12
IR8-11, EauGallie	Brevard County	6,866	1,010
IR8-11, EauGallie	City of Melbourne	29,907	4,460
IR8-11, EauGallie	FDOT District 5	586	79
IR8-11, EauGallie	Total	39,412	5,808

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-11, Table B-12, Table B-13, and Table B-14** 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-11. North IRL Segment IR1-5 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
IR1-5	Natural Lands	0	0	0.00%	0.00%
IR1-5	Agricultural Producers	28,374	4,278	17.33%	17.90%
IR1-5	Brevard County	38,328	5,842	23.40%	24.45%
IR1-5	City of Edgewater	2,704	361	1.65%	1.51%
IR1-5	City of Oak Hill	371	49	0.23%	0.20%
IR1-5	City of Titusville	51,549	7,561	31.48%	31.65%
IR1-5	FDOT District 5	5,972	766	3.65%	3.21%
IR1-5	Kennedy Space Center	13,435	1,728	8.20%	7.23%
IR1-5	Volusia County	23,029	3,309	14.06%	13.85%
IR1-5	Total	163,762	23,894	100.00%	100.00%

Table B-12. North IRL Segment IR6-7 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
IR6-7	Natural Lands	0	0	0.00%	0.00%
IR6-7	Agricultural Producers	7,923	1,218	7.22%	7.59%
IR6-7	Brevard County	72,774	10,872	66.32%	67.77%
IR6-7	City of Cocoa	15,169	2,219	13.82%	13.83%
IR6-7	City of Titusville	5,226	703	4.76%	4.38%
IR6-7	FDOT District 5	3,796	508	3.46%	3.17%
IR6-7	Kennedy Space Center	4,836	524	4.41%	3.26%
IR6-7	Total	109,725	16,043	100.00%	100.00%

Table B-13. North IRL Segment IR8-11 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
IR8-11	Natural Lands	0	0	0.00%	0.00%
IR8-11	Agricultural Producers	1,723	242	1.17%	1.13%
IR8-11	Brevard County	60,227	8,864	40.80%	41.29%
IR8-11	City of Cocoa	3,020	427	2.05%	1.99%
IR8-11	City of Melbourne	47,884	6,960	32.44%	32.42%
IR8-11	City of Rockledge	27,669	3,982	18.75%	18.55%
IR8-11	FDOT District 5	3,539	472	2.40%	2.20%
IR8-11	Town of Indialantic	1,623	244	1.10%	1.14%
IR8-11	Town of Palm Shores	1,924	276	1.30%	1.29%
IR8-11	Total	147,608	21,466	100.00%	100.00%

Table B-14. North IRL Segment IR8-11, EauGallie 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
IR8-11, EauGallie	Natural Lands	0	0	0.00%	0.00%
IR8-11, EauGallie	Agricultural Producers	78	12	0.21%	0.22%
IR8-11, EauGallie	Brevard County	6,866	1,010	18.34%	18.16%
IR8-11, EauGallie	City of Melbourne	29,907	4,460	79.89%	80.20%
IR8-11, EauGallie	FDOT District 5	586	79	1.56%	1.43%
IR8-11, EauGallie	Total	37,436	5,561	100.00%	100.00%

For the unadjusted Segment Groups IR6-7 and IR8-11, 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-12** and **Table B-13**. 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-15** and **Table B-16** from the entity anthropogenic starting loads (**Table B-12** and **Table B-13**).

Table B-15. North IRL Segment IR6-7 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)
IR6-7	Natural Lands	0	0	43,012	4,381
IR6-7	Agricultural Producers	3,971	822	3,953	396
IR6-7	Brevard County	36,468	7,336	36,305	3,536
IR6-7	City of Cocoa	7,602	1,497	7,568	722
IR6-7	City of Titusville	2,619	474	2,607	229
IR6-7	FDOT District 5	1,902	343	1,894	165
IR6-7	Kennedy Space Center	2,423	353	2,413	170
IR6-7	Total	54,985	10,825	97,751	9,599

Table B-16. North IRL Segment IR8-11 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)
IR8-11	Natural Lands	0	0	20,166	2,505
IR8-11	Agricultural Producers	705	130	1,018	112
IR8-11	Brevard County	24,644	4,751	35,583	4,113
IR8-11	City of Cocoa	1,236	229	1,784	198
IR8-11	City of Melbourne	19,593	3,731	28,290	3,229
IR8-11	City of Rockledge	11,322	2,135	16,348	1,848
IR8-11	FDOT District 5	1,448	253	2,091	219
IR8-11	Town of Indialantic	664	131	959	113
IR8-11	Town of Palm Shores	787	148	1,137	128
IR8-11	Total	60,399	11,506	107,375	12,465

For Segment Groups IR1-5 and IR8-11/EauGallie, 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-11** and **Table B-14**). 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-17** and **Table B-18**.

Table B-17. North IRL Segment IR1-5 entity reduction and allowable loading at natural load per acre adjustment (allocation)

Segment Group	Entity	Natural LPA TN Reduction (lbs/yr)	Natural LPA TP Reduction (lbs/yr)	Natural LPA TN Allocation (lbs/yr)	Natural LPA TP Allocation (lbs/yr)
IR1-5	Natural Lands	0	0	235,399	22,127
IR1-5	Agricultural Producers	20,550	3,522	7,824	757
IR1-5	Brevard County	27,759	4,809	10,569	1,033
IR1-5	City of Edgewater	1,959	297	746	64
IR1-5	City of Oak Hill	269	40	102	9
IR1-5	City of Titusville	37,334	6,224	14,215	1,337
IR1-5	FDOT District 5	4,325	631	1,647	135
IR1-5	Kennedy Space Center	9,730	1,422	3,705	305
IR1-5	Volusia County	16,679	2,724	6,350	585
IR1-5	Total	118,604	19,669	280,558	26,352

Table B-18. North IRL Segment IR8-11, EauGallie entity reduction and allowable loading at natural load per acre adjustment (allocation)

Segment Group	Entity	Natural LPA TN Reduction (lbs/yr)	Natural LPA TP Reduction (lbs/yr)	Natural LPA TN Allocation (lbs/yr)	Natural LPA TP Allocation (lbs/yr)
IR8-11, EauGallie	Natural Lands	0	0	1,976	247
IR8-11, EauGallie	Agricultural Producers	39	7	40	5
IR8-11, EauGallie	Brevard County	3,394	580	3,472	430
IR8-11, EauGallie	City of Melbourne	14,785	2,561	15,122	1,899
IR8-11, EauGallie	FDOT District 5	289	46	296	34
IR8-11, EauGallie	Total	18,507	3,194	20,905	2,615

As described above, the entity calculations were performed by segment group. Once these were complete, the information was summarized by entity. In **Table B-19**, 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 NIRL. 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-19. North IRL entity starting load and percent contribution from anthropogenic loads

*Indicates the stakeholder meeting the requirements for low priority.

Entity	Starting TN Load (lbs/yr)	Anthropogenic % TN in BMAP	Starting TP Load (lbs/yr)	Anthropogenic % TP in BMAP
Agricultural Producers	38,099	8.31	5,750	8.59
Brevard County	178,194	38.86	26,588	39.70
City of Cocoa	18,189	3.97	2,645	3.95
City of Edgewater	2,704	0.59	361	0.54
City of Melbourne	77,791	16.97	11,420	17.05
City of Rockledge	27,669	6.03	3,982	5.95
City of Titusville	56,775	12.38	8,264	12.34
FDOT District 5	13,893	3.03	1,825	2.73
Kennedy Space Center	18,271	3.98	2,251	3.36
Town of Indialantic	1,623	0.35	244	0.36
Town of Palm Shores	1,924	0.42	276	0.41
Volusia County	23,029	5.02	3,309	4.94
City of Oak Hill*	371	0.08	49	0.07
Total of Allocated Entities	458,532	100.00	66,964	100.00
Natural Lands	300,552	N/A	29,259	N/A
Total of BMAP	759,084	N/A	96,224	N/A

Table B-20 and **Table B-21** break down the TN and TP reductions for each entity by project zone and in total for the BMAP area.

Table B-20. North IRL entity TN reductions by project zone

*Indicates the stakeholder meeting the requirements for low priority.

** Adjusted using the natural load per acre.

Entity	Project Zone A	Project Zone B	Total
Brevard County	27,759	64,506	92,265
City of Melbourne	0	34,378	34,378
City of Titusville	37,334	2,619	39,953
Agricultural Producers	20,550	4,714	25,264
City of Rockledge	0	11,322	11,322
Volusia County	16,679	0	16,679
Kennedy Space Center	9,730	2,423	12,153
City of Cocoa	0	8,837	8,837
FDOT District 5	4,325	3,640	7,965
City of Edgewater	1,959	0	1,959
Town of Palm Shores	0	787	787
Town of Indialantic	0	664	664
City of Oak Hill*	269	0	N/A
Total	118,604**	133,891**	252,226

Table B-21. North IRL entity TP reductions by project zone

* Indicates the stakeholder meeting the requirements for low priority.

** Adjusted using the natural load per acre.

Entity	Project Zone A	Project Zone B	Total
Brevard County	4,809	12,667	17,476
City of Melbourne	0	6,292	6,292
City of Titusville	6,224	474	6,698
Agricultural Producers	3,522	958	4,480
City of Rockledge	0	2,135	2,135
Volusia County	2,724	0	2,724
Kennedy Space Center	1,422	353	1,775
City of Cocoa	0	1,726	1,726
FDOT District 5	631	641	1,272
City of Edgewater	297	0	297
Town of Palm Shores	0	148	148
Town of Indialantic	0	131	131
City of Oak Hill*	40	0	0
Total	19,669**	25,524**	45,154

Appendix C. Agricultural Enrollment and Reductions

(Language in this appendix was provided by FDACS.)

All agricultural nonpoint sources in the NIRL 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 rule¹ 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 acreages, while ensuring that all entities identified as agriculture will be notified. **Table C-1** lists the agricultural acreage based on FSAID VII that is enrolled in the NIRL BMAP area.

Table C-2 shows the agricultural acreage enrolled in the NIRL BMAP area by project zone. **Table C-3** through **Table C-5** show the agricultural land use acreage enrolled in the BMP Program by commodity. **Figure C-1** shows the parcels enrolled in the BMP Program by

commodity in the NIRL 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 NIRL BMAP area as of July 2020

Category	Acres
FSAID VII agricultural acres in the BMAP area	7,256
Total agricultural acres enrolled	401
% of FSAID VII agricultural acres enrolled	6

Table C-2. Agricultural land use acreage enrolled in the BMP Program in the NIRL BMAP area by project zone

Project Zone	Total Agricultural	Agricultural Acres	% of Agricultural
A	5,683	327	6
B	1,573	74	5
Total	7,256	401	6

Table C-3. Agricultural land use acreage enrolled in the NIRL BMAP area by BMP Program

Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	280
Cow/Calf	114
Fruit/Nut	6
Nursery	1
Total	401

Table C-4. Agricultural land use acreage enrolled in the BMP Program in Project Zone A

Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	213
Cow/Calf	114
Total	327

Table C-5. Agricultural land use acreage enrolled in the BMP Program in Project Zone B

Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	67
Fruit/Nut	6
Nursery	1
Total	74

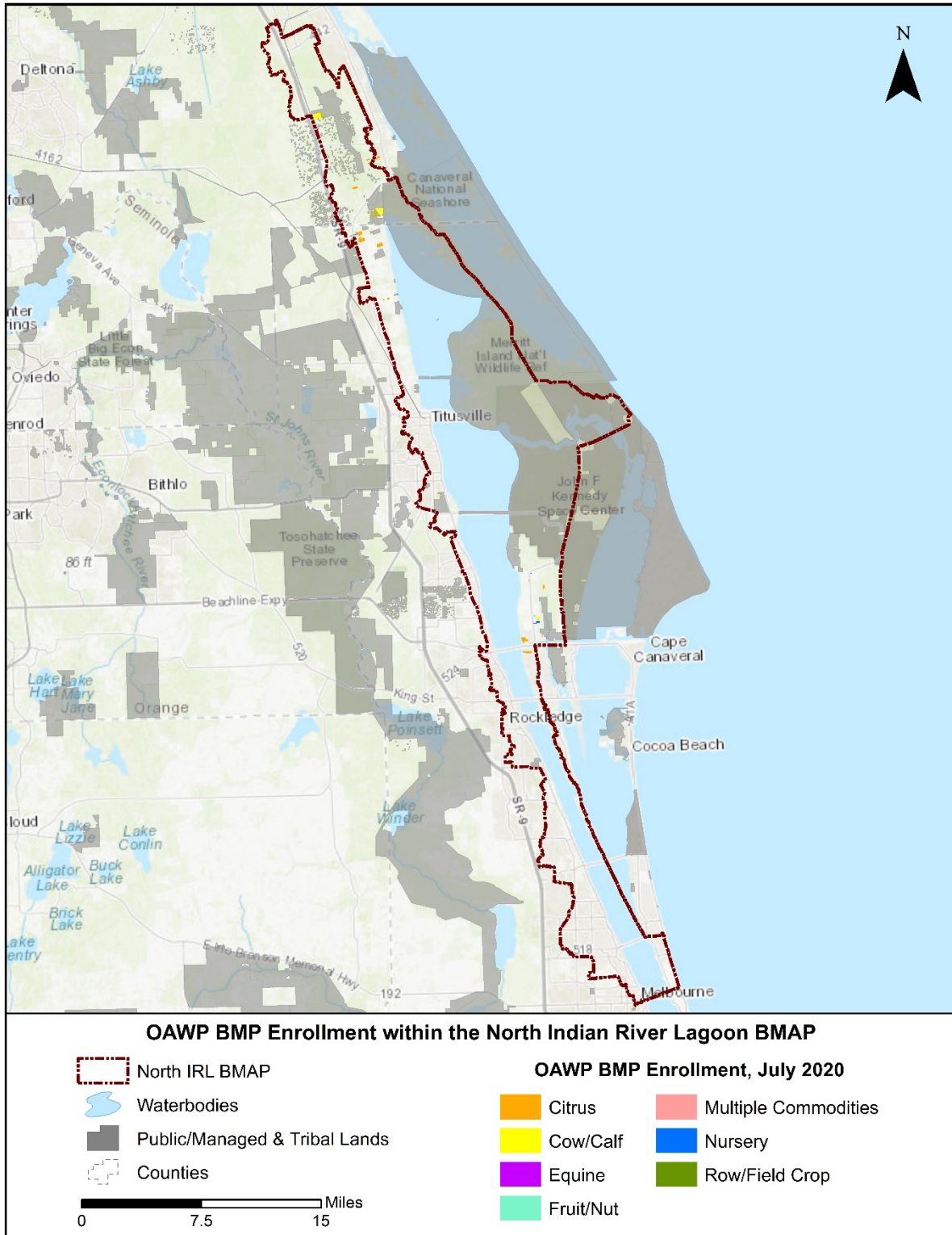


Figure C-1. BMP enrollment in the NIRL BMAP area as of July 2020

Unenrolled Agricultural Acreage

As of July 2020, 6 % of the agricultural acres in the NIRL BMAP area are enrolled in the FDACS BMP Program and are implementing practices designed to improve water quality. 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. Lands classified as agriculture where the ability to implement agricultural BMPs under the BMP Program is limited, such as smaller rural homesteads, receive lower priority for enrollment.

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. Many areas within the NIRL BMAP boundaries experience rapid land use changes, especially at the urban/rural boundary. 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, noncommercial agricultural properties. The increasing number of these smaller parcels with noncommercial agricultural activity represents a growing component of unenrolled acreage. It will be necessary to develop a suite of options to apply to these properties or develop a new classification that may subject these types of areas to other requirements to ensure their nutrient loading contribution is being appropriately identified and reduced.

Further, thousands of acres of open land, scrubland, unimproved pasture, and grazing land exist without a readily identifiable agricultural production activity that will fit within the framework of existing FDACS BMP manuals. Also, these types of parcels are usually controlled by many different individuals. It will be necessary to develop a suite of options to apply to these properties or develop a new classification that may subject these types of areas to alternative methods to ensure their nutrient loading contribution is being appropriately identified and reduced.

Another challenging area includes those agricultural lands that are inactive or fallow—i.e., lands that, on the day the FDACS representative visits, display no enrollable agricultural activity.

These lands may be part of a rotation implemented by a landowner, scheduled for development, listed for sale, etc. The land use information FDACS receives is consistently improving the classification of these areas, but policy options remain limited in scope to ensure the implementation of practices aimed at reducing nutrient inputs from these areas.

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.

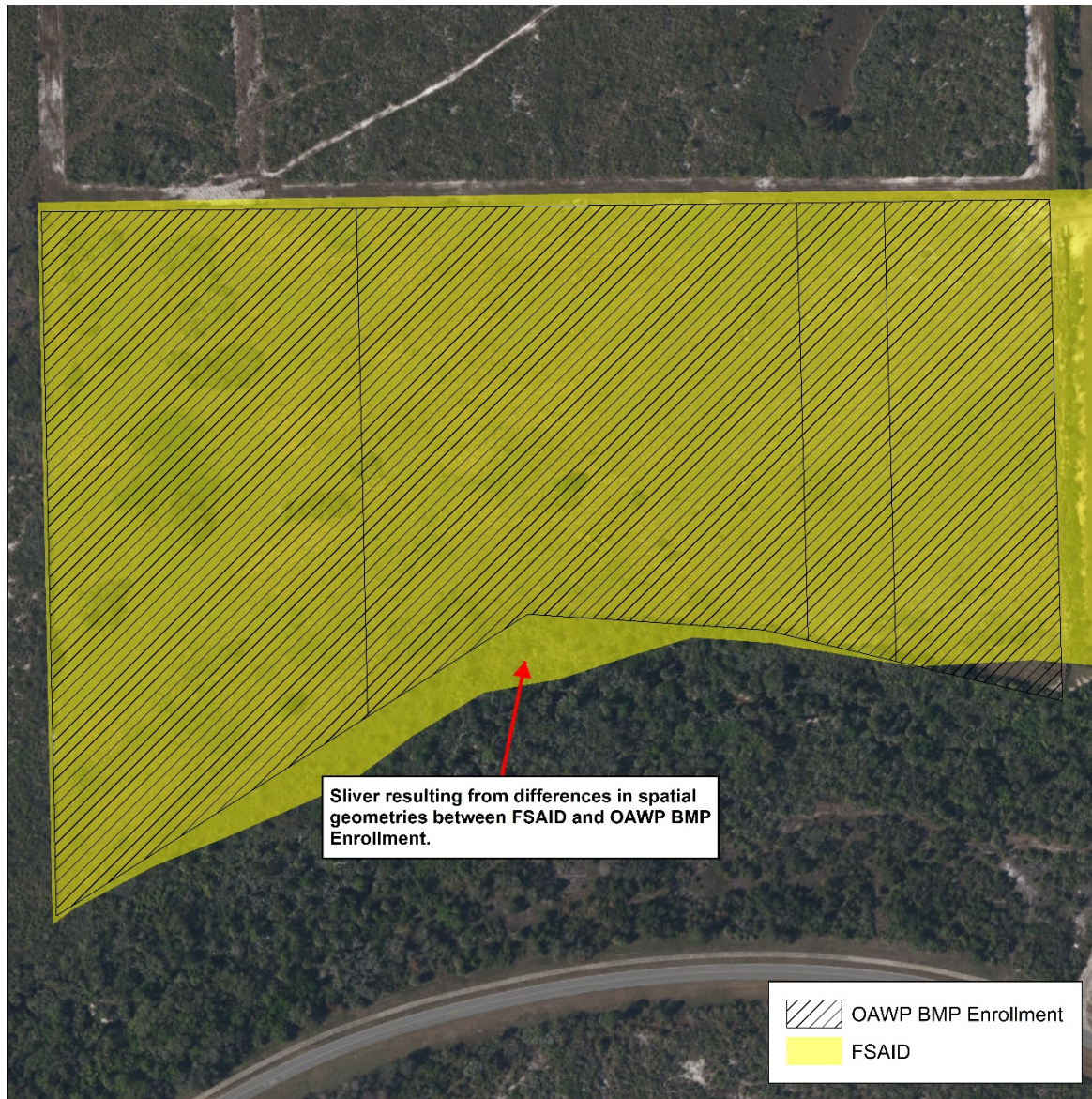


Figure C-2. GIS example of a sliver

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 district (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.

Those agricultural lands that have been identified as "fallow," "former [ag]," and "abandoned," as well as brushland/scrubland/open land, comprise 49 % of the total unenrolled agricultural acres in the NIRL BMAP area. These acres are still classified as agricultural land for the purposes of the BMAP nutrient load assessment. There are a variety of potential options to account for these lands, such as enrollment as "temporarily inactive" operations—particularly those that were previously enrolled and are planned to resume production. Another option may be to note the inactive acres at the time of a field visit and perform periodic reassessment on a cyclical basis. The possibility for DEP and FDACS to calculate nutrient reduction credits or adjust nutrient loading rates may also provide opportunities to present more accurate estimates and establish priorities.

Another factor considered in the prioritization of BMP enrollment is the number of agricultural acres on the parcel. Analyzing the number of agricultural acreages on the parcel and commodity type can give an idea of the efforts that are needed to enroll these areas in the FDACS BMP Program and also identify the areas most in need of enrollment. **Figure C-3** summarizes the agricultural acres distributed by agricultural acreage found on each parcel.

Further analysis was done to characterize the parcels based on agricultural acreage and land use type. For graphing purposes, land use distribution is displayed in two charts, one showing the land use for parcels containing 50 acres of agriculture or greater (**Figure C-4**) and a second for parcels containing less than 50 acres of agriculture (**Figure C-5**). Of the 5,176 acres of land identified as having potential agricultural activity, fallow land comprises 46 % of this acreage.

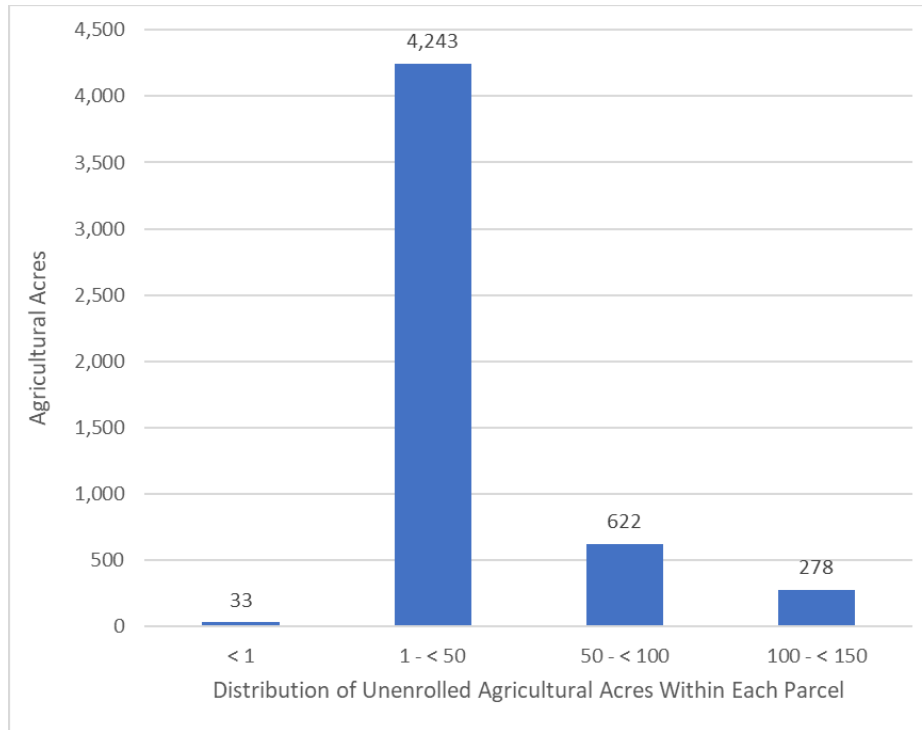


Figure C-3. Distribution of agricultural acreage on parcels with potential agricultural activity in the NIRL BMAP area

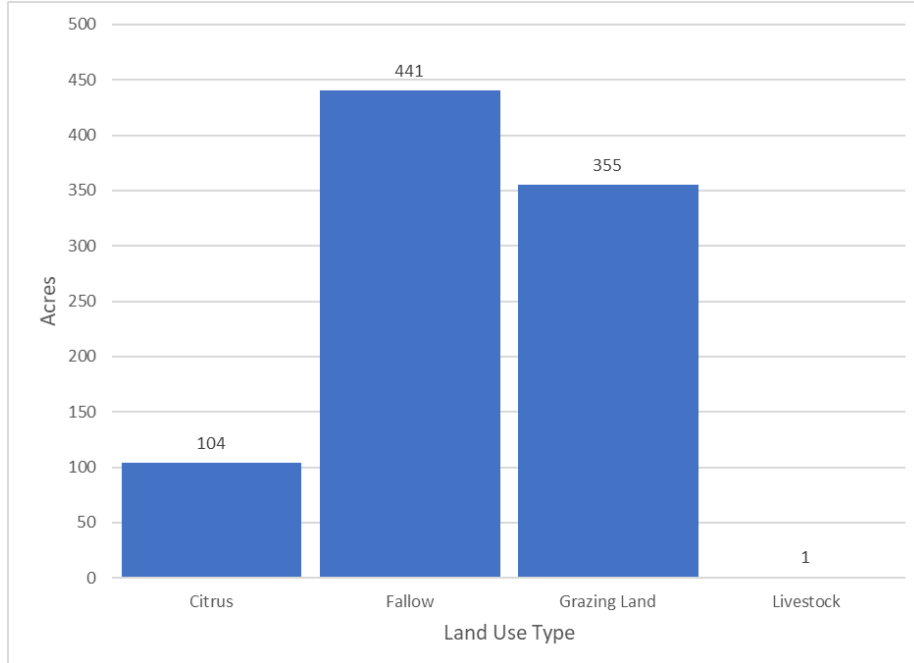


Figure C-4. Agricultural land uses on parcels with 50 acres of agriculture and greater in the NIRL BMAP area

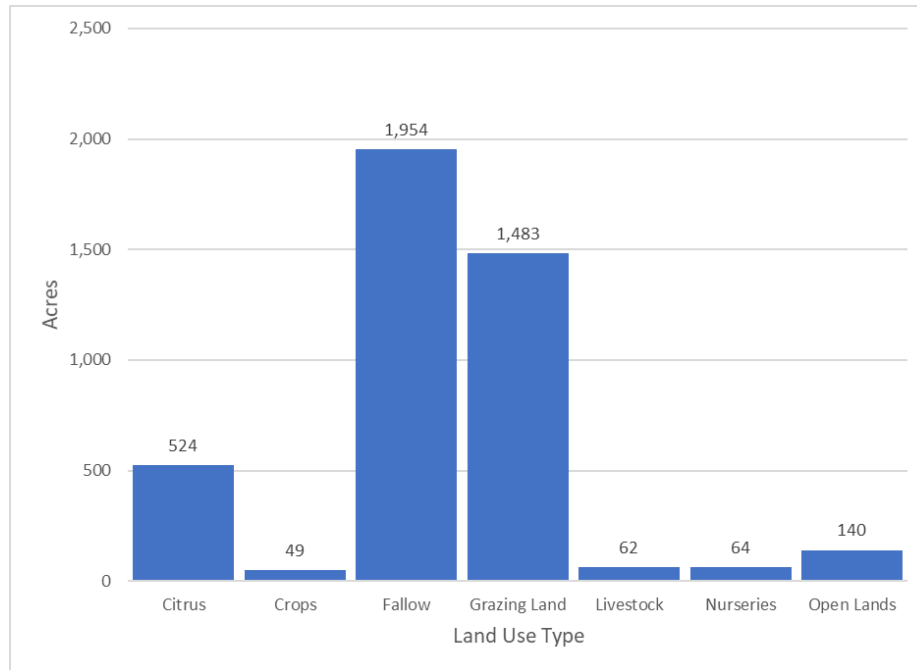


Figure C-5. Agricultural land uses on parcels with less than 50 acres of agriculture in the NIRL BMAP area

Table C-6 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-6** and **Figure C-7** summarize the unenrolled agricultural acres in the NIRL BMAP area by acres of agriculture within the parcels. However, they do not include acreages or parcels associated with slivers or lands that are not likely to have enrollable agricultural activities.

Table C-6. Summary of unenrolled agricultural land use acreage in the NIRL 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 C-1**.

Category	Acres
Unenrolled agricultural acres	6,855
Acres identified within slivers of unenrolled agricultural areas	164
Lands without enrollable agricultural activity (e.g., tribal lands, residential development, and parcels with DOR use codes 70-98)	1,515
Total lands with potentially enrollable agricultural activities	5,176

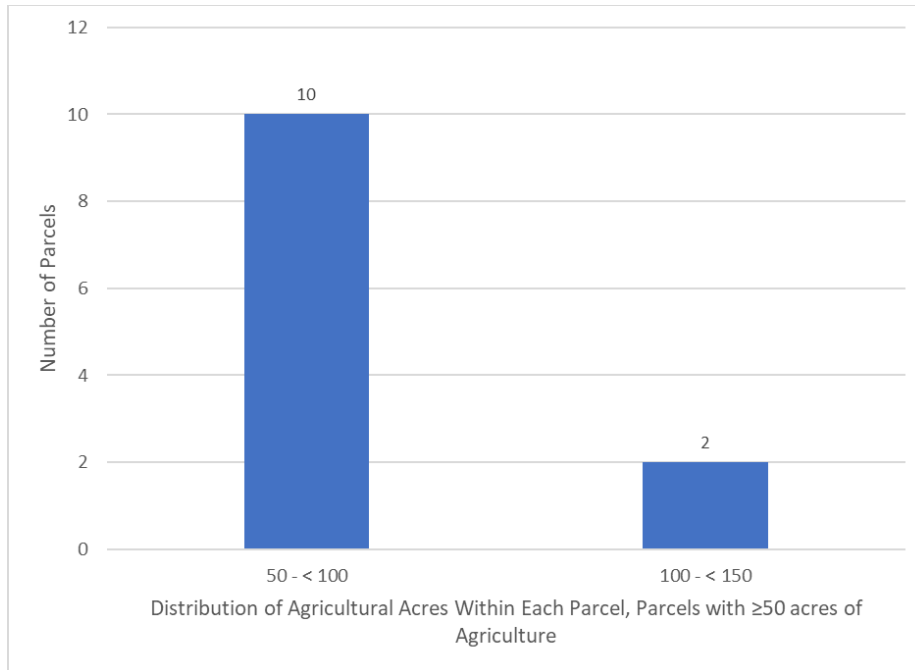


Figure C-6. Number of parcels with 50 acres of agriculture and greater in the NIRL BMAP area

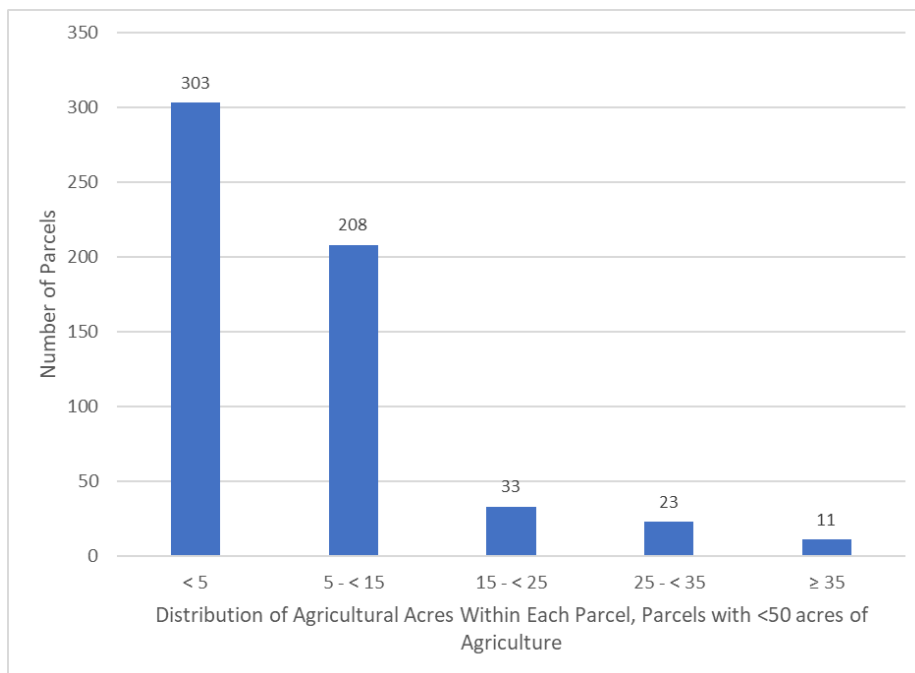


Figure C-7. Number of parcels with less than 50 acres of agriculture in the NIRL BMAP area

Unenrolled agriculture characterization information for each individual project zone, including the distribution of agricultural acres within each parcel and land use type, is presented in **Figure C-8** through **Figure C-11**.

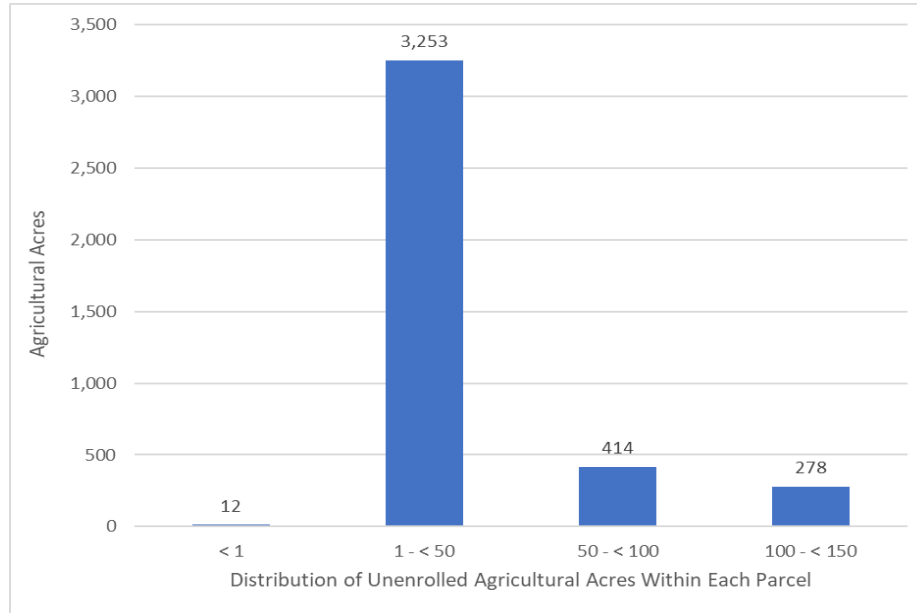


Figure C-8. Distribution of agricultural acreage on parcels with potential agricultural activity, Project Zone A

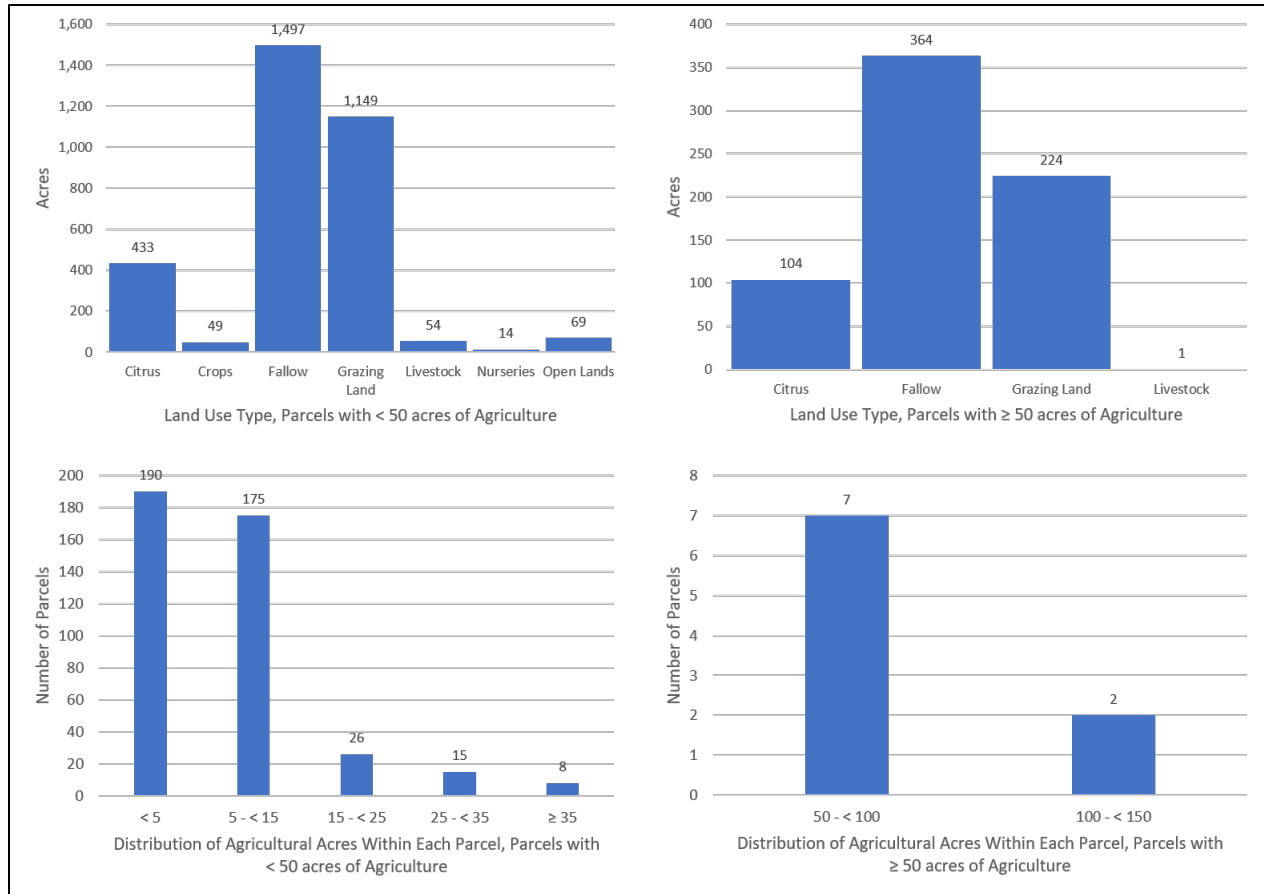


Figure C-9. Land use type and distribution of agricultural acreage, Project Zone A

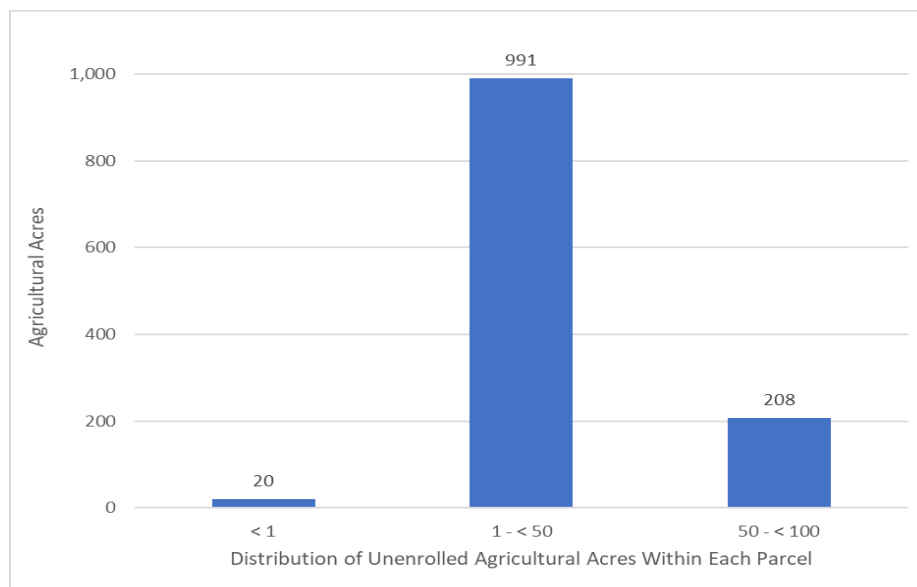


Figure C-10. Distribution of agricultural acreage on parcels with potential agricultural activity, Project Zone B

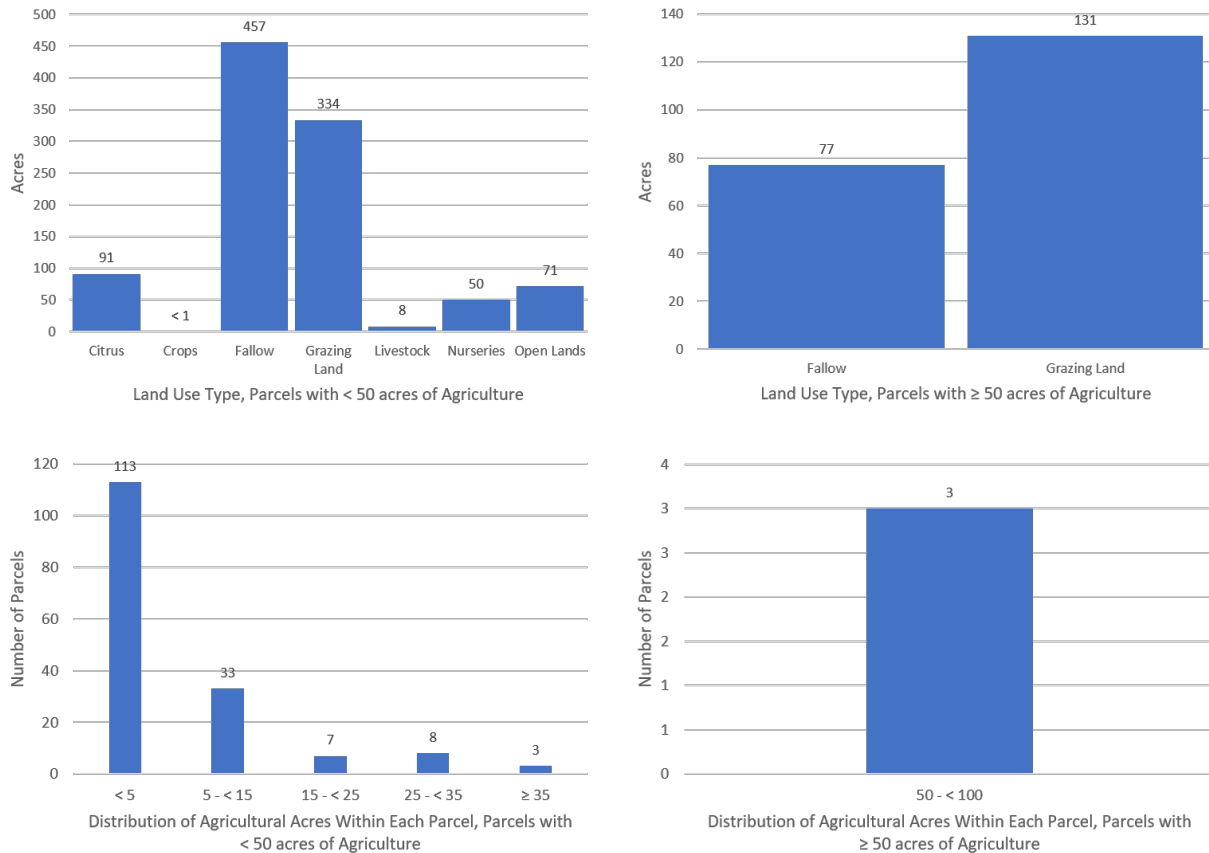


Figure C-11. Land use type and distribution of agricultural acreage by parcel size, Project Zone B

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 BMAP areas 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.

Additional Factors Related to Agricultural Lands and Measuring Progress

Legacy loading can present an additional challenge to measuring progress in many of areas of Florida with adopted BMAPs. Based on research, initial verification by DEP, and long-term trends in water quality in the BMAP area, it is expected that current efforts, such as BMP implementation, will continue to provide improvements in overall water quality despite the impacts from legacy loads.

While the implementation of BMPs will improve the water quality in the basin, it is not reasonable to assume that BMP implementation alone can overcome the issues of legacy loads, conversion to more urban environments, and the effects of intense weather events. BMP implementation is one of several complex and integrated components in managing the water resources of a watershed. Additional regional projects, precisely located and operated, may be needed to achieve the TMDLs for the NIRL Basin.

Collaboration between DEP, the water management districts, and other state agencies, as well as local governments, federal partners, and agricultural producers, is critical in identifying projects and programs, as well as locating funding opportunities to achieve allocations provided for under this BMAP. To improve water quality while retaining the benefits agricultural production provides to local communities, wildlife enhancement, and the preservation of natural areas requires a commitment from all stakeholders to implementing protective measures in a way that maintain the viability of agricultural operations.

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 and that is no longer an agricultural land use by the time this 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 1,725 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-7**). 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-7. Agricultural land use change by project zone

Project Zone	Acres
A	637
B	1,088
Total	1,725

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 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.

Table C-8 identifies the agricultural technologies that received cost-share assistance in the NIRL BMAP area and the associated nutrient reductions based on the 2016 Soil and Water Engineering Technology (SWET) report. Using the nutrient reductions from the report, OAWP developed a methodology to estimate nutrient reductions for NOIs that have received cost-share funding. The NOI boundary, based on property appraiser parcel data, was considered the area treated by the cost-shared agricultural technology or project. For parcels with more than one cost-share project, OAWP identified the order of treatment to determine the reductions for the multiple projects and created a workbook that provided the cost-share agricultural technologies and the formulas to estimate the nutrient reductions.

Table C-8. Cost-share project types and associated nutrient reductions recommended by OAWP

¹ Reductions for this measure are not incorporated as part of this exercise

² Reductions for this measure are from Table 5. Estimated Edge of Farm Nutrient Load Reductions for the FDACS Okeechobee BMP Program in the 2016 SWET Report (Bottcher 2016) and is represented in pounds per year per unit (each project is 1 unit)

Project Types	TN Reductions (%)	TP Reductions (%)
Chemigation/fertigation	20	20
Fence	10	10
Irrigation improvements, automation	20	20
Precision agriculture technology	30	10
Weather station¹	20	5
Well, pipeline, trough, pond, heavy use protection²	50	50

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 meters.
- 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**.

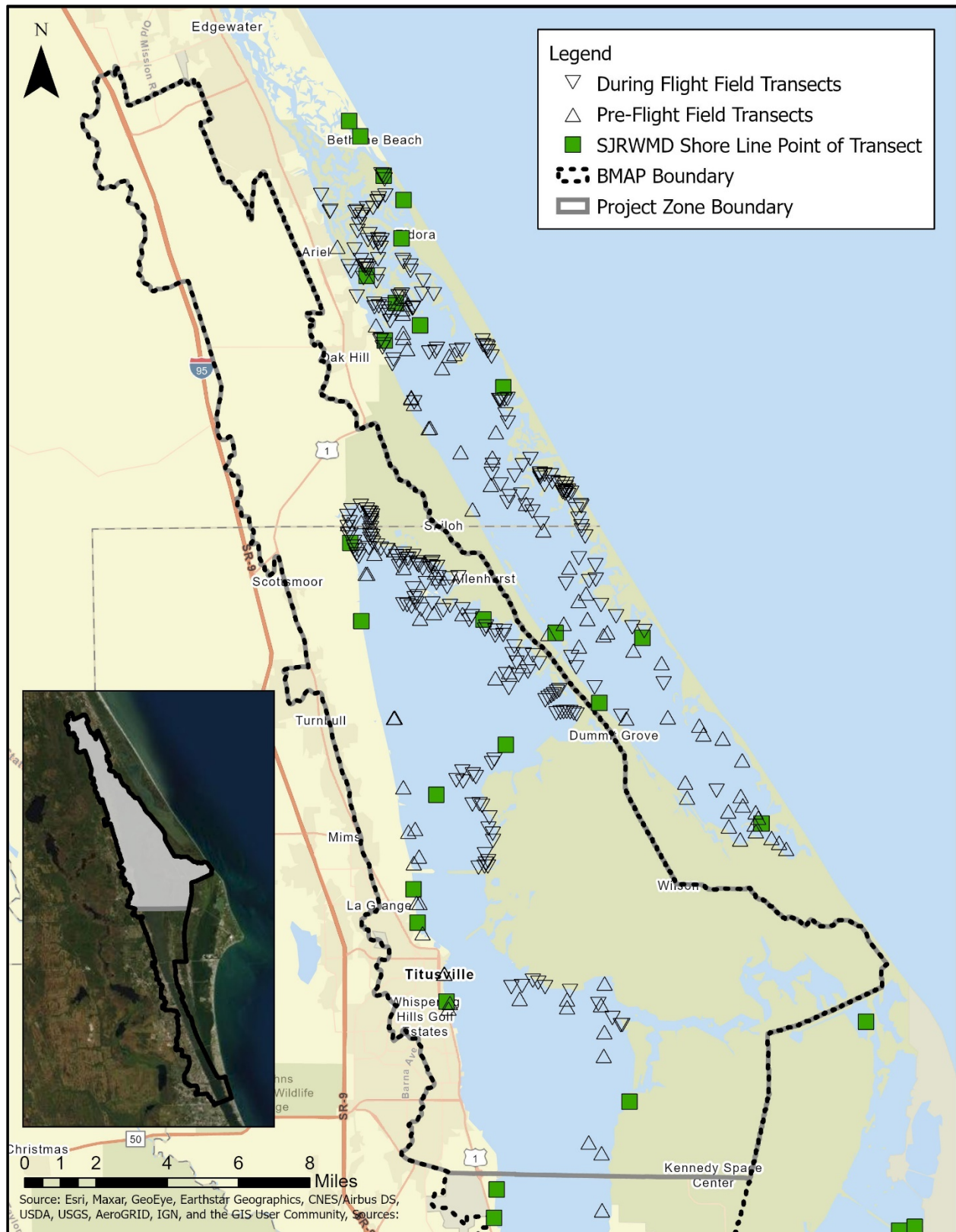


Figure D-1. Map of the seagrass transects in NIRL A

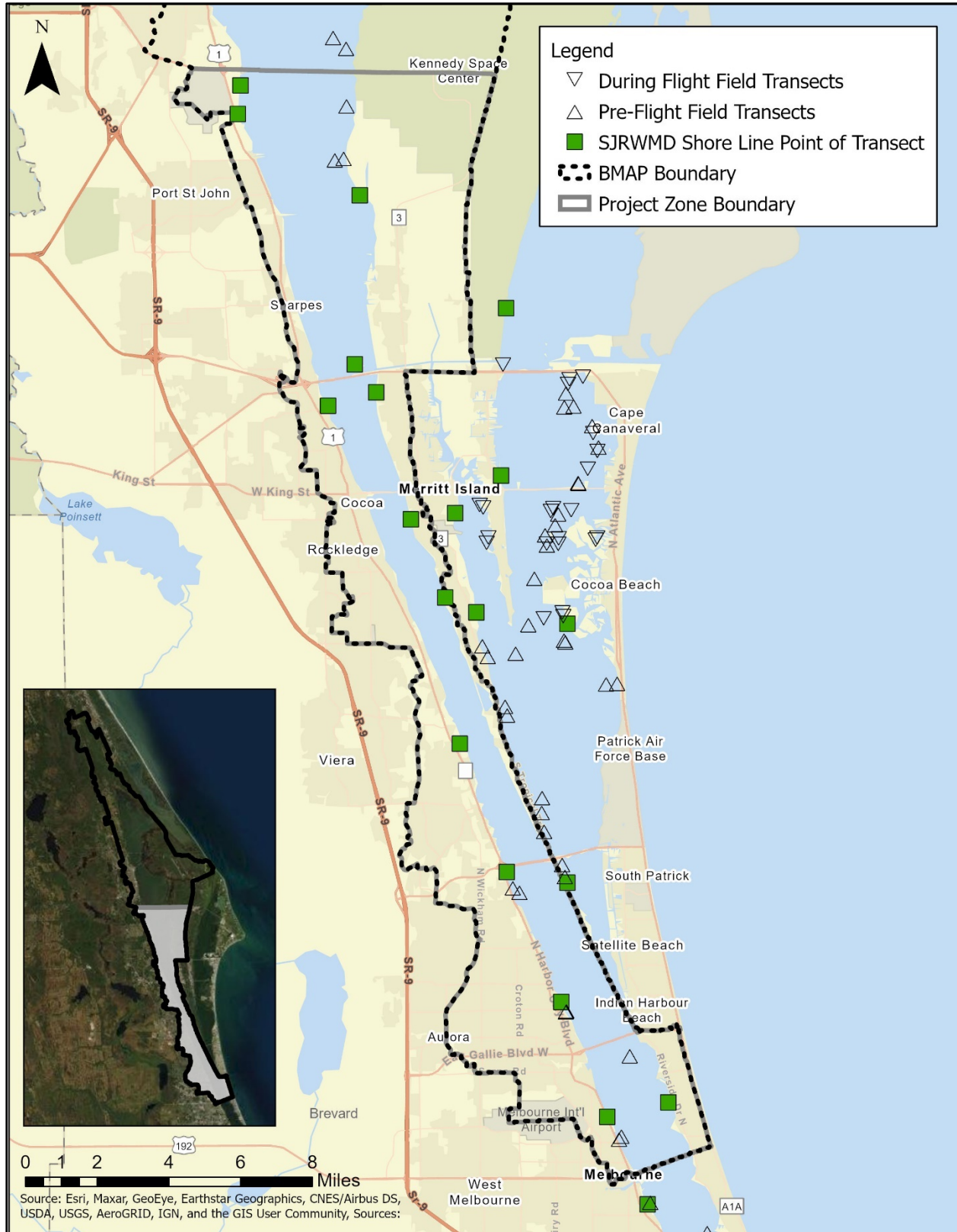


Figure D-2. Map of the seagrass transects in NIRL B