Appendix B

Central Indian River Lagoon Basin Management Action Plan

Indian River Lagoon Basin

Central 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
Central Indian River Lagoon Stakeholders

February 2021

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

Acknowledgments

The *Central Indian River Lagoon Basin Management Action Plan* was prepared as part of a statewide watershed management approach to restore and protect Florida's water quality. It was prepared by the Florida Department of Environmental Protection with participation from the Cenral Indian River Lagoon stakeholders identified below.

Type of Governmental or Private Entity	Participant
Local Governments	Brevard County Indian River County St. Lucie County City of Fellsmere City of Fort Pierce City of Melbourne City of Palm Bay City of Sebastian City of Vero Beach City of West Melbourne Town of Grant-Valkaria Town of Indialantic Town of Indian River Shores Town of Malabar Town of Melbourne Beach Town of Melbourne Village Town of Orchid Town of St. Lucie Village
Community Development Districts	Chaparral Community Development District Emerald Lakes Community Development District Mayfair Community Development District PBR Community Development District Viera East Community Development District
Special Districts	Fellsmere Water Control District Fort Pierce Farms Water Control District Indian River Farms Water Control District Melbourne Tillman Water Control District Sebastian River Improvement District Vero Lakes Water Control District
Federal Agencies	Patrick Air Force Base
Regional and State Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Transportation District 4 Florida Department of Transportation District 5 Florida Turnpike Enterprise Indian River Lagoon Estuary Program South Florida Water Management District St. Johns River Water Management District

Table of Contents

List of Figures

List of Tables

List of Acronyms and Abbreviations

BAM	Biosorption Activated Media
BCUD	Brevard County Utilities Department
BCWMA	Blue Cypress Water Management Area
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
CDD	Community Development District
CDS	Continuous Deflection Separation
CEPP	Central Everglades Planning Project
CERP	Comprehensive Everglades Restoration Plan
CIRL	Central Indian River Lagoon
CR	County Road
CWA	Clean Water Act
DEM	Division of Emergency Management
DEP	Florida Department of Environmental Protection
DIW	Deep Injection Well
DO	Dissolved Oxygen
DOR	Florida Department of Revenue
DWM	Dispersed Water Management
ECFRPC	East Coast Florida Regional Planning Council
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
FJV	Fellsmere Joint Ventures
FLWMI	Florida Water Management Inventory
FPFWCD	Fort Pierce Farms Water Control District
FPL	Florida Power and Light
F.S.	Florida Statutes
FSAID	Florida Statewide Agricultural Irrigation Demand (Geodatabase)
ft	Foot
FWRA	Florida Watershed Restoration Act
GIS	Geographic Information System
HMGP	Hazard Mitigation Grant Program
HOA	Homeowner Association
HSPF	Hydrologic Simulation Program–FORTRAN
HWTT	Hybrid Wetland Treatment Technology

IMPLAN	Impact Analysis for Planning
IRCUD	Indian River County Utilities Department
IRFWCD	Indian River Farms Water Control District
IRL	Indian River Lagoon
IRLC	Indian River Lake Conservancy
IWR	Impaired Surface Waters Rule
kg	Kilogram
km	Kilometer
lbs	Pounds
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
MHP	Mobile Home Park
MS4	Municipal Separate Storm Sewer System
mt	Metric Tons
MTWCD	Melbourne-Tillman Water Control District
N/A	Not Applicable
NELAC	National Environmental Laboratory Accreditation Council
NELAP	National Environmental Laboratory Accreditation Program
NEP	National Estuary Program
NGVD	National Geodetic Vertical Datum
NIRL	North Indian River Lagoon
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSLRWCD	North St. Lucie River Water Control District
O&M	Operations and Maintenance
OAWP	Office of Agricultural Water Policy
OSTDS	Onsite Sewage Treatment and Disposal System
PAM	Polyacrylamide
PLSM	Pollutant Load Screening Model
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
RRLA	Rapid Rate Land Application
RV	Recreational Vehicle
SFWMD	South Florida Water Management District
SJRWMD	St. Johns River Water Management District
SIRL	South Indian River Lagoon
SLC	St. Lucie County
SLCU	St. Lucie County Utilities
SOP	Standard Operating Procedure

SR	State Road
SRID	Sebastian River Improvement District
STEM	Science, Technology, Engineering and Mathematics
STEP	Septic Tank Effluent Pumping
STORET	STOrage and RETrieval (Database)
SWET	Soil and Water Engineering Technology
SWIL	Spatial Watershed Iterative Loading
SWMP	Stormwater Management Program
TCRPC	Treasure Coast Regional Planning Council
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
VLWCD	Vero Lakes Water Control District
WBID	Waterbody Identification (number)
WCD	Water Control District
WCS	Water Control Structure
WIN	Watershed Information Network (Database)
WMA	Water Management Area
WMD	Water Management District
WWTF	Wastewater Treatment Facility
WWTP	Wastewater treatment plant

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 CIRL Subbasin. The main stem of the CIRL Subbasin extends from the Melbourne Causeway in Brevard County to Fort Pierce Inlet, and includes the areas drained by the Fort Pierce Farms Canal network and the C-25 Canal (**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 certain tributaries to the CIRL, now addressed in this BMAP. For Crane Creek (waterbody identification [WBID] number 3085A), North Prong of the Sebastian River (WBID 3128), South Prong St. Sebastian River Estuary Segment (WBIDs 3129B1 and 3129B2), Sebastian River above Indian River (3129A), and the C-54 Canal (WBID 3135A), no further nutrient load reductions were requested beyond those already established for the main stem seagrass nutrient TMDLs. For Goat Creek (WBID 3107A), the targets were also

set to control nutrient loads from the watershed of the creek to restore seagrass distribution in the IRL proper. No further nutrient reductions beyond those already being requested to protect the main stem seagrasses were included in the Goat Creek TMDLs.

CIRL BMAP

In addition to dividing the overall IRL Watershed into subbasins, the CIRL 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 CIRL Subbasin was split into four project zones, as follows:

- Central A – Melbourne Causeway (U.S. 192) to the north tip of Grant Farm Island.
- Central SEB – Grant Farm Island to Wabasso Causeway (County Road 510).
- Central B – Wabasso Causeway to the boundary between Indian River County and St. Lucie County.
- South IRL (SIRL) – The St. Lucie/Indian River County line to the Fort Pierce Inlet.

TMDLs have not yet been developed for the SIRL; however, because of the connectivity of the SIRL to the other three project zones, the reduction of loads here is critical for achieving the TMDLs for the main stem of the IRL. The SIRL was therefore included in the CIRL BMAP adopted in 2013, and load reductions were developed for the SIRL project zone as part of this BMAP. Additionally, WBIDs 3163 and 3163B (C-25 canal) within the SIRL project zone are impaired for nutrients, as indicated by elevated phosphorus levels and the abundance of macrophytes.

DEP first adopted the CIRL BMAP in 2013 to implement total nitrogen (TN) and total phosphorus (TP) TMDLs in three of the four CIRL Project Zones. 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 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. 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 CIRL 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	76,866	29.2	9,267	22.7
SEB	61,065	23.2	23,646	50.9
B	92,410	31.4	14,169	37.4
SIRL	16,718	17.5	3,826	4.0
Total	**247,059**	**27.0**	**50,909**	**23.1**

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 CIRL 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 significant contributor of TN and TP loading to the CIRL. Since the adoption of the CIRL 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 25 % 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 CIRL BMAP monitoring network consists of 44 stations sampled by SJRWMD, South Florida Water Management District, U.S. Geological Survey, Indian River Farms Water Control District, Sebastian River Improvement District, Fort Pierce Farms Water Control District, and North St. Lucie River Water Control District. 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, 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.

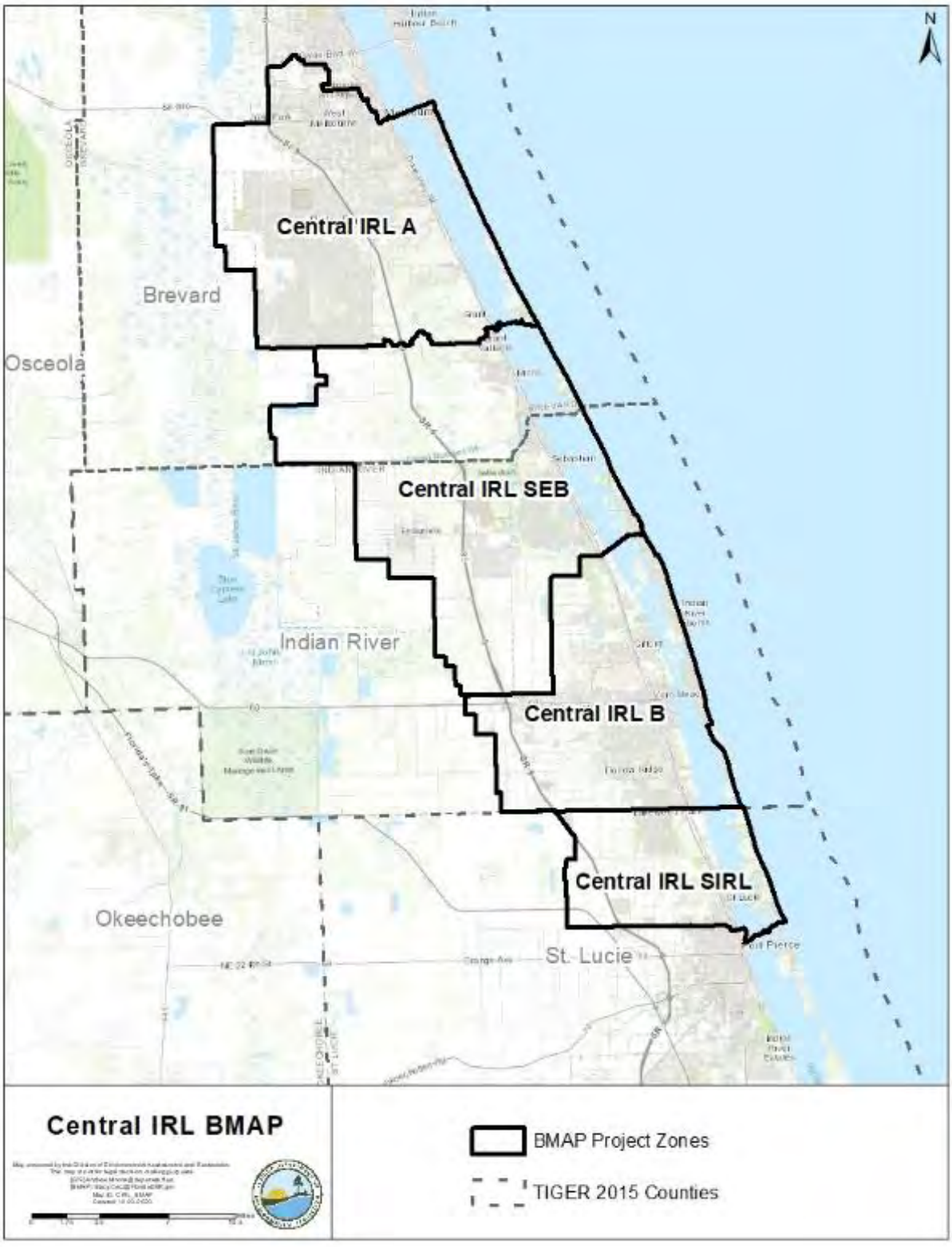

Figure ES- 1. CIRL BMAP area and project zones

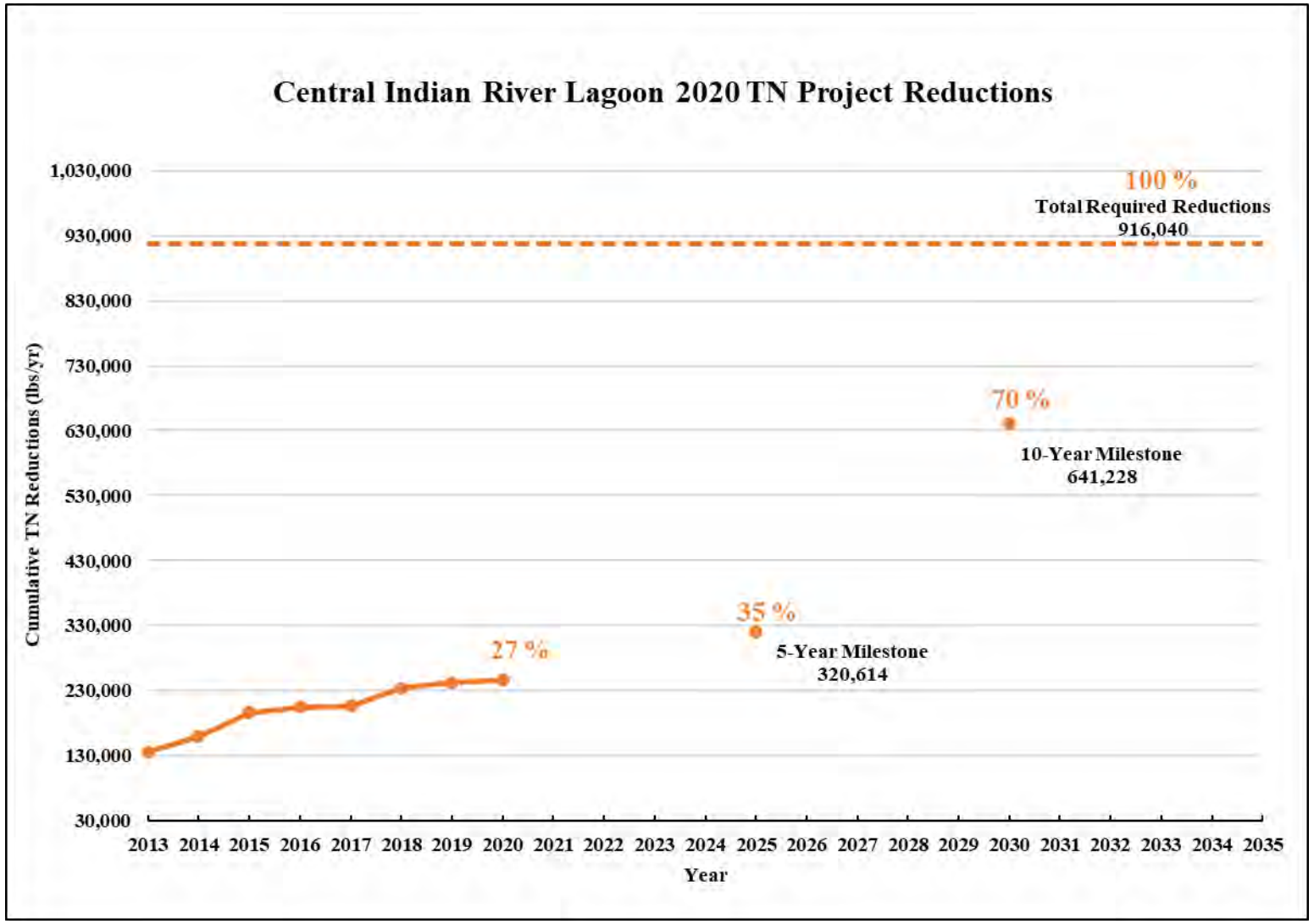

Figure ES- 2. Estimated progress towards the CIRL BMAP TN milestones with projects completed through July 31, 2020

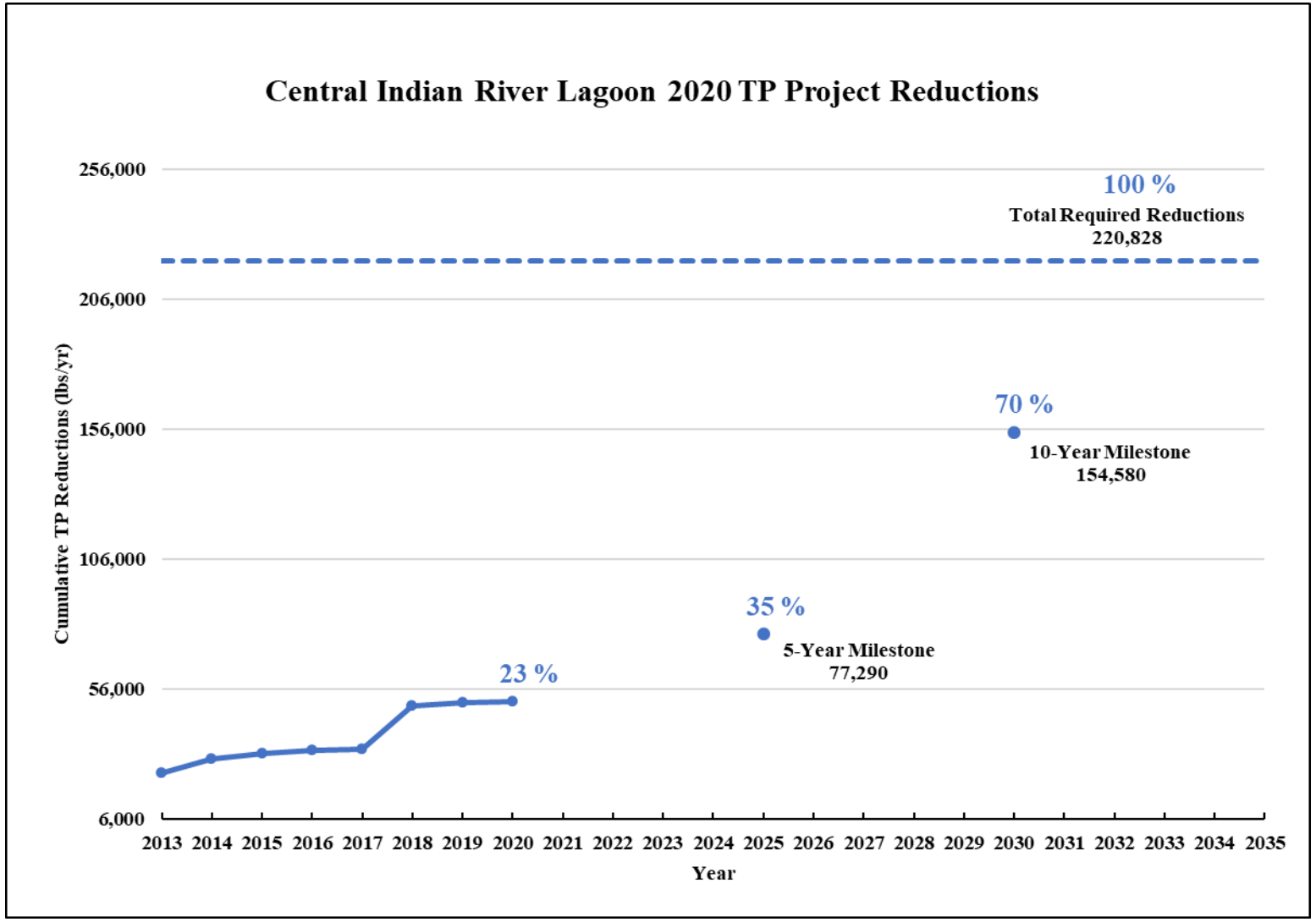

Figure ES- 3. Estimated progress towards meeting the CIRL TP milestones with projects completed through July 31, 2020

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 Central Indian River Lagoon (CIRL), are categorized as Class III waters, meaning they must be suitable for recreation and must support fish consumption and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. In addition, many waterbody segments (also known as waterbody identification units, WBIDs) are categorized as Class II waters, which have a designated use of shellfish propagation or harvesting. **Table 1** lists all designated use classifications for Florida surface waters.

Table 1. Designated use attainment categories for Florida surface waters

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

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

Class II waters in the CIRL 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.

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 CIRL 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.

Table 2. Class II waters in the CIRL

Classification	WBID Number	Waterbody Name
Class II	2963A1	Indian River above Sebastian Outlet
Class II	2963B1	Indian River above Melbourne Causeway
Class II	3107A	Goat Creek (marine segment)
Class II	3107B	Goat Creek (freshwater segment)
Class II	3115	Kid Creek
Class II	3119	Trout Creek
Class II	3147	North Canal
Class II	3190	South Indian River (above Ft. Pierce Inlet)
Class II	3190A	Little Jim Bridge
Class II	5003B1	South Indian River (below SR 60)
Class II	5003B2	South Indian River (below SR 60 – Shellfish Portion)
Class II	5003C1	South Indian River (above SR 60)
Class II	5003D1	South Indian River (near St. Sebastian River)
Class II	5003DA	Coconut Point Sebastian Inlet

1.1.1. CIRL 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 CIRL.

Table 3. CIRL TMDLs

NPDES = National Pollutant Discharge Elimination System.

WBID	Waterbody	Parameter	NPDES Stormwater (% reduction)
5003D+2963A	South Indian River + Indian River Above Sebastian Inlet	TN	56
5003D+2963A	South Indian River + Indian River Above Sebastian Inlet	TP	48
5003B+5003C	South Indian River	TN	56
5003B+5003C	South Indian River	TP	48

Additionally, this BMAP addresses adopted TMDLs for certain tributaries to the CIRL. For all the CIRL tributaries, there are biochemical oxygen demand (BOD) TMDLs in rule. Also, for these tributaries—Crane Creek (WBID 3085A), North Prong of the Sebastian River (WBID 3128), South Prong St. Sebastian River Estuary Segment (WBIDs 3129B1 and 3129B2), Sebastian River above Indian River (WBID 3129A), and C-54 Canal (WBID 3135A)—no further nutrient load reductions were requested beyond those already established for the main stem seagrass nutrient TMDLs. For Goat Creek (WBID 3107A), the targets were also set to control nutrient loads from the watershed of the creek to restore seagrass distribution in the IRL proper. No further nutrient reductions beyond those already being requested to protect the main stem seagrasses were included in the Goat Creek TMDLs.

Table 4 lists the tributary TMDLs in the CIRL.

Table 4. CIRL tributary TMDLs

WBID	Waterbody	Parameter	NPDES Stormwater (% Reduction)	Project Zone
3107A	Goat Creek	TN	36	A
3017A	Goat Greek	TP	0	A
3017A	Goat Greek	BOD	72.3	A
3085A	Crane Creek	TN	56	A
3085A	Crane Creek	TP	48	A
3085A	Crane Creek	BOD	80.1	A
3128	North Prong of the Sebastian River	TN	56	SEB
3128	North Prong of the Sebastian River	TP	48	SEB
3128	North Prong of the Sebastian River	BOD	69.7	SEB
3129B1	South Prong St. Sebastian River Estuary Segment	TN	56	SEB
3129B1	South Prong St. Sebastian River Estuary Segment	TP	48	SEB
3129B1	South Prong St. Sebastian River Estuary Segment	BOD	78.2	SEB
3129B2	South Prong St. Sebastian River Estuary Segment	TN	56	SEB
3129B2	South Prong St. Sebastian River Estuary Segment	TP	48	SEB
3129B2	South Prong St. Sebastian River Estuary Segment	BOD	78.2	SEB
3129A	Sebastian River above Indian River	TN	56	SEB
3129A	Sebastian River above Indian River	TP	48	SEB
3129A	Sebastian River above Indian River	BOD	74.2	SEB
3135A	C-54 Canal	TN	56	SEB
3135A	C-54 Canal	TP	48	SEB
3135A	C-54 Canal	BOD	72.3	SEB

1.2 CIRL 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 CIRL 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 CIRL BMAP area.

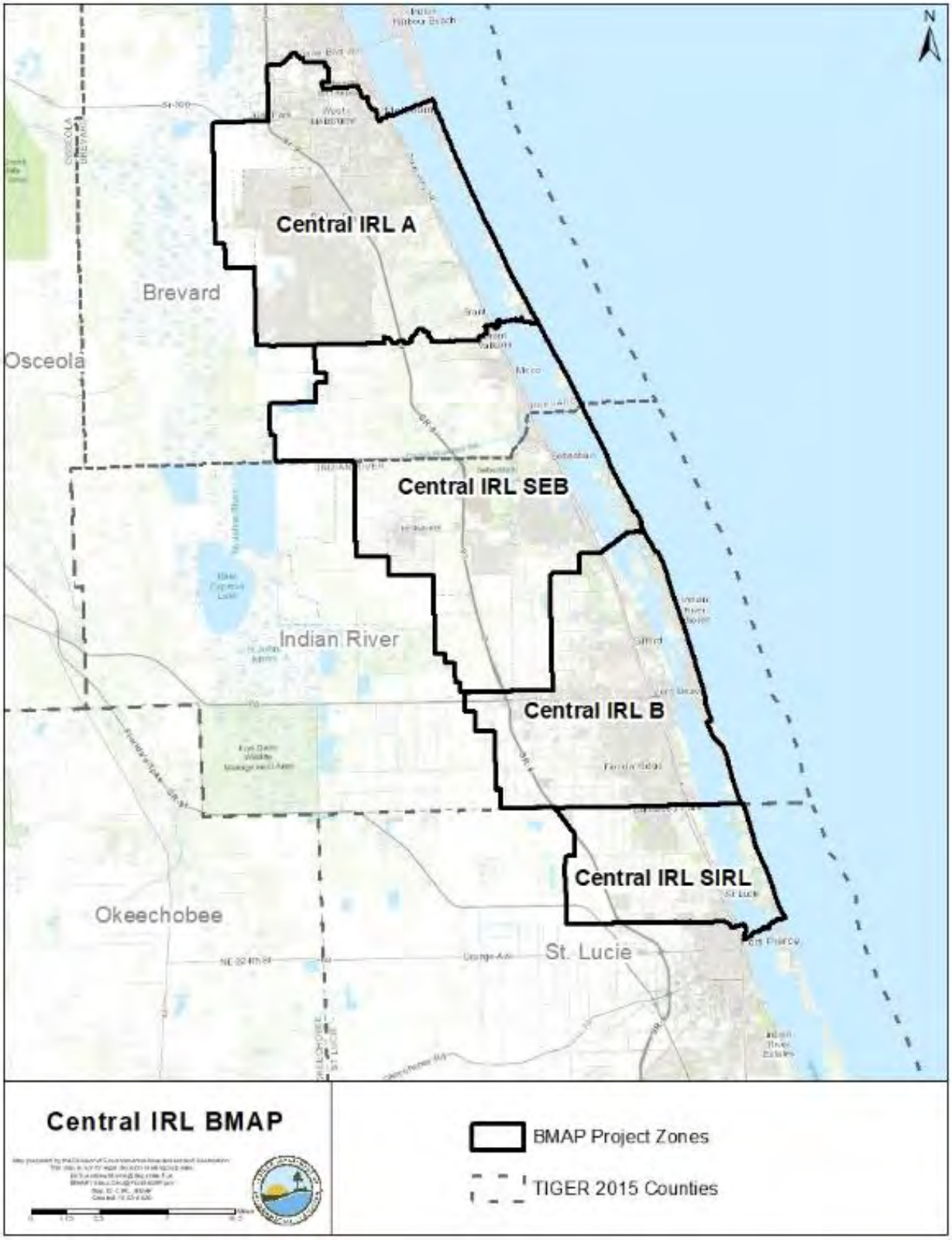

Figure 1. CIRL BMAP area

1.2.1. Pollutant Sources

There are various sources of pollution in the CIRL. Nonpoint (i.e., diffuse) sources in the watershed contribute the majority of TN and TP loads to the CIRL 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 St. Lucie Estuary, to the south, is being addressed through the St. Lucie River and Estuary BMAP.

1.2.1.1. Agricultural Nonpoint Sources

The primary agricultural land uses in the CIRL BMAP area are grazing lands, fallow land, citrus, and open lands. Other agricultural land uses include nurseries 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 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 BMP manuals 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 CIRL 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 CIRL BMAP area.

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

Category	Acres
FSAID VII agricultural acres in the BMAP area	72,898
Total agricultural acres enrolled	18,277
% of FSAID VII agricultural acres enrolled	25

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

Project Zone	Total FSAID VII Agricultural Acres	Agricultural Acres Enrolled	% of Agricultural Acreage Enrolled
A	9,781	355	4
SEB	33,776	12,737	38
B	16,061	2,418	15
SIRL	13,280	2,767	21
Total	**72,898**	**18,277**	**25**

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 CIRL 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	54,625
Acres identified within slivers of unenrolled agricultural areas	443
Lands without enrollable agricultural activity (e.g., tribal lands, residential development, and parcels with Florida Department of Revenue (DOR) use codes 70-98)	9,335
Total lands with potentially enrollable agricultural activities	**44,847**

As of July 2020, OAWP had enrolled 18,277 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 63,124 acres. Using this adjusted agricultural acreage, 29 % 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 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 CIRL Subbasin, 306 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 CIRL as of September 2020.

PHASE II MS4 STORMWATER PERMIT REQUIREMENTS

Table 8 lists the Phase II MS4s in the CIRL as of September 2020. Under a generic permit, the operators of regulated Phase II MS4s must develop a SWMP that includes BMPs with

measurable goals and a schedule for implementation to meet the following six minimum control measures:

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

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

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

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

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

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

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

- **Construction Site Runoff Control** –

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

  - Develop and implement requirements for construction site operators to implement appropriate erosion and sediment control BMPs.
  - Implement requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality.
  - Develop and implement procedures for site plan review that incorporate the consideration of potential water quality impacts.
  - Develop and implement procedures for receiving and considering information submitted by the public.
  - Develop and implement procedures for site inspection and the enforcement of control measures.

- **Postconstruction Runoff Control** – Implement and enforce a program to address the discharges of postconstruction stormwater runoff from areas with new development and redevelopment. (**Note**: In Florida, Environmental Resource Permits issued by water management districts typically serve as a Qualifying Alternative Program for purposes of this minimum control measure.)
- **Pollution Prevention/Good Housekeeping** – Implement an operations and maintenance (O&M) program that has the ultimate goal of preventing or reducing pollutant runoff from MS4 operator activities, such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, stormwater system maintenance, and staff training in pollution prevention.

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

DEP can designate an entity as a regulated Phase II MS4 if its discharges meet the requirements of the rule and are determined to be a significant contributor of pollutants to surface waters of the state in accordance with Rule 62-624.800, F.A.C. A Phase II MS4 can be designated for regulation when a TMDL has been adopted for a waterbody or segment into which the MS4 discharges the pollutant(s) of concern. If an MS4 is designated as a regulated Phase II MS4, it is

subject to the conditions of the "NPDES Generic Permit for Stormwater Discharges from Phase II MS4s."

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

Permittee	Permit Number
Brevard County	FLR04E052
Indian River County	FLR04E068
St. Lucie County	FLR04E029
City of Fort Pierce	FLR04E065
City of Melbourne	FLR04E027
City of Palm Bay	FLR04E077
City of Sebastian	FLR04E124
City of Vero Beach	FLR04E010
City of West Melbourne	FLR04E028
FDOT District 4	FLR04E083
FDOT District 5	FLR04E024
Florida Turnpike Authority	FLR04E049
Patrick Air Force Base	FLR04E074
Town of Indialantic	FLR04E030
Town of Indian River Shores	FLR04E009
Town of Malabar	FLR04E050
Town of Melbourne Beach	FLR04E041

1.2.1.3. Septic Systems

Based on data from the Florida Department of Health (FDOH) Florida Water Management Inventory (FLWMI), there are 78,363known or likely septic systems (onsite sewage treatment and disposal systems [OSTDS]) located throughout the CIRL (**Figure 2**). **Table 9** summarizes the number of septic systems by project zone.

Table 9. Septic system counts by project zone

Central Project Zone	Total Number of Septic Systems
A	39,547
SEB	17,369
B	16,178
SIRL	5,269
Total	**78,363**

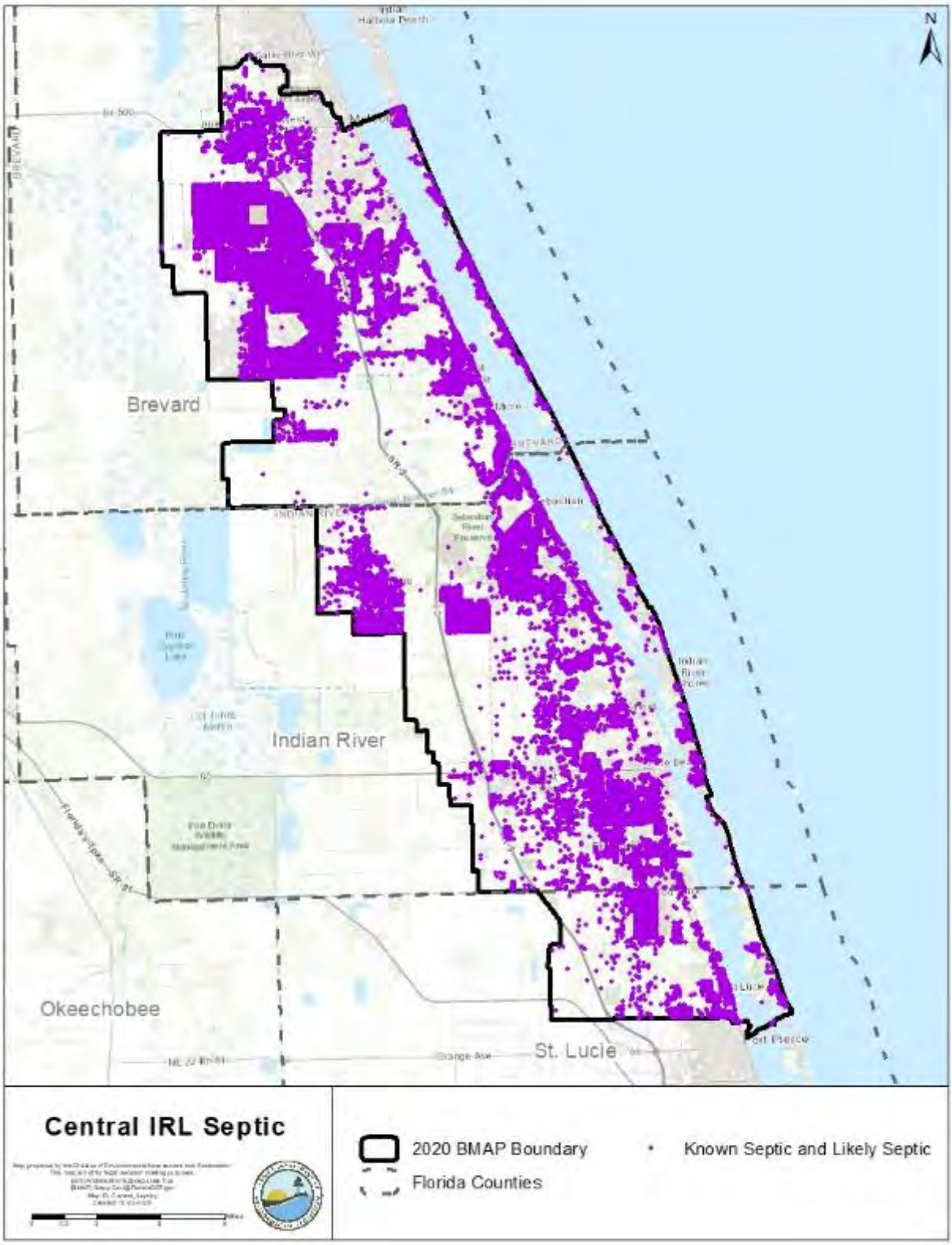

Figure 2. Location of septic systems in the CIRL

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 CIRL.

Table 10. Urban nonpoint sources in the CIRL

Type of Entity	Participant
Government Entities and Special Districts	Chaparral Community Development District Emerald Lakes Community Development District Mayfair Community Development District PBR Community Development District Viera East Community Development District Fellsmere Water Control District Fort Pierce Farms Water Control District Indian River Farms Water Control District Melbourne Tillman Water Control District Sebastian River Improvement District Vero Lakes Water Control District

1.2.1.5. Wastewater Treatment Facilities (WWTFs)

As of September 2020, DEP identified 41 individually permitted wastewater facilities or activities in the CIRL Subbasin. A list of wastewater facilities in the CIRL 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 CIRL as of September 2020

BCUD = Brevard County Utilities Department; WWTF = Wastewater treatment facility; WWTP = Wastewater treatment plant; DIW = Deep Injection Well; RV = Recreational vehicle; MHP = Mobile home park; SLCU = St. Lucie County Utilities; IRCUD = Indian River County Utilities Department

Facility ID	Facility Name
FL0040622	BCUD-South Beaches WWTF
FL0041122	Melbourne Grant St WWTP & DIW
FL0041637	Indian River County - West Regional WWTF
FL0042293	Barefoot Bay Advanced
FLA010265	Long Point Recreational Park
FLA010272	Discovery Elementary School
FLA010332	West Melbourne, City of - Ray Bullard WWTF
FLA010338	Summit Cove Condominium
FLA010343	Cove At South Beaches Condominium Association WWTF
FLA010346	Pelican Bay MHC WWTF
FLA010347	Southern Comfort Mobile Home Park WWTF
FLA010352	Aquarina Beach Community WWTF
FLA010356	Harris Malabar Facility
FLA010357	South Shores Utility
FLA010359	Treetop Village
FLA010363	Camelot RV Park Inc
FLA010366	Lighthouse Cove WWTF
FLA010374	Indian River Shores Trailer Park WWTF
FLA010400	River Grove Mobile Home Village WWTF
FLA010421	Enchanted Lakes Estates
FLA010431	Indian River County - Central - Gifford WWTF
FLA010434	Indian River County – Residuals Dewatering Facility
FLA010435	Indian River County – South Regional WWTF
FLA010472	Royal Oaks Mobile Home Park WWTF
FLA010475	Sun Ag Mobile Home Park Wastewater Treatment Facility
FLA010492	Su - Rene MHP
FLA013945	SLCU Fairwinds Golf Course WWTF
FLA013946	North Hutchinson Island Regional WWTF
FLA013969	St. Lucie County Utilities Holiday Pines WWTF
FLA013977	Spanish Lakes Country Club Village WWTF
FLA013982	Meadowood
FLA013998	Spanish Lakes Country Club Village WWTF
FLA014025	Cypress Mobile Home Park WWTF
FLA014028	Country Cove MHP
FLA017104	Harbor Branch Oceanographic Institution Post Doc Apartments
FLA021661	Vero Beach, City of
FLA039586	SLCU Lakewood Park WWTF
FLA103357	Palm Bay, City of - WWTF
FLA104299	Indian River County - Sea Oaks WWTF
FLA104388	IRCUD/North Regional WWTF
FLA693782	Palm Bay South Regional WRF

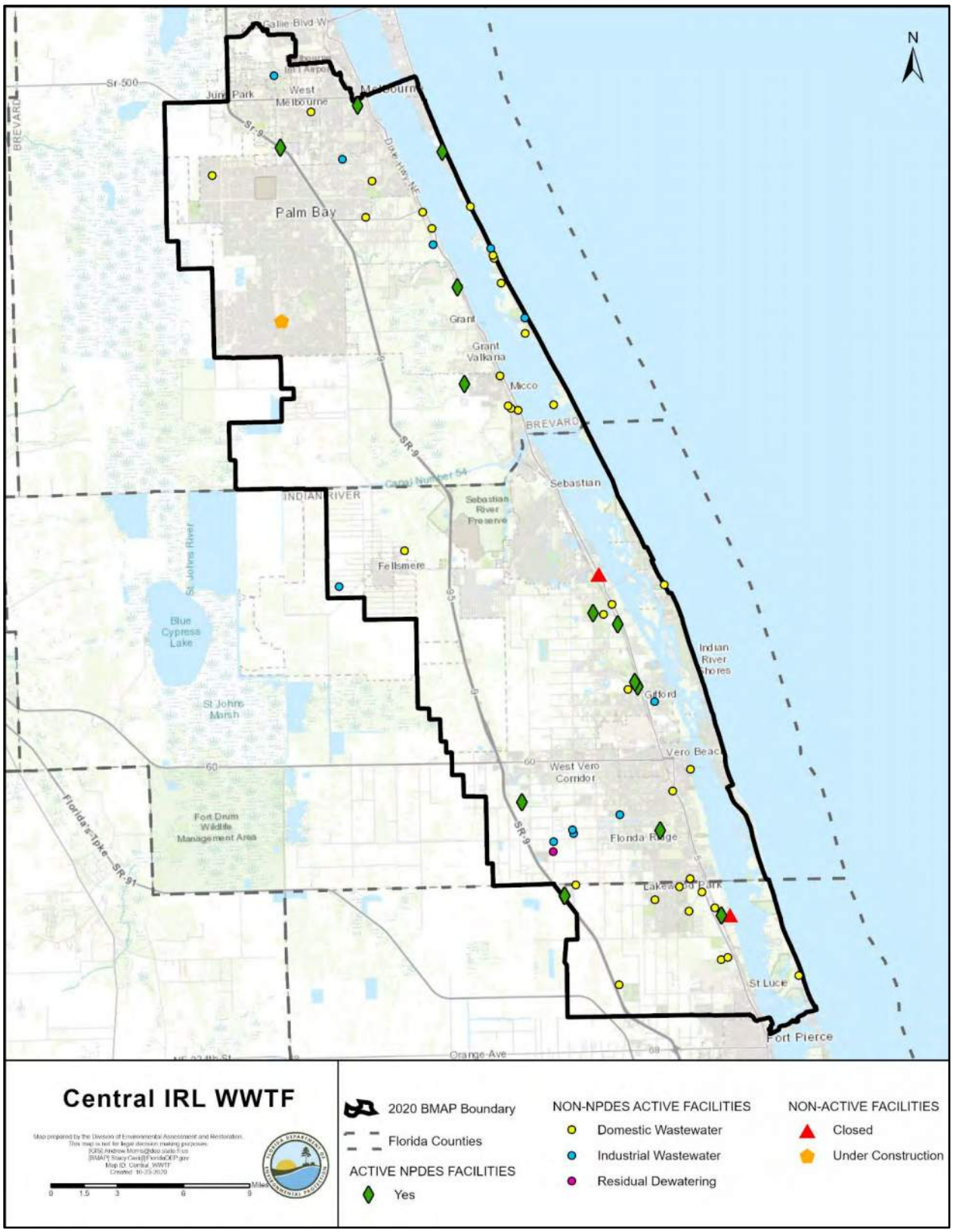

Figure 3. Map of wastewater facilities in the CIRL

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: 35 % or 320,614 lbs/yr of TN and 77,290 lbs/yr of TP. Based on model revisions, reset 10-year and 15-year milestones, as needed.
- 10-year milestone in 2030: 70 % or 641,228 lbs/yr of TN and 154,580 lbs/yr of TP.
- 15-year milestone in 2035: 100 % or 916,040 lbs/yr of TN and 220,828 lbs/yr of TP.

By the next milestone in 2025, at least 35 % 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 in the CIRL to allow 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 CIRL 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 CIRL and other nearby waterbodies (the North Indian River Lagoon [NIRL], Banana River Lagoon [BRL], and St. Lucie River and Estuary), and water quality conditions in the CIRL may be influenced by conditions in nearby waters. To help address these nearby conditions, separate BMAPs have been adopted for these watersheds.

1.2.4. Considerations

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

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

- **Harmful Algal Blooms (HABs)** – HABs cause shading that stresses seagrass in the IRL, adverse effects on wildlife, and in some cases, detrimental effects on human health. Intense and extensive algal blooms in the IRL began in 2011 and have returned periodically, with clear impacts on the extent, density, and depth where seagrasses grow; some fish kills; and, fortunately, little direct impact on human health. Compared with earlier blooms, the recent blooms

have been dominated by smaller species of algae called nanoplankton and picoplankton. SJRWMD launched the Indian River Lagoon Protection Initiative in 2013, including a multiyear investigation that increased the understanding of the blooms. This and other research indicate it is important to persevere with projects that decrease TN and TP loads to the IRL, because that approach will limit the severity of HABs and their impacts on the system.

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

- **Basin Boundaries** – **Figure 4** shows the previous and updated BMAP boundary. Overall, 1,214 acres were added to the BMAP area and 122,538 acres removed, resulting in a net reduction of 121,144 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 CIRL future allocations. Although the direction and magnitude of those changes are not certain, DEP anticipates that some may be higher, and some may be lower.

- **Community Development District (CDD) Responsibilities** –DEP has had several communications with the CDDs located in the CIRL. 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.

- **Special Districts** – Water control districts (WCDs) and similar types of special districts have been assigned qualitative allocations for the canals and rights-of-way to the special districts, as the districts have control over these portions of their jurisdictions. These districts are required to implement specific canal and right-of-way BMPs to be compliant with the BMAP. The BMPs for each special district are based on the activities and land uses within the district, and reporting on those BMPs is due annually. The specific approach for each special district is described in **Appendix E**, and will be reevaluated in each 5-year BMAP update. The evaluation will be based on the special district's operations, authorities, and utilization of those authorities.

- **Complexity of the Problem** – DEP acknowledges the complexity of the dynamics affecting the water quality of the CIRL; 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 adapative 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 tributary nutrient impairments within the SIRL project zone but has not yet set water quality targets with TMDLs. Specifically, WBIDs 3163 and 3163B (C-25 canal) are impaired for nutrients, as indicated by elevated phosphorus levels and the abundance of macrophytes.

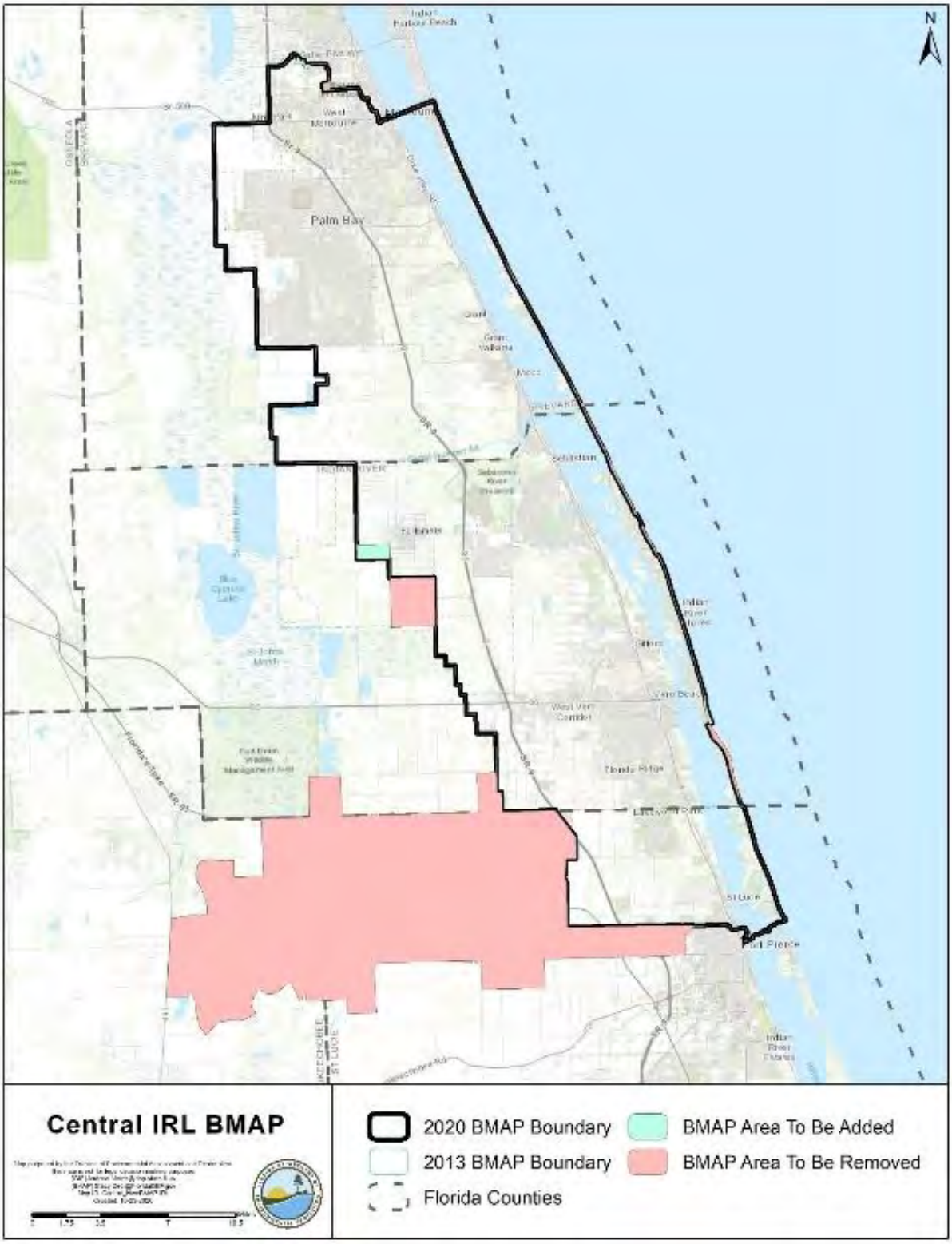

Figure 4. 2013 BMAP area boundary and 2020 BMAP area boundary

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 the 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, which estimates direct, indirect, and induced economic effects, as outlined in **Figure 5**.

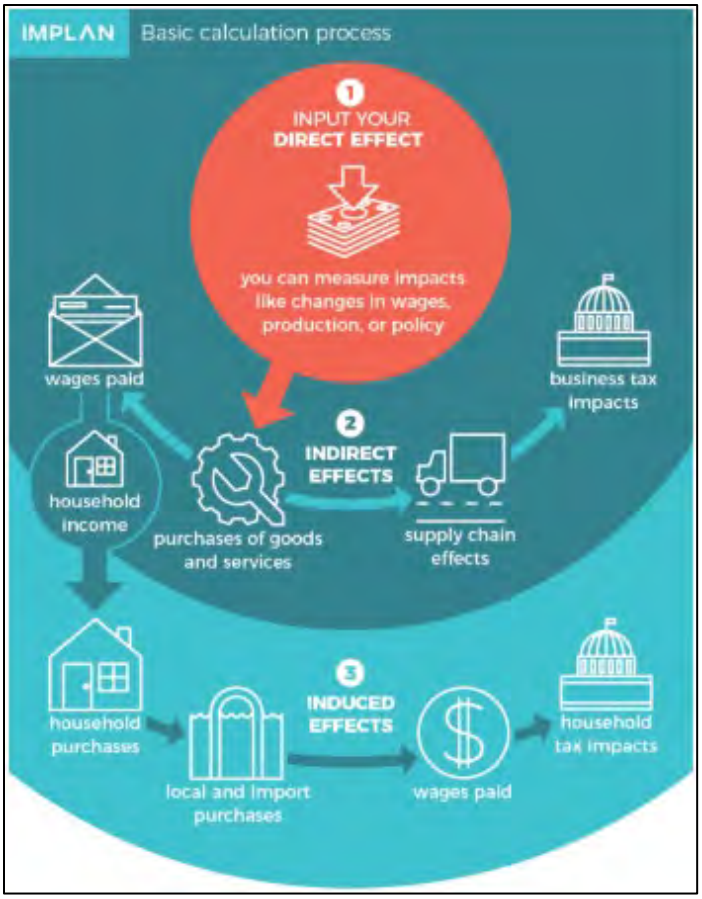

Figure 5. IMPLAN Model calculation process

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**.

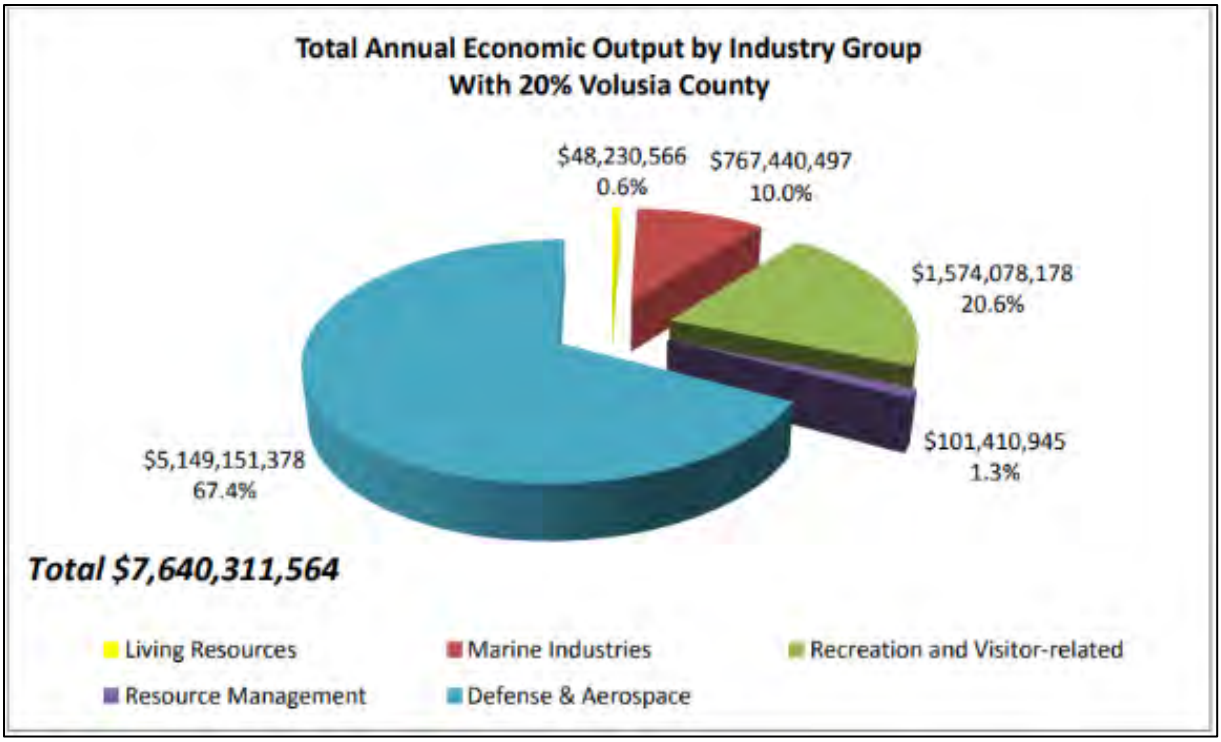

Figure 6. Total annual economic output by industry group in the IRL region, 2014

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 and 3.5 million visitors to the IRL region participate in IRL-related recreation, and each visitor spends an average of $162 a day. By 2025, the IRL region is anticipated to receive over 11 million visitors annually.

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

Chapter 2. Modeling, Load Estimates, and Restoration Approach

2.1 BMAP Modeling

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

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

During 2017 and 2018, while DEP prepared to calculate allocations for the CIRL BMAP, the SWIL Model was proposed as an alternative to the previously used PLSM. Several options were presented for updating allocations during a public meeting in May 2017, and the options were discussed by DEP and stakeholders during and after the meeting. In November 2017, a presentation was made to the IRL 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. WCDs and improvement district canals and rights-of-way.
4. Natural lands (land use codes 3000 [not including 3300], 4000, 5000, and 6000).
5. Agriculture (land use codes 2000 and 3300).
6. CDDs, if they meet the criteria.
7. Municipalities.

8. Remaining area assigned to each county.

Loads within DWM or CERP project areas were not included in the total loads for the project zone, since these land uses are being converted to treatment projects. Loads from natural land uses were not assigned to any specific entity's starting load. FDOT, agriculture, CDDs, municipalities, and counties were assigned starting loads based on this sequential process. The WCDs and Sebastian River Improvement District were assigned a qualitative allocation and are required to implement specific BMPs, as discussed in **Appendix E**.

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 districts 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 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. Project zones were used to assist in calculating the required reduction and the allocation of each entity within the BMAP. In the CIRL, the total project zone load from the LET was used, and the percent reduction from the TMDL for that project zone was applied to determine the total required reductions per project zone. 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 project zone was determined by subtracting the required reductions from the total project zone 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 project zone 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 project zone. This process was performed for both TN and TP loads in each project zone. The TN loads were adjusted using the natural load per acre for Project Zones A, B, and SEB. The TP loads were adjusted using the natural load per acre for Project Zone SIRL.

Once the total required reductions for each project zone were defined, the total anthropogenic load for the project zone was examined. Each stakeholder's anthropogenic load was compared with the total anthropogenic load for the project zone 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 project zone's required reduction was applied to that stakeholder.

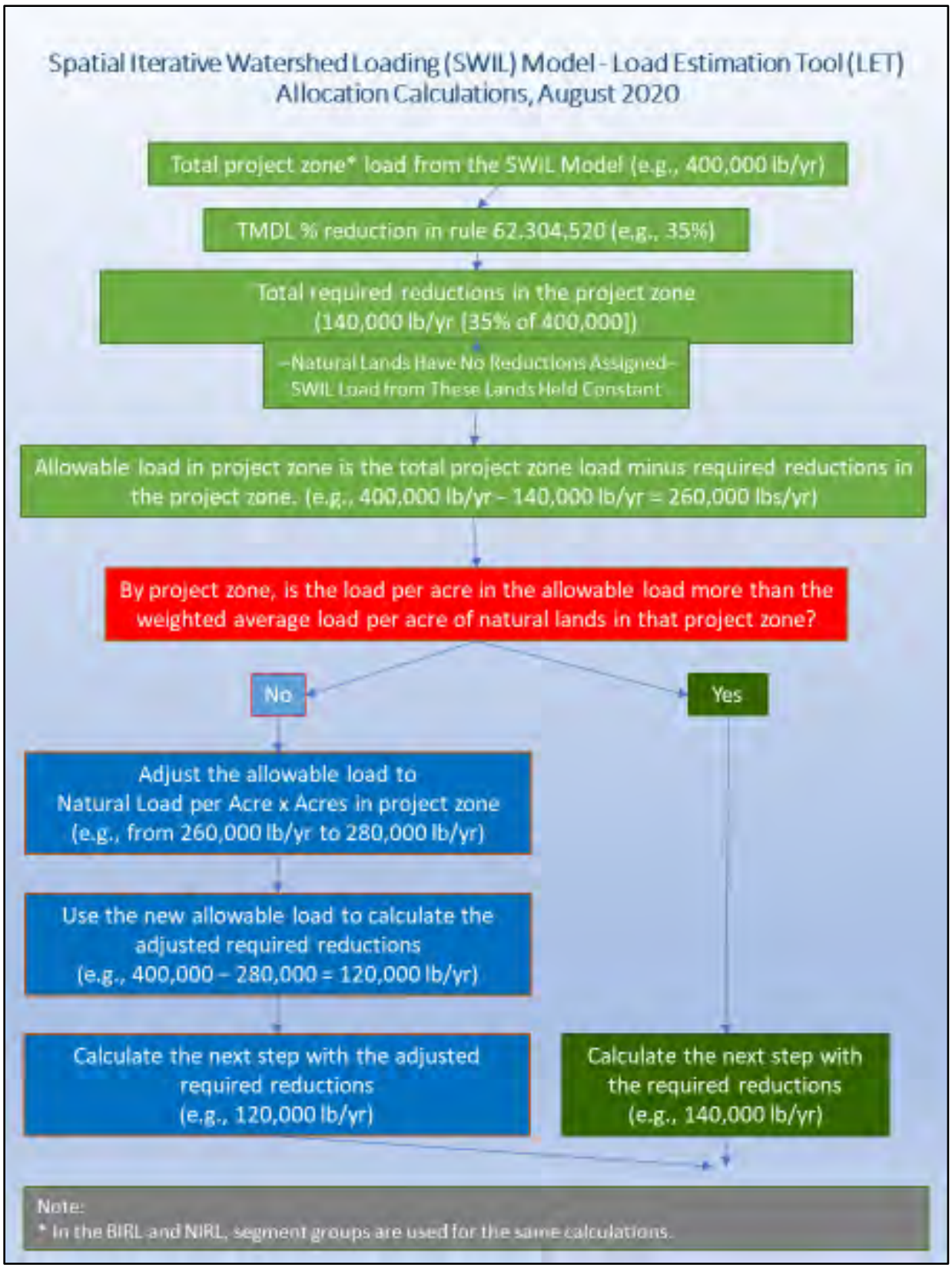

Figure 7. Flow chart of the allocation steps, Part 1 of 2

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

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

Table 12. SWIL Model starting loads

BMAP Area	Project Zone	Starting TN Load (lbs/yr)	% Total Load TN	Starting TP Load (lbs/yr)	% Total Load TP
CIRL	A	616,171	28	85,081	28
CIRL	B	567,009	26	78,837	26
CIRL	SEB	762,595	34	96,865	32
CIRL	SIRL	266,181	12	38,975	13
CIRL Totals	**N/A**	**2,211,955**	**100**	**299,758**	**100**

2.2.1.1. Low-Priority Ranking Determination

Several stakeholders contribute less than 0.30 % of both the TN and TP loading from the watershed to the CIRL. 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. Stakeholders that met the low-priority classification include the Town of St. Lucie Village, Town of Indialantic, Town of Melbourne Village, Town of Orchid, City of Fort Pierce, U.S. Air Force, and Florida Turnpike. These entities are 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 starting loads with low priority ranking cutoff

*Indicates the stakeholder meets the requirements for low priority.
NA = Not applicable

Entity	TN Starting Load (lbs/yr)	Anthropogenic % of TN in BMAP	TP Starting Load (lbs/yr)	Anthropogenic % of TP in BMAP
Agricultural Producers	477,619	29.82	67,398	29.05
Indian River County	357,237	22.30	51,895	22.37
City of Palm Bay	208,799	13.04	30,198	13.02
St. Lucie County	104,021	6.49	16,773	7.23
Brevard County	89,296	5.57	13,357	5.76
City of Melbourne	63,245	3.95	9,057	3.90
City of Sebastian	61,820	3.86	8,901	3.84
City of Vero Beach	48,755	3.04	7,049	3.04
Town of Grant-Valkaria	47,719	2.98	6,818	2.94
City of West Melbourne	34,398	2.15	5,010	2.16
Town of Malabar	23,093	1.44	3,338	1.44
FDOT District 4	22,731	1.42	2,978	1.28
Town of Indian River Shores	17,525	1.09	2,639	1.14
FDOT District 5	13,058	0.82	1,718	0.74
City of Fellsmere	10,603	0.66	1,544	0.67
Town Melbourne Beach	5,252	0.33	779	0.34
Town of St. Lucie Village*	3,608	0.23	638	0.28
Town of Indialantic*	3,589	0.22	531	0.23
Town of Melbourne Village*	3,194	0.20	475	0.20
Town of Orchid*	2,547	0.16	367	0.16
City of Fort Pierce*	1,854	0.12	305	0.13
U.S. Air Force*	954	0.06	118	0.05
FL Turnpike*	818	0.05	100	0.04
Total for Allocated Entities	**1,601,735**	**100.00%**	**231,986**	**100.00**
Natural Lands	564,616	N/A	61,538	N/A
WCD Canals	45,604	N/A	6,234	N/A
Total	**2,211,955**	**N/A**	**299,758**	**N/A**

2.2.1.2. 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 SEB	Project Zone B	Project Zone SIRL	Total
Agricultural Producers	28,912	128,681	74,773	31,287	263,653
Indian River County	N/A	47,223	169,639	N/A	216,862
City of Palm Bay	110,334	1,657	N/A	N/A	111,991
St. Lucie County	N/A	N/A	N/A	49,780	49,780
Brevard County	19,940	27,987	N/A	N/A	47,927
City of Melbourne	33,921	N/A	N/A	N/A	33,921
City of Sebastian	N/A	33,196	N/A	N/A	33,196
City of Vero Beach	N/A	N/A	30,713	N/A	30,713
Town of Grant-Valkaria	20,519	5081	N/A	N/A	25,600
City of West Melbourne	18,449	N/A	N/A	N/A	18,449
FDOT District 4	N/A	3,325	5,976	3,375	12,676
Town of Malabar	12,386	N/A	N/A	N/A	12,386
Town of Indian River	N/A	N/A	11,040	N/A	11,040
FDOT District 5	5,226	1,780	N/A	N/A	7,006
City of Fellsmere	N/A	5,694	N/A	N/A	5,694
Town Melbourne Beach	2,817	N/A	N/A	N/A	2,817
Town of Indialantic*	1,925	N/A	N/A	N/A	0
Town of St. Lucie Village*	N/A	N/A	N/A	1,727	0
Town of Melbourne Village*	1,713	N/A	N/A	N/A	0
Town of Orchid*	N/A	1,368	N/A	N/A	0
City of Fort Pierce*	N/A	N/A	N/A	887	0
U.S. Air Force*	512	N/A	N/A	N/A	0
FL Turnpike*	N/A	N/A	N/A	391	0
Total	**256,654****	**255,992****	**292,141****	**87,447**	**883,711**

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 SEB	Project Zone B	Project Zone SIRL	Total
Agricultural Producers	4,740	22,286	9,120	7,173	43,319
Indian River County	N/A	8,580	22,231	N/A	30,811
City of Palm Bay	17,041	279	N/A	N/A	17,320
St. Lucie County	N/A	N/A	N/A	11,964	11,964
Brevard County	3,197	5,251	N/A	N/A	8,448
City of Sebastian	N/A	6015	N/A	N/A	6,015
City of Melbourne	5,182	N/A	N/A	N/A	5,182
Town of Grant-Valkaria	3,131	910	N/A	N/A	4,041
City of Vero Beach	N/A	N/A	3,998	N/A	3,998
City of West Melbourne	2,866	N/A	N/A	N/A	2,866
FDOT District 4	N/A	501	724	685	1,910
Town of Malabar	1,910	N/A	N/A	N/A	1,910
Town of Indian River Shores	N/A	N/A	1,497	N/A	1,497
City of Fellsmere	N/A	1,043	N/A	N/A	1,043
FDOT District 5	744	282	N/A	N/A	1,026
Town Melbourne Beach	446	N/A	N/A	N/A	446
Town of St. Lucie Village*	**N/A**	**N/A**	**N/A**	**455**	**0**
Town of Indialantic*	**304**	**N/A**	**N/A**	**N/A**	**0**
Town of Melbourne Village*	**272**	**N/A**	**N/A**	**N/A**	**0**
Town of Orchid*	**N/A**	**248**	**N/A**	**N/A**	**0**
City of Fort Pierce*	**N/A**	**N/A**	**N/A**	**217**	**0**
FL Turnpike*	**N/A**	**N/A**	**N/A**	**72**	**0**
U.S. Air Force*	**67**	**N/A**	**N/A**	**N/A**	**0**
Total	**39,900**	**45,395**	**37,570**	**20,566****	**141,796**

2.3 Basinwide Sources Approach

The basinwide sources approach involves tailoring management strategies to the primary sources of anthropogenic nutrient loading throughout the CIRL 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 . The current enrollment is 25 % 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 implementation verification (IV) 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. SFWMD and SJRWMD are implementing and/or funding projects that encourage low-input agriculture and the use of water quality improvement technologies.

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

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

- Agricultural measures have been adopted by FDACS pursuant to Subparagraph 403.067(7)(c)2, F.S., and have been implemented and the waterbody remains impaired.
- Agricultural nonpoint sources contribute to at least 20 % of nonpoint source nutrient discharges.
- DEP determines that additional measures, in combination with state-sponsored regional projects and other management strategies included in the BMAP, are necessary to achieve the TMDLs.

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

2.3.2. Septic Systems

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

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

- Cost-effective and financially feasible projects necessary to achieve the nutrient load reductions required for OSTDS (e.g., sewering, advanced septic system retrofits, prohibiting the installation of new conventional septic systems).
- An inventory of OSTDS based on the best information available.
- OSTDS that would be eliminated through connection to existing or future central domestic wastewater infrastructure in the jurisdiction or domestic wastewater service area of the local government.
- OSTDS that would be replaced with or upgraded to enhanced nutrient-reducing systems.
- Cost of improvements and sources of funding.

Based on data from FDOH, there are 78,363 known and likely septic systems located throughout the CIRL Subbasin. **Table 9** in **Section 1.2.1.3** 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 CIRL, 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 41 individually permitted wastewater facilities or activities in the CIRL 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 CIRL as of September 2020 is provided in **Table 11**, and a map of their locations is shown in **Figure 3** in **Section 1.2.1.5**.

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, 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 ground water 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 TN and TP 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 CIRL 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 a 25-year, 24-hour rainfall event or less frequent rainfall event and that infrequently reaches surface waters are considered insignificant sources of TN and TP, provided the ponds or basins are maintained under normal conditions at or below established water levels. The owners or operators of cooling pond reservoirs must operate each spillway gate either during regular operation or on a test basis to protect the structural integrity of the reservoir. Because of the short duration and low volume of wastewater released during spillway gate testing, releases either on an annual or semiannual basis are considered insignificant sources of TN and TP.

Existing industrial wastewater facilities are not subject to the limits in **Table 16** or **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 TMDLs 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 for the CIRL monitoring plan 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 CIRL 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 CIRL. Additional details on the seagrass assessment methodology are contained in **Appendix D**.

To achieve the secondary monitoring objective above, the existing SJRWMD and SFWMD stations in the CIRL 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 and SFWMD water quality monitoring stations, long-term stations are monitored by the Indian River Farms Water Control District (IRF-WCD), North St. Lucie River WCD (NSLR-WCD) Fort Pierce Farms WCD (FPF-WCD), and Sebastian River Improvement District (SRID) for water quality, and U.S. Geological Survey (USGS) for flow. **Table 18** lists the stations that SJRWMD, USGS, IRF-WCD, NSLR-WCD, FPF-WCD, and SRID currently sample in the CIRL BMAP area, and these stations are shown by project zone in **Figure 9** through **Figure 12.** Data collection generally occurs 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. Monitoring stations in the CIRL BMAP area

Entity	Station ID	Project Zone	Status	Latitude	Longitude	Station Type	Frequency
SJRWMD	CC03	CIRL-A	Active	28.0688	-80.6212	Tributary Water Quality	Monthly
SJRWMD	IRLI23	CIRL-A	Active	28.0699	-80.5689	Lagoon Water Quality	Monthly
SJRWMD	IRLI24	CIRL-A	Active	28.0447	-80.5763	Lagoon Water Quality	Monthly
SJRWMD	IRLI26	CIRL-A	Active	27.9885	-80.5325	Lagoon Water Quality	Monthly
SJRWMD	IRLI27	CIRL-A	Active	27.9469	-80.5284	Lagoon Water Quality	Monthly
SJRWMD	IRLIRJ01	CIRL-A	Active	27.7975	-80.4496	Lagoon Water Quality	Monthly
SJRWMD	IRLTPM	CIRL-A	Active	28.0171	-80.5959	Tributary Water Quality	Monthly
SJRWMD	IRLTUS	CIRL-A	Active	28.0334	-80.5797	Tributary Water Quality	Monthly
SJRWMD	IRLUPGC	CIRL-A	Active	27.9650	-80.5681	Tributary Water Quality	Monthly
USGS	02249500	CIRL-A	Active	28.0792	-80.6297	Flow	Continuous
USGS	02250030	CIRL-A	Active	28.0170	-80.5959	Flow	Continuous
IRFWCD	IRF-1	CIRL-B	Active	27.6397	-80.4294	Tributary Water Quality	Quarterly
IRFWCD	IRF-2	CIRL-B	Active	27.6935	-80.4453	Tributary Water Quality	Quarterly
IRFWCD	IRF-3	CIRL-B	Active	27.5980	-80.4132	Tributary Water Quality	Quarterly
SJRWMD	IRLIRJ04	CIRL-B	Active	27.6921	-80.3869	Lagoon Water Quality	Monthly
SJRWMD	IRLIRJ05	CIRL-B	Active	27.6586	-80.3763	Lagoon Water Quality	Monthly
SJRWMD	IRLIRJ07	CIRL-B	Active	27.6197	-80.3685	Lagoon Water Quality	Monthly
SJRWMD	IRLIRJ08	CIRL-B	Active	27.5898	-80.3561	Lagoon Water Quality	Monthly
SJRWMD	IRLVMC	CIRL-B	Active	27.6493	-80.4003	Tributary Water Quality	Monthly
SJRWMD	IRLVNCODH	CIRL-B	Active	27.6924	-80.4145	Tributary Water Quality	Monthly
SJRWMD	IRLVSC	CIRL-B	Active	27.6052	-80.3826	Tributary Water Quality	Monthly
USGS	02252500	CIRL-B	Active	27.6934	-80.4292	Flow	Continuous
USGS	02253000	CIRL-B	Active	27.6478	-80.4056	Flow	Continuous
USGS	02253500	CIRL-B	Active	27.6034	-80.3898	Flow	Continuous
SJRWMD	IRLI28	CIRL-SEB	Active	27.8882	-80.4851	Lagoon Water Quality	Monthly
SJRWMD	IRLSEBNP	CIRL-SEB	Active	27.8563	-80.5242	Tributary Water Quality	Monthly
SJRWMD	IRLSIR003	CIRL-SEB	Active	27.7695	-80.5058	Tributary Water Quality	Monthly

Entity	Station ID	Project Zone	Status	Latitude	Longitude	Station Type	Frequency
SJRWMD	IRLSUS	CIRL-SEB	Active	27.8544	-80.4913	Tributary Water Quality	Monthly
SJRWMD	IRLUPSFW	CIRL-SEB	Active	27.8303	-80.5348	Tributary Water Quality	Monthly
SRID	SRID-1	CIRL-SEB	Active	27.7486	-80.4949	Tributary Water Quality	Quarterly
USGS	02251000	CIRL-SEB	Active	27.7692	-80.5061	Flow	Continuous
USGS	02251500	CIRL-SEB	Active	27.8558	-80.5244	Flow	Continuous
USGS	02251767	CIRL-SEB	Active	27.8303	-80.5344	Flow	Continuous
FPFWCD	1	CIRL-SIRL	Active	27.4763	-80.3451	Tributary Water Quality	Quarterly
FPFWCD	2	CIRL-SIRL	Active	27.5208	-80.3903	Tributary Water Quality	Quarterly
FPFWCD	3	CIRL-SIRL	Active	27.5209	-80.3985	Tributary Water Quality	Quarterly
FPFWCD	4	CIRL-SIRL	Active	27.5210	-80.4068	Tributary Water Quality	Quarterly
FPFWCD	5	CIRL-SIRL	Active	27.5140	-80.4299	Tributary Water Quality	Quarterly
NSLRWCD	5	CIRL-SIRL	Active	27.4688	-80.3670	Tributary Water Quality	Quarterly
SFWMD	C25S50	CIRL-SIRL	Active	27.4690	-80.3383	Tributary Water Quality	Weekly
SFWMD	IRL34B	CIRL-SIRL	Active	27.4669	-80.3226	Lagoon Water Quality	7x a year (Jan., Feb., Apr., Jun., Jul., Aug., Oct.)
SFWMD	IRL36B	CIRL-SIRL	Active	27.4900	-80.3306	Lagoon Water Quality	7x a year (Jan., Feb., Apr., Jun., Jul., Aug., Oct.)
SFWMD	IRL39B	CIRL-SIRL	Active	27.5401	-80.3451	Lagoon Water Quality	7x a year (Jan., Feb., Apr., Jun., Jul., Aug., Oct.)
SFWMD	IRL31C	CIRL-SIRL	Active	27.4430	-80.2983	Lagoon Water Quality	7x a year (Jan., Feb., Apr., Jun., Jul., Aug., Oct.)
SFWMD	S50_S	CIRL-SIRL	Active	27.4686	-80.3381	Flow	Continuous

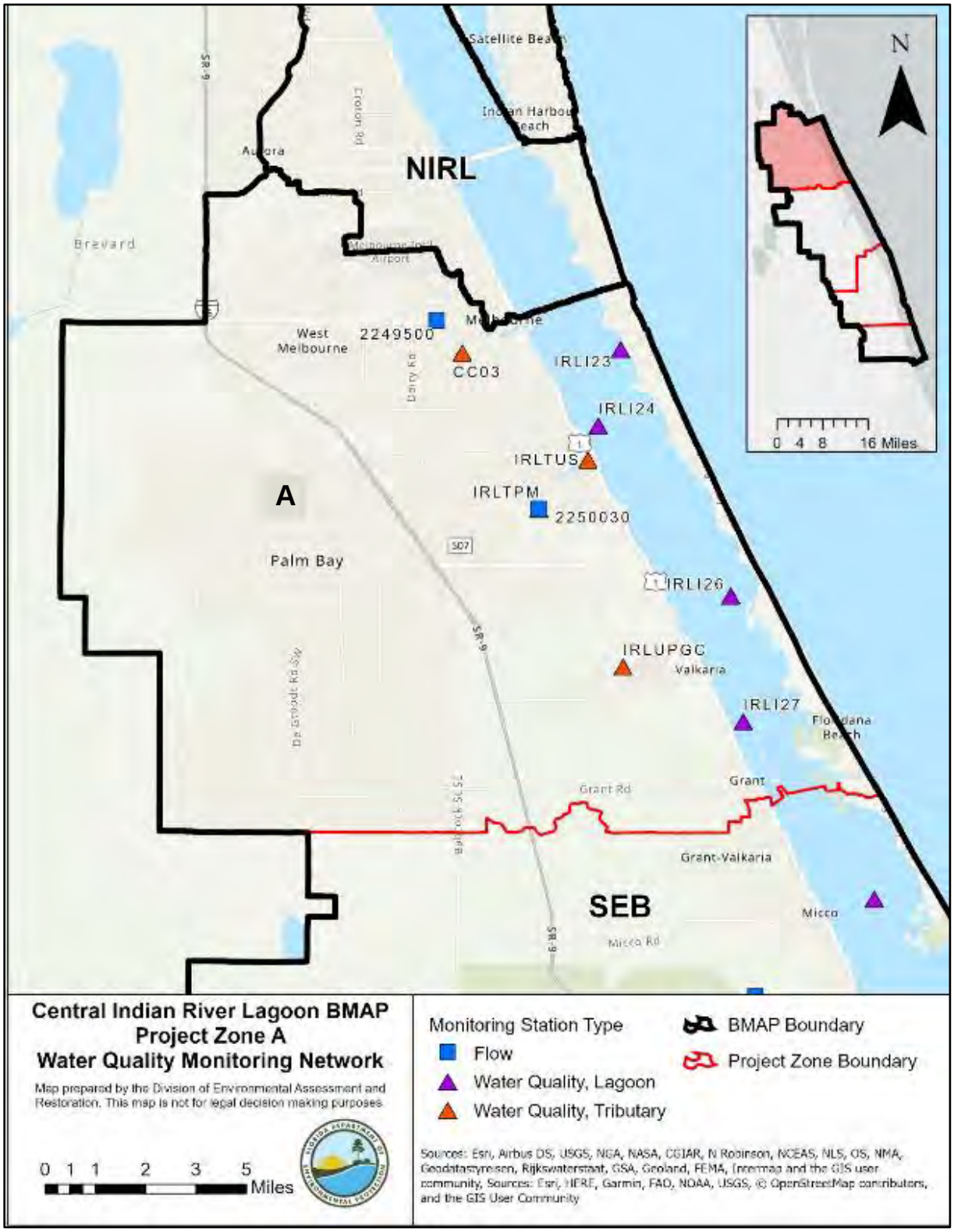

Figure 9. Monitoring network in the Central A Project Zone

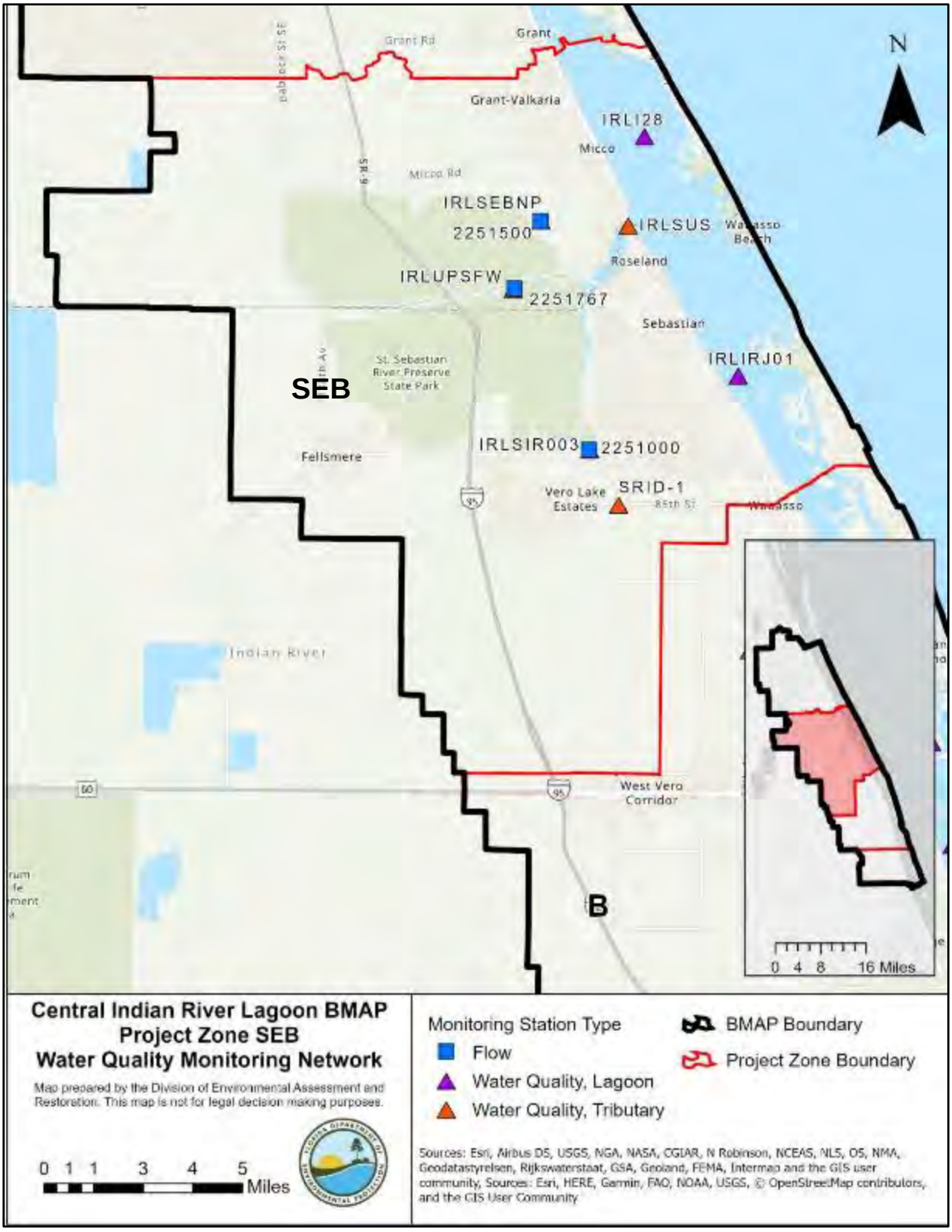

Figure 10. Monitoring network in the Central SEB Project Zone

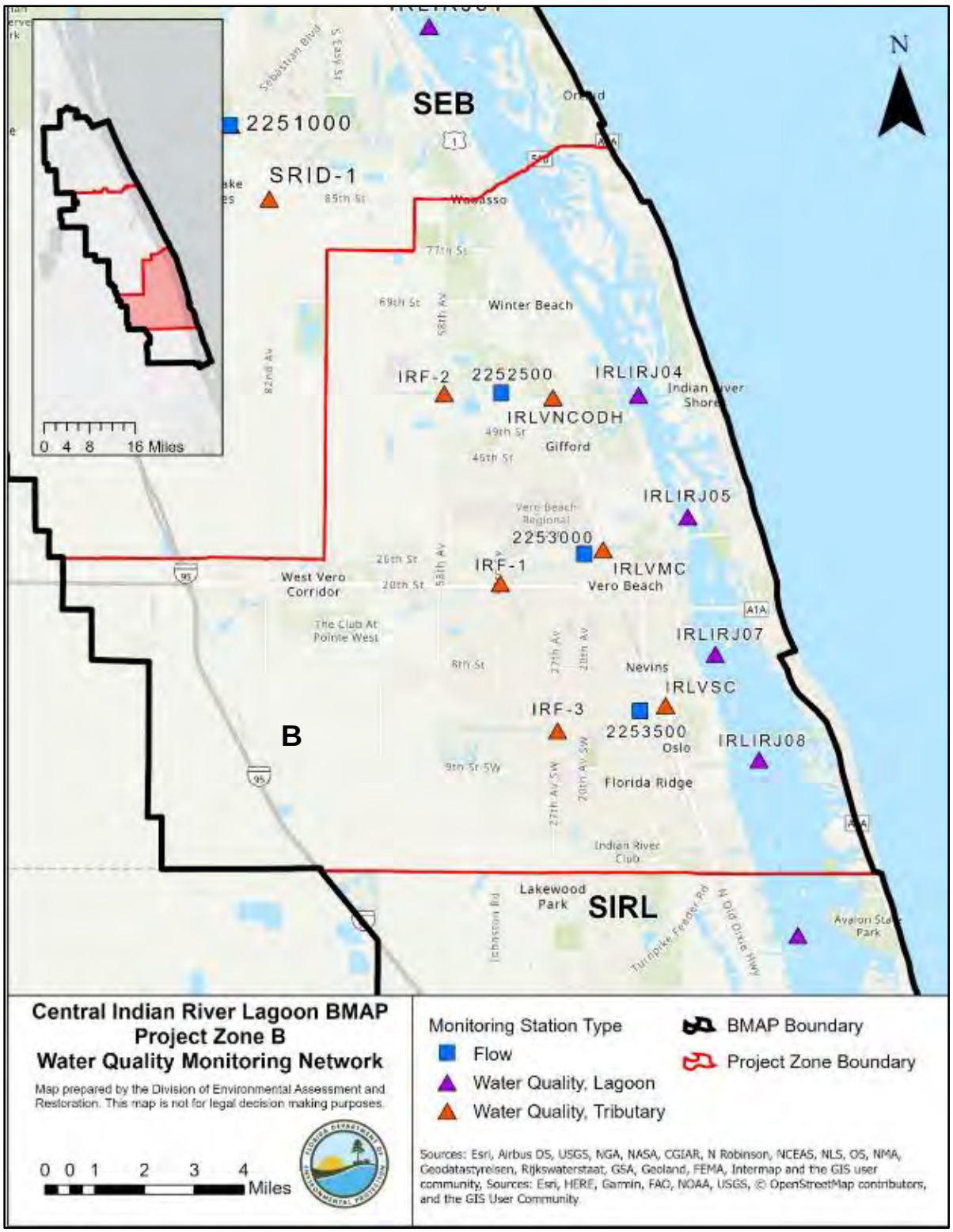

Figure 11. Monitoring network in the Central B Project Zone

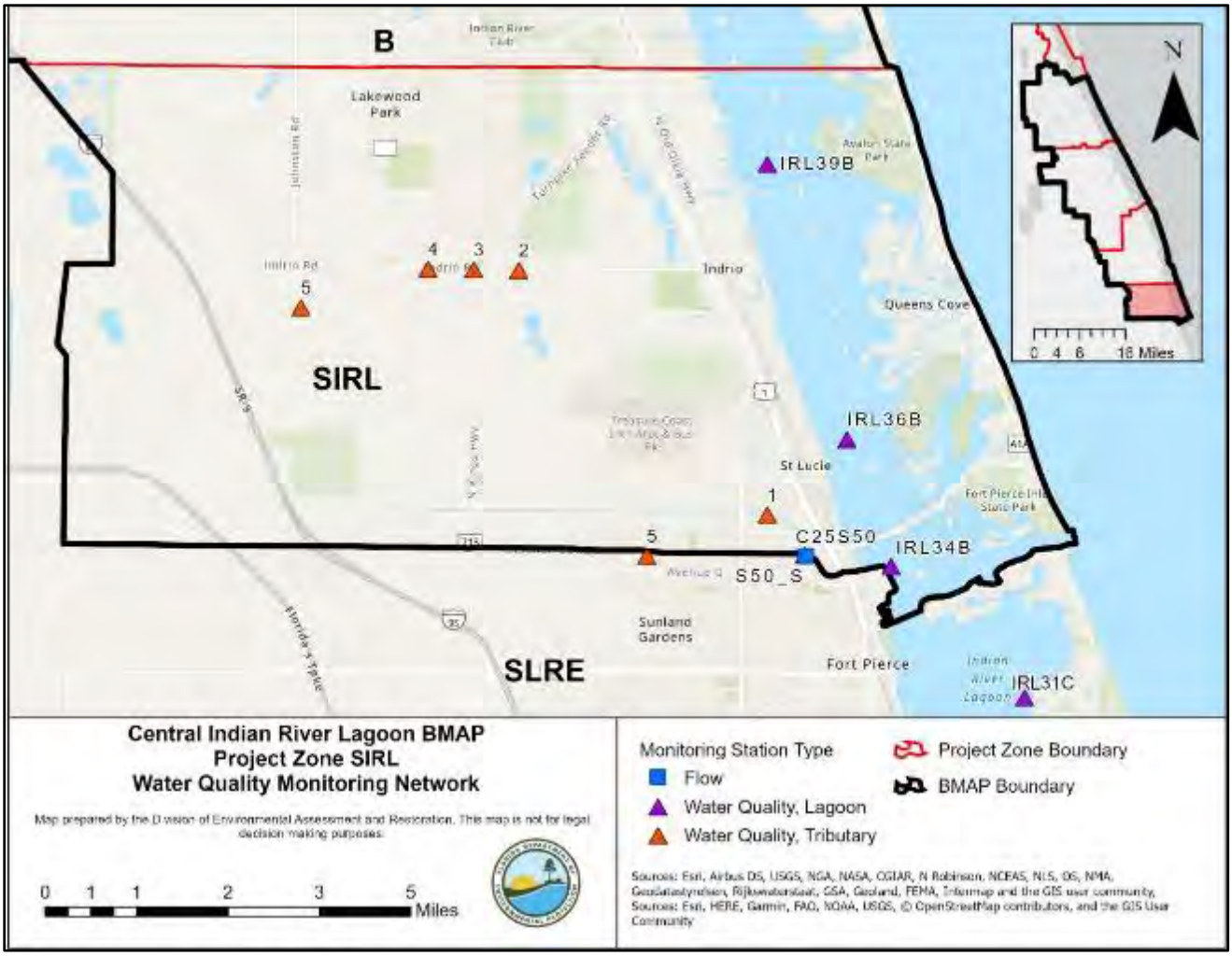

Figure 12. Monitoring network in the Central SIRL Project Zone

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*. SFWMD staff and contractors collect, process, and preserve samples according to SFWMD's *Field Sampling Quality Manual.*

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.
- Collecting data on the nutrient load reduction that results from WCD staging/ retaining stormwater runoff.
- Refining load estimates delivered by baseflows and modeling the contributions of baseflows.
- Synthesizing data on nutrient flux/internal recycling of legacy nutrient loads held within IRL sediments and exchanged with the water column.

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

The stakeholders will continue to work with DEP and IRL NEP to identify other research needs, prioritize these needs, and develop scopes of work to address research priorities as appropriate. This information may be organized in a more detailed research plan that could be used to guide future efforts, as funding becomes available. These research projects are not BMAP requirements but would provide valuable information for future assessments of the health of the CIRL. 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 through **Section 3.4** provides specific land use and project information on the four project zones in the CIRL. 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 94,742 acres of the CIRL BMAP. As shown in **Table 19**, urban land uses makes up the majority of the project zone with 55.4 % of the area, followed by shrublands with 12.2%. Stakeholders in Project Zone A are agricultural producers, Brevard County, City of Melbourne, City of Palm Bay, City of Melbourne, FDOT District 5, Melbourne-Tillman WCD, Town of Melbourne Beach, Town of Grant-Valkaria, Town of Indialantic, Town of Malabar, Town of Melbourne Village, and U.S. Air Force (Malabar Annex).

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	52,496	55.4
2000	Agricultural	7,994	8.4
3000	Upland Prairie and Shrublands	11,573	12.2
4000	Upland Forested Areas	8,488	9.0
5000	Water	1,514	1.6
6000	Wetlands	8,283	8.7
7000	Distrurbed Lands	1,213	1.3
8000	Transportation	3,181	3.4
Total		**94,742**	**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 A from projects completed through July 31, 2020.

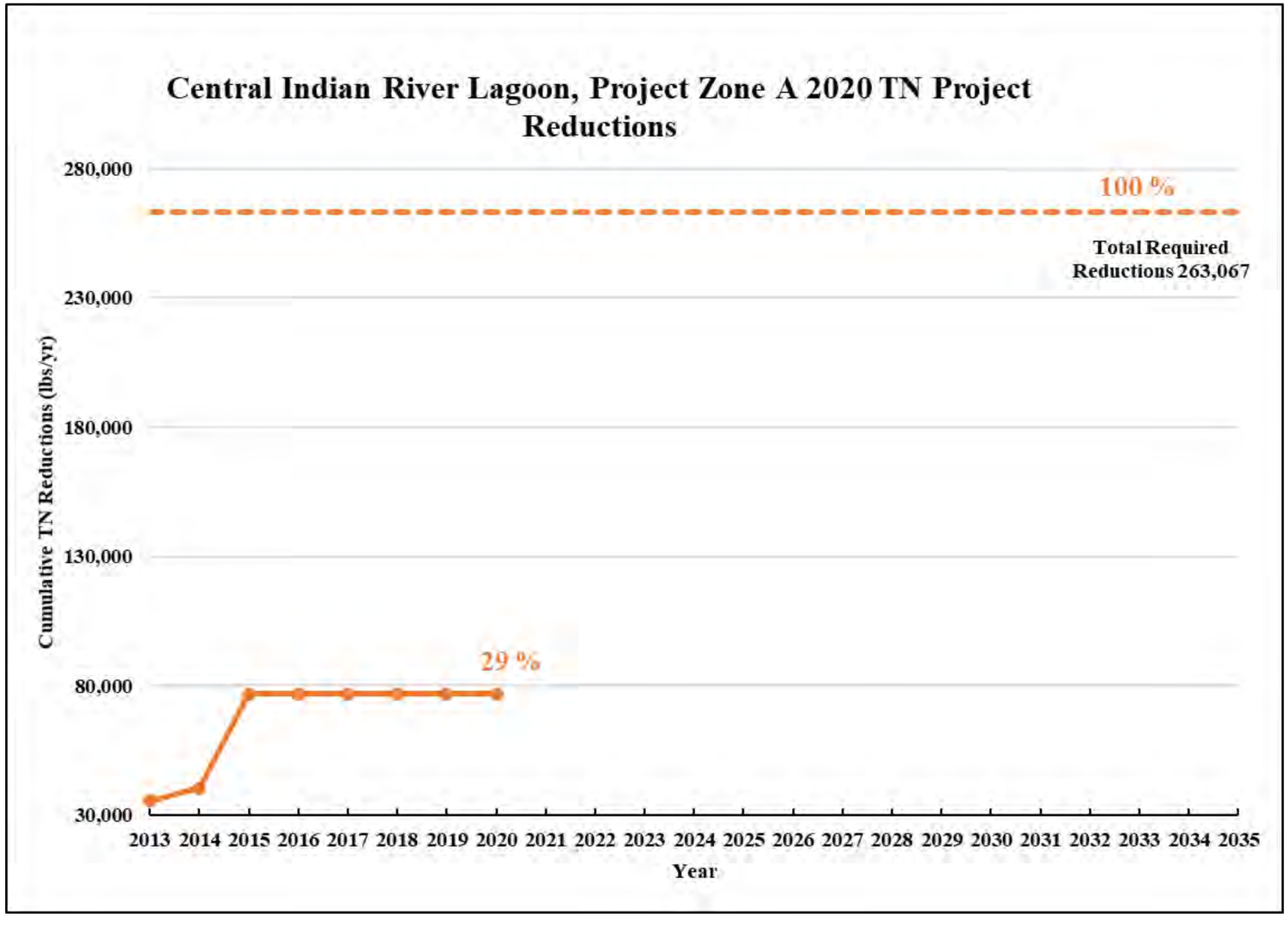

Figure 13. Estimated progress towards meeting the required TN reductions allocated to Project Zone A with projects completed through July 31, 2020

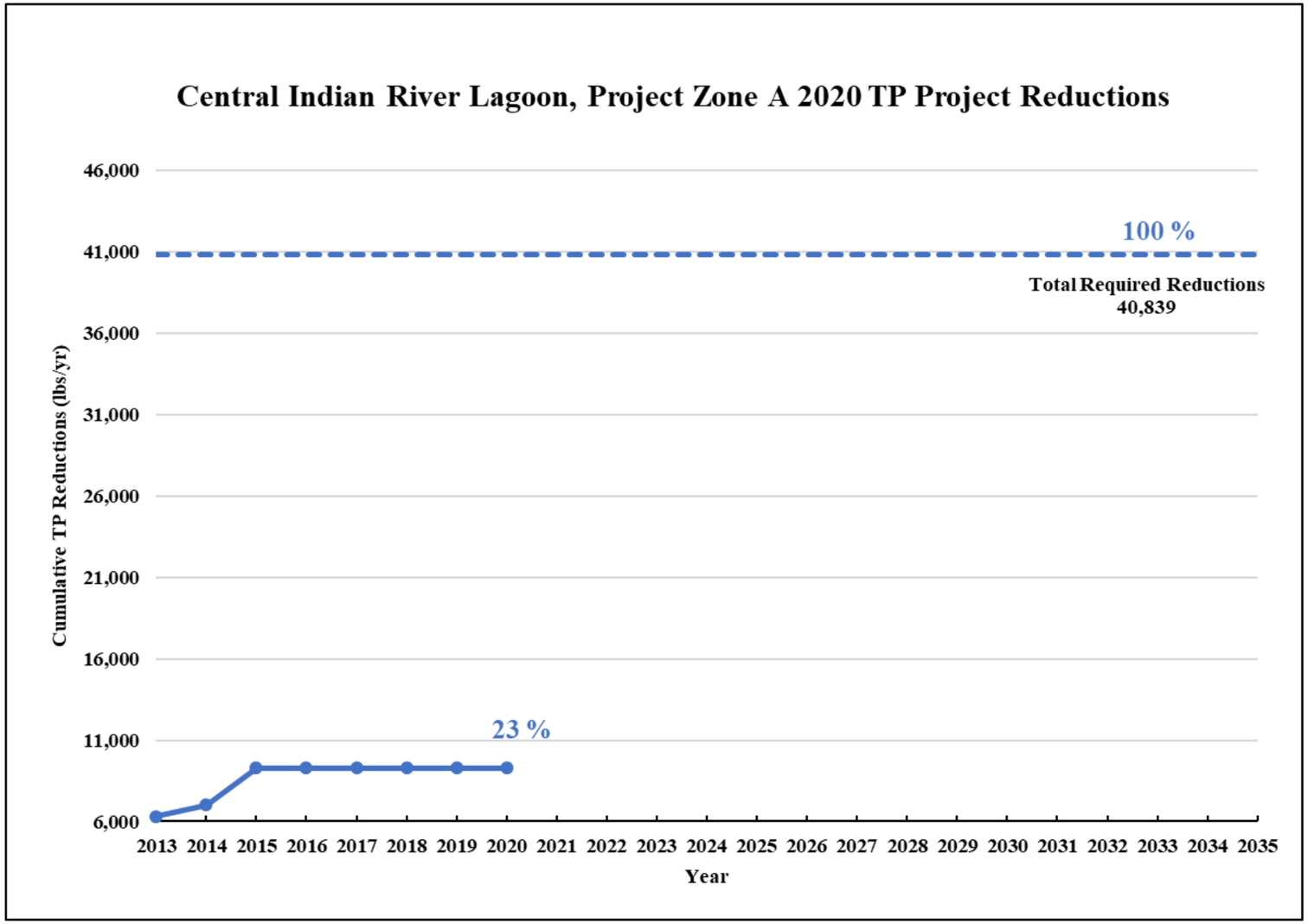

Figure 14. Estimated progress towards meeting the required TP reductions allocated to Project Zone A with projects completed through July 31, 2020

3.1.1. 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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	N/A	BC-01	Tadlock and Goat Creek Baffle Box	Upgraded a 1st generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2000	40	6	22	$43,811	$1,000	N/A	N/A	N/A
Brevard County	N/A	BC-02	Oak Street Drainage Improvements	Swale and baffle box.	BMP Treatment Train	Completed	2003	0	1	0	$660,285	Not provided	Not provided	Not provided	Not provided
Brevard County	N/A	BC-03	Melbourne Shores Ponds	This pond helps alleviate flooding in the south beaches and cleans the stormwater runoff from a 135.9 acre drainage basin.	Wet Detention Pond	Completed	2004	193	70	136	$939,543	Not provided	County	N/A	N/A
Brevard County	W. Melbourne/ Grant-Valkaria/ Malabar/ Melbourne/ Cocoa/ IHB/ Sat. Beach/ Cocoa Beach/ Cape Canaveral	BC-05	Education Efforts	FYN, fertilizer and pet waste ordinances, public service announcements (PSAs), pamphlets, website, illicit discharge program.	Education Efforts	Ongoing	N/A	2,231	335	N/A	$90,000	N/A	County	N/A	N/A
Brevard County	N/A	BC-06	Street Sweeping	Remove debris from 786 linear feet of curb street throughout the county.	Street Sweeping	Ongoing	N/A	55	35	N/A	N/A	$147,076	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	DEP	BC-07	Valkaria Lakes	Converted borrow pits into detention ponds for stormwater treatment.	Wet Detention Pond	Completed	2014	1,132	256	458	$261,000	Not provided	DEP/ County	$144,598	G0249
Brevard County	City of Melbourne	BC-14	Fountainhead	982,300 lbs of vegetation removed using 113 dump trucks.	Aquatic Vegetation Harvesting	Completed	2013	890	273	Not provided	$39,274	Not provided	Not provided	Not provided	N/A
Brevard County	DEP	BC-15	Corey Road at Hall	Upgraded a 1st generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	83	9	52	$12,507	$2,140	DEP	DEP - $275,000	S0648
Brevard County	DEP	BC-16	430 Riverview	Upgraded a 1st generation to a 2nd generation baffle box by adding the nutrient separating screen.	Baffle Boxes-Second Generation	Completed	2015	13	2	8	$30,508	$2,140	DEP	DEP - $275,000	S0648
Brevard County	SJRWMD	BC-17	C-1 Rediversion	This project is designed to help restore the natural drainage flow from the west side of Palm Bay back to the St. Johns River.	Hydrologic Restoration	Completed	2015	35,565	2,038	Not provided	$531,051	Not provided	SJRWMD	Not provided	S0652
Brevard County	N/A	BC-18	Baffle Box/Sediment Trap Cleaning	Increasing cleanout frequency to quarterly.	BMP Cleanout	Ongoing	N/A	1	1	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Brevard County	DEP	BC-19	Turkey Creek Dredging	230,000 cubic yards of material collected.	Muck Removal/Restoration Dredging	Completed	2017	TBD	TBD	N/A	$1,545,522	Not provided	DEP	Not provided	S0714
Brevard County	DEP	BC-20	Multiple Ditch Outfall Denitrification D3	Providing base flow/groundwater treatment in 20 open drainage basins. Each Project will have its own number	Denitrification Walls	Underway	TBD	TBD	TBD	TBD	$1,182,858	TBD	DEP	TBD	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	N/A	BC-21	Kingsmill Aurora Phase II	Construction of a 5-acre pond with weirs, drop structures, etc.	Wet Detention Pond	Underway	2018	TBD	TBD	1,213	$990,000	TBD	TBD	TBD	N/A
Brevard County	Cities within Brevard County	BC-23	Education Efforts	Fertilizer video, rain barrel workshops, Facebook page, bus wrap, and billboard.	Enhanced Public Education	Ongoing	N/A	N/A	N/A	Not provided	TBD	TBD	Brevard County/ SOIRL	TBD	N/A
Brevard County	SOIRL/ Melbourne	BC-24	Hoag Sewer Conversion	Septic Removal - CIRL - Melbourne, SOIRL-04.	OSTDS Phase Out	Underway	2020	24	N/A	Not provided	$100,000	Not provided	SOIRL/ City	$86,031	N/A
Brevard County	SOIRL	BC-25	M1 Canal BAM - BB#1470	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)	Canceled	2019	N/A	N/A	TBD	$101,300	Not provided	SOIRL	SOIRL - $66,300	N/A
Brevard County	SJRWMD/ SOIRL	BC-27	Crane Creek/M-1 Canal Rediversion Project	The project will treat and restore small storm events and baseflow from 5,300 acres of Lagoon-diverted water.	Hydrologic Restoration	Planned	2020	TBD	TBD	5,300	$9,186,500	Not provided	SOIRL	SOIRL - $2,033,944	N/A
Brevard County	Not provided	BC-29	Riverview Senior Oyster Bar	Construct 320 linear foot oyster bar	Creating/ Enhancing Oyster Reefs	Completed	2018	TBD	TBD	TBD	$30,304	Not provided	SOIRL	SOIRL - $30,304	N/A
Brevard County	Not provided	BC-30	Lagoon House Living Shoreline	Plant 300 mangroves and 1,000 spartina along the shoreline of the Lagoon House.	Creating/ Enhancing Living Shoreline	Completed	2018	TBD	TBD	TBD	$24,000	Not provided	SOIRL	SOIRL - $24,000	N/A
City of Melbourne	N/A	MEL-01	Fee & Apollo Drainage Improvements	No treatment is provided within the existing development; completely a water quality addition.	Wet Detention Pond	Completed	2011	28	40	77	$525,161	Not provided	City	City - $525,161	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Melbourne	N/A	MEL-02	Education Efforts	Irrigation, fertilizer, pet waste management, and landscaping ordinances; pamphlets, presentations, website, illicit discharge program.	Education Efforts	Ongoing	N/A	3,795	543	N/A	Not provided	Not provided	City	Not provided	N/A
City of Melbourne	N/A	MEL-03	Street Sweeping	Street sweeping in the basin and debris removal.	Street Sweeping	Ongoing	N/A	378	187	N/A	N/A	$87,500	City	Not provided	N/A
City of Melbourne	N/A	MEL-04	Participation in FYN	Participation in FYN Program. Credited in MEL-02.	Education Efforts	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Melbourne	N/A	MEL-05	South Croton Baffle Box	Dry retention and baffle box.	BMP Treatment Train	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Melbourne	N/A	MEL-06	Southwest Park Improvements near Florida Avenue	Installation of baffle box along with pipe replacement.	Baffle Boxes-Second Generation with Media	Completed	2017	TBD	TBD	48	$582,153	Not provided	City	City - $582,153	N/A
City of Melbourne	N/A	MEL-07	Melbourne Avenue 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	13	$12,000	Not provided	City	City - $12,000	N/A
City of Melbourne	SOIRL	MEL-08	Penwood Septic to Sewer Conversion	Providing for 12 lots (4 existing and 8 proposed) to be converted to municipal sewer.	Wastewater Service Area Expansion	Underway	2020	TBD	TBD	TBD	$60,000	TBD	City/ SOIRL	$40,632	N/A
City of Melbourne	SOIRL	MEL-09	Riverview Park Living Shoreline	Construction of a living shoreline with an oyster breakwater.	Creating/ Enhancing Living Shoreline	Underway	2021	TBD	TBD	TBD	$440,000	TBD	City/ SOIRL	$108,790	N/A
City of Melbourne	SOIRL	MEL-10	Hoag Septic to Sewer Conversion	Providing for 12 lots (7 existing and 5 proposed) to be converted to municipal sewer.	Wastewater Service Area Expansion	Underway	2021	TBD	TBD	TBD	$105,000	TBD	City/ SOIRL	$86,031	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Melbourne	SOIRL	MEL-11	Grant Place Baffle Box	2nd Generation baffle box with BAM.	Baffle Boxes- Second Generation with Media	Underway	2020	TBD	TBD	103	$400,000	TBD	City/ SOIRL	$82,481	N/A
City of Melbourne	SOIRL	MEL-12	Roxy Septic to Sewer Conversion	Five lots with septic systems to be converted to municipal sewer.	Wastewater Service Area Expansion	Planned	2021	TBD	TBD	TBD	$265,000	TBD	City/ SOIRL	$88,944	N/A
City of Melbourne	SOIRL	MEL-13	Espanolia Baffle Box	Installation of baffle box along with pipe replacement.	Baffle Boxes- Second Generation with Media	Planned	2022	458	73	61	$550,000	TBD	City/ SOIRL	$105,000	N/A
City of Melbourne	SOIRL/SRF Loan	MEL-14	Grant Street Water Reclamation Facility Improvements	Improvements include rehabilitation of major treatment elements and structures of facility.	WWTF Nutrient Reduction	Planned	TBD	TBD	TBD	TBD	#######	Not provided	City of Melbourne/ SOIRL/ SRF	#######	N/A
City of Palm Bay	N/A	PB-01	Basin 11	Not provided.	Muck Removal/Restoration Dredging	Completed	2009	Not provided	Not provided	Not provided	$1,866,695	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-02	Chace Lane Pond Modifications	Not provided.	Dry Detention Pond	Completed	2001	78	11	91	$20,290	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-03	Glenham Drive Sidewalks Improvements	Not provided.	Dry Detention Pond	Completed	2014	11	2	12	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-04	Basin 7 Stormwater Improvements Phase II	Not provided.	Wet Detention Pond	Completed	2009	352	101	147	$79,109	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-05	Boundary Canal Trail Phase 3	Not provided.	Baffle Boxes- First Generation	Completed	2014	17	12	366	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-06	Boundary Canal Phase II Stormwater Improvement	Not provided.	On-line Retention BMPs	Completed	2014	3,276	383	633	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-07	Boundary Canal Phase I Baffle Box Installation	Not provided.	Baffle Boxes- First Generation	Completed	2014	0	0	633	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-08	Norwood Street Baffle Box Installation	Not provided.	Baffle Boxes- First Generation	Completed	2014	16	12	529	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-09	Basin 1 Drainage Improvements Phase 1 (East of US 1)	Not provided.	Wet Detention Pond	Completed	2007	110	10	137	$22,247	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Palm Bay	N/A	PB-10	Basin 13 Stormwater Improvements	Not provided.	Wet Detention Pond	Completed	2006	143	37	42	$200,419	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-11	Powell's Subdivision Paving & Drainage Improvements	Not provided.	Wet Detention Pond	Completed	2000	176	82	124	$147,478	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-12	Port Malabar Unit 40 Drainage Improvements North	Not provided.	Wet Detention Pond	Completed	2015	737	182	224	$23,778	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-13	Mandarin Ditch (South)	Not provided.	Grass swales without swale blocks or raised culverts	Completed	2006	213	30	73	$308,797	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-14	Basin 3 Main Street Parking Lot	Treatment train with PB-15.	Pervious Pavement Systems	Completed	2008	1,428	206	346	$4,845	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-15	Basin 3 Main Street Improvements Channel Alignment	Treatment train with PB-14.	BMP Treatment Train	Completed	2010	1,604	231	359	$403,561	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-16	Street Sweeping	Not provided.	Street Sweeping	Ongoing	N/A	57	36	N/A	$8,900	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-17	Turkey Creek Maintenance Dredging	Not provided.	Muck Removal/Restoration Dredging	Completed	2007	Not provided	Not provided	Not provided	$255,241	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-18	Turkey Creek Maintenance Dredging - Sump	Not provided.	Muck Removal/Restoration Dredging	Completed	2014	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-19	Anglers Drive	Not provided.	Baffle Boxes- First Generation	Completed	2008	1	1	12	$85,000	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-20	Worth Court	Not provided.	Catch Basin Inserts/Inlet Filter Cleanout	Completed	2014	0	0	5	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	SJRWMD/ DEP	PB-21	Basin 9 (Harris Pond)	Not provided.	Wet Detention Pond	Completed	2010	TBD	TBD	443	$294,519	Not provided	SJRWMD/ DEP	Not provided	Not provided
City of Palm Bay	N/A	PB-22	Wild Rose BMP	Not provided.	Baffle Boxes- First Generation	Completed	2014	0	0	5	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-24	Port Malabar Inlet Inserts	Not provided.	Catch Basin Inserts/Inlet Filter Cleanout	Completed	2010	Not provided	Not provided	29	$19,518	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-25	Kent Street Baffle Box	Not provided.	Baffle Boxes- First Generation	Completed	2009	1	1	21	$50,000	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-26	PMU1 North (Florin Pond)	Not provided.	Dry Detention Pond	Completed	2000	TBD	TBD	26	$150,000	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Palm Bay	N/A	PB-27	Education Efforts	FYN, ordinances, pamphlets, PSAs, website, illicit discharge program.	Education Efforts	Ongoing	N/A	12,343	1,787	N/A	$1,866,695	N/A	N/A	N/A	N/A
City of Palm Bay	N/A	PB-28	Vance Circle-Drainage Improvements	Not provided.	Catch Basin Inserts/Inlet Filter Cleanout	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Palm Bay	DEP	PB-29	Basin 1 Drainage Improvements Phase 1	Baffle box, modular wetlands, and upward filter.	BMP Treatment Train	Completed	2017	Not provided	Not provided	175	$250,000	Not provided	DEP	DEP - $250,000	S0876
City of Palm Bay	N/A	PB-30	Troutman/ Clearmond Drainage Pond	Roadway widening from rural to urban section with underground drainage.	Dry Detention Pond	Completed	2014	7	1	8	$5,400,000	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-31	Port Malabar Drainage Improvements Central	Modification of existing drainage system redesigned to promote infiltration of stormwater runoff. The system has perforated piping, baffles, and infiltration trenches to encourage percolation.	Exfiltration Trench	Completed	2013	12	2	12	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	N/A	PB-32	Kingswood Drainage Pond	Modification and expansion of existing drainage pond to provide additional stormwater capacity, attenuation, and treatment.	Dry Detention Pond	Completed	2015	61	8	62	Not provided	Not provided	Not provided	Not provided	N/A
City of Palm Bay	DEP	PB-33	Basin 3 Bayfront Community SW Improvements (Koske Pond Phase 1)	Baffle box, modular wetlands, and upward filter.	BMP Treatment Train	Completed	2017	TBD	TBD	Not provided	$500,000	Not provided	DEP	DEP - $500,000	S0801

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Palm Bay	SJRWMD/ DEP	PB-34	Stormwater Treatment at City Marina	Baffle box, modular wetlands, and upward filter.	BMP Treatment Train	Planned	TBD	TBD	TBD	TBD	$890,050	TBD	SJRWMD/ DEP	TBD	LP05073
City of Palm Bay	N/A	PB-37	Norwood Baffle Box Retrofit	N/A	Baffle Boxes- First Generation	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Palm Bay	N/A	PB-38	Victoria Pond	N/A	Baffle Boxes- First Generation	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Palm Bay	N/A	PB-39	Goode Park	N/A	Baffle Boxes- First Generation	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Palm Bay	N/A	PB-40	Florin Pond	N/A	Baffle Boxes- First Generation	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Palm Bay	N/A	PB-41	Turkey Creek Shoreline Restoration	Bayfront shoreline restoration to place fill addressing hurricane erosion damage from 2016 and 2017.	Shoreline Stabilization	Completed	2018	TBD	TBD	TBD	$180,000	TBD	DEO	DEO - $177,300/ City - $2,700	N/A
City of Palm Bay	N/A	PB-42	Unit 48 Drainage Improvements - Emerson	Expansion of wet detention system and adjustment of control structures.	Wet Detention Pond	Planned	2019	TBD	TBD	TBD	TBD	TBD	City	TBD	N/A
City of Palm Bay	Brevard County/ Brevard Zoo	PB-43	Bayfront/Palm Bay Living Shoreline at Turkey Creek	Installation of oyster mats and plantings to uptake nutrients from sheet flow.	Creating/ Enhancing Living Shoreline	Canceled	2019	N/A	N/A	TBD	$113,000	TBD	Brevard County	Brevard County - $113,000	N/A
City of Palm Bay	N/A	PB-44	Basin 3 Bayfront Community SW Improvements (Koske Pond Phases 2 and 3)	Expansion of wet pond.	Wet Detention Pond	Planned	2019	TBD	TBD	TBD	TBD	$200	TBD	TBD	N/A
City of Palm Bay	N/A	PB-45	Basin 1 Drainage Improvements Phase 2B Victoria Pond (West of U.S. 1)	Baffle box and upflow filter.	BMP Treatment Train	Planned	2019	TBD	TBD	175	TBD	TBD	TBD	TBD	N/A
City of West Melbourne	N/A	WM-01	Westbrooke	Not provided.	Wet Detention Pond	Completed	2004	23	4	169	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-02	Saddlebrook	Not provided.	Wet Detention Pond	Completed	2004	0	0	40	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of West Melbourne	N/A	WM-03	Stratford Point	Not provided.	Wet Detention Pond	Completed	2004	23	6	84	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-04	Oak Grove	Not provided.	Wet Detention Pond	Completed	2010	20	5	91	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-05	Manchester Lakes	Not provided.	Wet Detention Pond	Completed	2007	11	2	133	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-06	Havens at Riviera	Not provided.	Wet Detention Pond	Completed	2009	5	4	23	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-07	Cypress/Creek Imagine Schools	Not provided.	Wet Detention Pond	Completed	2009	32	4	72	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-08	Lynnwood	Not provided.	Wet Detention Pond	Completed	2006	3	1	28	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-09	Coastal Commerce	Not provided.	Wet Detention Pond	Completed	2009	12	5	60	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-10	Hammock Landing	Not provided.	Wet Detention Pond	Completed	2009	5	2	76	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-11	Crystal Lakes	Not provided.	Wet Detention Pond	Completed	2009	11	7	91	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-12	Orange View Drive	Not provided.	Baffle Boxes-Second Generation	Completed	2014	90	11	49	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-13	Stephenson Drive	Not provided.	Baffle Boxes-Second Generation	Completed	2014	28	3	14	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-14	Parker Road	Not provided.	Baffle Boxes-Second Generation	Completed	2014	25	3	13	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-15	Laila Drive	Not provided.	Baffle Boxes-Second Generation	Completed	2014	42	5	22	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-16	Doherty Drive	Not provided.	Baffle Boxes-Second Generation	Completed	2014	120	16	66	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of West Melbourne	N/A	WM-17	Trend Road	Not provided.	Baffle Boxes-Second Generation	Completed	2014	17	2	9	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-18	San Paolo	Not provided.	Baffle Boxes-Second Generation	Completed	2014	6	1	3	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-19	San Paolo West	Not provided.	Baffle Boxes-Second Generation	Completed	2014	17	2	8	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-20	John Carrol	Not provided.	Baffle Boxes-Second Generation	Completed	2014	133	16	75	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-21	Street Sweeping	Not provided.	Street Sweeping	Ongoing	N/A	316	216	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-22	Inlet Cleaning	Not provided.	BMP Cleanout	Ongoing	N/A	20	2	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
City of West Melbourne	N/A	WM-23	Sawgrass Lakes Ph. I	Not provided.	Wet Detention Pond	Completed	2015	Not provided	Not provided	508	Not provided	Not provided	Private	Not provided	N/A
City of West Melbourne	N/A	WM-24	Manchester Lakes	Not provided.	Wet Detention Pond	Completed	2016	Not provided	Not provided	133	Not provided	Not provided	Private	Not provided	N/A
City of West Melbourne	Brevard County/St. Johns	WM-25	Construction of Sylvan Drive Septic to Sewer Project	Connecting 59 properties to public sewer and abandoning 59 septic tanks	OSTDS Phase Out	Underway	2021	TBD	TBD	60	$2,322,551	TBD	SOIRL/ St. Johns/ City of West Melbourne	#######	N/A
FDACS	Agricultural Producers	FDACS-01	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	208	27	234	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDACS	Agricultural Producers	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	Completed	2020	0	0	TBD	TBD	N/A	FDACS	TBD	N/A
SJRWMD	Not provided	SJRWMD-05	C-10 Water Management Area Project	Construction of a 1,300 acre reservoir with pump station and outfall structure designed to increase the flow restoration to the St. Johns River of the C-1 Rediversion Project to a total of 50% of the average annual flow	Hydrologic Restoration	Planned	TBD	TBD	TBD	Not provided	TBD	Not provided	Ad Valorem	Not provided	Not provided
SJRWMD	DEP/ Brevard County	SJRWMD-06	Crane Creek M-1 Canal Flow Restoration	This project would restore M-1 Canal baseflows and small stormflows west of Evans Road back to the USJRB by constructing an operable diversion structure in the M-1 Canal to divert and treat flows prior to discharging to the USJRB.	Hydrologic Restoration	Underway	2022	TBD	TBD	Not provided	#######	Not provided	Ad Valorem/ DEP/ Brevard County	SJRWMD - $616000/ DEP - $2450000/ Brevard County - $2034000	33,591.00
FDOT District 5	N/A	FDOTD5-01	D5_70010-3528-01	Pond A.	Wet Detention Pond	Completed	2002	1	0	16	Not provided	Not provided	Not provided	Not provided	N/A
FDOT District 5	N/A	FDOTD5-02	D5_70010-3528-02	Pond B.	Wet Detention Pond	Completed	2002	2	0	8	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 5	N/A	FDOTD5-03	D5_70012-3503-01 (Missing from model)	Pond WRA 1.	Wet Detention Pond	Completed	Prior to 2013	165	0	22	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-04	D5_70012-3503-02 (Missing from model)	Pond WRA 2.	Wet Detention Pond	Completed	Prior to 2013	0	0	9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-05	D5_70012-3503-03 (Missing from model)	Pond WRA 3.	Dry Detention Pond	Completed	Prior to 2013	6	1	7	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-06	D5_70050-3544-03	Pond 7B.	Wet Detention Pond	Completed	2004	2	0	5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-07	D5_70100-3517-01 (Missing from model)	French drains. Project canceled. Start date prior to 2000. BMP is accounted for in new model.	100% On-site Retention	Canceled	Prior to 2013	N/A	N/A	3	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-08	D5_70220-3433-01	Pond C.	Wet Detention Pond	Completed	2000	3	0	9	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-09	D5_70220-3429-01 (Missing from model)	Pond A; Pond 1A under 242251-2 (10/09). Project canceled. Start date prior to 2000. BMP is accounted for in new model.	Wet Detention Pond	Canceled	Prior to 2013	N/A	N/A	20	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-10	D5_70220-3429-02 (Missing from model)	Pond B is now Pond 1B under 241221-2 (10/09). Project canceled. Start date prior to 2000. BMP is accounted for in new model.	Wet Detention Pond	Canceled	Prior to 2013	N/A	N/A	26	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-11	D5_70220-3429-03 (Missing from model)	Pond C is now Pond 2B under 241221-2 (10/09). Project canceled. Start date prior to 2000. BMP is accounted for in new model.	Wet Detention Pond	Canceled	Prior to 2013	N/A	N/A	26	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 5	N/A	FDOTD5-12	D5_70220-3429-04 (Missing from model)	Pond D is now Pond 2A under 241221-2 (10/09). Project canceled. Start date prior to 2000. BMP is accounted for in new model.	Wet Detention Pond	Canceled	Prior to 2013	N/A	N/A	22	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-13	D5_409034-01	French drains.	100% On-site Retention	Completed	2005	4	1	0	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-14	Education Efforts	Pamphlets, Illicit Discharge Program.	Education Efforts	Ongoing	N/A	97	13	N/A	Not provided	Not provided	Florida Legislature	N/A	N/A
FDOT District 5	N/A	FDOTD5-15	Fertilizer Cessation	Elimination of fertilizer application in rights-of-way.	Fertilizer Cessation	Completed	2005	1,586	0	101	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-16	Street Sweeping	Street sweeping.	Street Sweeping	Ongoing	N/A	215	117	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
Melbourne Tillman WCD	DEP	MT-01	C-1 Re-Diversion Project	Not provided.	Hydrologic Restoration	Completed	2014	Not provided	Not provided	Not provided	Not provided	Not provided	DEP	Not provided	S0652
Melbourne Tillman WCD	N/A	MT-02	Weir Construction C-69 @ C-1	Not provided.	Control Structure	Completed	2016	Not provided	Not provided	3,830	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	N/A	MT-03	Weir Construction C-69 @ C-75	Not provided.	Control Structure	Completed	2016	Not provided	Not provided	2,940	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	N/A	MT-04	Weir Construction C-74 @ C-69	Not provided.	Control Structure	Completed	2016	Not provided	Not provided	840	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	N/A	MT-05	Windmill Aeration	Not provided.	Stormwater Aeration System	Completed	2016	N/A	N/A	516	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	N/A	MT-06	C-9R	Woodchip logs.	Turbidity Reducing Polymers (e.g., Floc logs ®)	Completed	2016	Not provided	Not provided	205	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	N/A	MT-07	C-49 Pond	Not provided.	Stormwater - Biological/ Bacteria Treatment	Completed	2016	Not provided	Not provided	238	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	N/A	MT-08	C-47	Not provided.	Stormwater - Biological/ Bacteria Treatment	Completed	2016	Not provided	Not provided	480	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	N/A	MT-09	C-62	Woodchip logs.	Turbidity Reducing Polymers (e.g., Floc logs ®)	Completed	2016	Not provided	Not provided	120	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Melbourne Tillman WCD	N/A	MT-10	C-84	Not provided.	Stormwater - Biological/ Bacteria Treatment	Completed	2016	Not provided	Not provided	152	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	N/A	MT-11	Harvesting	Hydrilla harvesting.	Aquatic Vegetation Harvesting	Completed	2016	Not provided	Not provided	80	Not provided	Not provided	Not provided	Not provided	N/A
Melbourne Tillman WCD	Not provided	MT-12	Harvesting	Hygrophilia and tape grass harvesting	Aquatic Vegetation Harvesting	Ongoing	N/A	7,550	1,699	141	$30,353	Not provided	User Fees	User Fees - $30,352	N/A
Melbourne Tillman WCD	N/A	MT-13	Control Structure Maintenance	Maintain existing water control structures and any adjustable gates on water control structures.	Control Structure	Underway	TBD	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Melbourne Tillman WCD	N/A	MT-14	Public Education and Outreach	Update website with links and literature related to clean waters and the Indian River Lagoon, and participate in education training to include FSESCI program.	Education Efforts	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Melbourne Tillman WCD	N/A	MT-15	New Outfall Discharge Requirements	Implement discharge requirements for new outfalls from developments which are greater than required by other agencies to regulate the peak flow into the canals.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Town of Indialantic	N/A	TI-01	Education Efforts	Pamphlets, website, and fertilizer ordinance.	Education Efforts	Ongoing	N/A	144	21	N/A	N/A	N/A	N/A	N/A	N/A
Town of Indialantic	N/A	TI-02	Swale Construction	Not provided.	Grass swales without swale blocks or raised culverts	Underway	TBD	12	2	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Town of Indialantic	N/A	TI-03	Drainage Inlet Cleaning	Not provided.	BMP Cleanout	Ongoing	N/A	TBD	TBD	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Town of Indialantic	N/A	TI-04	Street Sweeping	Not provided.	Street Sweeping	Ongoing	N/A	28	18	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Town of Indialantic	N/A	TI-05	Lily Park	Not provided.	On-line Retention BMPs	Planned	2018	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A
Town of Melbourne Beach	N/A	MB-01	Basin 9 - Oak Street Pedway	Not provided.	Exfiltration Trench	Completed	2007	115	18	13	$146,000	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-02	Basin 9 - Oak Street Pedway - Improvement Project	Not provided.	Baffle Boxes- Second Generation	Completed	2007	152	19	86	$146,000	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-03	Basin 8, 9, and 11 Oak Street Pedway - Improvement Project	Not provided.	Grass swales without swale blocks or raised culverts	Completed	2007	199	30	45	$146,000	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-04	Basin 1 - Hazard Mitigation Grant Program (HMGP) Flood Water Improvements Project	Not provided.	Baffle Boxes- Second Generation	Completed	2010	150	18	84	$500,000	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-05	Basin 1 - HMGP Flood Water Improvements Project	Not provided.	Grass swales without swale blocks or raised culverts	Completed	2010	4	1	1	$500,000	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-06	Basin 9 - HMGP Flood Water Improvements Project	Not provided.	Grass swales without swale blocks or raised culverts	Completed	2010	4	1	1	$500,000	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-07	Anchor Key Drainage Improvements - Basin 16	Not provided.	Baffle Boxes- First Generation	Completed	2002	0	0	3	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-08	Pelican Key Drainage Improvements - Basin 14	Not provided.	Baffle Boxes- First Generation	Completed	2002	0	0	2	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	DEP	MB-09	Basin 5 - Ocean Ave Baffle Box	Not provided.	Baffle Boxes- First Generation	Completed	2000	3	2	58	Not provided	Not provided	DEP	Not provided	G0320
Town of Melbourne Beach	N/A	MB-10	Basin 10 - Cherry Drive Baffle Box	Not provided.	Baffle Boxes- First Generation	Completed	2000	4	3	87	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-11	Basin 15 - Neptune Drive Baffle Box	Not provided.	Baffle Boxes- First Generation	Completed	2000	0	0	6	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Town of Melbourne Beach	N/A	MB-12	Basin 17 - Riverview Lane Baffle Box	Not provided.	Baffle Boxes- First Generation	Completed	2000	0	0	1	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-13	Basin 18 - Riverview Lane Baffle Box	Not provided.	Baffle Boxes- First Generation	Completed	2000	0	0	6	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-14	CIBs - Basins 4, 6, 10 & 15	Not provided.	Catch Basin Inserts/Inlet Filter Cleanout	Completed	2000	5	4	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-15	Melbourne Beach Chevron	Not provided.	100% On-site Retention	Completed	2010	6	1	1	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-16	Melbourne Beach Library	Not provided.	Dry Detention Pond	Completed	2001	1	0	2	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Beach	N/A	MB-17	Melbourne Beach Town Hall	Not provided.	100% On-site Retention	Completed	2005	14	2	2	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Village	N/A	MV-01	Platt Circle	Not provided.	Baffle Boxes- Second Generation	Completed	2005	48	6	31	$124,000	Not provided	Not provided	Not provided	N/A
Town of Melbourne Village	N/A	MV-02	Education Efforts	FYN, fertilizer ordinance, irrigation ordinance, PSAs, and informational pamphlets.	Education Efforts	Ongoing	N/A	144	21	N/A	Not provided	Not provided	Not provided	Not provided	N/A
Town of Melbourne Village	N/A	MV-02	Dayton Culvert	Restoration of swale and installation of new culvert with baffle box.	Baffle Boxes- Second Generation	Underway	2021	TBD	TBD	TBD	$11,300	Not provided	Not provided	Not provided	N/A

3.2 Project Zone SEB

Project Zone SEB covers more than 117,881 acres of the CIRL BMAP. As listed in **Table 21**, urban land use makes up the largest portion of the project zone with 22.5 % of the area, followed by agriculture with 21.0 %. Stakeholders in Project Zone SEB are agricultural producers, Brevard County, City of Fellsmere, City of Palm Bay, City of Sebastian, FDOT District 4 and District 5, Fellsmere WCD, Indian River County, Sebastian River Improvement District, Town of Grant-Valkaria, Town of Orchid, and Vero Lakes WCD.

Table 21. Summary of land uses in Project Zone SEB

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	26,562	22.5
2000	Agricultural	24,726	21.0
3000	Upland Prairie and Shrublands	24,660	20.9
4000	Upland Forested Areas	17,250	14.6
5000	Water	2,256	1.9
6000	Wetlands	18,734	15.9
7000	Disturbed Lands	1,778	1.5
8000	Transportation	1,916	1.6
Total		**117,881**	**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 15** and **Figure 16** show progress towards the required TN and TP load reductions allocated to Project Zone SEB from projects completed through July 31, 2020.

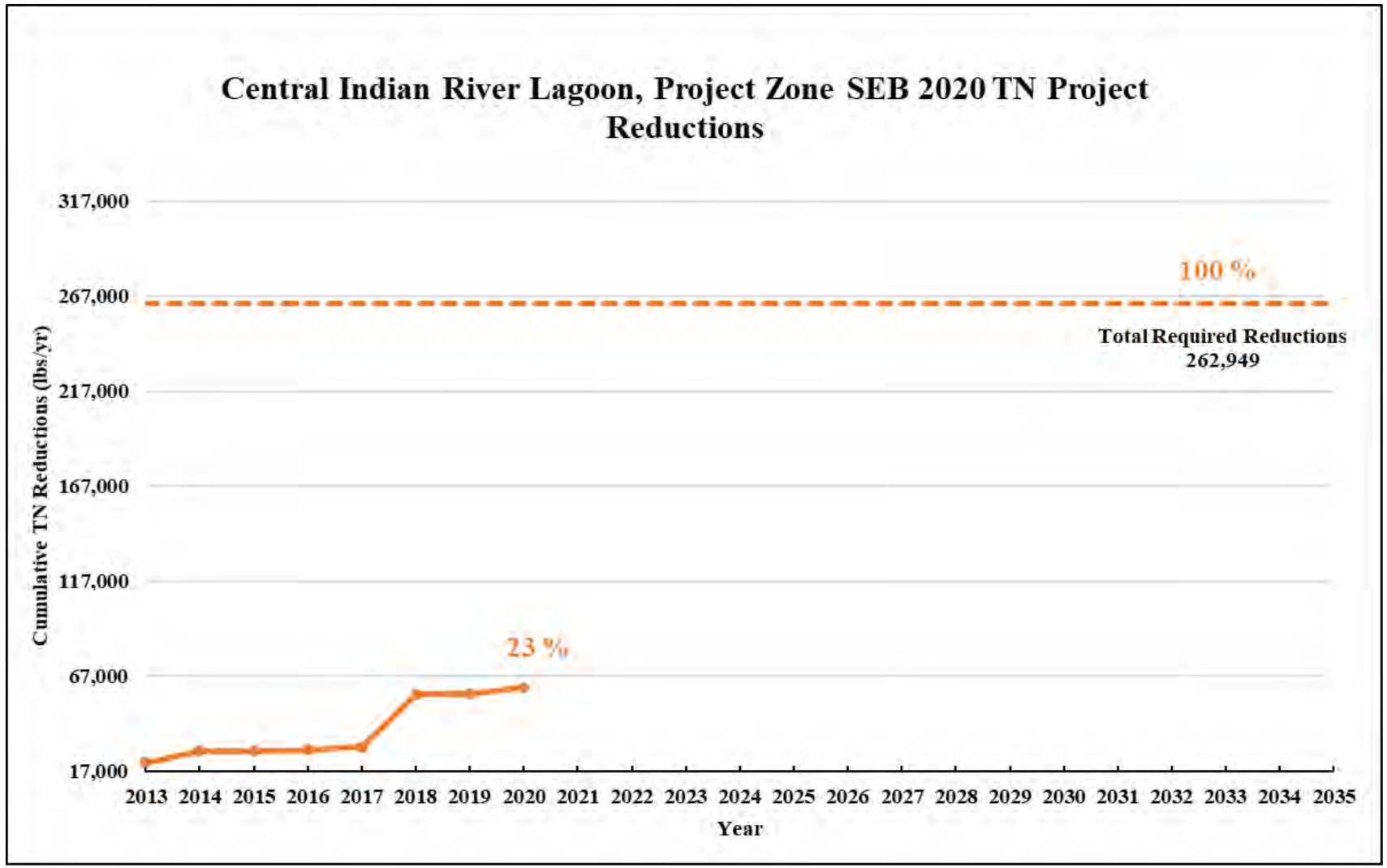

Figure 15. Estimated progress towards meeting the required TN reductions allocated to Project Zone SEB with projects completed through July 31, 2020

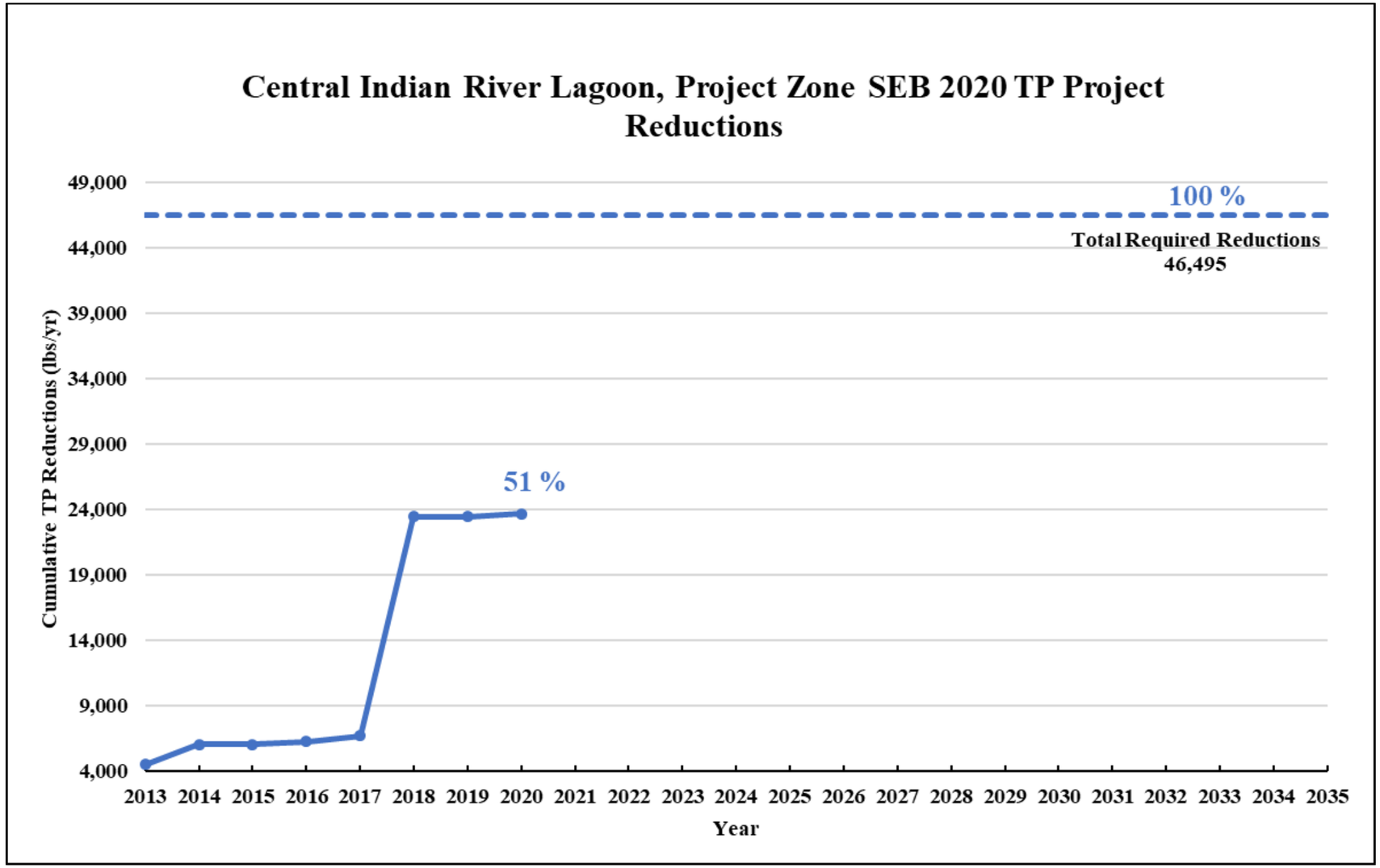

Figure 16. Estimated progress towards meeting the required TP reductions allocated to Project Zone SEB with projects completed through July 31, 2020

3.2.1. Existing and Planned Projects

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

Table 22. Existing and planned projects in Project Zone SEB

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	N/A	BC-04	Church Street Pond Cleanout	Removed vegetation from pond.	BMP Cleanout	Completed	2014	137	26	172	Not provided	Not provided	County	Not provided	N/A
Brevard County	W. Melbourne/ Grant-Valkaria/ Malabar/ Melbourne/ Cocoa/ IHB/ Sat. Beach/ Cocoa Beach/ Cape Canaveral	BC-05a	Education Efforts	FYN, fertilizer and pet waste ordinances, public service announcements (PSAs), pamphlets, website, illicit discharge program.	Education Efforts	Ongoing	N/A	3,127	466	N/A	N/A	N/A	County	N/A	N/A
Brevard County	N/A	BC-06a	Street Sweeping	Remove debris from 786 linear feet of curb street throughout the county.	Street Sweeping	Ongoing	N/A	58	37	N/A	N/A	N/A	N/A	N/A	N/A
Brevard County	SJRWMD	BC-08	Wheeler Properties (Sebastian River Improvements)	Wet detention pond and wetland enhancement.	Wet Detention Pond	Completed	2012	TBD	TBD	16,404	$3,500,000	$2,000	DEP	Not provided	S0436
Brevard County	N/A	BC-09	Micco I	Exfiltration and denitrification.	BMP Treatment Train	Completed	2016	40	6	52	$175,599	$1,000	DEP	DEP - $355,304	G0358
Brevard County	N/A	BC-10	Micco B	Not provided.	Dry Detention Pond	Canceled	N/A	41	6	N/A	N/A	N/A	N/A	N/A	N/A
Brevard County	N/A	BC-11	Mockingbird Pond	Installation of a floating vegetated island in an existing stormwater retention pond to provide additional nutrient removal.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2017	23	3	27	$10,923	$1,350	DEP	Not provided	G0430
Brevard County	N/A	BC-12	Church Street Pond MAPS	Installation of a floating vegetated island in an existing stormwater retention pond to provide additional nutrient removal.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2010	135	21	172	$4,212	$2,106	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Brevard County	DEP	BC-13	Wheeler Flemming Grant	Construction of a wet detention pond that will help remove nitrogen and phosphorus from the stormwater adjacent to Fleming Grant Road in southeastern Brevard County.	Wet Detention Pond	Completed	2016	553	182	134	$645,073	$2,000	DEP	DEP - $591,081	G0396
Brevard County	DEP	BC-20a	Multiple Ditch Outfall Denitrification D3	Providing base flow/groundwater treatment in 20 open drainage basins. Each Project will have its own number	Denitrification Walls	Underway	TBD	TBD	TBD	TBD	N/A	TBD	DEP	TBD	LP0511A
Brevard County	SOIRL	BC-26	Flemming Grant BAM - BB#2134	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	TBD	$181,000	Not provided	LF/SOIRL	$91,588	N/A
Brevard County	Not provided	BC-28	Long Point Park Denitrification	Denitrification wall to remove nitrogen from the groundwater flowing from campground rapid infiltration wet pond into IRL	Denitrification Walls	Completed	2017	TBD	TBD	TBD	$101,854	Not provided	SOIRL	SOIRL - $22,206.73	N/A
Brevard County	Not provided	BC-31	Education Efforts	Fertilizer, grass clippings, and septic system maintenance	Enhanced Public Education	Underway	2017	N/A	N/A	TBD	$375,000	Not provided	SOIRL	SOIRL - $375,000	N/A
Brevard County	Not provided	BC-32	Babcock @C54 - BB#2258	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	TBD	$84,999	TBD	LF	LF - $35,000	Not provided
City of Fellsmere	Fellsmere WCD	F-01	State Street Improvements and Stormwater Lake Project	Not provided.	Wet Detention Pond	Completed	Prior to 2013	79	22	50	Not provided	Not provided	Not provided	Not provided	N/A
City of Fellsmere	N/A	F-02	Senior League Field Park Improvements	Not provided.	Wet Detention Pond	Completed	2008	4	1	12	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Fellsmere	N/A	F-03	City Hall/Orange Street Project	Not provided.	Wet Detention Pond	Completed	2018	4	1	8	Not provided	Not provided	Not provided	Not provided	N/A
City of Fellsmere	N/A	F-04	Sunrise Apartments Phase 1 & 2	Not provided.	Wet Detention Pond	Completed	2009	12	5	36	Not provided	Not provided	Not provided	Not provided	N/A
City of Fellsmere	Fellsmere WCD	F-05	Grace Meadows Subdivision	Not provided.	Wet Detention Pond	Completed	2009	4	2	18	Not provided	Not provided	Not provided	Not provided	N/A
City of Fellsmere	N/A	F-07	Solid Waste Transfer Station	Not provided.	Wet Detention Pond	Completed	2008	1	0	5	Not provided	Not provided	Not provided	Not provided	N/A
City of Fellsmere	N/A	F-08	Fertilizer Ordinance	Ordinance.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	53	8	N/A	N/A	N/A	N/A	N/A	N/A
City of Fellsmere	SJRWMD/ Property Owner	F-09	North Regional Lake	Not provided.	Wet Detention Pond	Completed	2017	1,512	456	22	$615,000	$10,000	SJRWMD	SJRWMD - $500,000	N/A
City of Fellsmere	SJRWMD/ Property Owner	F-10	South Regional Lake	Created wetland flow through system.	BMP Treatment Train	Planned	2019	3,025	797	450	$787,187	$5,000	SJRWMD	SJRWMD - $500,000	N/A
City of Fellsmere	N/A	F-11	Alleyway Grading	Convert alleyway system into stormwater treatment system.	Grass swales without swale blocks or raised culverts	Planned	TBD	TBD	TBD	640	$1,260,000	$20,000	City/ Grants	TBD	N/A
City of Fellsmere	N/A	F-12	Stormwater Greenway	Convert unused rights-of-way into stormwater greenways.	Bioswales	Planned	TBD	TBD	TBD	220	$1,750,000	$30,000	City/ Grants	TBD	N/A
City of Fellsmere	N/A	F-13	Additional Regional Treatment	Lake or treatment train system (additional 40 acres required).	Wet Detention Pond	Planned	TBD	TBD	TBD	220	$2,080,000	$50,000	City/ Grants	TBD	N/A
City of Fellsmere	N/A	F-14	Road culverts, stormwater conveyance, paving	Reconstruct road culverts, stormwater conveyance, paving	Grass swales without swale blocks or raised culverts	Planned	TBD	TBD	TBD	TBD	########	TBD	City/ Grants	TBD	N/A
City of Fellsmere	N/A	F-15	Micro system basins	Construct micro system basins for stormwater treatment	BMP Treatment Train	Planned	TBD	TBD	TBD	TBD	$1,000,000	TBD	City/ Grants	TBD	N/A
City of Fellsmere	N/A	F-16	Stormwater data inventory	Develop stormwater data inventory system	Study	Completed	2018	N/A	N/A	N/A	$15,000	N/A	City Stormwater Fund	City Stormwater Fund - $15,000	N/A
City of Fellsmere	IRL NEP	F-17	259 S. Pine Stormwater	Construct swale conveyances, dry retention and control structures for micro basin	Dry Detention Pond	Planned	2019	37	5	7	$130,000	$5,000	City/ Grants	$50,000	N/A

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Fellsmere	IRL NEP	F-18	Stormwater Greenway	Convert unused rights-of-way into stormwater greenways.	Creating/ Enhancing Living Shoreline	Planned	2019	TBD	TBD	22	$5,000	$2,500	City/ Grants	$5,000	N/A
City of Fellsmere	Not provided	F-18	97th Street Flood Control	Not provided.	BMP Treatment Train	Planned	TBD	TBD	TBD	107	Not provided	Not provided	Not provided	Not provided	Not provided
City of Palm Bay	N/A	PB-35	Education Efforts	FYN, ordinances, pamphlets, PSAs, website, illicit discharge program.	Education Efforts	Ongoing	N/A	185	25	N/A	N/A	N/A	N/A	N/A	N/A
City of Sebastian	N/A	SEB-01	Main Street/Indian River Drive Improvements	Not provided.	Dry Detention Pond	Completed	2009	6	1	6	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-02	Main Street 4	Not provided.	Dry Detention Pond	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Sebastian	N/A	SEB-03	T-Hangar Development/Access Roads	Not provided.	Dry Detention Pond	Completed	2004	2	0	2	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-04	Louisiana Avenue Improvements Projects	Not provided.	Dry Detention Pond	Completed	2004	3	0	3	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-05	Twin Ditches Stormwater Retrofit	Not provided.	Wet Detention Pond	Completed	2007	241	127	177	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-06	Indian River Drive & Davis Street Baffle Box	Not provided.	Baffle Boxes- First Generation	Completed	2009	1	1	22	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	DEP	SEB-07	Periwinkle Drive Stormwater	Not provided.	Wet Detention Pond	Completed	2008	5	1	48	Not provided	Not provided	DEP	Not provided	G0200
City of Sebastian	DEP	SEB-08	Collier Canal Stormwater Retrofit	Not provided.	Wet Detention Pond	Completed	2010	1,655	444	532	Not provided	Not provided	DEP	Not provided	G0235
City of Sebastian	N/A	SEB-09	Schumann Park Improvements	Not provided.	Dry Detention Pond	Completed	2009	4	1	4	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-10	Fertilizer Ordinance	Ordinance.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	309	45	N/A	N/A	N/A	N/A	Not provided	N/A
City of Sebastian	N/A	SEB-11	Airport Drive	Not provided.	Baffle Boxes- First Generation	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Sebastian	N/A	SEB-12	Presidential Street	Not provided.	Baffle Boxes- First Generation	Completed	2014	TBD	TBD	15	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-13	Powerline Road	Not provided.	Baffle Boxes- First Generation	Completed	2014	TBD	TBD	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Sebastian	N/A	SEB-14	STEP Septic System	Not provided.	Onsite Sewage Treatment and Disposal System (OSTDS) Enhancement	Canceled	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
City of Sebastian	N/A	SEB-15	Collier Canal Dredge	Not provided.	Muck Removal/Restoration Dredging	Canceled	N/A	N/A	N/A	22	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-16	Stormwater Park	Not provided.	Wet Detention Pond	Completed	2010	TBD	TBD	162	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-17	Presidential Street	Not provided.	Baffle Boxes- First Generation	Completed	2012	TBD	TBD	24	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-18	Water Quality Testing	Not provided.	Monitoring/Data Collection	Canceled	N/A	N/A	N/A	24	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-19	Drainage Improvements	Not provided.	BMP Treatment Train	Completed	2016	TBD	TBD	1	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-20	Tulip Drainage	Not provided.	On-line Retention BMPs	Completed	2016	TBD	TBD	4	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-21	Septic to Sewer	22 septic systems converted to central sewer.	OSTDS Phase Out	Underway	Not provided	TBD	TBD	TBD	Not provided	Not provided	Not provided	Not provided	N/A
City of Sebastian	N/A	SEB-22	Oyster Point Exfiltration Trench	Exfiltration Trench.	Exfiltration Trench	Completed	2018	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A
City of Sebastian	IRL Council	SEB-23	Community Oyster Garden Project	Community Oyster Garden Outreach Education Project	Education Efforts	Underway	Not provided	N/A	N/A	TBD	TBD	TBD	IRL Council	TBD	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	10,233	1,338	2,196	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDACS	Agricultural Producers	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	Completed	2020	3,324	187	TBD	TBD	N/A	FDACS	TBD	N/A
SJRWMD	Banack Family Partnership	SJRWMD-02	Banack Family Partnership	Upgrade irrigation system to better utilize surface water on approximately 80 acres of citrus.	Agricultural BMPs	Completed	2019	167	14	80	$277,388	N/A	Banack Family Partnership/ SJRWMD	Banack Family Partnership - $69,347/ SJRWMD - $208,041	N/A
SJRWMD	IMG Citrus	SJRWMD-03	IMG Citrus Inc.	Purchase of compost and compost spreader for approximately 920 acres of citrus.	Agricultural BMPs	Underway	2020	3,628	794	524	$175,959	N/A	IMG Citrus/ SJRWMD	IMG Citrus - $43,990/ SJRWMD - $131,969	N/A
SJRWMD	Hammon Groves	SJRWMD-04	Hammond Groves Inc.	Design and install a surface water pump station, design and complete a pond restoration project and purchase and install mesh bags for citrus trees on approximately 400 acres of citrus.	Agricultural BMPs	Underway	2020	2,195	199	400	$363,491	N/A	Hammond Groves/ SJRWMD	Hammond Groves - $113,491/ SJRWMD - $250,000	N/A
SJRWMD	Fellsmere Joint Venture	SJRWMD-07	Dispersed Water Storage / Nutrient Reduction Pilot Project with Fellsmere Joint Venture	The District is evaluating benefits of using groves and private lands for retention to reduce excess nutrients. Project will create a ~2000 acre reservoir that should store about 18 mgd and reduce ~24 metric tons (mt) TN and 3 MT TP annually.	Dispersed Water Management	Underway	2022	TBD	TBD	Not provided	########	Not provided	Ad Valorem	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
SJRWMD	Graves Brothers	SJRWMD-08	Dispersed Water Storage / Nutrient Reduction Pilot Project with Graves Brothers	The District is evaluating benefits of using groves and private lands for retention to reduce excess nutrients. Project will create a ~200 acre reservoir that should store about 5 mgd and provide nutrient reductions of ~ 3 mt TN and 1 MT TP annually.	Dispersed Water Management	Underway	2021	TBD	TBD	Not provided	$5,655,000	Not provided	Ad Valorem	Not provided	N/A
SJRWMD	FWC/ NRCS	SJRWMD-09	Fellsmere Water Management Area	A component of the Upper St. Johns River Basin Project constructing a 10,000-acre reservoir to treat agricultural discharges and also benefits the IRL. Project will collectively restore more than 160,000 acres of the St. Johns River headwaters.	Stormwater Reuse/ Wet Detention Pond	Underway	2021	TBD	TBD	Not provided	########	Not provided	Ad Valorem/ FWC/ NRCS	Not provided	Not provided
SJRWMD	FDOT/ Brevard County	SJRWMD-10	Micco Stormwater Park	Two wet-detention ponds and wetland restoration areas, which improve the water quality to the Sebastian River and IRL. The stormwater system infrastructure was complete in 2016 and the park opened in 2018 with educational signs and other site amenities.	Regional Stormwater Treatment	Completed	2018	27,200	16,750	Not provided	$2,816,603	Not provided	Ad Valorem/ FDOT/ Brevard County	Not provided	N/A
FDOT District 4	N/A	FDOT4-03	FM# 228615-1	Resurfacing SR 5 between CR 510 to just south of Harrison Street.	Baffle Boxes-Second Generation	Completed	2007	108	12	289	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-04a	FDOT4 Street Sweeping	Materials from roadway and gutter sweeping.	Street Sweeping	Ongoing	N/A	76	49	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 4	N/A	FDOT4-09a	Education Efforts	Pamphlets and Illicit Discharge Program.	Education Efforts	Ongoing	N/A	20	2	N/A	N/A	N/A	Florida Legislature	N/A	N/A
FDOT District 4	N/A	FDOT4-10a	Fertilizer Cessation	No longer applying routine fertilizer.	Fertilizer Cessation	Completed	2014	6,045	1,511	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-21a	FM#: 413048-1 (Interstate-95 from St. Lucie/ Indian River County Line to North of State Road 60)	Widening SR 9 from St. Lucie / IRC Line to North of State Rd 60.	100% On-site Retention	Completed	2016	36	4	33	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-22	FM# 411476-1 (Sebastian River Bridge Replacement Project)	SR A1A Sebastian River Bridge replacement.	Grass swales without swale blocks or raised culverts	Completed	2014	0	0	2	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-23	FM# 413049-2	Widening SR 9 from North of SR 60 to Indian River/ Brevard County line.	Grass swales without swale blocks or raised culverts	Completed	2018	554	0	883	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-35A	FM# 431152-1	US-1 lateral ditch restoration.	On-line Retention BMPs	Completed	2016	TBD	TBD	TBD	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 5	N/A	FDOTD5-14a	Education Efforts	Pamphlets, Illicit Discharge Program.	Education Efforts	Ongoing	N/A	33	4	N/A	Not provided	Not provided	Florida Legislature	N/A	N/A
Fellsmere WCD	Sunrise Villas	FWCD-01	Sunrise Villas	Pond designed per two-inch/day limitation rule.	Wet Detention Pond	Completed	2003	5	2	14	TBD	TBD	Private	TBD	N/A
Fellsmere WCD	SJRWMD/ Indian River County/ State	FWCD-02	St. Johns Land Purchase	Conservation land.	Land Use Change	Completed	Prior to 2013	N/A	N/A	2,391	TBD	TBD	SJRWMD	TBD	N/A
Fellsmere WCD	City of Fellsmere/ SJRWMD	FWCD-03	Fellsmere Stormwater Lake and State Street Improvements	Stormwater retrofit improvements. Reduction split 50/50 with the City of Fellsmere.	Wet Detention Pond	Completed	2003	76	21	50	TBD	TBD	SJRWMD/ Fellsmere WCD	TBD	N/A
Fellsmere WCD	Indian River County Habitat for Humanity	FWCD-04	Grace Meadows	Pond designed per two-inch/day limitation rule. Reductions split 50/50 with City of Fellsmere.	Wet Detention Pond	Completed	2009	2	1	18	TBD	TBD	Private	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Fellsmere WCD	N/A	FWCD-05	2-Inch Limitation Discharges	Establishment of two-inch discharge rule.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	TBD	TBD	N/A	N/A	N/A	N/A	N/A	N/A
Fellsmere WCD	N/A	FWCD-06	Fellsmere WCD Mechanical Canal Maintenance	Canal cleaning/maintenance.	Stormwater System Rehabilitation	Ongoing	N/A	N/A	N/A	N/A	TBD	TBD	Fellsmere WCD	TBD	N/A
Fellsmere WCD	City of Fellsmere	FWCD-07	Historic Fellsmere Master Drainage Plan	Stormwater retrofit improvements. Reductions will be split with the City of Fellsmere once determined.	Regional Stormwater Treatment	Planned	TBD	TBD	TBD	1,661	TBD	TBD	Fellsmere WCD/ City of Fellsmere	TBD	N/A
Fellsmere WCD	City of Fellsmere/ SJRWMD	FWCD-08	South Regional Lake	Created wetland flow through system. Reductions to be split with the City of Fellsmere once determined.	BMP Treatment Train	Underway	TBD	TBD	TBD	627	TBD	TBD	SJRWMD/ City of Fellsmere	TBD	N/A
Fellsmere WCD	City of Fellsmere/ SJRWMD	FWCD-09	North Regional Lake	Reductions to be split with the City of Fellsmere once determined.	Wet Detention Pond	Completed	2018	TBD	TBD	367	TBD	TBD	SJRWMD	TBD	N/A
Fellsmere WCD	Fellsmere Joint Venture (FJV)/ SJRWMD	FWCD-10	Water Dispersion Project	Construction of berms and two pump stations to remove water from outfall canals and store on land.	Dispersed Water Management (DWM)	Planned	TBD	TBD	TBD	TBD	TBD	TBD	SJRWMD	TBD	N/A
Fellsmere WCD	N/A	FWCD-11	Public Education and Outreach	Provide public education to residents of the District that fosters an understanding of the necessity to reduce nutrient impacts to surface waters.	Education Efforts	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Fellsmere WCD	N/A	FWCD-12	Assist FDACS with BMP Enrollment Outreach	Assist FDACS, where needed, with identifying and contacting landowners/ producers within the District boundaries for purposes of participating in the relevant FDACS BMP programs.	Agricultural BMPs	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Indian River County	DEP	IRC-01	Vero Lake Estates Stormwater Improvements - Phase 1	Series of swales and canals in a large development leading to large stormwater detention ponds.	Wet Detention Pond	Completed	2002	7,655	1,993	2,407	$1,572,829	Not provided	DEP	Not provided	WM803
Indian River County	DEP	IRC-02	East Roseland Stormwater Improvements	A stormwater detention pond receiving water from swale systems in a subdivision.	Wet Detention Pond	Completed	2005	216	58	74	$433,134	$2,176	DEP	Not provided	G0061
Indian River County	N/A	IRC-07a	Moorhen Marsh Low Energy Aquatic Plant System	This is a managed aquatic plant system that will remove sediment and suspended solids through settling and filtration by aquatic plant roots. The aquatic plants will be harvested on a regular basis.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Underway	2021	52	7	6,301	$8,705,000	$84,000	County/ SJRWMD/Florida Legislature	Not provided	LPA0018
Indian River County	N/A	IRC-08a	Education Efforts	Fertilizer ordinance, PSAs, website, pamphlets, Illicit Discharge Program, and signs along Indian River Farms WCD canals.	Education Efforts	Ongoing	N/A	5,277	762	N/A	N/A	$52,000	Not provided	Not provided	N/A
Indian River County	N/A	IRC-09a	Street Sweeping	Street sweeping.	Street Sweeping	Ongoing	N/A	91	59	N/A	Not provided	$22,050	Not provided	Not provided	N/A
Indian River County	N/A	IRC-10a	Storm Drain Cleaning with Vacuum Trucks	Nutrient removal from measured data.	BMP Cleanout	Planned	TBD	TBD	TBD	TBD	TBD	$19,067	TBD	TBD	N/A
Indian River County	N/A	IRC-11a	Floating Aquatic Plant Islands in County Stormwater Ponds and Lakes	Nutrient removal from measured data.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Planned	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A
Indian River County	N/A	IRC-13	North Relief Canal Mechanical Vegetation/Debris Removal	Removal of aquatic vegetation containing nitrogen and phosphorus that otherwise, would enter IRL and die, releasing nutrients into the lagoon.	Aquatic Vegetation Harvesting	Planned	TBD	TBD	TBD	6,301	$1,000,000	$50,000	County/ Grants	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Sebastian River Improvement District	N/A	SRID-01	2-Inch Rule	Establishment of two-inch discharge rule.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sebastian River Improvement District	Not provided	SRID-02	Control Gates	Radial arm control gates.	Control Structure	Planned	TBD	TBD	TBD	9,000	TBD	TBD	SRID	TBD	N/A
Sebastian River Improvement District	N/A	SRID-03	Muck Removal	Vegetation and sediment/muck removal from canals.	Stormwater System Rehabilitation	Ongoing	N/A	Not provided	Not provided	Not provided	Not provided	Not provided	SRID	Not provided	N/A
Sebastian River Improvement District	N/A	SRID-04	Education Efforts	Permit manual on website that encourages the use of BMPs.	Education Efforts	Ongoing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sebastian River Improvement District	N/A	SRID-05	Water Conservation	Large regional water conservation/ storage areas.	Off-line Retention BMPs	Planned	TBD	TBD	TBD	TBD	TBD	TBD	SRID	TBD	N/A
Sebastian River Improvement District	Groves Brothers/ SJRWMD	SRID-06	200-Acre Water Dispersion Project	Construction of berms and two pump stations to remove water from outfall canals and store on land.	Dispersed Water Management (DWM)	Underway	2020	TBD	TBD	7,700	$5,650,000	TBD	SJRWMD	SJRWMD - $5,650,000	N/A
Sebastian River Improvement District	N/A	SRID-07	Lateral D System Stormwater Management	Lateral D system stormwater discharge limitation.	Regulations, Ordinances, and Guidelines	Planned	TBD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sebastian River Improvement District	FDACS	SRID-08	Assist FDACS with BMP Enrollment Outreach	Assist FDACS, where needed, with identifying and contacting producers within the district boundaries for purposes of participating in the relevant FDACS BMP programs.	Agricultural BMPs	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Vero Lakes WCD	N/A	VL-01	Public Education and Outreach	Include annual meeting agenda item to alert the landowner of the existence of the BMAP and requirements for this landowner.	Education Efforts	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Vero Lakes WCD	FDACS	VL-02	Assist FDACS with BMP Enrollment Outreach	Identify the current landowner and his contact information as shown on the VLWCD records, and encourage participation in the FDACS BMP program.	Agricultural BMPs	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Vero Lakes WCD	N/A	VL-03	Canal/Ditch Bank Berms	Minimize sediment transport by constructing berms on top of canal/ditch banks and promoting vegetation to cover.	Vegetated Buffers	Underway	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Vero Lakes WCD	N/A	VL-04	Culverts	Regular inspection is made to insure flow is maintained through culverts.	Stormwater System Rehabilitation	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided

3.3 Project Zone B

Project Zone B covers more than 68,938 acres of the CIRL BMAP area. As listed in **Table 23**, urban land uses makes up the majority of the project zone with 55.6 % of the area, followed by agriculture with 19.3 %. Stakeholders in Project Zone B are agricultural producers, City of Vero Beach, FDOT District 4, Fort Pierce Farms WCD, Indian River County, Indian River Farms WCD, and Town of Indian River Shores.

Table 23. 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	38,344	55.6
2000	Agricultural	13,308	19.3
3000	Upland Prairie and Shrublands	5,984	8.7
4000	Upland Forested Areas	4,456	6.5
5000	Water	1,229	1.8
6000	Wetlands	2,383	3.5
7000	Disturbed Lands	929	1.3
8000	Transportation	2,301	3.3
9000	Open Lands	3	0.0
Total		**68,938**	**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 17** and **Figure 18** show progress towards the required TN and TP load reductions allocated to Project Zone B from projects completed through July 31, 2020.

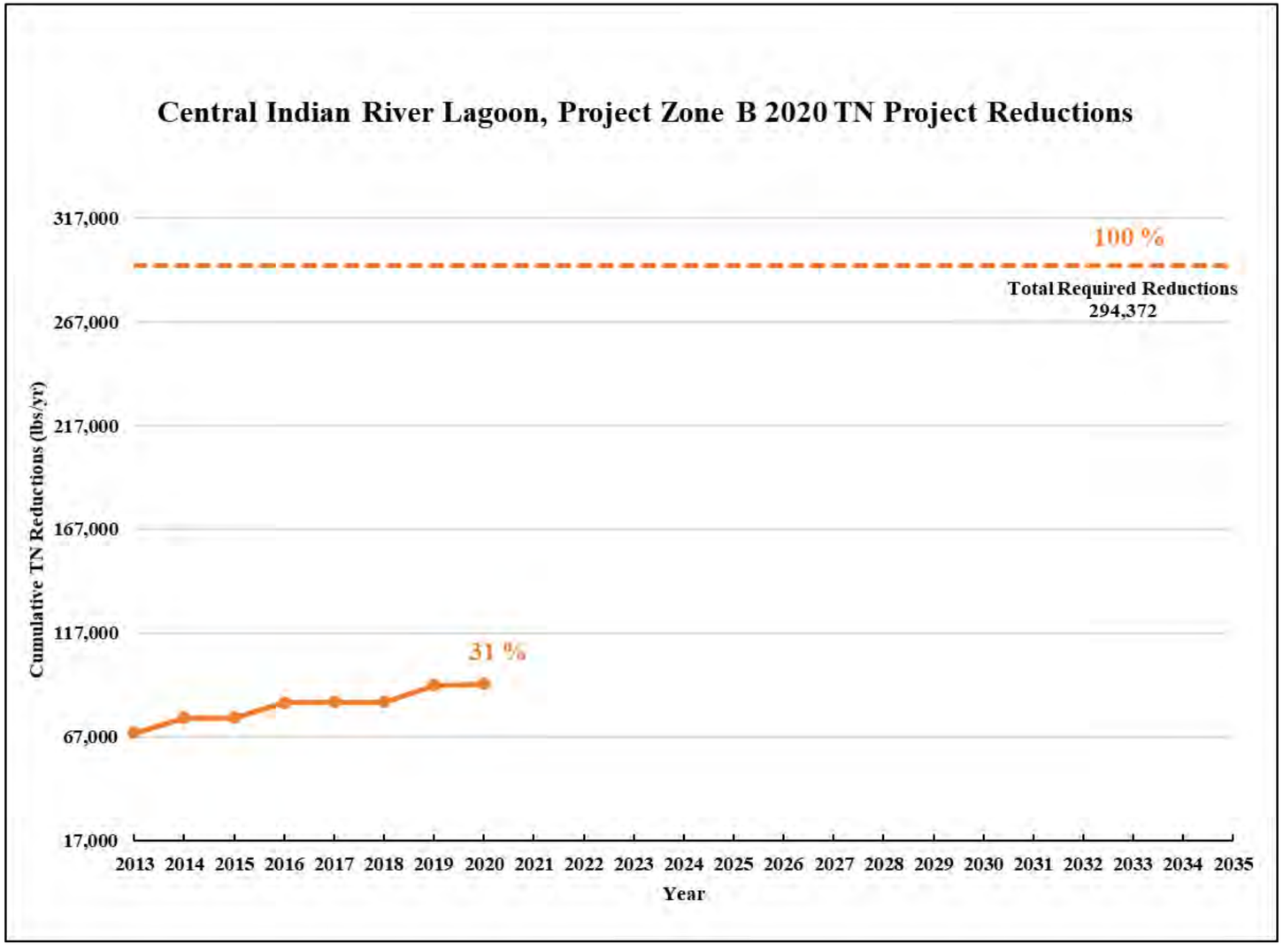

Figure 17. Estimated progress towards meeting the required TN reductions allocated to Project Zone B with projects completed through July 31, 2020

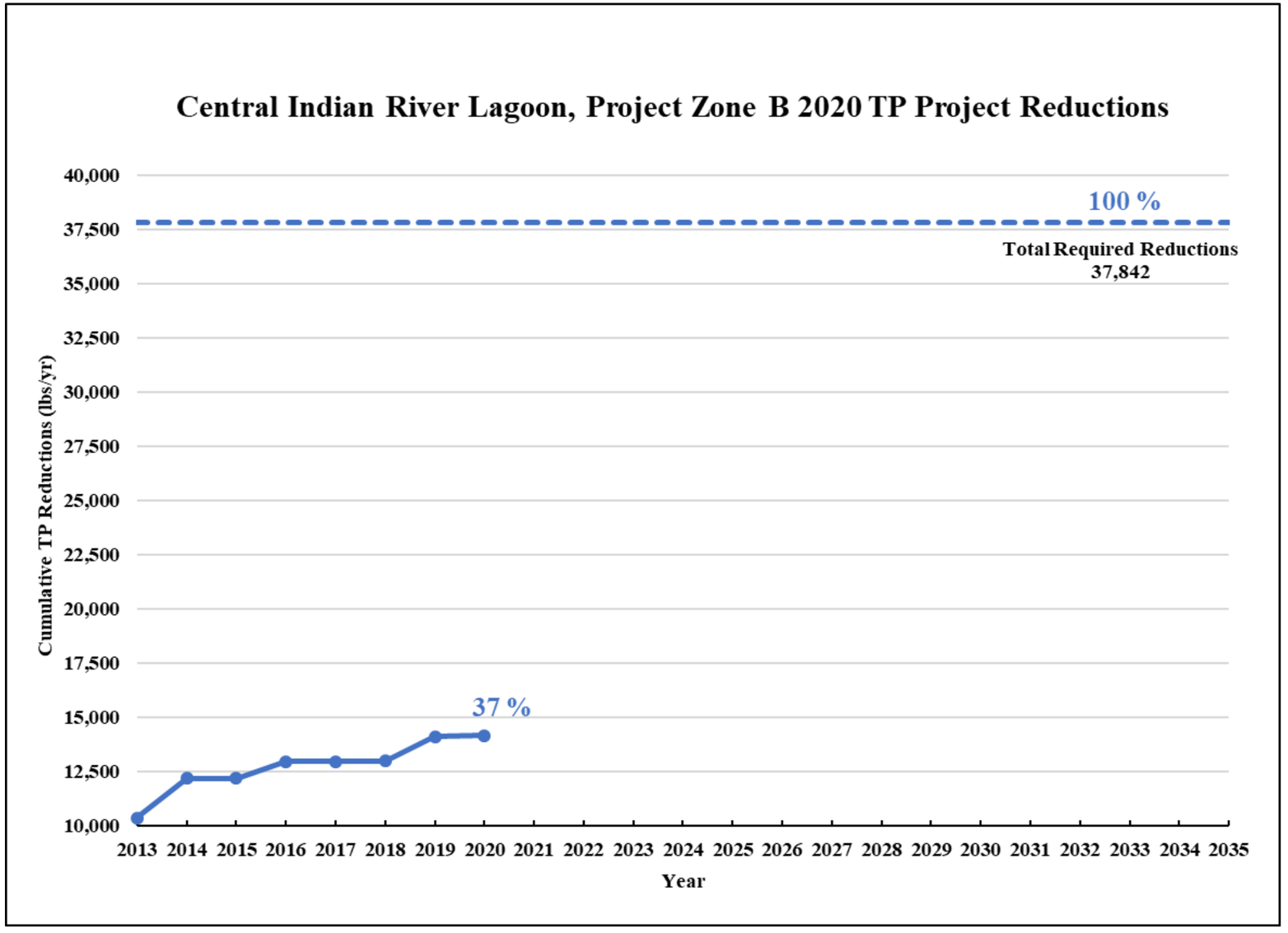

Figure 18. Estimated progress towards meeting the required TP reductions allocated to Project Zone B with projects completed through July 31, 2020

3.3.1. Existing and Planned Projects

Table 24 summarizes the existing and planned projects provided by the stakeholders for Project Zone B.

Table 24. 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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Vero Beach	DEP	VB-01	Date Palm Baffle Box	Suntree baffle box with Bold and GoldTM media.	Baffle Boxes-Second Generation	Completed	2017	109	13	7	$200,232	$1,000	COVB/ DEP	COVB - $128,966.54/ DEP - $71,265.73	G0242
City of Vero Beach	N/A	VB-02	10th and 12th Avenue Baffle Boxes	Includes ESI Ecovault® with a debris collection screen and baffle.	Baffle Boxes-Second Generation	Completed	2011	135	16	70	$97,800	$1,000	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-03	Greytwig Baffle Box	Includes ESI Ecovault® with a debris collection screen and baffle.	Baffle Boxes-Second Generation	Completed	2011	51	6	10	$75,000	$1,000	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-04	Education Efforts	FYN, landscape, fertilizer, irrigation, and pet waste ordinances, PSAs, informational pamphlets, website, and IDDE program.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	2,925	423	N/A	N/A	N/A	N/A	N/A	N/A
City of Vero Beach	N/A	VB-05	STEP Septic System	Conversion of existing septic systems to septic tank effluent pumping (STEP) systems.	Onsite Sewage Treatment and Disposal System (OSTDS) Enhancement	Underway	TBD	TBD	N/A	N/A	$500,000	Not provided	COVB	Not provided	N/A
City of Vero Beach	DEP	VB-06	18th Street Outfall	Not provided.	Baffle Boxes-Second Generation	Completed	2013	255	32	131	$161,511	Not provided	COVB/ DEP	COVB - $61,511.01/ DEP - $100,000.00	G0356
City of Vero Beach	DEP	VB-07	Humiston Park Outfall	Not provided.	Exfiltration Trench	Completed	2010	Not provided	Not provided	40	$577,313	Not provided	COVB/ DEP	COVB - $241,312.77/ DEP - $336,000.00	G0228
City of Vero Beach	N/A	VB-08	Bahia Mar Road Outfall	Not provided.	Baffle Boxes-Second Generation	Completed	2012	23	3	13	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-09	Bay Drive Bridge	Not provided.	Baffle Boxes-Second Generation	Completed	2010	3	0	2	Not provided	Not provided	COVB	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Vero Beach	N/A	VB-10	Indian Bay North and South	Not provided.	Baffle Boxes- Second Generation	Completed	2012	21	3	20	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-11	Live Oak Outfall	Not provided.	Baffle Boxes- Second Generation	Completed	2011	113	14	12	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-12	Indian River Drive E at Conn Way	Not provided.	Baffle Boxes- Second Generation	Completed	2012	71	8	69	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-13	River Drive Bridge	Not provided.	Baffle Boxes- Second Generation	Completed	2010	12	1	61	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-14	Lantana Lane	Not provided.	Pervious Pavement Systems	Canceled	2014	N/A	N/A	38	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-15	Royal Palm Pointe	Not provided.	Baffle Boxes- First Generation	Completed	2001	1	1	Not provided	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-16	Deep Injection Well	Not provided.	Wastewater - Deep Injection Well	Completed	2010	15,158	1,403	Not provided	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-17	Street Sweeping	Street sweeper operating 40 hours per week and sweeping approximately 9,600 miles annually.	Street Sweeping	Ongoing	N/A	683	430	N/A	$253,000	$76,800	COVB	COVB- $253,000.00	N/A
City of Vero Beach	N/A	VB-18	Country Club Drive Outfall	Not provided.	Baffle Boxes- First Generation	Completed	2016	1	0	21	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	N/A	VB-19	Mockingbird Drive / Iris Lane	Not provided.	Baffle Boxes- First Generation	Completed	2016	3	2	69	Not provided	Not provided	COVB	Not provided	N/A
City of Vero Beach	Indian River Lagoon Council	VB-20	Vero Isles Inlet Retrofits	Not provided.	Pervious Pavement Systems	Completed	2017	TBD	TBD	51	$339,868	Not provided	COVB/ IRL Council	COVB - $235,314.77/ IRL Council - $104,553.50	N/A
City of Vero Beach	N/A	VB-23	BMP Maintenance	Not provided.	Catch Basin Inserts/Inlet Filter Cleanout	Ongoing	N/A	190	114	Not provided	Not provided	Not provided	COVB	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDACS	Agricultural Producers	FDACS-02	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	2,163	352	10,576	TBD	TBD	FDACS	TBD	N/A
FDACS	Agricultural Producers	FDACS-07	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	Completed	2020	575	44	TBD	TBD	N/A	FDACS	TBD	N/A
SJRWMD	Lambeth Citrus	SJRWMD-01	Lambeth Citrus Micro Jet Irrigation Replacement	Replace micro-jet system with more efficient one and install soil moisture sensors on 116 acres of citrus.	Agricultural BMPs	Completed	2018	767	168	116	$213,070	N/A	Lambeth Citrus/ SJRWMD	Lambeth Citrus - $53,268 / SJRWMD - $159,803	N/A
FDOT District 4	N/A	FDOT4-01	FM# 228595-1 (Basin 4B)	Widening SR 60 between SR 9 and SR 91.	Wet Detention Pond	Completed	2007	3	2	229	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-02	FM# 228620-1	Resurfacing SR 60 and SR A1A intersection.	100% On-site Retention	Completed	2005	20	3	16	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-04	FDOT4 Street Sweeping	Materials from roadway and gutter sweeping.	Street Sweeping	Ongoing	N/A	90	58	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-05	FM# 228583-5 (Pond 1)	Widening SR 5 from just south of Oslo Road to South Relief Canal.	Wet Detention Pond	Completed	2010	0	0	118	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 4	N/A	FDOT4-06	FM# 228583-5 (Pond 2)	Widening SR 5 from just south of Oslo Road to South Relief Canal.	Wet Detention Pond	Completed	2010	0	0	52	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-07	FM# 228627-1 (Pond 1)	Widening SR 60 between 82nd Ave to 66th Ave.	Wet Detention Pond	Completed	2010	2	3	149	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-08	FM# 228627-1 (Pond 2)	Widening SR 60 between 82nd Ave to 66th Ave.	Wet Detention Pond	Completed	2010	3	2	89	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-09	Education Efforts	Pamphlets and Illicit Discharge Program.	Education Efforts	Ongoing	N/A	36	5	N/A	N/A	N/A	Florida Legislature	N/A	N/A
FDOT District 4	N/A	FDOT4-10	Fertilizer Cessation	No longer applying routine fertilizer.	Fertilizer Cessation	Completed	2014	7,179	1,795	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-18	FM# 228583-3 (State Road 5/US-1)	Widening SR 5 from South Relief Canal to north of 4th Street.	Wet Detention Pond	Completed	2014	0	0	92	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-19	FM#: 230873-1 (27th Avenue Reconstruction)	27th Avenue reconstruction.	100% On-site Retention	Completed	2014	61	9	49	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-20	FM#: 229966-1 (State Road A1A at the Moorings)	Drainage Improvements for SR A1A at the Moorings (from north of Periwinkle Drive to south of Harbour Drive).	Grass swales without swale blocks or raised culverts	Completed	2014	Not provided	Not provided	2	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-21	FM#: 413048-1 (Interstate-95 from St. Lucie/ Indian River County Line to North of State Road 60)	Widening SR 9 from St. Lucie / IRC Line to North of State Rd 60.	100% On-site Retention	Completed	2016	1,298	166	754	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-29	FM# 228583-2 US 1 Widening (Pond 3)	Widening SR 5 from north of SR 713 to south of Oslo Road (Pond 3).	Wet Detention Pond	Completed	2016	46	3	194	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 4	City of Vero Beach	FDOT4-30	FM# 403596-1: SR 60 Resurfacing (20th Street Outfall)	Resurfacing SR 60 from 21st Ave to Mockingbird Drive (20th Street outfall).	Baffle Boxes-Second Generation	Completed	2008	155	24	443	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	City of Vero Beach	FDOT4-31	FM# 403596-1: SR 60 Resurfacing (21st Street Outfall)	Resurfacing SR 60 from 21st Ave to Mockingbird Drive (21st Street outfall).	Baffle Boxes-Second Generation	Completed	2008	28	4	107	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	City of Vero Beach	FDOT4-32	FM# 403596-1: SR 60 Resurfacing (23rd Street Outfall)	Resurfacing SR 60 from 21st Ave to Mockingbird Drive (23rd Street outfall).	Baffle Boxes-Second Generation	Completed	2008	217	34	598	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	City of Vero Beach	FDOT4-33	FM# 403596-1: SR 60 Resurfacing (25th and Royal Palm outfall) - Baffle Boxes # 1 and # 2.	Resurfacing SR 60 from 21st Ave to Mockingbird Drive (25th Street and Royal Palm outfall) - Baffle Boxes #1 and #2.	Baffle Boxes-Second Generation	Completed	2008	80	12	265	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	City of Vero Beach	FDOT4-34	FM# 403596-1: SR 60 Resurfacing (25th and Royal Palm outfall) - Baffle Boxes # 1 and # 2.	Combined with FDOT4-33.	Baffle Boxes-Second Generation	Completed	2008	TBD	TBD	51	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-35	FM# 431152-1	US-1 lateral ditch restoration.	On-line Retention BMPs	Completed	2016	TBD	TBD	TBD	Not provided	Not provided	Florida Legislature	Not provided	N/A
Indian River County	DEP	IRC-03	East Gifford Stormwater Improvements	A stormwater detention pond receiving water from swale systems in a subdivision.	Wet Detention Pond	Completed	2004	129	39	44	$686,136	$2,471	DEP	Not provided	WM836
Indian River County	DEP	IRC-04	PC Main Screening System	Nutrient removal from measured data.	Regional Stormwater Treatment	Completed	2009	1,739	476	22,801	$5,331,908	$63,260	DEP	Not provided	G0182
Indian River County	DEP	IRC-05	Egret Marsh Stormwater Park	Nutrient removal from measured data.	Regional Stormwater Treatment	Completed	2010	13,406	3,005	10,104	$7,563,274	$200,189	DEP	Not provided	G0143

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Indian River County	DEP	IRC-06	PC South (Osprey Marsh) Algal Nutrient Removal Facility	Nutrient removal from measured data.	Regional Stormwater Treatment	Completed	2016	6,091	604	9,782	$10,000,000	$600,000	DEP	Not provided	G0353
Indian River County	N/A	IRC-07	Moorhen Marsh Low Energy Aquatic Plant System	This is a managed aquatic plant system that will remove sediment and suspended solids through settling and filtration by aquatic plant roots. The aquatic plants will be harvested on a regular basis.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Underway	2021	4,889	680	6,301	$8,705,000	$84,000	County/ SJRWMD/Florida Legislature	Not provided	LPA0018
Indian River County	N/A	IRC-08	Education Efforts	Fertilizer ordinance, PSAs, website, pamphlets, Illicit Discharge Program, and signs along Indian River Farms WCD canals.	Education Efforts	Ongoing	N/A	16,158	2,352	N/A	N/A	$52,000	Not provided	Not provided	N/A
Indian River County	N/A	IRC-09	Street Sweeping	Street sweeping.	Street Sweeping	Ongoing	N/A	274	176	N/A	Not provided	$22,050	Not provided	Not provided	N/A
Indian River County	N/A	IRC-10	Storm Drain Cleaning with Vacuum Trucks	Nutrient removal from measured data.	BMP Cleanout	Planned	TBD	TBD	TBD	TBD	TBD	$19,067	TBD	TBD	N/A
Indian River County	N/A	IRC-11	Floating Aquatic Plant Islands in County Stormwater Ponds and Lakes	Nutrient removal from measured data.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Planned	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	N/A
Indian River County	N/A	IRC-12	Spoonbill Marsh Project	Nutrient removal from measured data.	Constructed Wetland Treatment	Completed	2010	5,700	247	359	$4,200,000	$329,143	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Indian River County	N/A	IRC-14	South Relief Canal Mechanical Vegetation/Debris Removal	Removal of aquatic vegetation containing nitrogen and phosphorus that otherwise, would enter IRL and die, releasing nutrients into the lagoon.	Aquatic Vegetation Harvesting	Planned	TBD	TBD	TBD	7,155	$1,000,000	$50,000	County/ Grants	Not provided	N/A
Indian River County	SJRWMD/ DEP/ EPA	IRC-15	Osprey Acres Floway and Nature Preserve	This is a managed aquatic plant system that will remove nutrients using aquatic vegetation that will be harvested on a regular basis.	Floating Islands/ Managed Aquatic Plant Systems (MAPS)	Completed	2019	8,058	1,129	9,784	$7,500,000	$50,000	DEP/ SJRWMD/ Florida Legislature	$3,634,536	NS027
Indian River Farms WCD	N/A	IRF-01	Tilting Weir Gates	Not provided.	Control Structure	Completed	Prior to 2013	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Indian River Farms WCD	N/A	IRF-02	Mechanical Removal of Floating Vegetation	Not provided.	Aquatic Vegetation Harvesting	Ongoing	N/A	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Indian River Farms WCD	N/A	IRF-03	Establishment of 2-Inch Discharge Rule	Establishment of 2-Inch Discharge Rule.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
Indian River Farms WCD	N/A	IRF-04	Public Education and Outreach	Provide public education to residents of the District that fosters an understanding of the necessity to reduce nutrient impacts to surface waters.	Education Efforts	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Indian River Farms WCD	FDACS	IRF-05	Assist FDACS with BMP Enrollment Outreach	Assist FDACS, where needed, with identifying and contacting landowners/ producers within the District boundaries for purposes of participating in the relevant FDACS BMP programs.	Agricultural BMPs	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Town of Indian River Shores	DEP/ Indian River County	IRS-01	Public Education	Implement FYN Program; adopted fertilizer, landscape, and irrigation ordinances; public website; and inspection of illicit discharges.	Education Efforts	Ongoing	N/A	876	132	N/A	$25,000	$5,000	IRL NEP/ Town	Not provided	N/A
Town of Indian River Shores	DEP	IRS-02	Hurricane Evacuation Stormwater Improvements	Stormwater improvements including exfiltration, polyacrylamide (PAM) blocks, dry retention, swales, and stormwater reuse line.	BMP Treatment Train	Underway	2019	TBD	TBD	36	$1,470,000	$25,000	DEP/ Division of Emergency Management (DEM)/ Johns Island Water Management/ City of Palm Bay	DEP - $550,000/ DEM $637,500	NS036
Town of Indian River Shores	DEP/ SJRWMD/ Indian River Lake Conservancy (IRLC)	IRS-03	Dredging of Indian/Seminole Lane Stormwater Drainage Canal	Removal of accumulated muck that will reduce nutrient loading in the drainage canal.	Muck Removal/Restoration Dredging	Planned	2020	TBD	TBD	54	$350,000	$25,000	DEP/ SJRWMD/ Town	TBD	TBD
Town of Indian River Shores	DEP/ SJRWMD/ IRLC	IRS-04	Pebble Bay Estates Inlet Basket Retrofit	Retrofit inlet baskets on four catch basins in Pebble Bay Estates.	Catch Basin Inserts/Inlet Filter Cleanout	Planned	2021	TBD	TBD	31	$150,000	$15,000	DEP/ SJRWMD/ Town	TBD	TBD
Town of Indian River Shores	IRL NEP	IRS-05	Baffle Box	Installation of baffle box to reduce nutrient loading to lagoon.	Baffle Boxes- Second Generation	Completed	2015	TBD	TBD	54	$122,103	$15,000	IRL NEP/ Town	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Town of Indian River Shores	IRL NEP	IRS-06	Oyster Reef	Construct an oyster bar reef waterside of Indian and Seminole Lanes.	Creating/ Enhancing Oyster Reefs	Planned	2020	N/A	N/A	0	$35,000	$2,500	IRL NEP/ Town	Not provided	N/A
Turnpike Enterprise	N/A	T-01	Street Sweeping	Not provided.	Street Sweeping	Ongoing	N/A	31	20	N/A	$124,000	Not provided	Not provided	Not provided	N/A
Turnpike Enterprise	N/A	T-02	Public Education	No fertilizer on rights-of-way, educational signage, and illicit discharge training.	Education Efforts	Underway	Not provided	8	1	N/A	Not provided	Not provided	Not provided	Not provided	N/A

3.4 Project Zone SIRL

Project Zone SIRL covers more than 34,653 acres of the CIRL BMAP area. As shown in **Table 25**, urban land uses makes up the largest portion of the project zone with 40.6 % of the area, followed by agriculture with 29.2 %. Stakeholders in Project Zone SIRL are agricultural producers, City of Fort Pierce, FDOT District 4, Florida Turnpike Enterprise, Fort Pierce Farms WCD, St. Lucie County, and Town of St. Lucie Village. TMDLs have not yet been developed by DEP for the impaired waterbodies in the SIRL, although there are some tributary TMDLs in this area, as outlined in **Section 1.1.1.**

Table 25. Summary of land uses in Project Zone SIRL

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	14,086	40.6
2000	Agricultural	10,130	29.2
3000	Upland Prairie and Shrublands	3,699	10.7
4000	Upland Forested Areas	2,910	8.4
5000	Water	570	1.6
6000	Wetlands	2,500	7.2
7000	Disturbed Lands	110	0.3
8000	Transportation	649	1.9
Total		**34,653**	**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 19** and **Figure 20** show progress towards the required TN and TP load reductions allocated to Project Zone SIRL from projects completed through July 31, 2020.

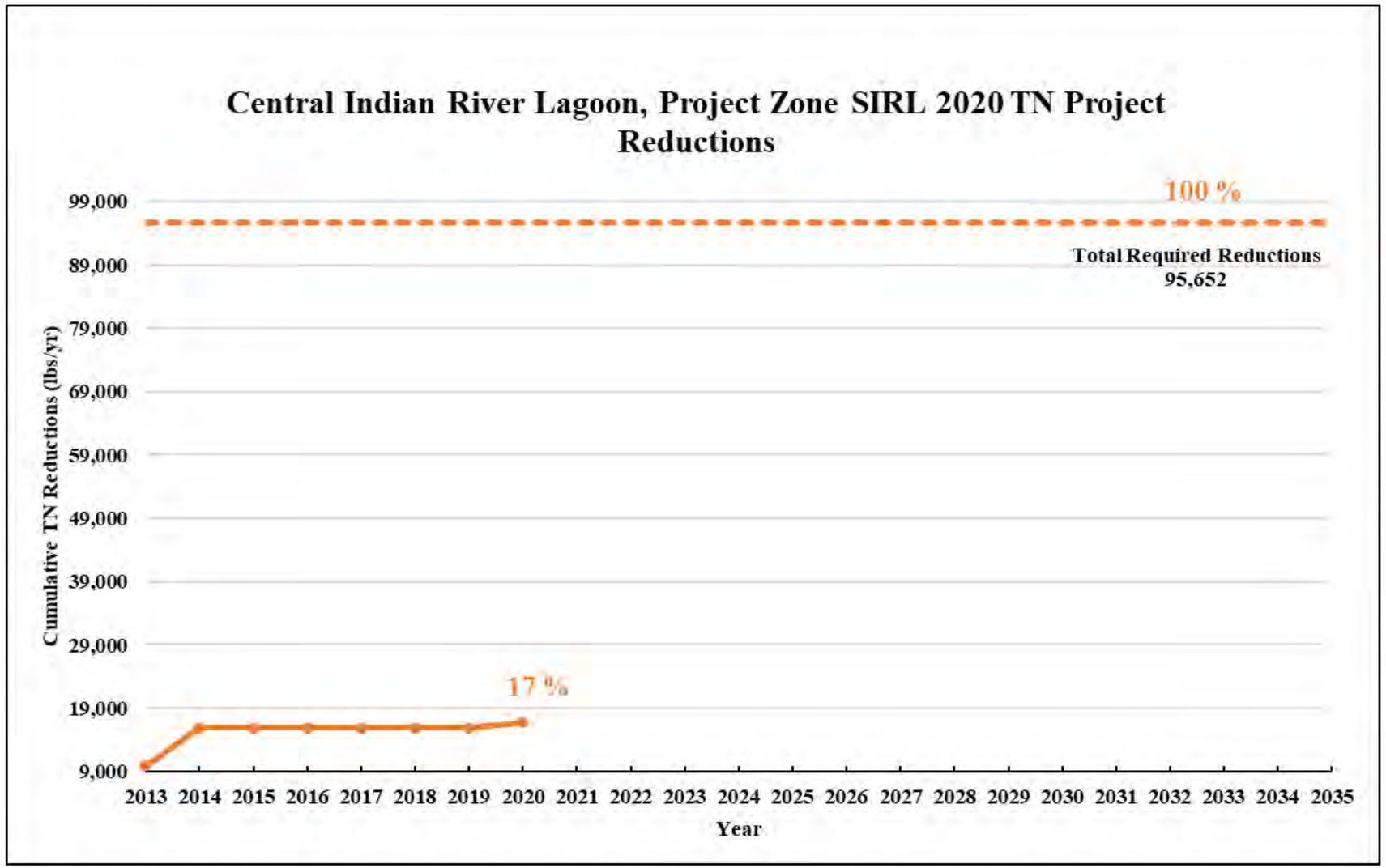

Figure 19. Estimated progress towards meeting the required TN reductions allocated to Project Zone SIRL with projects completed through July 31, 2020

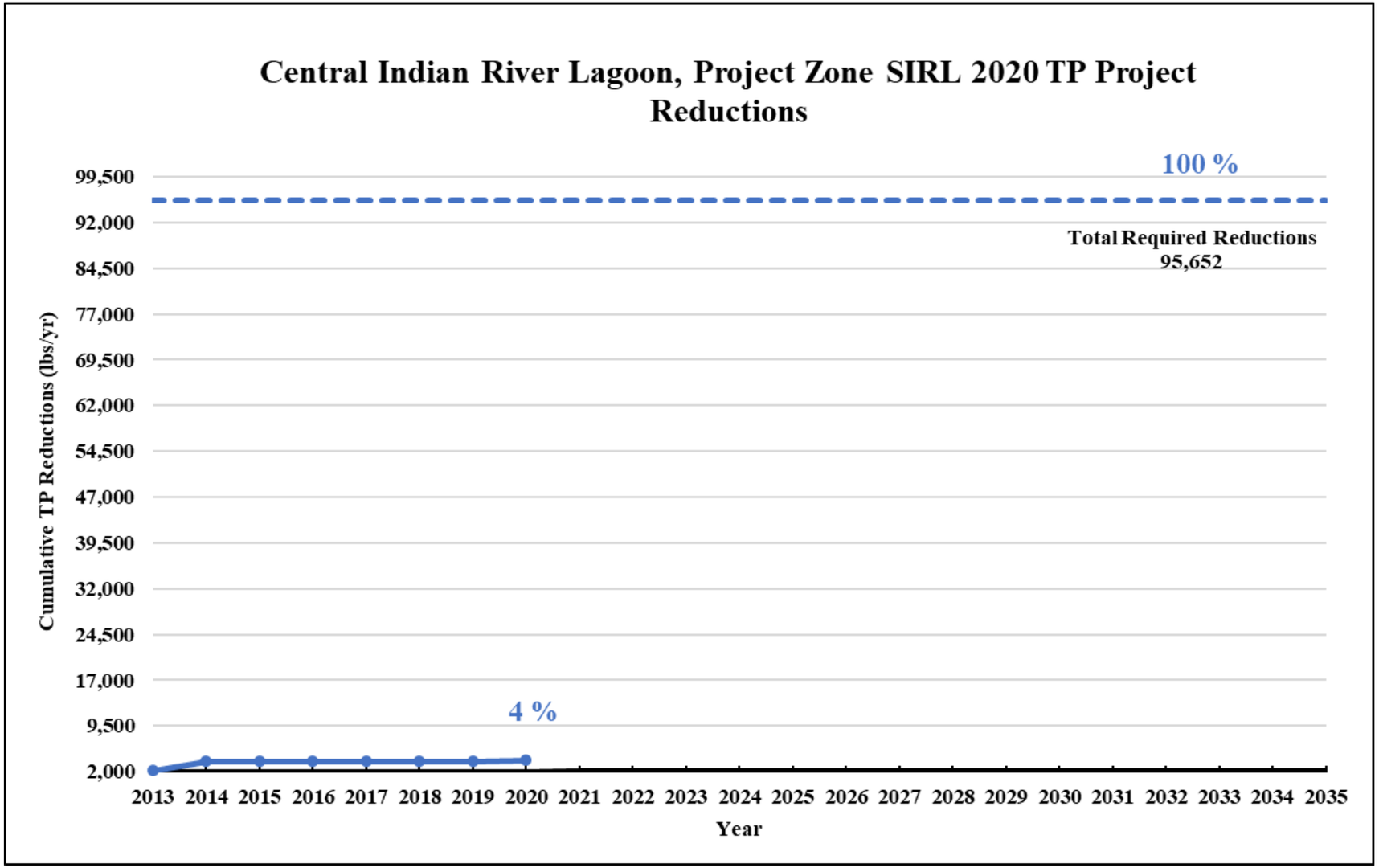

Figure 20. Estimated progress towards meeting the required TP reductions allocated to Project Zone SIRL with projects completed through July 31, 2020

3.4.1. Existing and Planned Projects

Table 26 summarizes the existing and planned projects provided by the stakeholders for Project Zone SIRL.

Table 26. Existing and planned projects in Project Zone SIRL

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Fort Pierce	N/A	FP-05	Street Sweeping	6,599 cubic yards of material.	Street Sweeping	Ongoing	N/A	774	421	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Pierce	N/A	FP-07	Education Efforts	Stormwater education shows, pamphlets, presentations, storm drain stenciling, Illicit Discharge Program, and adopted fertilizer ordinance.	Education Efforts	Ongoing	N/A	93	15	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	1,745	344	2,378	TBD	TBD	FDACS	TBD	N/A
FDACS	Agricultural Producers	FDACS-08	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	Completed	2020	760	120	TBD	TBD	N/A	FDACS	TBD	N/A
FDOT District 4	N/A	FDOT4-04b	FDOT4 Street Sweeping	Materials from roadway and gutter sweeping.	Street Sweeping	Ongoing	N/A	71	46	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-09b	Education Efforts	Pamphlets and Illicit Discharge Program.	Education Efforts	Ongoing	N/A	21	3	N/A	N/A	N/A	Florida Legislature	N/A	N/A
FDOT District 4	N/A	FDOT4-10b	Fertilizer Cessation	No longer applying routine fertilizer.	Fertilizer Cessation	Completed	2014	5,667	1,417	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-11	FM# 230132-1 (system 1)	Widening SR 615 between Avenue Q and Industrial Ave Three and constructing new roadway between Industrial Ave Three to SR 5 (system 1).	Dry Detention Pond	Completed	2001	TBD	TBD	TBD	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 4	N/A	FDOT4-12	FM# 230132-1 (system 2)	Widening SR 615 between Avenue Q and Industrial Ave Three and constructing new roadway between Industrial Ave Three to SR 5 (system 2).	Dry Detention Pond	Completed	2001	0	4	126	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-13	FM# 230132-1 (system 3)	Widening SR 615 between Avenue Q and Industrial Ave Three and constructing new roadway between Industrial Ave Three to SR 5 (system 3).	Dry Detention Pond	Completed	2001	5	1	40	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-14	FM# 230132-1 (system 4)	Widening SR 615 between Avenue Q and Industrial Ave Three and constructing new roadway between Industrial Ave Three to SR 5 (system 4).	Dry Detention Pond	Completed	2001	10	1	78	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-15	FM# 230132-1 (system 5)	Widening SR 615 between Avenue Q and Industrial Ave Three and constructing new roadway between Industrial Ave Three to SR 5 (system 5).	Wet Detention Pond	Completed	2001	24	8	61	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-16	FM# 230132-1 (system 6)	Widening SR 615 between Avenue Q and Industrial Ave Three and constructing new roadway between Industrial Ave Three to SR 5 (system 6).	Wet Detention Pond	Completed	2001	8	3	25	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-17	FM# 230132-1 (system 7)	Widening SR 615 between Avenue Q and Industrial Ave Three and constructing new roadway between Industrial Ave Three to SR 5 (system 7).	100% On-site Retention	Completed	2001	65	8	46	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-24	FM# 230279-1 (Kings Highway)	Constructing surface water management system for SR 713 (King's Highway).	Dry Detention Pond	Completed	2003	1	0	6	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 4	N/A	FDOT4-25	FM# 413046-1	Widening SR 9 from south of SR 70 to south of Indrio Rd.	Grass swales without swale blocks or raised culverts	Completed	2014	226	58	454	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-26	FM# 413047-1	Widening SR 9 from Indrio Rd to Indian River County.	Grass swales without swale blocks or raised culverts	Completed	2013	151	40	285	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-27	FM# 230108-1 (Pond 1)	SR 68 from SR 9 to east of CR-607A: widening and new lane construction (60% credit, remaining 40% to SLE).	Wet Detention Pond	Completed	2013	Not provided	Not provided	5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-28	FM# 230108-1 (Pond 4)	SR 68 from SR 9 to east of CR-607A: widening and new lane construction (60% credit, remaining 40% to SLE).	Wet Detention Pond	Completed	2013	Not provided	Not provided	5	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 4	N/A	FDOT4-36	FM# 230338-4	Indrio Rd. widening - I-95 to SR-607.	BMP Treatment Train	Canceled	2019	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fort Pierce Farms WCD	N/A	FPF-01	Swale Along Canal 1 Top of Bank (SLRIT Grant 2006-07)	Grassed swale constructed along Canal 1 top of bank, immediately upstream of IRL, to collect stormwater runoff and provide some water quality benefit. Project addressed previous area of bank erosion.	Grass swales without swale blocks or raised culverts	Completed	Prior to 2013	Not provided	Not provided	0	Not provided	Not provided	Not provided	Not provided	N/A
Fort Pierce Farms WCD	N/A	FPF-02	Dry Detention Area Along Canal 1 Top of Bank (SLRIT Grants 2006-07 and 2007-08)	Grassed dry detention area and control structure replacement to address stormwater runoff issues and canal bank erosion immediately upstream of the IRL.	Dry Detention Pond	Completed	Prior to 2013	Not provided	Not provided	3	Not provided	Not provided	Not provided	Not provided	N/A
Fort Pierce Farms WCD	N/A	FPF-03	Discharge Criteria Adopted as Part of Fort Pierce Farms WCD Permit Application Criteria	More stringent than standard pre vs. post; allows for approximately 11 % more volume per development to be detained by stormwater system.	Regulations, Ordinances, and Guidelines	Ongoing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Fort Pierce Farms WCD	N/A	FPF-04	Mechanical Removal of Aquatic Vegetation	Perform harvest aquatic vegetation within the canals using mechanical processes to the extent practicable to reduce the need for herbicide treatment.	Aquatic Vegetation Harvesting	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Fort Pierce Farms WCD	N/A	FPF-05	Canal Buffer	Create a canal buffer or filter strip to help reduce loading from stormwater runoff to the canals.	Vegetated Buffers	Underway	TBD	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Fort Pierce Farms WCD	FDACS	FPF-06	Assist FDACS with BMP Enrollment Outreach	Assist FDACS, where needed, with identifying and contacting landowners/ producers within the District boundaries for purposes of participating in the relevant FDACS BMP programs.	Agricultural BMPs	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Fort Pierce Farms WCD	N/A	FPF-07	Public Education and Outreach	Provide public education to residents of the District that fosters an understanding of the necessity to reduce nutrient impacts to surface waters.	Education Efforts	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Fort Pierce Farms WCD	N/A	FPF-08	Control Structure Maintenance	Maintain existing water control structures and any adjustable gates on water control structures.	Control Structure	Underway	TBD	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
North St. Lucie River WCD	N/A	NSLR-01	C-25 Diversion Structure	Replace previous pump structure with gravity flow control structure.	Control Structure	Completed	Prior to 2013	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
North St. Lucie River WCD	N/A	NSLR-02	Invasive Vegetation Removal at Canals 33 and 42	Mechanical removal of invasive vegetation in canals and surrounding banks.	Aquatic Vegetation Harvesting	Completed	Prior to 2013	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
North St. Lucie River WCD	N/A	NSLR-03	Canal Maintenance Program	Ongoing maintenance primarily by mechanical means to keep canals free of exotic and decaying vegetation.	Aquatic Vegetation Harvesting	Ongoing	N/A	N/A	N/A	Not provided	Not provided	$9,400	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
North St. Lucie River WCD	N/A	NSLR-04	Canal Buffer	Create a canal buffer or filter strip to help reduce loading from stormwater runoff to the canals.	Vegetated Buffers	Underway	TBD	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
North St. Lucie River WCD	FDACS	NSLR-05	Assist FDACS with BMP Enrollment Outreach	Assist FDACS, where needed, with identifying and contacting landowners/ producers within the District boundaries for purposes of participating in the relevant FDACS BMP programs.	Agricultural BMPs	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
North St. Lucie River WCD	N/A	NSLR-06	Public Education and Outreach	Provide public education to residents of the District that fosters an understanding of the necessity to reduce nutrient impacts to surface waters.	Education Efforts	Ongoing	N/A	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
North St. Lucie River WCD	N/A	NSLR-07	Control Structure Maintenance	Maintain existing water control structures and any adjustable gates on water control structures.	Control Structure	Underway	TBD	N/A	N/A	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
St. Lucie County	N/A	SLC-01	Education Efforts	FYN; landscaping, irrigation, fertilizer, and pet waste ordinances; PSAs, pamphlets, website, and illicit discharge program.	Education Efforts	Ongoing	N/A	6,241	1,006	N/A	N/A	N/A	N/A	N/A	N/A
St. Lucie County	N/A	SLC-02	Street Sweeping	470 tons/yr collected.	Street Sweeping	Ongoing	N/A	664	299	N/A	Not provided	Not provided	Not provided	Not provided	N/A
St. Lucie County	DEP/ SFWMD/ IRL National Estuary Program (NEP)	SLC-03	Paradise Park Stormwater Improvement	Construction of drainage system providing 75 % treatment of first 1-inch runoff.	Dry Detention Pond	Completed	2014	171	28	168	########	Not provided	DEP/ SFWMD/ IRL NEP	DEP - $225,000/ SFWMD - $304,448/ IRL NEP - $125,000	LP56020
St. Lucie County	N/A	SLC-04	Harmony Heights Stormwater Improvement	Construction of drainage system providing 75 % treatment of first 1-inch runoff.	Dry Detention Pond	Underway	2015	253	44	239	########	TBD	TBD	$511,838	N/A
St. Lucie County	N/A	SLC-05	Taylor Creek Dredging	Three-phase sediment/muck removal project totaling approximately 200,000 cubic yards.	Muck Removal/Restoration Dredging	Completed	2015	Not provided	Not provided	Not provided	$7,500,000	N/A	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)	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
St. Lucie County	N/A	SLC-06	Stan Blum Memorial Boat Launch	Not provided.	Wet Detention Pond	Completed	Prior to 2013	Not provided	Not provided	6	Not provided	N/A	Not provided	Not provided	N/A
St. Lucie County	IRL NEP	SLC-07	San Lucie Plaza Stormwater Master Plan	Construction of drainage system providing 75 % treatment of first 1-inch runoff.	On-line Retention BMPs	Underway	2018	1,210	214	157	########	TBD	TBD	$650,325	N/A
St. Lucie County	N/A	SLC-09	North Hutchinson Island Septic to Sewer Project	538 Homes converted to Central Sewer	Wastewater Service Area Expansion	Underway	Not provided	TBD	TBD	N/A	N/A	N/A	N/A	N/A	N/A
St. Lucie County	N/A	SLC-10	Port of Fort Pierce	Stormwater management system.	Stormwater System Rehabilitation	Completed	2018	N/A	N/A	Not provided	TBD	TBD	Not provided	Not provided	N/A
St. Lucie County	N/A	SLC-11	Swales Material Collected	Roadside swale cleanout and reprofiling.	BMP Cleanout	Underway	TBD	TBD	TBD	N/A	TBD	TBD	TBD	TBD	N/A
St. Lucie County	N/A	SLC-12	St. Lucie County Stormwater Needs Assessment Study	Report that will provide information on identified project opportunities to reduce nutrients, estimated benefits, and costs.	Study	Underway	TBD	N/A	N/A	TBD	$142,380	TBD	TBD	TBD	N/A
St. Lucie Village	N/A	SLV-01	Peninsula Drive	0.75" detention storage for western half of Peninsula Drive where there was no previous treatment.	Wet Detention Pond	Completed	2011	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	Not provided	N/A
St. Lucie Village	N/A	SLV-02	Education Efforts	Credit for fertilizer ordinance.	Education Efforts	Ongoing	N/A	18	3	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, B, and SEB Project Zones. TMDL targets for Steps 1 and 2 were not established for the lagoon in the SIRL project zone, and so it is excluded from this analysis. 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 CIRL, all three project zones were determined to be both Step 1 and Step 2 compliant in 2013. Therefore, stakeholders in the CIRL were not required to make additional

reductions at the time and were not assigned detailed allocations in the first iteration of the BMAP.

Since the 2013 BMAP, further evaluations of the seagrass depth limits in the CIRL have been conducted to reassess whether the CIRL project zones have continued to be compliant. **Table 27** and **Table 28** 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 21** through **Figure 23** show the results of both steps of the 2020 evaluation for Project Zones A, SEB, and B respectively. None of the 3 project zones with TMDLs was compliant. As indicated in the 2013 BMAP, DEP assigns detailed allocations in project zones where compliance is not maintained.

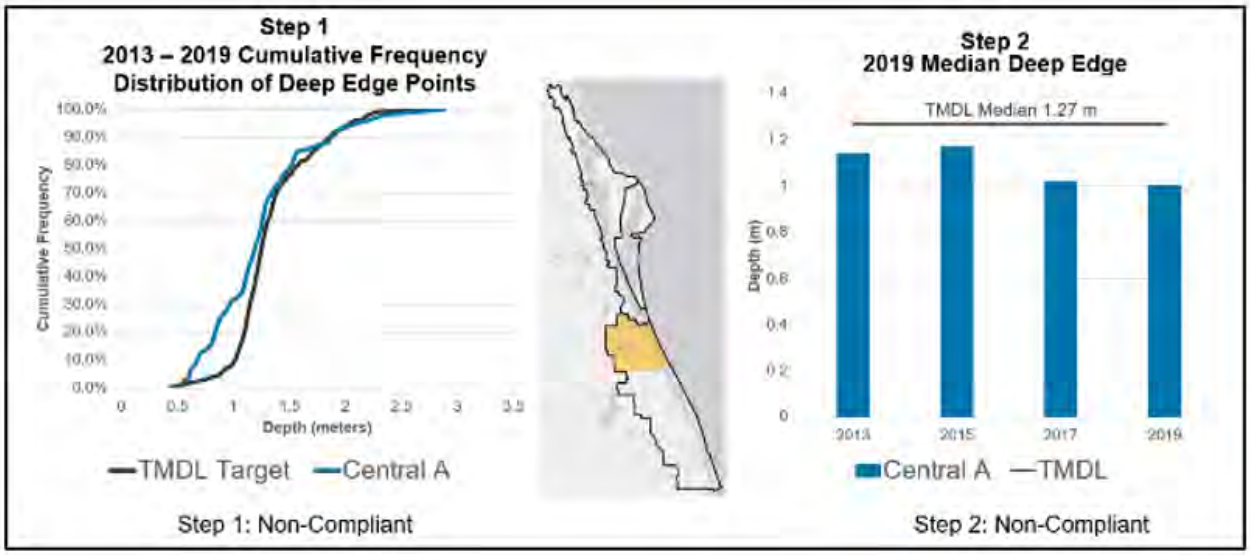

Figure 21. CIRL Project Zone A seagrass evaluation results for Compliance Step 1 and Step 2

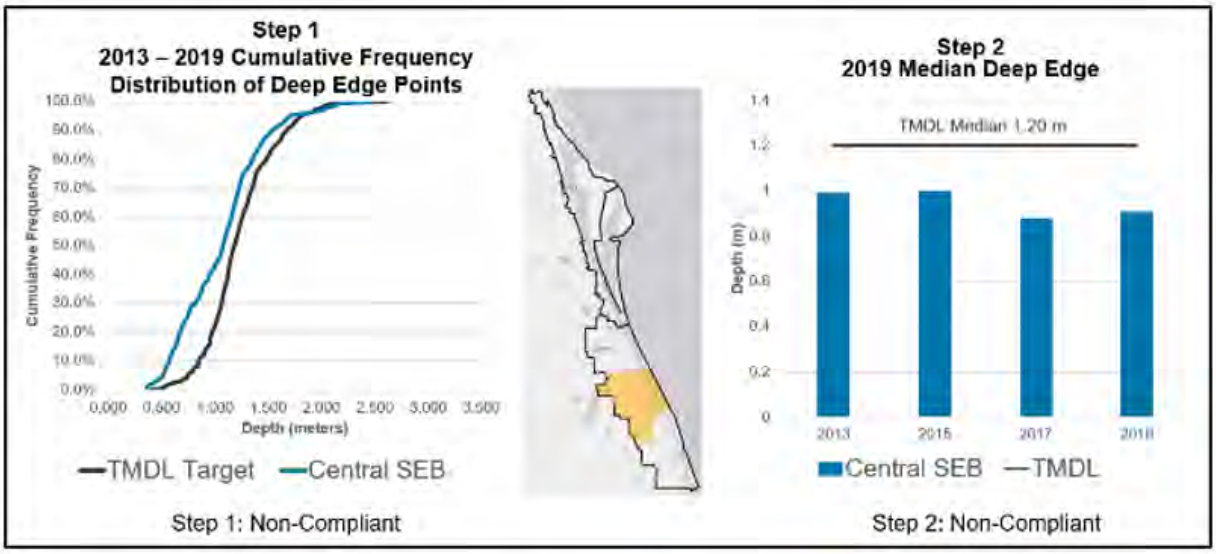

Figure 22. CIRL Project Zone SEB seagrass evaluation results for Compliance Step 1 and Step 2

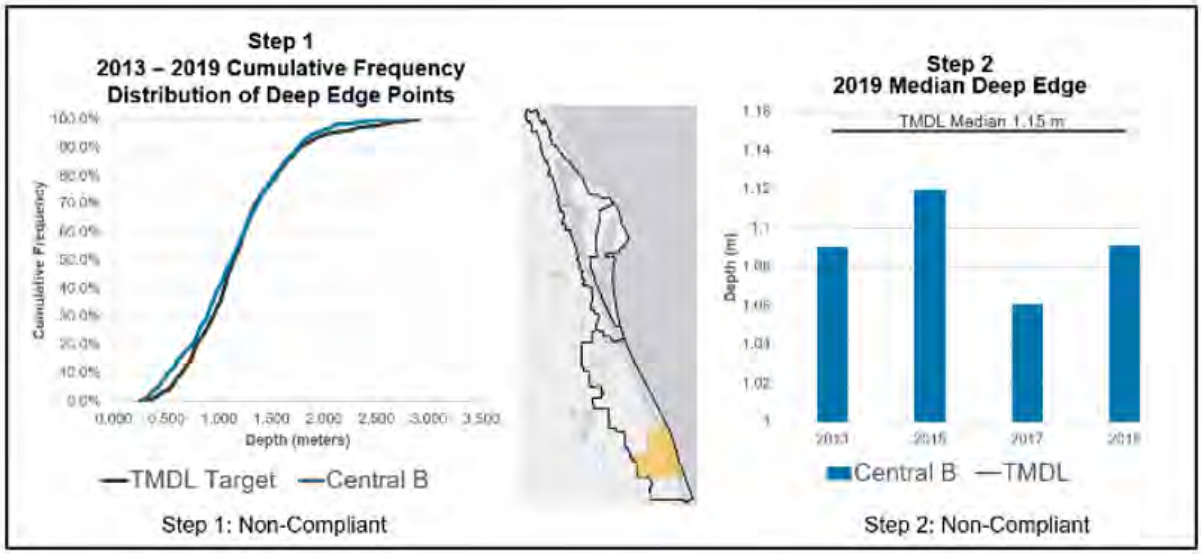

Figure 23. CIRL Project Zone B seagrass evaluation results for Compliance Step 1 and Step 2

Table 27. Seagrass compliance results, Step 1

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

Table 28. 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	CIRL A	CIRL SEB	CIRL B
2007 – 2013	Fail (2 of 4)	Fail (2 of 4)	Fail (2 of 4)
2009 – 2015	Fail (1 of 4)	Fail (1 of 4)	Fail (1 of 4)
2011 – 2017	Fail (0 of 4)	Fail (0 of 4)	Fail (1 of 4)
2013 – 2019	Fail (0 of 4)	Fail (0 of 4)	Fail (0 of 4)

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

Adkins, M., M. Mao, M. Taulor, W. Green, C. Basci, M. Bergman, and D. Smith. 2004. *Watershed model development for the Indian River Lagoon Basin: Providing simulated runoff and pollution load to the Indian River Lagoon Pollution Load Reduction Model.* Technical Memorandum 50. Palatka, FL: St. Johns River Water Management District.

Applied Ecology. October 15, 2015. *Spatial Watershed Iterative Loading (SWIL) Model methodology report, updated for SWIL 3.0.* Page 18. Prepared for Brevard County Natural Resources Department.

Applied Ecology. March 20, 2019. *Final memorandum report for the development of baseload spatial input layers for the Indian River Lagoon Watershed.* Prepared for Brevard County Natural Resources Department.

East Coast Florida Regional Planning Council and Treasure Coast Regional Planning Council. August 2016. *Indian River Lagoon economic valuation update.*

Florida Stormwater Association. 2012. *Methodology for calculating nutrient load reductions using the FSA assessment tool.*

Gao, X. 2009. *Nutrient and dissolved oxygen TMDLs for the Indian River Lagoon and Banana River Lagoon.* TMDL report. Tallahassee, FL: Florida Department of Environmental Protection.

Hazen and Sawyer, P.C. 2008. *Indian River Lagoon economic assessment and analysis update.* Prepared for the Indian River Lagoon National Estuary Program in cooperation with the St. Johns River Water Management District and South Florida Water Management District.

Listopad, C. September 10, 2020. Personal communication with Tiffany Busby, DEP Contractor.

St. Johns River Water Management District. January 2020. *Indian River Lagoon seagrass monitoring standard operating procedures.*

Appendices

Appendix A. BMAP Projects Supporting Information

The project tables in this BMAP (**Table 20**, **Table 22**, **Table 24**, and **Table 26**) 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. Central IRL Allocation Calculations

The first step in the allocation process was to establish the total TN and TP load, by project zone, 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 SWIL Model. Starting loads for Project Zone A were adjusted to account for the impact of the C-1 diversion project, which redirects flow to the St. John's River and away from the IRL. **Table B-1** below lists the TN and TP starting loads from the SWIL Model for each project zone and the associated acres of watershed in that segment.

Table B-1. Central IRL starting loads from model

Project Zone	Area (Acres)	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
A	106,926	616,171	85,081
SEB	131,576	762,595	96,865
B	77,252	567,009	78,837
SIRL	39,672	267,636	39,232

The TMDLs for the IRL (in Rule 62.304.520, F.A.C.) include a percent reduction from the starting load for TN and TP.

Table B-2 describes the TMDL rule percent reduction for each project zone and lists the WBIDs included in each project zone.

Table B-2. Central IRL BMAP TMDL Required Reduction Percentage

WBIDs	Project Zone	% TN Reduction	% TP Reduction
2936A	A	56	48
5003D	SEB	56	48
5003B & 5003C	B	56	48
3190, 3190A, 3163A, & 3163	SIRL	36	58

The second step in the allocation calculations was to apply the TMDL percent reduction (

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

Table B-3. Central IRL load reductions – starting load * TMDL Required Reduction Percentage

Project Zone	TN Reduction (lbs/yr)	TN Allocation (lbs/yr)	TP Reduction (lbs/yr)	TP Allocation (lbs/yr)
A	345,056	271,115	40,839	44,242
SEB	427,053	335,542	46,495	50,370
B	317,525	249,484	37,842	40,995
SIRL	96,349	171,287	22,755	16,477

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 project zone. 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 project zone. The loading for TN and TP was divided by the acres of natural lands, respectively, to derive the natural load per acre and the values were rounded. These natural loads per acre were compared with the allowable loads per acre, as shown in **Table B-5**.

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

lbs/ac/yr = Pounds per acre per year

Project Zone	Natural	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)
A	Natural Lands	39,344	129,927	14,198	3.30	0.36
SEB	Natural Lands	66,299	251,765	25,077	3.80	0.38
B	Natural Lands	19,726	69,618	7,981	3.53	0.40
SIRL	Natural Lands	14,444	54,669	6,083	3.78	0.42

DEP then calculated the allowable load per acre for each project zone. This is the allocation load divided by the acres in the project zone. 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 project zone. If the allowable load per acre is less than the natural load per acre, an adjustment is made. In **Table B-5** below, 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. Central IRL allowable load per acre from total allocation

Project Zone	Allowable TN Load Per Acre	Natural TN Load Per Acre (LPA)	Is Allowable TN LPA Less than Natural TN LPA?	Allowable TP LPA	Natural TP LPA	Is Allowable TP LPA Less than Natural TP LPA?	Result
A	2.54	3.30	True	0.41	0.36	FALSE	Use adjustment for TN but no adjustment for TP
SEB	2.55	3.80	True	0.38	0.38	FALSE	Use adjustment for TN but no adjustment for TP
B	3.23	3.53	True	0.53	0.40	FALSE	Use adjustment for TN but no adjustment for TP
SIRL	4.32	3.78	False	0.42	0.42	TRUE	No adjustment for TN but use adjustment for TP

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 a 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. Central IRL adjusted load reductions

Project Zone	TN Reduction (lbs/yr)	TN Allocation (lbs/yr)	TP Reduction (lbs/yr)	TP Allocation (lbs/yr)
A	263,315	352,856	N/A	N/A
SEB	262,606	499,989	N/A	N/A
B	294,309	272,700	N/A	N/A
SIRL	N/A	N/A	22,570	16,662

After the reductions are calculated for each project zone, the relative starting load in the project zone 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**, natural lands are separated from the starting loads, and so only the anthropogenic loadings are included in the entity loads.

Table B-7. Central IRL Project Zone A entity starting loads from model, natural lands separated

Project Zone	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
A	Natural Lands	272,914	28,068
A	Agricultural Producers	239,638	32,975
A	Brevard County	52,120	7,769
A	City of Fellsmere	10,603	1,544
A	City of Palm Bay	3,087	413
A	City of Sebastian	61,820	8,901
A	FDOT District 4	6,191	741
A	FDOT District 5	3,314	418
A	FWCD	6,122	806
A	Indian River County	87,942	12,696
A	SRID ROW	4,435	561
A	Town of Grant-Valkaria	9,462	1,346
A	Town of Orchid	2,547	367
A	VLWCD	2,401	259
A	**Totals**	**762,595**	**96,865**

Table B-8. Central IRL Project Zone SEB entity starting loads from model, natural lands separated

Project Zone	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
SEB	Natural Lands	272,914	28,068
SEB	Agricultural Producers	239,638	32,975
SEB	Brevard County	52,120	7,769
SEB	City of Fellsmere	10,603	1,544
SEB	City of Palm Bay	3,087	413
SEB	City of Sebastian	61,820	8,901
SEB	FDOT District 4	6,191	741
SEB	FDOT District 5	3,314	418
SEB	FWCD	6,122	806
SEB	Indian River County	87,942	12,696
SEB	SRID ROW	4,435	561
SEB	Town of Grant-Valkaria	9,462	1,346
SEB	Town of Orchid	2,547	367
SEB	VLWCD	2,401	259
SEB	**Totals**	**762,595**	**96,865**

Table B-9. Central IRL Project Zone B entity starting loads from model, natural lands separated

Project Zone	Entity	TN Starting Load (lbs/yr)	TP Starting load (lbs/yr)
B	Natural Lands	99,706	12,113
B	Agricultural Producers	118,698	16,081
B	City of Vero Beach	48,755	7,049
B	FDOT District 4	9,487	1,276
B	FPFWCD	10	1
B	Indian River County	269,295	39,199
B	IRFWCD	3,532	478
B	Town of Indian River Shores	17,525	2,639
B	**Totals**	**567,009**	**78,837**

Table B-10. Central IRL Project Zone SIRL entity starting loads from model, natural lands separated

Project Zone	Entity	TN Starting Load (lbs/yr)	TP Starting Load (lbs/yr)
SIRL	Natural Lands	66,304	7,653
SIRL	Agricultural Producers	65,378	10,057
SIRL	City of Fort Pierce	1,854	305
SIRL	FDOT District 4	7,052	961
SIRL	FL Turnpike	818	100
SIRL	FPFWCD	17,145	2,487
SIRL	SFWMD CP	1,456	257
SIRL	St. Lucie County	104,021	16,773
SIRL	Town of St. Lucie Village	3,608	638
SIRL	**Totals**	**267,636**	**39,232**

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 project zone anthropogenic load was calculated. **Table B-11**, **Table B-12**, **Table B-13**, and **Table B-14** show the percent contribution within the project zone 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 load.

Table B-11. Central IRL Project Zone A entity anthropogenic starting loads from model, natural lands separated

Project Zone	Entity	Anthropogenic TN (lbs/yr)	Anthropogenic TP (lbs/yr)	% Contribution to Anthropogenic TN	% Contribution to Anthropogenic TP
A	Natural Lands	0	0	0.00	0.00
A	Agricultural Producers	53,905	8,285	10.99	11.61
A	Brevard County	37,176	5,588	7.58	7.83
A	City of Melbourne	63,245	9,057	12.89	12.69
A	City of Palm Bay	205,713	29,785	41.94	41.73
A	City of West Melbourne	34,398	5,010	7.01	7.02
A	FDOT District 5	9,744	1,300	1.99	1.82
A	MTWCD	11,959	1,641	2.44	2.30
A	Town Melbourne Beach	5,252	779	1.07	1.09
A	Town of Grant-Valkaria	38,257	5,472	7.80	7.67
A	Town of Indialantic	3,589	531	0.73	0.74
A	Town of Malabar	23,093	3,338	4.71	4.68
A	Town of Melbourne Village	3,194	475	0.65	0.67
A	U.S. Air Force	954	118	0.19	0.16
A	**Totals**	**490,479**	**71,377**	**100.00**	**100.00**

Table B-12. Central IRL Project Zone SEB entity anthropogenic starting loads from model, natural lands separated

Project Zone	Entity	Anthropogenic TN (lbs/yr)	Anthropogenic TP (lbs/yr)	% Contribution to Anthropogenic TN	% Contribution to Anthropogenic TP
SEB	Natural Lands	0	0	0.00	0.00
SEB	Agricultural Producers	239,638	32,975	48.94	47.93
SEB	Brevard County	52,120	7,769	10.64	11.29
SEB	City of Fellsmere	10,603	1,544	2.17	2.24
SEB	City of Palm Bay	3,087	413	0.63	0.60
SEB	City of Sebastian	61,820	8,901	12.62	12.94
SEB	FDOT District 4	6,191	741	1.26	1.08
SEB	FDOT District 5	3,314	418	0.68	0.61
SEB	FWCD	6,122	806	1.25	1.17
SEB	Indian River County	87,942	12,696	17.96	18.45
SEB	SRID ROW	4,435	561	0.91	0.82
SEB	Town of Grant-Valkaria	9,462	1,346	1.93	1.96
SEB	Town of Orchid	2,547	367	0.52	0.53
SEB	VLWCD	2,401	259	0.49	0.38
SEB	**Totals**	**489,681**	**68,797**	**100.00**	**100.00**

Table B-13. Central IRL Project Zone B entity anthropogenic starting loads from model, natural lands separated

Project Zone	Entity	Anthropogenic TN (lbs/yr)	Anthropogenic TP (lbs/yr)	% Contribution to Anthropogenic TN	% Contribution to Anthropogenic TP
B	Natural Lands	0	0	0.00	0.00
B	Agricultural Producers	118,698	16,081	25.40	24.10
B	City of Vero Beach	48,755	7,049	10.43	10.56
B	FDOT District 4	9,487	1,276	2.03	1.91
B	FPFWCD	10	1	0.00	0.00
B	Indian River County	269,295	39,199	57.63	58.75
B	IRFWCD	3,532	478	0.76	0.72
B	Town of Indian River Shores	17,525	2,639	3.75	3.96
B	**Totals**	**467,303**	**66,724**	**100.00**	**100.00**

Table B-14. Central IRL Project Zone SIRL entity anthropogenic starting loads from model, natural lands separated

Project Zone	Entity	Anthropogenic TN (lbs/yr)	Anthropogenic TP (lbs/yr)	% Contribution to Anthropogenic TN	% Contribution to Anthropogenic TP
SIRL	Natural Lands	0	0	0.00	0.00
SIRL	Agricultural Producers	65,378	10,057	32.47	31.85
SIRL	City of Fort Pierce	1,854	305	0.92	0.96
SIRL	FDOT District 4	7,052	961	3.50	3.04
SIRL	FL Turnpike	818	100	0.41	0.32
SIRL	FPFWCD	17,145	2,487	8.52	7.88
SIRL	SFWMD CP	1,456	257	0.72	0.81
SIRL	St. Lucie County	104,021	16,773	51.67	53.12
SIRL	Town of St. Lucie Village	3,608	638	1.79	2.02
SIRL	**Totals**	**201,332**	**31,579**	**100.00**	**100.00**

For the unadjusted project zones (for TN, Project Zone SIRL is unadjusted, and for TP, Project Zone A, Project Zone SEB, and Project Zone B are unadjusted), each entity's reduction was calculated by multiplying the total project zone starting load (**Table B-1**) by the project zone required reduction (**Table B-3**) and by the entity's percent contribution to anthropogenic loading, as defined in **Table B-11**, **Table B-12**, **Table B-13**, and **Table B-14**. The calculations for the entity reductions were performed separately for TN and TP. Then, the entity TN and TP allowable loading (allocations) was then computed by subtracting the entity required reductions in **Table B-15**, **Table B-16**, **Table B-17**, and **Table B-18** from the entity anthropogenic starting loads (**Table B-11**, **Table B-12**, **Table B-13**, and **Table B-14**).

Table B-15. Central IRL Project Zone A entity reduction and allowable loading (allocation)

Project Zone	Entity	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	TN Allocation (lbs/yr)	TP Allocation (lbs/yr)
A	Natural Lands	0	0	125,692	13,704
A	Agricultural Producers	37,922	4,740	15,982	3,545
A	Brevard County	26,154	3,197	11,023	2,391
A	City of Melbourne	44,493	5,182	18,752	3,875
A	City of Palm Bay	144,720	17,041	60,992	12,743
A	City of West Melbourne	24,199	2,866	10,199	2,143
A	FDOT District 5	6,855	744	2,889	556
A	MTWCD	8,413	939	3,546	702
A	Town Melbourne Beach	3,695	446	1,557	333
A	Town of Grant-Valkaria	26,914	3,131	11,343	2,341
A	Town of Indialantic	2,525	304	1,064	227
A	Town of Malabar	16,246	1,910	6,847	1,428
A	Town of Melbourne Village	2,247	272	947	203
A	U.S. Air Force	671	67	283	50
A	**Totals**	**345,056**	**40,839**	**271,115**	**44,242**

Table B-16. Central IRL Project Zone SEB entity reduction and allowable loading (allocation)

Project Zone	Entity	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	TN Allocation (lbs/yr)	TP Allocation (lbs/yr)
SEB	Natural Lands	0	0	272,914	28,068
SEB	Agricultural Producers	208,990	22,286	30,649	10,689
SEB	Brevard County	45,454	5,251	6,666	2,519
SEB	City of Fellsmere	9,247	1,043	1,356	500
SEB	City of Palm Bay	2,692	279	395	134
SEB	City of Sebastian	53,913	6,015	7,906	2,885
SEB	FDOT District 4	5,399	501	792	240
SEB	FDOT District 5	2,890	282	424	135
SEB	FWCD	5,339	545	783	261
SEB	Indian River County	76,694	8,580	11,247	4,116
SEB	SRID ROW	3,868	379	567	182
SEB	Town of Grant-Valkaria	8,252	910	1,210	436
SEB	Town of Orchid	2,221	248	326	119
SEB	VLWCD	2,094	175	307	84
SEB	**Totals**	**427,053**	**46,495**	**335,542**	**50,370**

Table B-17. Central IRL Project Zone B entity reduction and allowable loading (allocation)

Project Zone	Entity	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	TN Allocation (lbs/yr)	TP Allocation (lbs/yr)
B	Natural Lands	0	0	99,706	12,113
B	Agricultural Producers	80,654	9,120	38,045	6,961
B	City of Vero Beach	33,128	3,998	15,627	3,051
B	FDOT District 4	6,446	724	3,041	552
B	FPFWCD	6	1	3	1
B	Indian River County	182,982	22,231	86,313	16,968
B	IRFWCD	2,400	271	1,132	207
B	Town of Indian River Shores	11,908	1,497	5,617	1,142
B	**Totals**	**317,525**	**37,842**	**249,484**	**40,995**

Table B-18. Central IRL Project Zone SIRL entity reduction and allowable loading (allocation)

Project Zone	Entity	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	TN Allocation (lbs/yr)	TP Allocation (lbs/yr)
SIRL	Natural Lands	0	0	66,304	7,653
SIRL	Agricultural Producers	31,287	7,247	34,091	2,810
SIRL	City of Fort Pierce	887	220	967	85
SIRL	FDOT District 4	3,375	692	3,677	268
SIRL	FL Turnpike	391	72	426	28
SIRL	FPFWCD	8,205	1,792	8,940	695
SIRL	SFWMD CP	697	185	759	72
SIRL	St. Lucie County	49,780	12,086	54,241	4,687
SIRL	Town of St. Lucie Village	1,727	460	1,881	178
SIRL	**Totals**	**96,349**	**22,755**	**171,287**	**16,477**

For some project zone calculations (for TN, Project Zones A, SEB, and B, and for TP, Project Zone SIRL), the entity reductions and allowable loads were calculated differently to incorporate the natural load per acre adjustment. Here, the project zone allocation was calculated by multiplying the acres in the project zone (**Table B-4**) by the project zone natural load per acre (**Table B-4**). Next, the entity allocation was computed by multiplying the adjusted project zone allocation (**Table B-6**) by the entity percent contribution to anthropogenic loading (**Table B-11**, **Table B-12**, **Table B-13**, 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 shown in **Table B-19**, **Table B-20**, **Table B-21**, and **Table B-22**.

Table B-19. Central IRL Project Zone A entity TN reduction and allowable TN loading at natural load per acre adjustment (allocation)

Project Zone	Entity	Adjusted TN Reduction (lbs/yr)	Adjusted TN Allocation (lbs/yr)
A	Natural Lands	0	125,692
A	Agricultural Producers	28,912	24,993
A	Brevard County	19,940	17,237
A	City of Melbourne	33,921	29,324
A	City of Palm Bay	110,334	95,379
A	City of West Melbourne	18,449	15,949
A	FDOT District 5	5,226	4,518
A	MTWCD	6,414	5,545
A	Town Melbourne Beach	2,817	2,435
A	Town of Grant-Valkaria	20,519	17,738
A	Town of Indialantic	1,925	1,664
A	Town of Malabar	12,386	10,707
A	Town of Melbourne Village	1,713	1,481
A	U.S. Air Force	512	442
A	**Totals**	**263,067**	**353,104**

Table B-20. Central IRL Project Zone SEB entity TN reduction and allowable TN loading at natural load per acre adjustment (allocation)

Project Zone	Entity	Adjusted TN Reduction (lbs/yr)	Adjusted TN Allocation (lbs/yr)
SEB	Natural Lands	0	272,914
SEB	Agricultural Producers	128,681	110,957
SEB	Brevard County	27,987	24,133
SEB	City of Fellsmere	5,694	4,910
SEB	City of Palm Bay	1,657	1,429
SEB	City of Sebastian	33,196	28,624
SEB	FDOT District 4	3,325	2,867
SEB	FDOT District 5	1,780	1,535
SEB	FWCD	3,287	2,834
SEB	Indian River County	47,223	40,719
SEB	SRID ROW	2,381	2,053
SEB	Town of Grant-Valkaria	5,081	4,381
SEB	Town of Orchid	1,368	1,179
SEB	VLWCD	1,289	1,112
SEB	**Totals**	**262,949**	**499,646**

Table B-21. Central IRL Project Zone B entity TN reduction and allowable TN loading at natural load per acre adjustment (allocation)

Project Zone	Entity	Adjusted TN Reduction (lbs/yr)	Adjusted TN Allocation (lbs/yr)
B	Natural Lands	0	99,706
B	Agricultural Producers	74,773	43,926
B	City of Vero Beach	30,713	18,042
B	FDOT District 4	5,976	3,511
B	FPFWCD	6	4
B	Indian River County	169,639	99,656
B	IRFWCD	2,225	1,307
B	Town of Indian River Shores	11,040	6,485
B	**Totals**	**294,372**	**272,637**

Table B-22. Central IRL Project Zone SIRL entity TN reduction and allowable TN loading at natural load per acre adjustment (allocation)

Project Zone	Entity	Adjusted TP Reduction (lbs/yr)	Adjusted TP Allocation (lbs/yr)
SIRL	Natural Lands	0	7,653
SIRL	Agricultural Producers	7,173	2,884
SIRL	City of Fort Pierce	217	87
SIRL	FDOT District 4	685	275
SIRL	FL Turnpike	72	29
SIRL	FPFWCD	1,774	713
SIRL	SFWMD CP	184	74
SIRL	St. Lucie County	11,964	4,809
SIRL	Town of St. Lucie Village	455	183
SIRL	**Totals**	**22,524**	**16,708**

As described above, the entity calculations were performed by project zone. Once these were complete, the information was summarized by entity. In **Table B-23**, the starting loads for each entity are totaled across all the project zones in which they have a land area. Also listed are their relative percentages of anthropogenic load for TN and TP, respectively, in the BMAP area.

Seven 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 B-23. Central IRL BMAP entity starting load and percent contribution from anthropogenic loads

*Indicates the stakeholder meets 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	477,619	28.99	67,398	28.29
Brevard County	89,296	5.42	13,357	5.61
City of Fellsmere	10,603	0.64	1,544	0.65
City of Melbourne	63,245	3.84	9,057	3.80
City of Palm Bay	208,799	12.67	30,198	12.68
City of Sebastian	61,820	3.75	8,901	3.74
City of Vero Beach	48,755	2.96	7,049	2.96
City of West Melbourne	34,398	2.09	5,010	2.10
FDOT District 4	22,731	1.38	2,978	1.25
FDOT District 5	13,058	0.79	1,718	0.72
St. Lucie County	104,021	6.31	16,773	7.04
Indian River County	357,237	21.69	51,895	21.78
Town Melbourne Beach	5,252	0.32	779	0.33
Town of Grant-Valkaria	47,719	2.90	6,818	2.86
Town of Indian River Shores	17,525	1.06	2,639	1.11
Town of Malabar	23,093	1.40	3,338	1.40
City of Fort Pierce*	1,854	0.11	305	0.13
FL Turnpike*	818	0.05	100	0.04
Town of Indialantic*	3,589	0.22	531	0.22
Town of Melbourne Village*	3,194	0.19	475	0.20
Town of Orchid*	2,547	0.15	367	0.15
Town of St. Lucie Village*	3,608	0.22	638	0.27
U.S. Air Force*	954	0.06	118	0.05
SRID	4,435	0.27	561	0.24
IRFWCD	3,532	0.21	478	0.20
VLWCD	2,401	0.15	259	0.11
FWCD	6,122	0.37	806	0.34
FPFWCD	17,154	1.04	2,489	1.04
MTWCD	11,959	0.73	1,641	0.69
Totals	**1,647,339**	**100.00**	**238,219**	**100.00**

Table B-24 and **Table B-25** break down the TN and TP reductions for each entity by project zone and in total for the BMAP area.

Table B-24. Central IRL entity TN reductions by project zone

*Indicates the stakeholder meets the requirements for low priority.
WCDs receive qualitative allocations in this BMAP as described in **Appendix E; reductions shown have been calculated in the event of unsatisfactory implementation of qualitative allocation.
† = Adjusted using the natural load per acre.

Entity	A	SEB	B	SIRL	Total
Agricultural Producers	28,912	128,681	74,773	31,287	263,653
Brevard County	19,940	27,987	0	0	47,927
City of Fellsmere	0	5,694	0	0	5,694
City of Vero Beach	0	0	30,713	0	30,713
FDOT District 4	0	3,325	5,976	3,375	12,676
St. Lucie County	0	0	0	49,780	49,780
City of Melbourne	33,921	0	0	0	33,921
City of Palm Bay	110,334	1,657	0	0	111,991
City of Sebastian	0	33,196	0	0	33,196
City of West Melbourne	18,449	0	0	0	18,449
FDOT District 5	5,226	1,780	0	0	7,006
Indian River County	0	47,223	169,639	0	216,862
Town Melbourne Beach	2,817	0	0	0	2,817
Town of Grant-Valkaria	20,519	5,081	0	0	25,600
Town of Indian River Shores	0	0	11,040	0	11,040
Town of Malabar	12,386	0	0	0	12,386
City of Fort Pierce*	0	0	0	887	0
FL Turnpike*	0	0	0	391	0
Town of Indialantic*	1,925	0	0	0	0
Town of Melbourne Village*	1,713	0	0	0	0
Town of Orchid*	0	1,368	0	0	0
Town of St. Lucie Village*	0	0	0	1,727	0
U.S. Air Force*	512	0	0	0	0
SRID	0	2,381**	0	0	0
FWCD	0	3,287**	0	0	0
VLWCD	0	1,289**	0	0	0
MTWCD	6,414**	0	0	0	0
IRFWCD	0	0	2,225**	0	0
FPFWCD	0	0	6	8,205**	0
Totals	**263,067†**	**262,949†**	**294,372†**	**95,652**	**883,711**

Table B-25. Central IRL entity TP reductions by project zone

*Indicates the stakeholder meets the requirements for low priority.
**WCDs receive qualitative allocations in this BMAP as described in Appendix E; reductions shown have been calculated in the event of unsatisfactory implementation of qualitative allocation.
† = Adjusted using the natural load per acre.

Entity	A	SEB	B	SIRL	Total
Agricultural Producers	4,740	22,286	9,120	7,173	43,319
Brevard County	3,197	5,251	0	0	8,448
City of Fellsmere	0	1,043	0	0	1,043
City of Melbourne	5,182	0	0	0	5,182
City of Palm Bay	17,041	279	0	0	17,320
City of Sebastian	0	6,015	0	0	6,015
City of Vero Beach	0	0	3,998	0	3,998
City of West Melbourne	2,866	0	0	0	2,866
FDOT District 4	0	501	724	685	1,910
FDOT District 5	744	282	0	0	1,026
St. Lucie County	0	0	0	11,964	11,964
Indian River County	0	8,580	22,231	0	30,811
Town of Grant-Valkaria	3,131	910	0	0	4,041
Town of Malabar	1,910	0	0	0	1,910
Town Melbourne Beach	446	0	0	0	446
Town of St. Lucie Village*	0	0	0	455	0
City of Fort Pierce*	0	0	0	217	0
FL Turnpike*	0	0	0	72	0
Town of Indian River Shores*	0	0	1,497	0	0
U.S. Air Force*	67	0	0	0	0
Town of Indialantic*	304	0	0	0	0
Town of Melbourne Village*	272	0	0	0	0
Town of Orchid*	0	248	0	0	0
FWCD	0	545**	0	0	0
SRID	0	379**	0	0	0
IRFWCD	0	0	271**	0	0
FPFWCD	0	0	1	1,774**	0
VLWCD	0	175**	0	0	0
MTWCD	939**	0	0	0	0
Totals	**40,839**	**46,495**	**37,842**	**22,341†**	**140,299**

Appendix C. Agricultural Enrollment and Reductions

(Language in this appendix was provided by FDACS.)

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

FDACS Role in BMP Implementation and Follow-up

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

To enroll in the FDACS BMP Program, landowners must meet with an OAWP representative to determine the BMPs that are applicable to their operation. The landowner must submit an NOI to an OAWP representative 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 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 corrective and 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, SJRWMD, and

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

SFWMD activities. If a reevaluation of the BMPs is needed, FDACS will also include SJRWMD, SFWMD, and other partners in the process pursuant to Subsection 403.067(7), F.S.

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 this can lead to the incorrect 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, and 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 CIRL BMAP area.

Table C-2 lists the agricultural acreage enrolled in the CIRL BMAP area by project zone. **Table C-3** through **Table C-7** list 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 CIRL BMAP area; however, compliance with Section 403.067, F.S., is based on the NOIs and site visits described in **Section 1.2.1.1**.

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

Category	Acres
FSAID VII agricultural acres in the BMAP area	72,898
Total agricultural acres enrolled	18,277
% of FSAID VII agricultural acres enrolled	25

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

Project Zone	Total Agricultural Acres	Agricultural Acres Enrolled	% of Agricultural Acreage Enrolled
A	9,781	355	4
B	16,061	2,418	15
SEB	33,776	12,737	38
SIRL	13,280	2,767	21
Total	**72,898**	**18,277**	**25**

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

Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	4,803
Cow/Calf	10,488
Equine	22
Multiple Commodities	160
Nursery	130
Row/Field Crop	2,675
Total	**18,277**

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

Related OAWP BMP Programs	Agricultural Acres Enrolled
Cow/Calf	348
Nursery	7
Total	**355**

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

Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	1,313
Cow/Calf	978
Multiple Commodities	64
Nursery	11
Row/Field Crops	53
Total	**2,418**

Table C-6. Agricultural land use acreage enrolled in the BMP Program in Project Zone SEB

Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	2,087
Cow/Calf	7,977
Equine	22
Multiple Commodities	18
Nursery	11
Row/Field Crops	2,622
Total	**12,737**

Table C-7. Agricultural land use acreage enrolled in the BMP Program in Project Zone SIRL

Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	1,403
Cow/Calf	1,185
Multiple Commodities	78
Nursery	101
Total	**2,767**

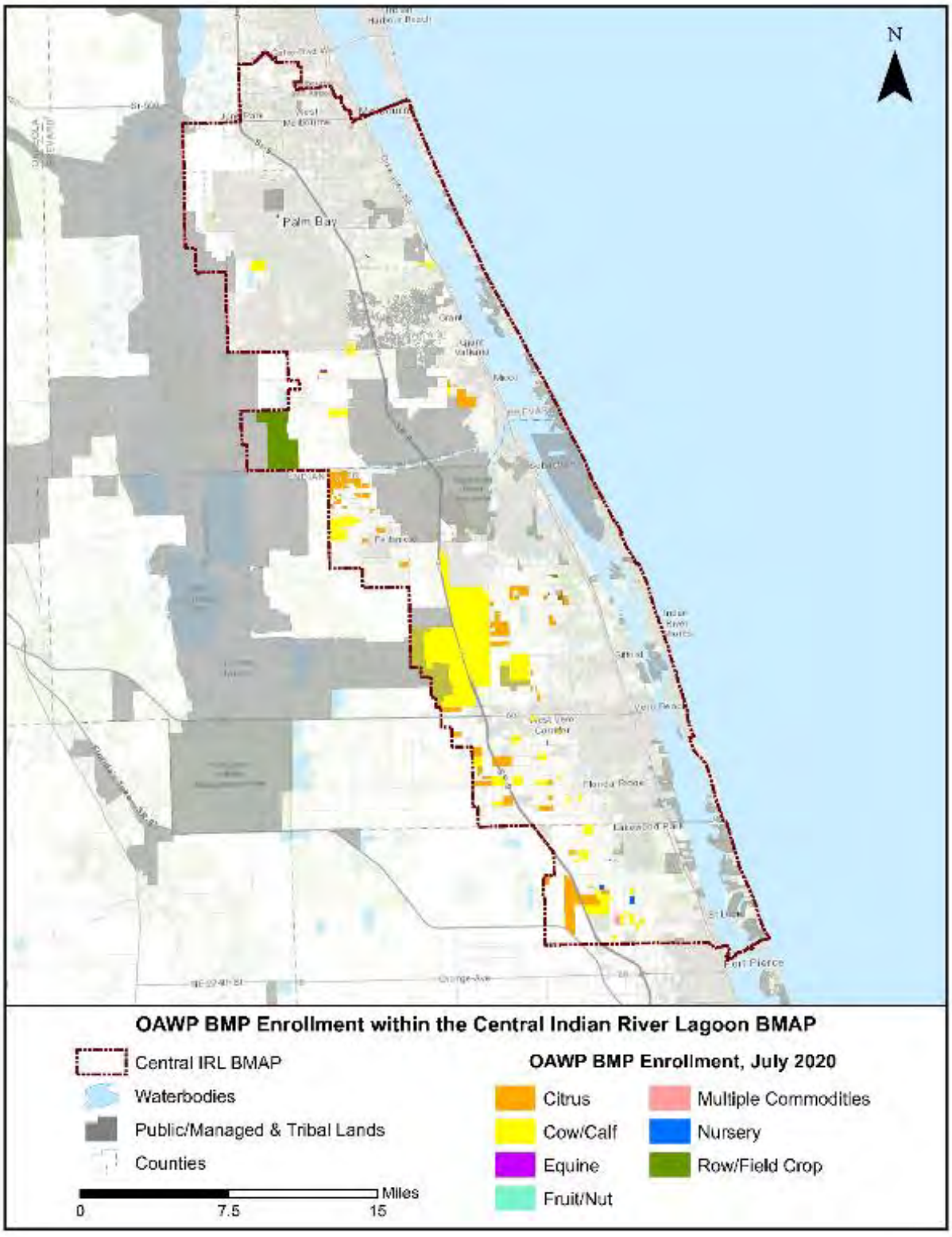

Figure C-1. BMP enrollment in the CIRL BMAP area as of July 2020

Unenrolled Agricultural Acreage

As of July 2020, 25 % of the agricultural acres in the CIRL 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 CIRL 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 other requirements 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 used to consistently improve 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 in agriculture, to allow BMPs to be tied to the specific parcels where agricultural activities are occurring. FSAID agricultural lands are delineated based on land use features identified as agriculture and represent a more refined analysis of those areas actually in agricultural production.

Because of differences in the spatial geometries between the OAWP BMP enrollment, FSAID, and property appraiser parcels, when they are combined or compared, the boundaries often do not align precisely, creating "slivers." Slivers are not enrollable because they are an artifact of the geospatial analysis and do not represent lands with active agricultural practices. For example, a sliver can represent the area between the boundary of a parcel and the beginning of a road, canal, easement, etc. A sliver can also represent a small portion of an FSAID feature outside the BMP enrollment areas that is slightly overlapped by a property appraiser parcel. Slivers are often associated with previously enrolled agricultural operations but because of the delineation differences, these slivers are not captured within the enrolled parcel during geoprocessing. When characterizing unenrolled agricultural lands, slivers are excluded. **Figure C-2** shows an example of a sliver created when performing geospatial analysis.

Figure C-2. GIS example of a sliver

Large areas that are identified as agricultural land use but are unlikely to have enrollable agricultural activities include lands owned by the state (Board of Trustees of the Internal Improvement Trust Fund) and water management districts (SJRWMD or SFWMD). 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, SJRWMD, and SFWMD 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 34 % of the total unenrolled agricultural acres in the CIRL 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 44,847 acres of land identified as having potential agricultural activity, grazing land comprises 48 % of this acreage.

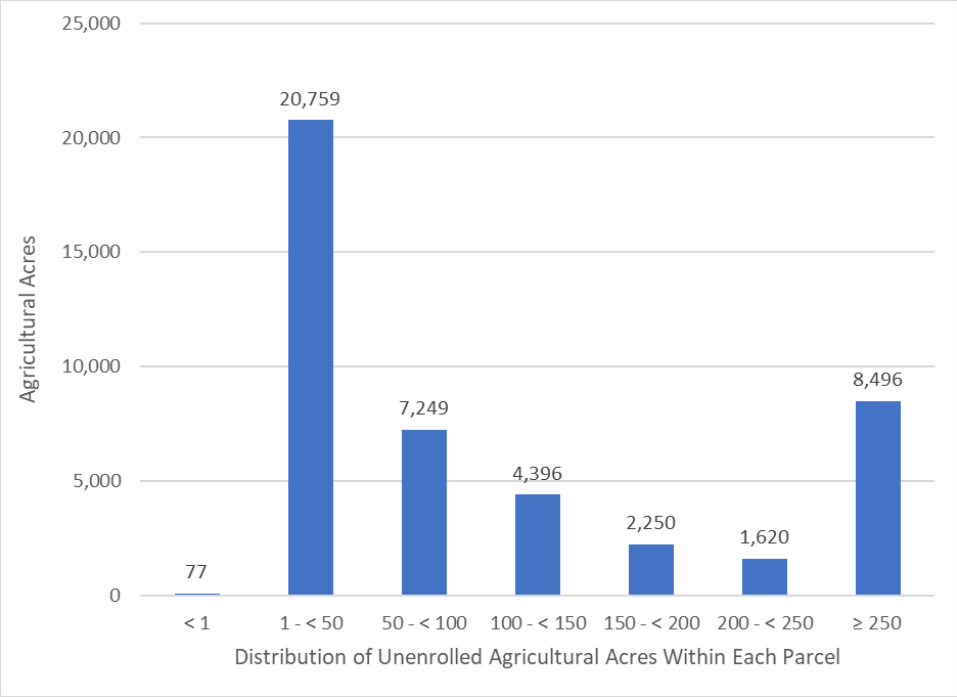

Figure C-3. Distribution of agricultural acreage on parcels with potential agricultural activity in the CIRL BMAP area

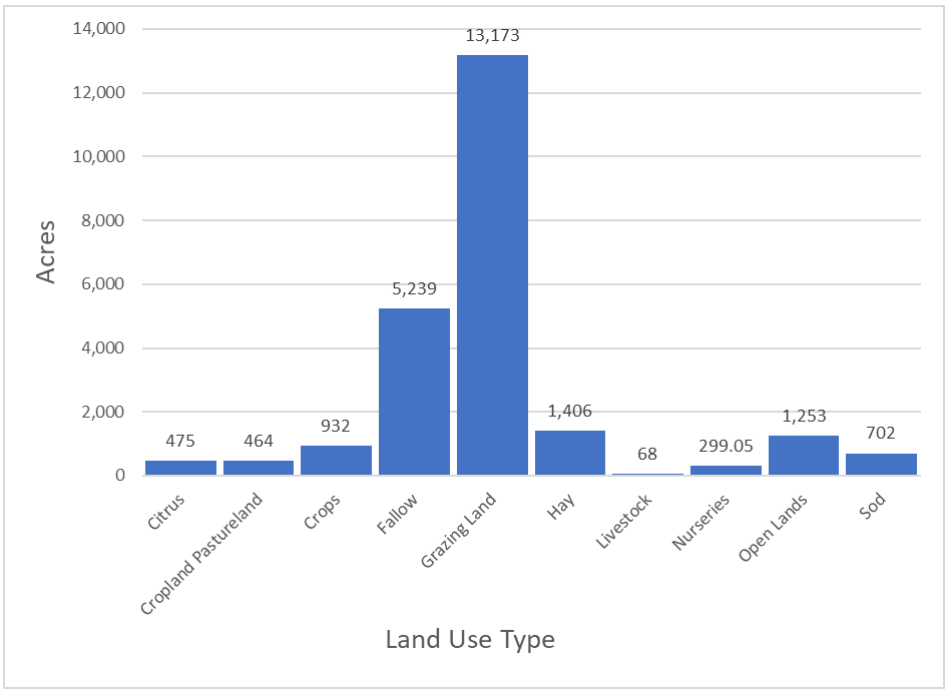

Figure C-4. Agricultural land uses on parcels with 50 acres of agriculture and greater in the CIRL BMAP area

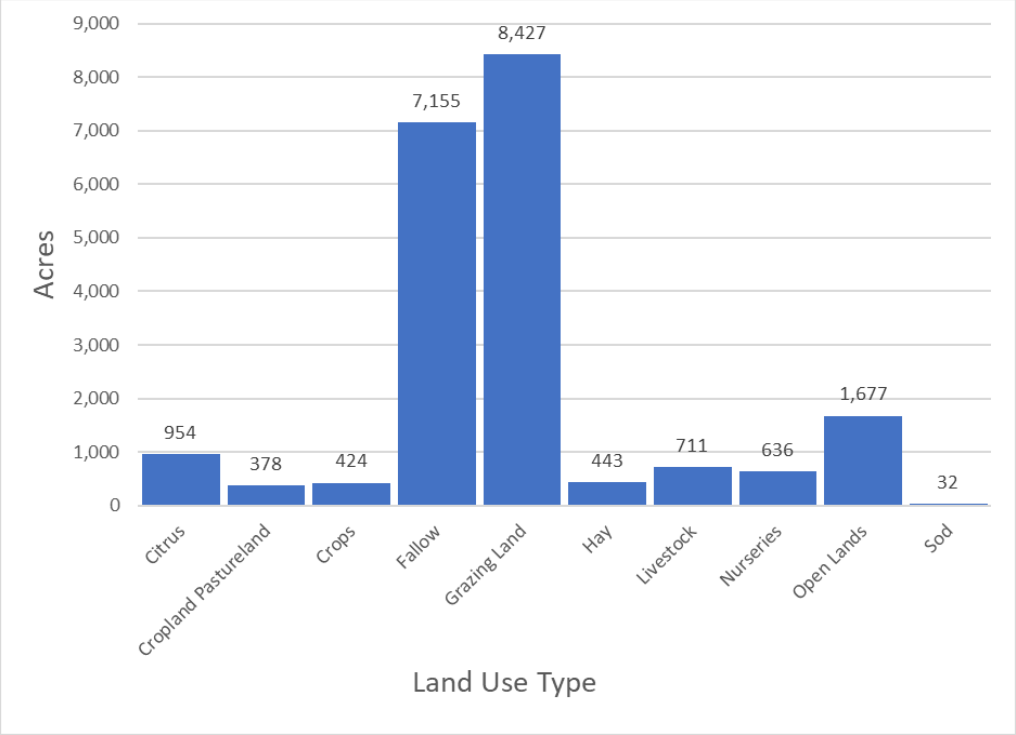

Figure C-5. Agricultural land uses on parcels with less than 50 acres of agriculture in the CIRL BMAP area

Table C-8 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 CIRL 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-8. Summary of unenrolled agricultural land use acreage in the CIRL 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 B-1**.

Category	Acres
Unenrolled agricultural acres	54,625
Acres identified within slivers of unenrolled agricultural areas	443
Lands without enrollable agricultural activity (e.g., tribal lands, residential development, and parcels with DOR use codes 70-98)	9,335
Total lands with potentially enrollable agricultural activities	**44,847**

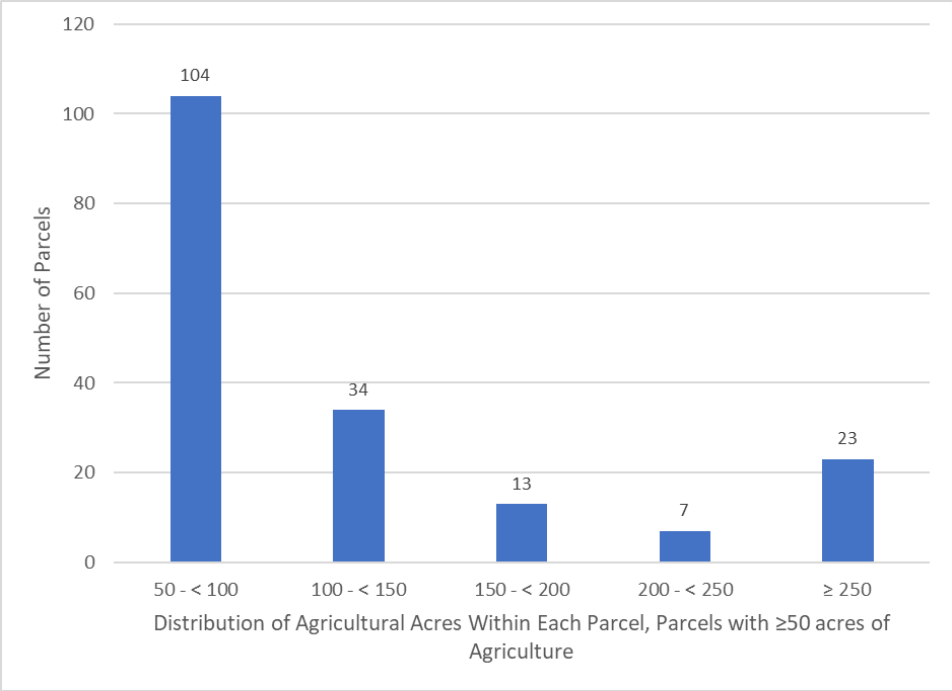

Figure C-6. Number of parcels with 50 acres of agriculture and greater in the CIRL BMAP area

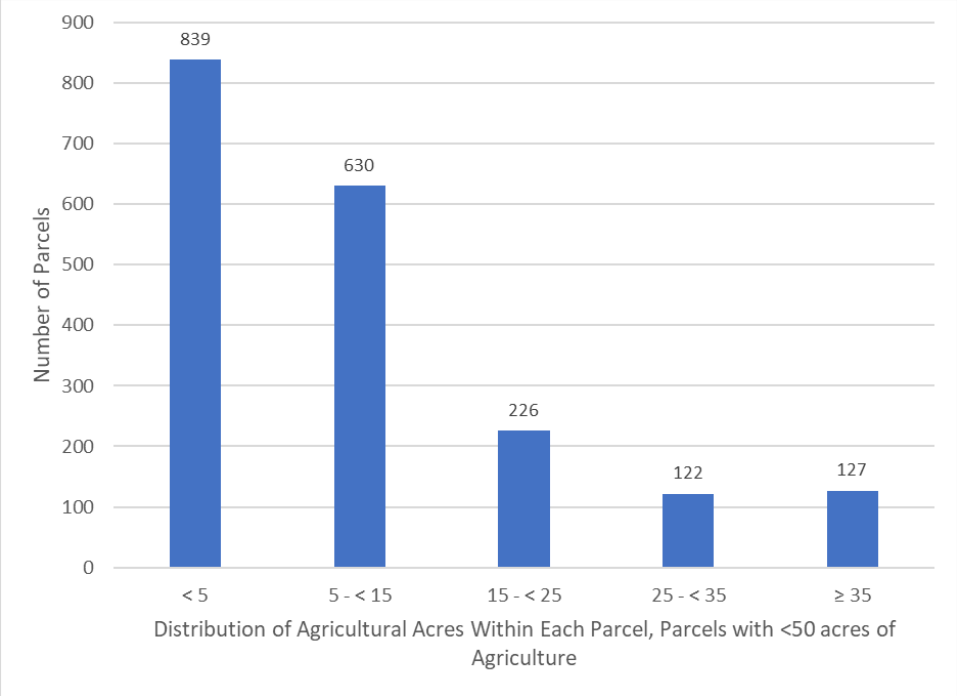

Figure C-7. Number of parcels with less than 50 acres of agriculture in the CIRL BMAP area

Unenrolled agriculture characterization information for each individual project zone, including the distribution of agricultural acres within each parcel and land use type, is shown in **Figure C-8** through **Figure C-15**.

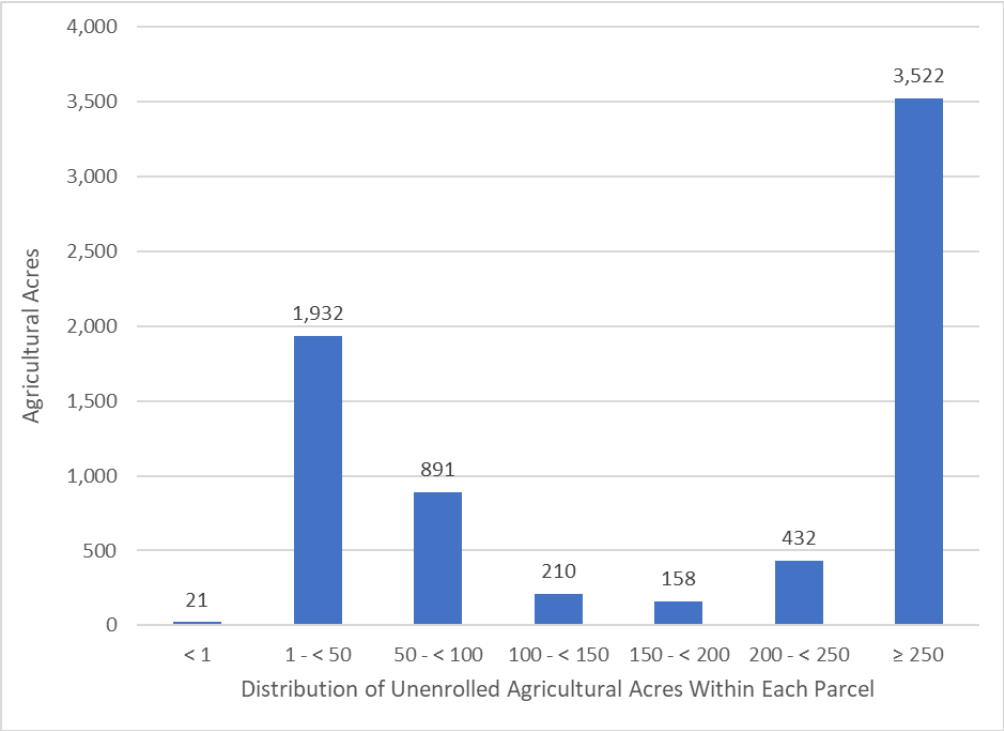

Figure C-8. Distribution of agricultural acreage on parcels with potential agricultural activity, Project Zone A

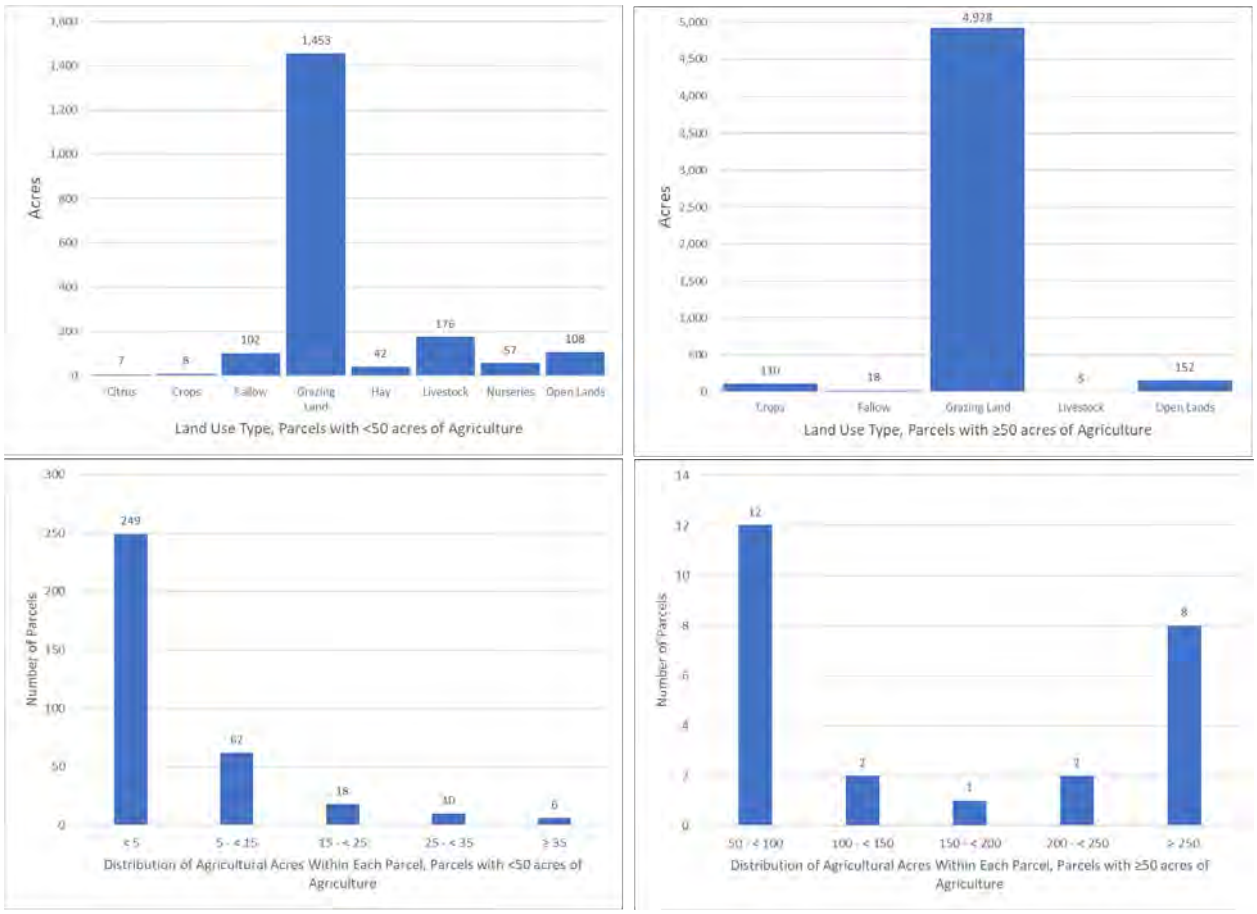

Figure C-9. Land use type and distribution of agricultural acreage, Project Zone A

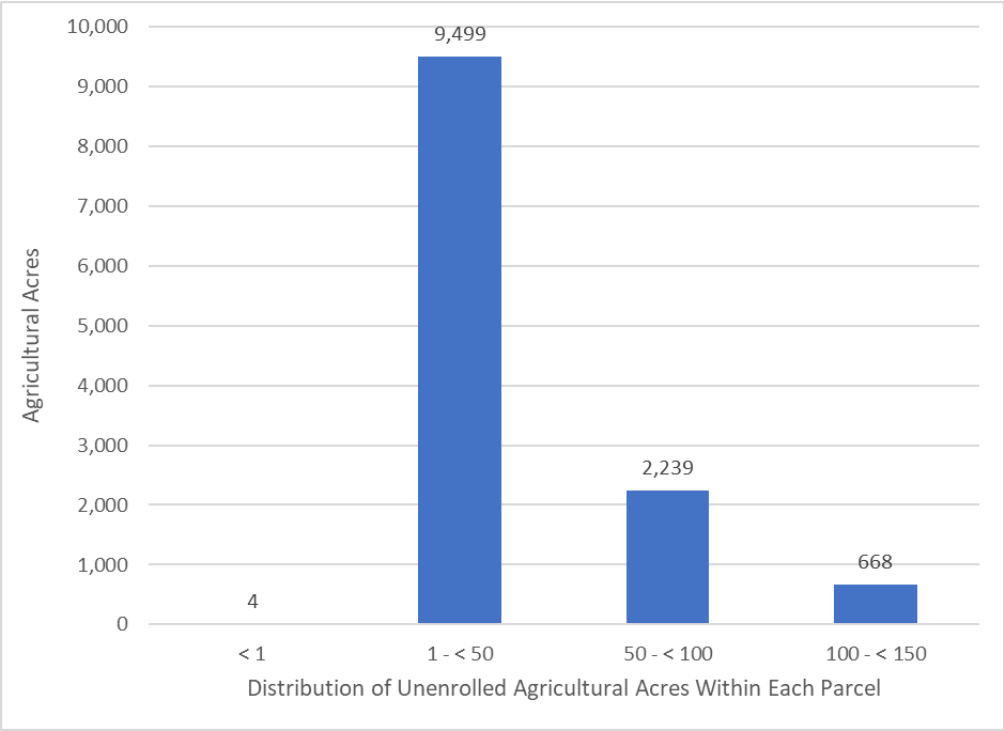

Figure C-10. Distribution of agricultural acreage on parcels with potential agricultural activity, Project Zone B

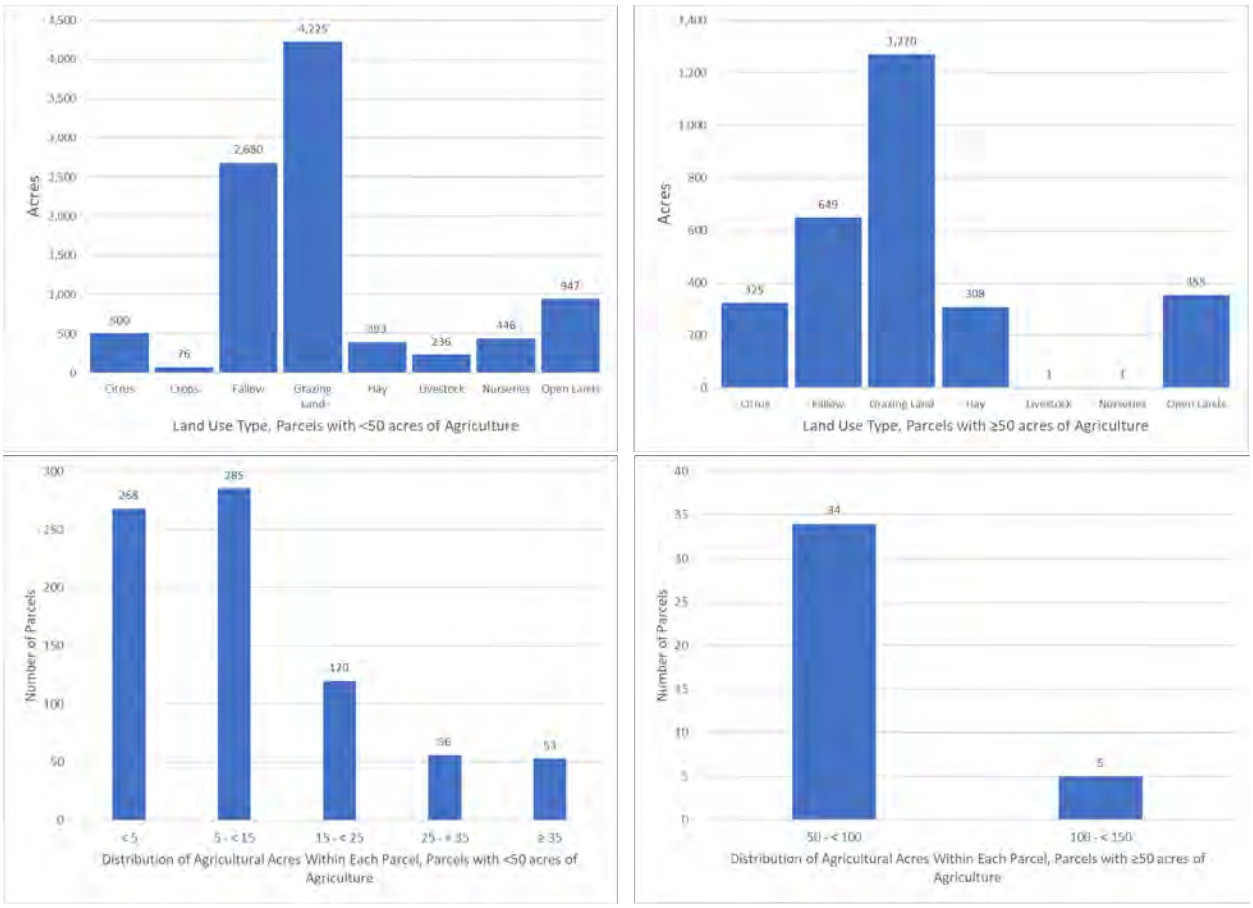

Figure C-11. Land use type and distribution of agricultural acreage by parcel size, Project Zone B

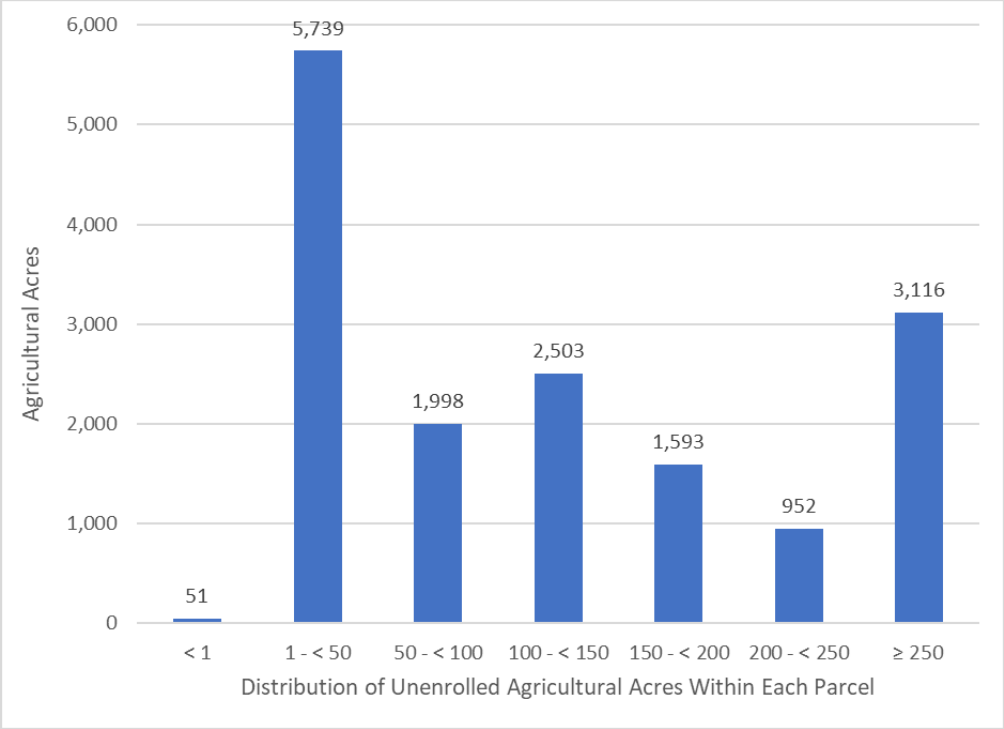

Figure C-12. Distribution of agricultural acreage on parcels with potential agricultural activity, Project Zone SEB

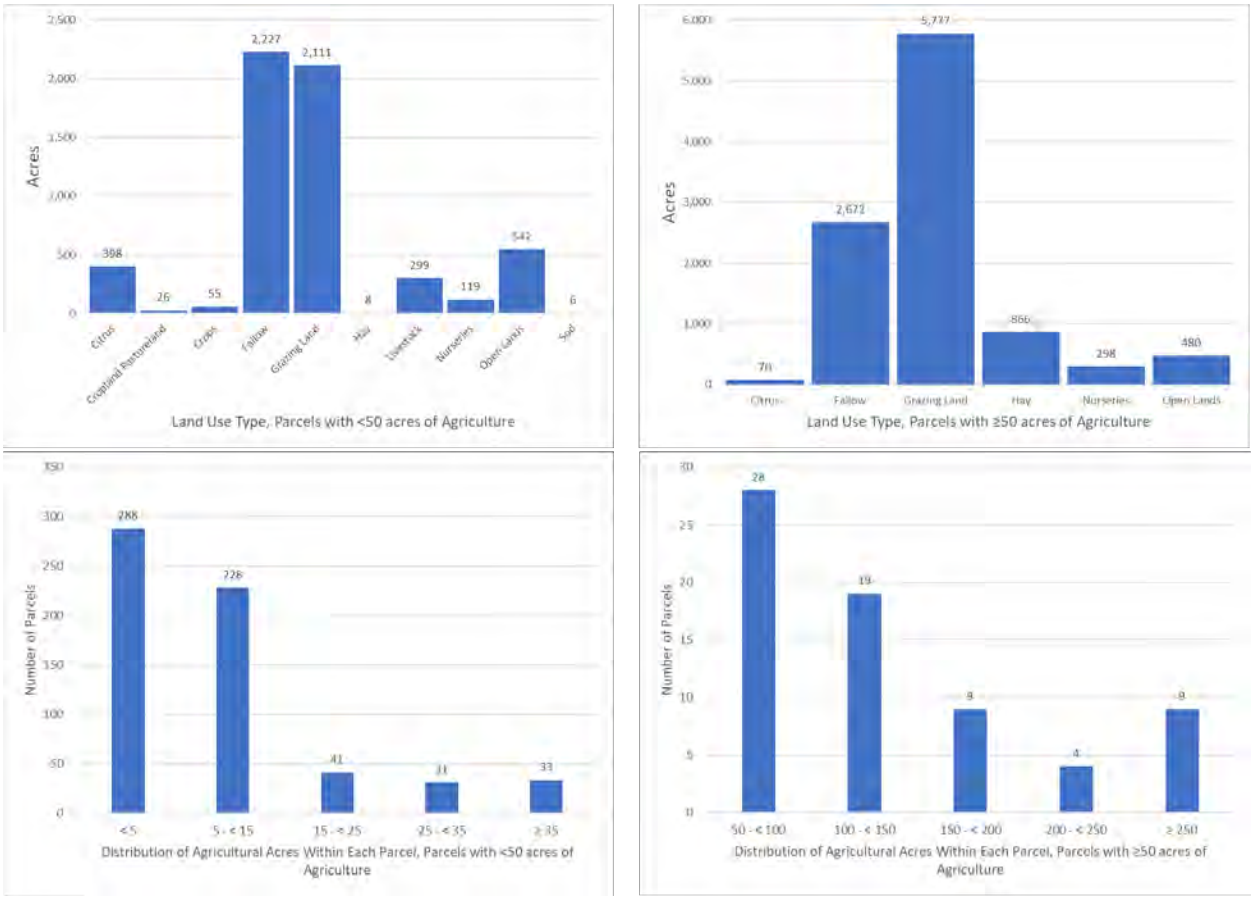

Figure C-13. Land use type and distribution of agricultural acreage by parcel size, Project Zone SEB

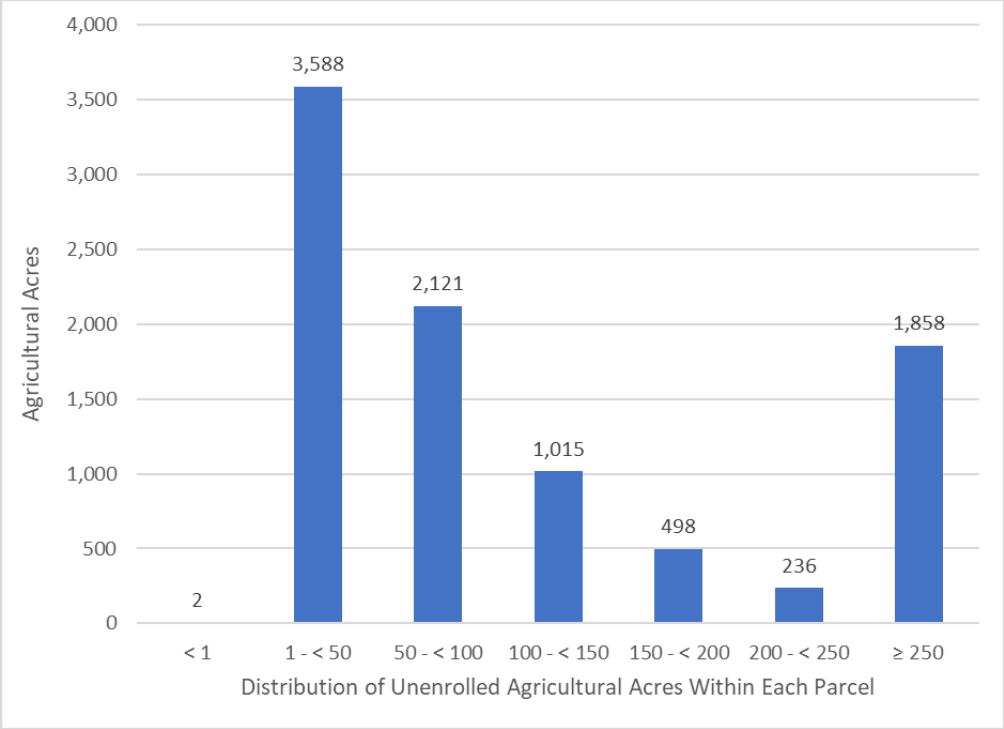

Figure C-14. Distribution of agricultural acreage on parcels with potential agricultural activity, Project Zone SIRL

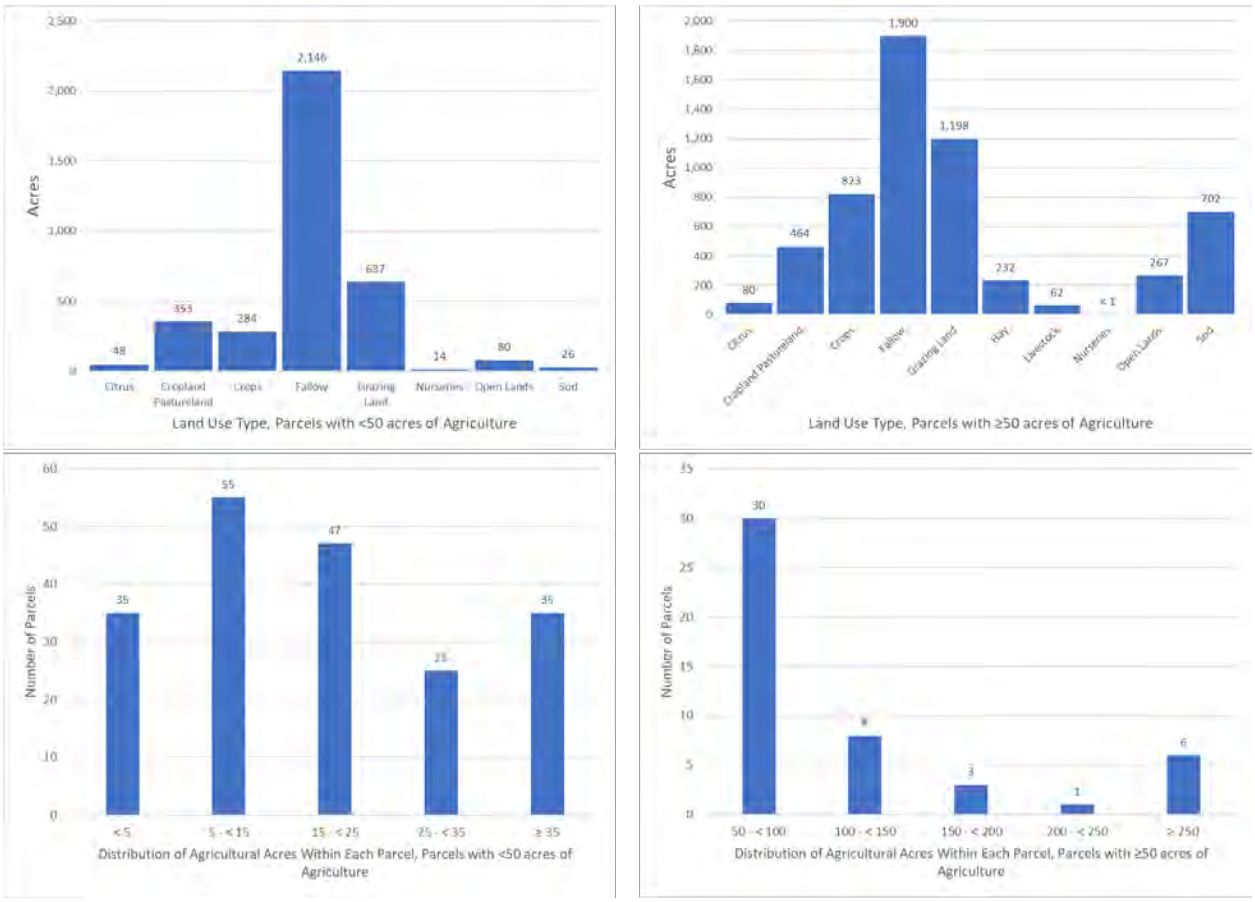

Figure C-15. Land use type and distribution of agricultural acreage by parcel size, Project Zone SIRL

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 agricultural 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 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 CIRL Subbasin.

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 that 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 maintains 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 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 what is no longer an agricultural land use by the time the BMAP is adopted or an update occurs.

OAWP has developed a methodology to identify agricultural land use changes to make adjustments in subsequent models and reports. Using GIS, OAWP compared the SWIL model land use with the latest FSAID land use and BMP enrollment data. OAWP identified areas classified as agriculture by the BMAP modeled land use that do not overlap with the latest FSAID or BMP enrollment data

OAWP reviewed the output of this overlay analysis by using county appraiser data and aerial imagery to determine if the nonoverlapping areas were still in production. It identified 3,113 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-9**). 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-9. Agricultural land use change by project zone

Project Zone	Acres
A	1,639
B	543
SEB	784
SIRL	146
Total	**3,113**

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

Potential Site-Specific Nutrient Management Measures in Addition to BMPs

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

Table C-10 identifies the agricultural technologies that received cost-share assistance in the CIRL 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-10. Cost-share project types and associated nutrient reductions recommended by OAWP

[1] Reductions for this measure 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 station[1]	20	5
Well, pipeline, trough, pond, heavy use protection[2]	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. 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 SJRWMD in 1996, and the bathymetry was measured every 15.2 m. The 15.8 m buffer around the seagrass polyline ensures that 1 bathymetry point will be captured in the GIS analysis.
- Intersect the updated bathymetry shapefile with the seagrass coverage file that was transformed into a polyline. This intersection correlates the depth data with the seagrass locations so that depths along the seagrass bed edge can be determined.
- Intersect the deep edge file to each project zone (BRL A, BRL B, North A, North B, Central A, Central SEB, and Central B).
- Use the select by location function to identify and note points within dredged areas. The dredged areas are removed from this coverage because seagrass is not expected to grow in areas that have been dredged.
- Identify and note points that fall below 0.3 m and above 3.5 m from the coverage. This step is needed because seagrass growing at depths less than 0.3 m are likely not light-limited, and seagrass are not expected to grow at depths greater than 3.5 m.
- Identify and note points from the intersections of holes or bare areas, which do not represent the deep edge of the seagrass bed.
- These steps are also followed separately for each assessment year so that the median value can be calculated.

The final points that represent the seagrass deep edge boundary for the assessment years' union coverage are then exported from GIS into Excel to conduct the two-step evaluation. The depth points are sorted from highest to lowest, and the count of the number of points at each depth is determined. The cumulative count is determined by taking the count for the shallowest depth and adding it to the count for the next shallowest point until the counts for all the depths are added together to yield the total number of depth points. The cumulative count at each depth is divided by the total points to determine the percentage of the seagrass points at each depth. These points are then plotted as a curve on a graph for comparison with the TMDL cumulative distribution curve. For the Step 2 evaluation, the median depth point is calculated for each assessment year using Excel. These medians are then compared with the TMDL median to determine compliance.

The maps in **Figure D-1** through **Figure D-3** 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**.

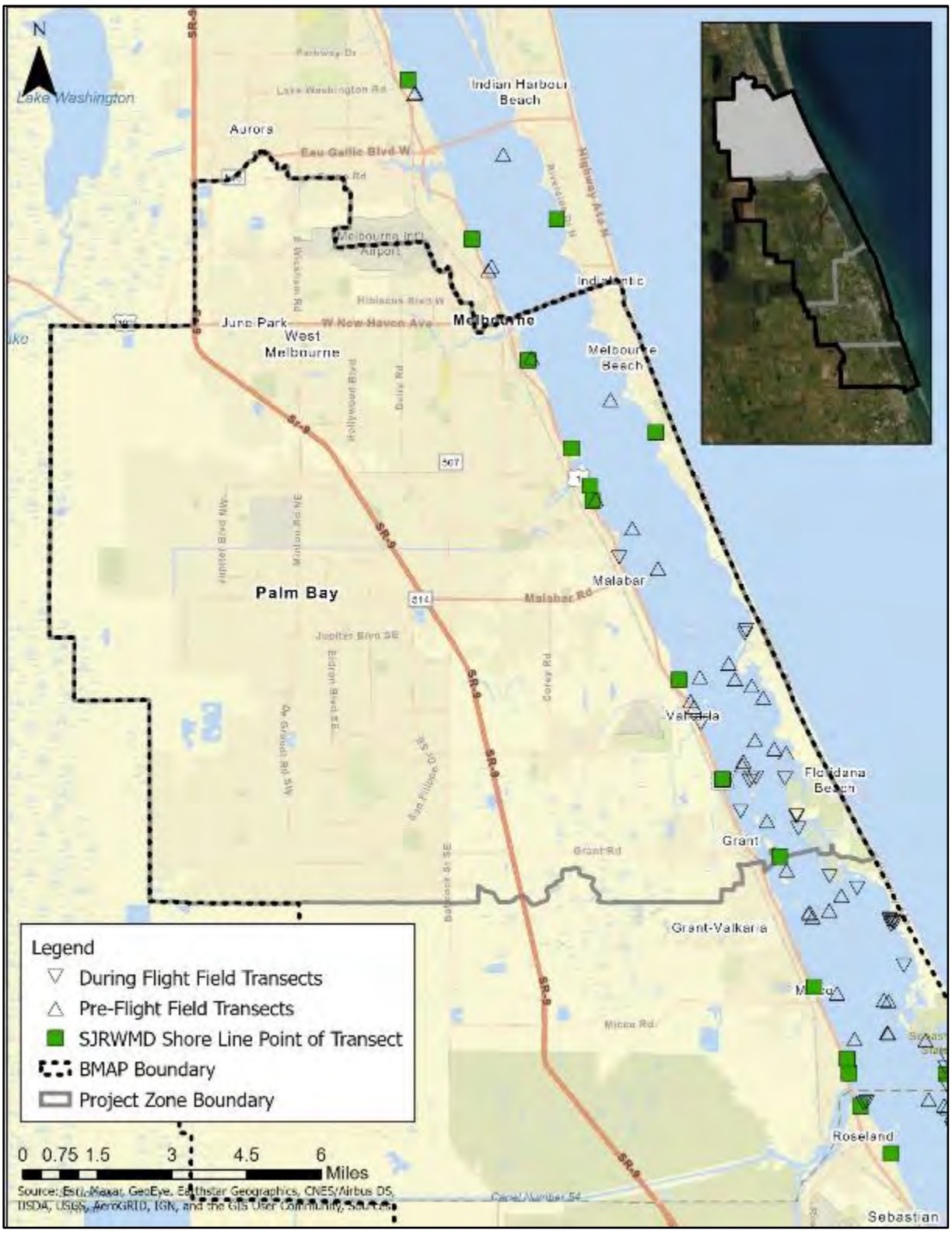

Figure D-1. Map of the seagrass transects in CIRL A

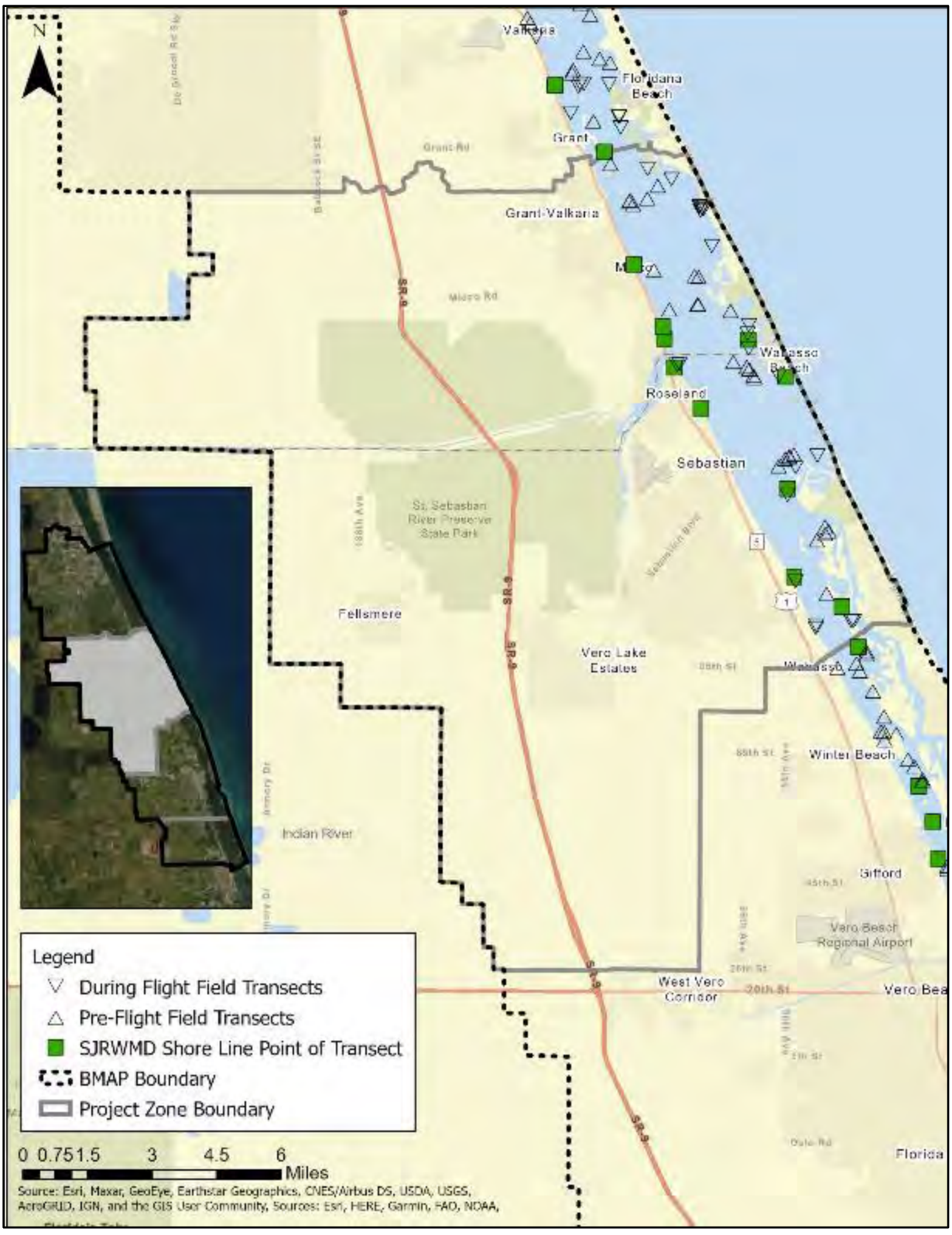

Figure D-2. Map of the seagrass transects in CIRL SEB

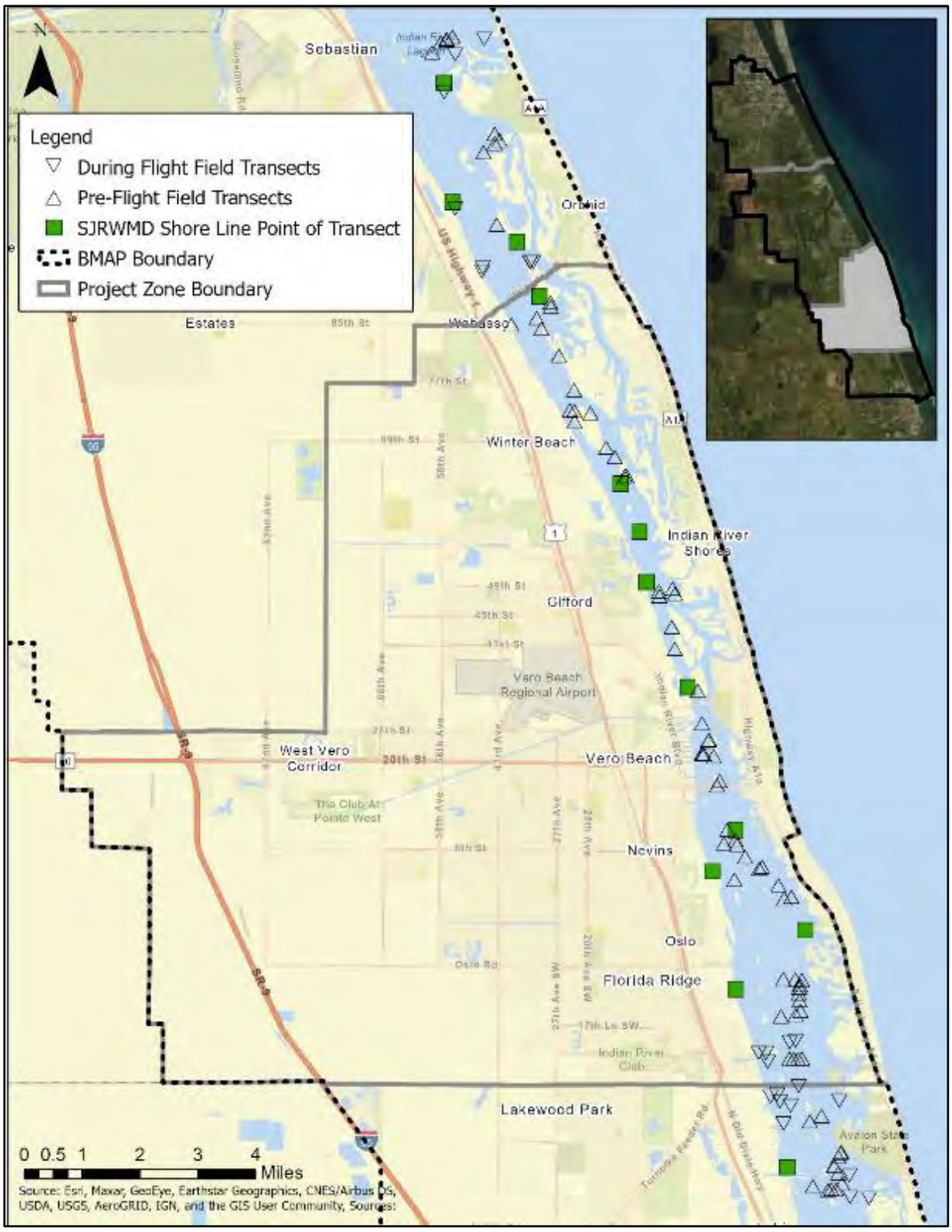

Figure D-3. Map of the seagrass transects in CIRL B

Appendix E. WCDs and Other Special Districts

In the 2013 BMAP, WCDs and other special districts were assigned quantitative (numeric) allocations, which included all agricultural and urban lands within their jurisdictional boundaries that were not part of an MS4. During the development of the 2013 BMAP, there were concerns with this approach, because FDACS is the only entity that can enroll agricultural producers in BMPs, but the WCDs were held responsible for reducing loading from the agricultural areas. In addition, the urban lands within the districts were permitted by the city or county and not under the district's control.

Therefore, this 2020 BMAP assigns qualitative (activity-based) allocations to the special districts for the canals and rights-of-way, as the districts have control over these portions of their jurisdictions. The districts are required to implement specific canal and right-of-way BMPs to be compliant with the BMAP. The BMPs for each special district are based on the activities and land uses in the district, and reporting on those BMPs is due annually. The included BMP plans were prepared and submitted by each individual WCD and reviewed by DEP.

Fellsmere Water Control District (FWCD)

The FWCD (formerly known as the Fellsmere Drainage District) was created April 8, 1919, under the General Drainage Laws of the State of Florida, by a Circuit Court proceeding (St. Lucie County, Case No. RED 533) and currently operates under Chapter 298 of the Florida Statutes, and amendments thereto, as an Independent Single Purpose Special District. The district was created and is responsible for the drainage, flood protection, and control with respect to drainage in times of excess water within its geographical boundaries. The FWCD does not generate any nutrient loading. The district receives the runoff from the lands within the gravity drainage portion of the overall district and conveys the flow to the Fellsmere Main Canal discharge point. The district map is shown in **Figure E-1**.

The original overall district watershed included 50,000 acres of land primarily used for agriculture. The system includes east-west sublateral ditches approximately one-quarter mile on center. Because of the naturally occurring 10 mile ridge (Interstate 95) east of the district; the land generally slopes from east to west. The one-quarter mile ditches flow west into the lateral canals. The lateral canals flow north to the Fellsmere Main Canal.

The Fellsmere Main Canal is located along the north boundary of Indian River County and is graded to drain east through the 10-mile ridge and into the west prong of the St. Sebastian River. A plug in the Fellsmere Main Canal west of Lateral U, and internal control structures in Lateral U near Sublateral Ditch 20 and in Park Lateral near Sublateral Ditch 24, separates the gravity drained watershed and the pumped drained watershed.

With the acquisition of lands and development of the Upper St. Johns River Basin project by SJRWMD, the watershed basin of the original Fellsmere Water Control District has been reduced to 34,000 acres. A majority of the remaining area within the Fellsmere Water Control

District is owned by Fellsmere Joint Ventures (FJV) and is pumped, or partially pumped, into portions of the Upper St. Johns River Basin.

Figure E-1. Map of the Fellsmere WCD

The remaining gravity drained portion of the FWCD is drained by two lateral canals (Park Lateral and Lateral "U"). Generally, Park Lateral drains all the land within FWCD lying east of Park Lateral (including "The Original Town of Fellsmere") and north of Sub-lateral PL-24, containing approximately 14.0 square miles. Park Lateral also partially drains the former "Berry Groves" parcel (now owned by FJV), containing approximately 6 square miles, that is pumped south into the Blue Cypress Water Management Area (BCWMA), during heavy rainfall events.

Lateral "U" Canal gravity drains all the land west of Park Lateral Canal and north of Sublateral U-20, containing approximately 8.4 square miles, and partially drains a portion of its southern basin (between Sublateral U-20 and U-28), containing approximately 2.5 square miles. This area is pumped south into BCWMA during heavy storm events.

The remaining nongravity-drained portions of the district are drained through pump stations, all owned and operated by FJV (SunAg, Inc.), into water management areas of the Upper St. Johns River Basin.

The FJV agricultural land that gravity drains to the CIRL is enrolled and is subject to the BMP Program managed by FDACS.

FWCD developed the *Permit Information and Criteria Manual for Use of or Connection to Works of the District*, the purpose of which is to provide information describing the criteria and permitting requirements relating to the utilization of, and connection to, the works of the FWCD. A copy of the manual and other information associated with FWCD can be found on the district's website: http://www.fellsmerewatercontroldistrict.com/permits.html.

FWCD proposes that the listed BMPs will be implemented and reported as active-based strategies. A specific allocation or nutrient reduction target will not be established. Rather, the FWCD's activities will serve to assist in the control of nutrients as part of the efforts described in the BMAP. Implementation of the BMPs shall provide compliance with the BMAP.

In selecting the BMPs, in coordination with DEP, the function, operation, and budget of FWCD has been considered. Each year, during the annual report information collection period, FWCD will confirm that these activities continue in its canals and rights-of-way. Each BMP includes a description and the required records.

Fellsmere Water Control District BMPs (For the Gravity Drainage Watershed Area Only)

1. Assist FDACS, where needed, with identifying and contacting producers within the district boundaries for purposes of participating in the relevant FDACS BMP programs.

    - Report: Number of landowners contacted to assist FDACS, and the names of landowners.

2. For all new change of land use development projects, exempting single family residences, a FWCD connection permit will require the compliance with the

stormwater discharge limitation policy of 2 inches/24 hours for a 25-year-24-hour storm event. This limitation applies to any 24-hour period (hour 10–34, hour 14-38, etc.) during the 72 hours starting at time 0 of a 25-year, 24-hour storm event.

- Report: The FWCD will provide the developer's engineer with a boundary condition at the connection point to the FWCD system. The boundary condition will include a time stage summary for hours 0 – hour 72 of the 24-hour–25-year event. A list of projects permitted over the year will be provided.

3. Routine maintainence of laterals and sublaterals for drainage and flood protection for land owners. Harvest aquatic vegetation in the canals using mechanical processes along with some necessary herbicide treatment. Vegetation removed from the canals must be disposed of in a location where the material will not be able to reenter the canal. Vegetation harvesting should consider the DEP guidelines in *Removal of Aquatic Vegetation for Nutrient Credits in the Indian River Lagoon (IRL) Basin* (September 2012).

    - Report: Dates when harvesting occurred and disposal location. Report any herbicide treatments and justification for nonmechanical removal of vegetation.

4. Provide public education to residents of the FWCD that fosters an understanding of the necessity to reduce nutrient impacts to surface waters.

    - Report: Provide link or brief summary of the information regarding the encouraged use of BMPs throughout the district.

FORT PIERCE FARMS WATER CONTROL DISTRICT (FPFWCD)

The FPFWCD was originally created in 1919 under the provisions of Chapter 298, F.S., commonly referred to as the General Drainage Law of Florida. The FPFWCD is located in St. Lucie County, and current FPFWCD boundaries encompass roughly 13,000 acres. The FPFWCD is responsible for drainage, flood control and protection, water managemen and the reclamation of lands within FPFWCD boundaries. The FPFWCD owns, operates, and maintains works for water management and regulates their use by others. The water management system generally includes a network of approximately 50 miles of canals, and associated pumps and water control structures. The Phillip C. Gates structure is the main water control structure located within Canal No. 1 that serves to regulate stormwater discharges into the Indian River Lagoon from FPFWCD. The original construction consisted of four 8 foot (ft) by 16 ft radial gates that opened from the bottom at elevation 6 ft National Geodetic Vertical Datum (NGVD). In 2018, FPFWCD completed a retrofit project in which the two outer gates were split at elevation 10 ft-NGVD and the two center gates were split at elevation 8 ft-NGVD. The retrofitted structure reduces sediment deposits downstream of the structure. An aerial map of the FPFWCD boundary (thick

white line) and drainage canals is shown in **Figure E-2**. A more detailed map identifying the canal numbers and associated rights of way is shown in **Figure E-3**.

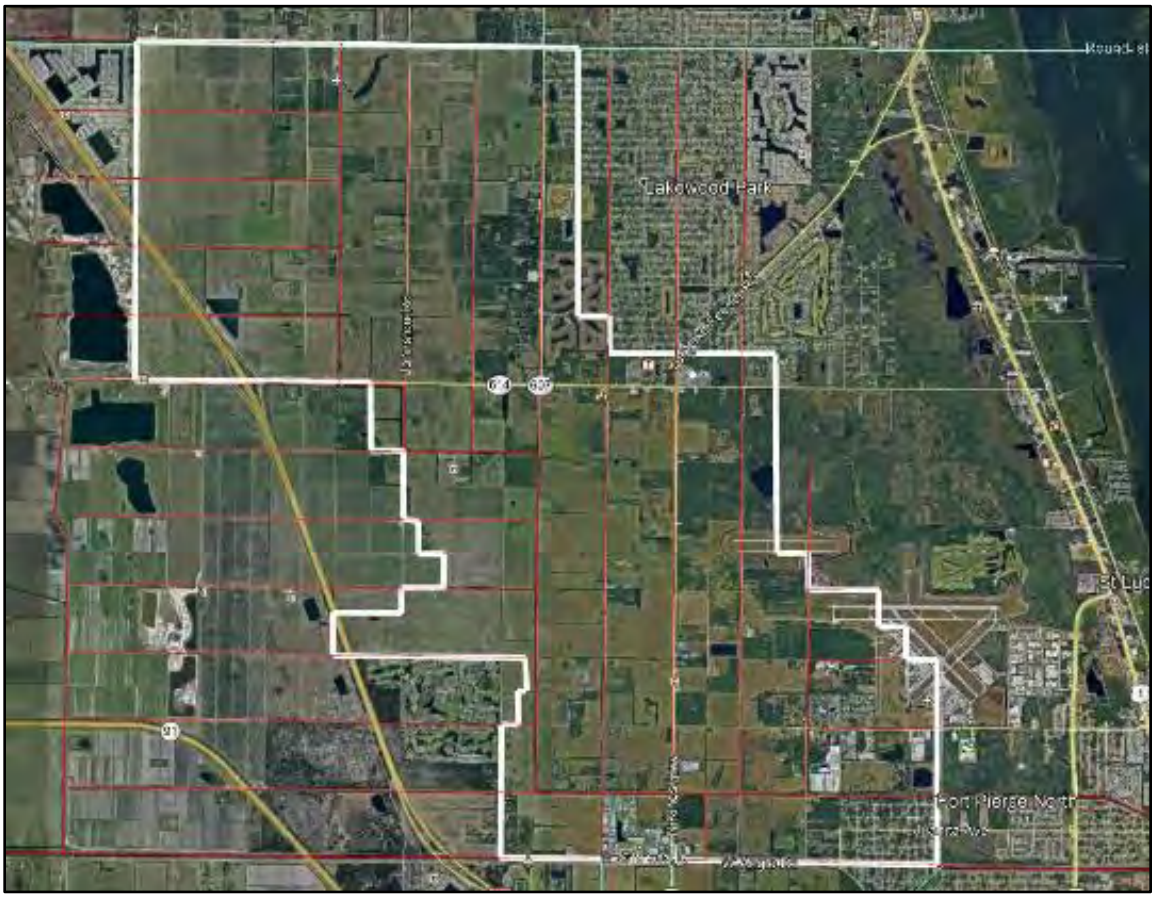

Figure E-2. Map of the FPFWMD

A map generally depicting the agricultural producers enrolled within the FPFWCD is on file with FDACS. Significant stormwater entering the FPFWCD canals is subject to the FDACS program. Additionally, stormwater entering the FPFWCD canals are subject to criteria imposed by other local, state, and federal agencies—including, but not limited to, the City of Fort Pierce, St. Lucie County, SFWMD, DEP, and U.S. Army Corps of Engineers (USACE).

The FPFWCD developed the *Permit Information and Criteria Manual for Use of or Connection to Works of the District*, the purpose of which is to provide information describing the criteria and permitting requirements relating to the utilization of, and connection to, the works of the FPFWCD. A copy of the manual and other information associated with FPFWCD can be found on the district's website: http://fpfwcd.org/.

The FPFWCD proposes that the listed BMPs will be implemented and reported as active-based strategies. A specific allocation or nutrient reduction target will not be established. Rather, the

FPFWCD's activities will assist in the control of nutrients as part of the efforts described in the BMAP. The implementation of the BMPs shall provide compliance with the BMAP.

In selecting the BMPs, in coordination with DEP, the function, operation, and budget of the FPFWCD has been considered, and these listed BMPs should not be considered as cost-effective, technically practical, or applicable to any other water control district within the BMAP area. Each BMP includes a description and the required records.

1. Aquatic Vegetation Control

Description: Perform harvest aquatic vegetation within the canals using mechanical processes to the extent practicable to reduce the need for herbicide treatment. Vegetation removal from the canals shall be placed in a manner as to limit the possibility of the material reentering the canal. Use of herbicide treatments shall be used at locations where canal bank stabilization measures, such as rock riprap, have been installed.

Report: Disposal of material outside of the district's rights-of-way is cost prohibitive at this time and will only be performed when deemed necessary by the district. The FPFWCD shall report herbicide treatment locations and provide a justification for each location.

2. Canal Buffer

Description: Create a canal buffer or filter strip to help reduce loading from stormwater runoff to the canals. Maintenance activities consisting of mowing the canal banks shall be limited to the area outside a minimum distance of 10 feet from the canal top-of-bank. Mowing and maintenance activities shall be done in such a way to prevent grass clippings from entering the canals, where they can decompose and add nutrients.

Report: Width and locations (or percentage of canal banks that include a buffer strip) of vegetated buffer strip. Type and location of any alternative methods of canal buffer or filter strips.

3. Assist FDACS

Description: Assist FDACS, where needed, with identifying and contacting landowners/ producers within the district boundaries for the purposes of participating in the relevant FDACS BMP programs.

Report: Number of landowners/ producers information requested by FDACS and response provided.

4. Public Education and Outreach

Description: Provide public education to residents of the district that fosters an understanding of the necessity to reduce nutrient impacts to surface waters.

Report: Provide a link or brief summary of the information regarding the encouraged use of BMPs throughout the district.

5. Control Structures

Description: Maintain existing water control structures and any adjustable gates on water control structures. The location of each water control structure can be found on the map in **Figure E-3**.

Report: Provide an update on any changes to existing water control structures including, but not limited to structure removal, modification or significant repairs.

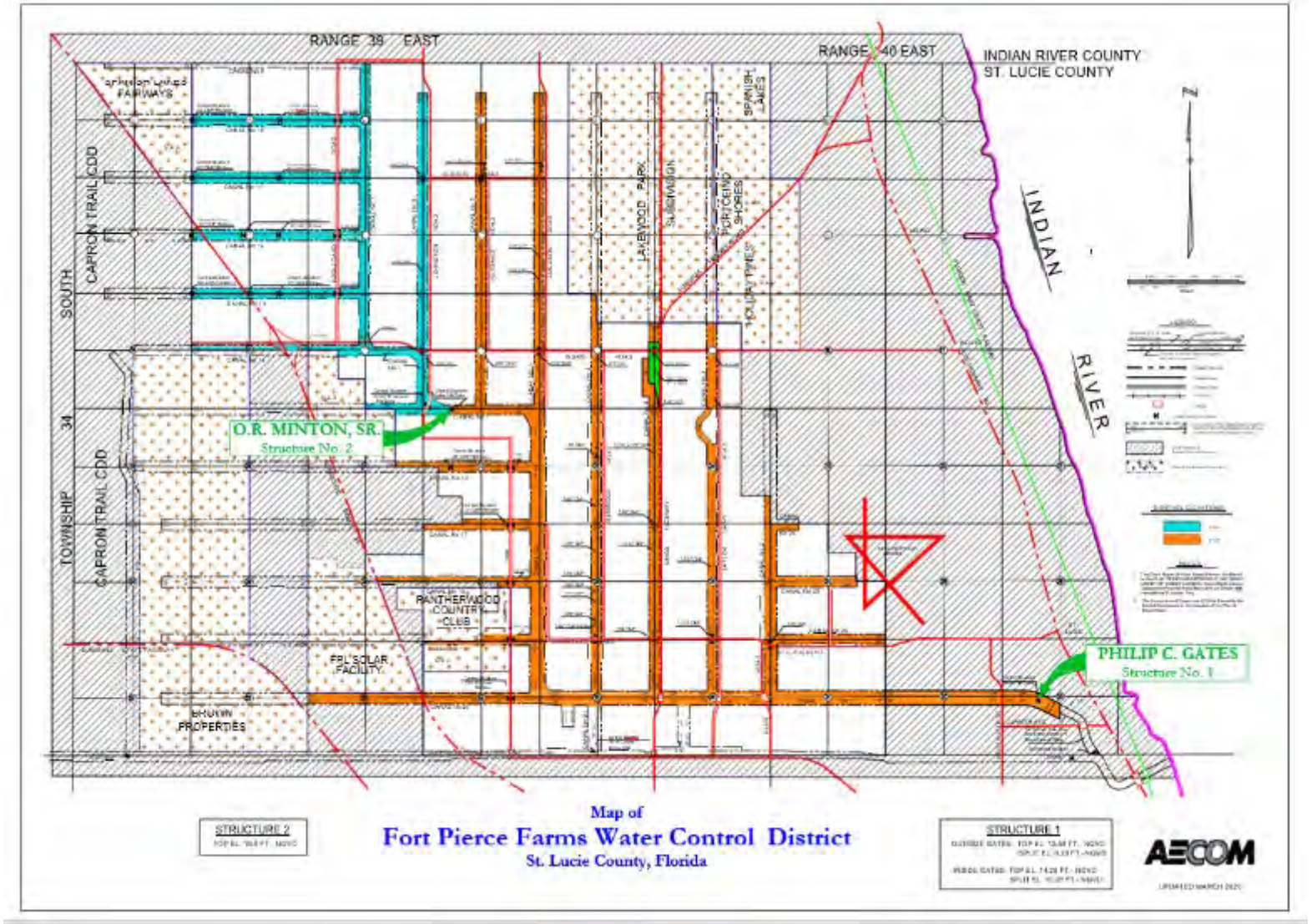

Figure E-3. Map of the FPFWCD

INDIAN RIVER FARMS WATER CONTROL DISTRICT (IRFWCD)

The original Plan of Reclamation of the IRFWCD, formerly known as the Indian River Farms Drainage District, was initially adopted and approved by the Board of Supervisors of the Indian River Farms Drainage District on March 4, 1920.

At that point in time, the Indian River Farms Drainage District was located in St. Lucie County (Indian River County was created in June 1925), and the order approving the Report of Commissioners was approved by the Fifteenth Judicial Circuit in St. Lucie County on August 18, 1921, and recorded in Chancery Order Book 2, Page 493, Public Records of St. Lucie County.

The original Plan of Reclamation (now an integral part of the "Water Control Plan") has long been completed, and the IRFWCD now functions as an operations and maintenance entity of the *Works of Improvements* therein.

In the early to mid 1980s, the IRFWCD approved and undertook a project of evaluation and updating of the original *Works of Improvements of the District*. This study resulted in the creation of a computer model of the District's facilities and various revised recommendations in the operations of the district, including the two-inches-per-day volume discharge limitation.

The district map is shown in **Figure E-4**.

The IRFWCD contains approximately 50,000 gross acres lying within portions of Township 32 and 33 South, Range 39 East and Township 33 South, Range 38 East, and a small portion of Township 33 South, Range 40 East in Indian River County.

The IRFWCD contains the western portion of the City of Vero Beach (primarily west of the ancient coastal dune/ridge located along the Florida East Coast Railroad alignment) and the remainder of the district lies within the unincorporated area of Indian River County.

The 1913 Plat of Indian River Farms Subdivision was originally subdivided into primarily 40-acre, more or less, tracts and developed for agricultural use. With the growth of population and development in the IRFWCD, the gradual conversion of agricultural lands to urbanization has occurred concentrically around the City of Vero Beach (westward from the coast) and along major corridors such as State Road 60, 27th Avenue, 43rd Avenue, 58th Avenue, and Oslo Road (9th Street, S.W.)

The initial canal system was designed and constructed by the Indian River Farms Company in the 1912 to 1917 era, and contained only the Main Outfall Canal.

In early 1919, steps were taken to reorganize the former "district" under the General Drainage Laws of Florida. This new district was modified and reformed into the Indian River Farms Drainage District in May of 1919 and currently operates under Chapter 298, F.A.. This plan

expanded the limits of the original project, adding the north and south relief canals and interconnecting lateral and sublateral canals.

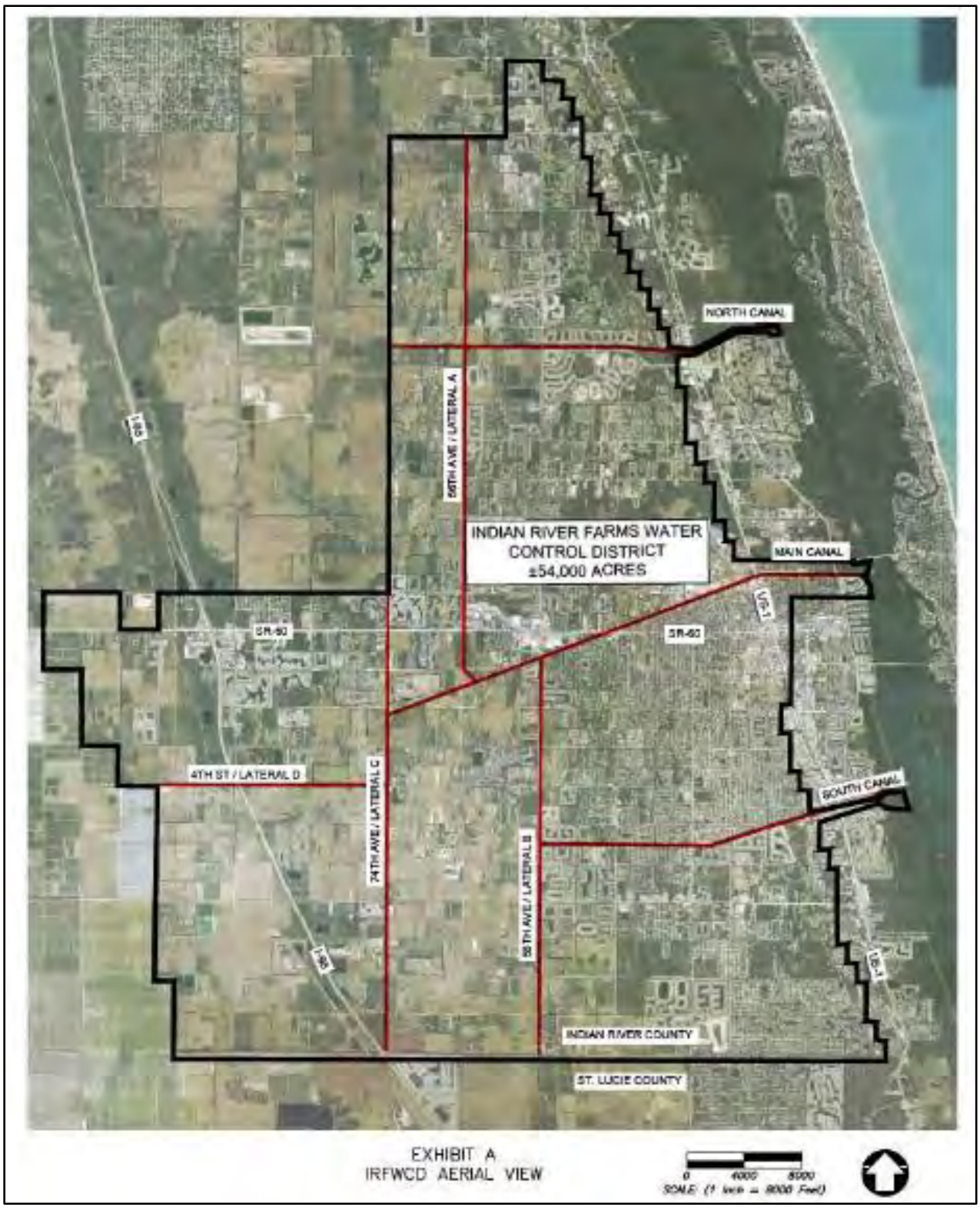

Figure E-4. Map of the IRFWCD

This system was designed and constructed only as a gravity flow drainage district comprising many sublateral canals spaced one-half mile apart (generally along section and one-quarter section lines in an east-west alignment). These sublateral canals discharge into lateral canals (generally running in a north-south direction which, in turn, discharge into three major relief canals) that ultimately outfall into the IRL.

The initial design and construction of the system contained only one structure in the Main Canal. This structure is a drop spillway structure and provides a grade transition from 9.0 ft above sea level upstream to 0.00 ft downstream to prevent erosion and sloughing in the Main Relief Canal.

In the mid-1950s, radial gate water control structures were constructed in the three outfall canals to (1) reduce irrigation requirements, (2) conserve water, and (3) provide a limited source of supplemental irrigation water.

A salinity control weir structure was constructed in the Main Canal downstream of the drop spillway structure in 1962 to protect the City of Vero Beach wellfield from saltwater intrusion, and to provide irrigation water for the Vero Beach Country Club golf course.

In 1963, a fourth radial gate water control structure was added in Lateral "C" Canal (74th Avenue) south of 8th Street to reduce irrigation requirements and provide a limited source of irrigation for landowners in the southwest portion of the district.

The operation of the radial gate structures in the district relate directly to the duration and intensity of storm events and the antecedent rainfall conditions. The gates are kept closed a majority of the time, maintaining a minimum elevation of 15.5 ft, more or less, above sea level upstream of the 3 radial gates located in the 3 outfall canals, and 18.5 ft, more or less, above sea level upstream of the Lateral "C" structure.

These gates are opened, or partially opened, following storm events that create flooding conditions in the respective upstream pool elevations of the structures. The gates are opened only for a few hours to relieve flooding conditions in the affected areas. Following major storm events and complete ground saturation, the gates may be left open for a few days to provide groundwater draw down.

The IRFWCD is isolated from surrounding drainage by a levee (elevation 28.5 ft, more or less, above sea level, 6 ft to 8 ft top width and 1.5 ft to 1 ft side slope) along its north, west, and south boundary and by a coastal/dune ridge along its eastern boundary. It is further protected by adjoining water control districts along its north, west and southern boundaries, and serves no area outside its geographic area.

The IRFWCD proposes that the listed BMPs will be implemented and reported as active-based strategies. A specific allocation or nutrient reduction target will not be established. Rather, the IRFWCD's activities will assist in the control of nutrients as part of the efforts described in the BMAP. The implementation of the BMPs shall provide compliance with the BMAP.

In selecting the BMPs, in coordination with DEP, the function, operation and budget of the IRFWCD has been considered. Each year, during the annual report information collection period, the IRFWCD will confirm that these activities continue in their canals and rights-of-way. Each BMP includes a description and the required records.

Indian River Farms Water Control District BMPs

1. Harvest aquatic vegetation in the canals using mechanical processes along with some necessary herbicide treatment. Vegetation removed from the canals must be disposed of in a location where the material will not be able to reenter the canal. Vegetation harvesting should consider the DEP guidelines in *Removal of Aquatic Vegetation for Nutrient Credits in the Indian River Lagoon (IRL) Basin* (September 2012).

    - Report: Dates when harvesting occurred and disposal location. Report any herbicide treatments and justification for nonmechanical removal of vegetation.

2. For all new change of land use development projects, exempting single-family residences, an IRFWCD connection permit will require the compliance with the stormwater discharge limitation policy of 2 inches/24 hours for a 25-year-24-hour storm event. This limitation applies to any 24-hour period (hour 10–34, hour 14–38, etc.) during the 72-hours starting at time 0 of a 25-year, 24-hour storm event.

    - Report: The IRFWCD model results will provide the developer's engineer with a boundary condition at the connection point to the IRFWCD system. The boundary condition will include a time stage summary for hours 0 – hour 72 of the 24-hour–25-year event. A list of projects permitted over the year will be provided.

3. Provide public education to residents of the district that fosters an understanding of the necessity to reduce nutrient impacts to surface waters.

    - Report: Provide a link or brief summary of the information regarding the encouraged use of BMPs throughout the district.

4. Assist FDACS, where needed, with identifying and contacting producers within the district boundaries for purposes of participating in the relevant FDACS BMP programs.

    - Report: Number of landowners contacted to assist FDACS, and the names of landowners.

MELBOURNE-TILLMAN WATER CONTROL DISTRICT (MTWCD)

The Melbourne-Tillman Water Control District (MTWCD) is a dependent special district authorized by the Florida Legislature under Chapter 2001-336, Laws of Florida, as amended by Chapters 2003-334 and 2010-253, respectively, for the purpose of constructing, reconstructing, and repairing, maintaining, and operating a surface water management system.

It was initially authorized as an independent district in 1922 for land reclamation for agricultural development and operating under Chapter 298, F.S.. It was reorganized as a dependent district in 1986 under Chapter 86-418, Laws of Florida, and codified in the 2001 legislation.

The Board of Directors has the power to establish a water management system to prevent damage from flooding, soil erosion, and excessive drainage; to promote the conservation, development, and proper utilization of surface and ground water; to preserve natural resources, fish, and wildlife; to maintain water quality; and to preserve and protect natural systems within and surrounding the district. The Board may authorize the cleaning, straightening, widening, or the change of course or flow, and alter or deepen any canal, ditch, drain, watercourse, or natural stream within the district boundaries. The building and construction of other works and improvements to preserve and maintain the works of the district are also authorized.

The MTWCD encompasses portions of unincorporated Brevard County, City of West Melbourne, City of Melbourne, City of Palm Bay, Town of Malabar, and Town of Grant-Valkaria. MTWCD is responsible for maintaining a primary network of canals within the district boundary. Various parcels have privately owned outfalls to the canals, with runoff from the remaining lands collected by the various governmental agencies delivering the runoff to the canals.

A map of the MTWCD canals and boundary is shown in **Figure E-5**. The district owns and maintains over 2,300 acres of canal rights-of-way in 163 miles of canals; 50 % has a right-of-way width greater than 100 ft, and 8 % has a right-of-way width greater than 250 feet. The district boundary covers 102 square miles.

The MTWCD proposes that the listed BMPs will be implemented and reported as activity-based strategies. A specific allocation or nutrient reduction target will not be established. The MTWCD's activities will assist in the control of nutrients as part of the efforts described in the IRL BMAP. Implementation of the BMPs shall provide compliance with the BMAP.

The BMPs, in coordination with DEP, are selected with the function, operation, and budget of the MTWCD in consideration, and the BMPs are not intended to be cost-effective, technically practical, or applicable to any other water control district within the BMAP area. Each BMP includes a description and the required record keeping.

It is recognized that the configuration of the canals and rights-of-way are limiting factors to the performance of certain BMP. An annual report confirming the activities identified are reported to DEP, with detailed records kept at the MTWCD office.

Melbourne-Tillman Water Control District BMPs

1. Redirect flows to the St Johns River from the IRL during certain storm conditions. Replacement of the control structure gates (from underflow to over top) in the WCD's structure at the east end of Canal C-1 was completed in 2011.
    - Report: Once completed, reports will be included with those defined in Point 5 below. Establish and maintain a stormwater aeration system at specified locations.
    - Report: Operation type, location (shapefile), and operation. Operation and any maintenance for the structure(s).
2. Introduce turbidity-reducing polymers to canals such as woodchip logs.
    - Report: Operation type, location (shapefile), operation, and monitoring reports. Operation and any maintenance for the structure(s).
3. Establish and maintain biological/bacteria treatment at specified locations.
    - Report: Operation type, location (shapefile), operation, and monitoring reports. Operation and any maintenance for the structure/facility(s)
4. Harvest aquatic vegetation in the canals using mechanical processes instead of herbicide treatment. Vegetation removed from the canals must be disposed of in a location where the material will not be able to reenter the canal. Vegetation harvesting should consider the DEP guidelines in *Removal of Aquatic Vegetation for Nutrient Credits in the Indian River Lagoon (IRL) Basin* (September 2012).
    - Report: Dates when harvesting occurred and disposal location. Report any herbicide treatments and justification for nonmechanical removal of vegetation.
5. Maintain existing water control structure(s).
    - Report: Structure type, location (shapefile), and operation. Operation and any maintenance for the structure(s).
6. Provide education outreach and public involvement efforts as follows:
    - Update website with links and literature related to clean waters and the IRL.
    - Participate in educational training to include the Florida Erosion and Sedimentation Control Inspector program.

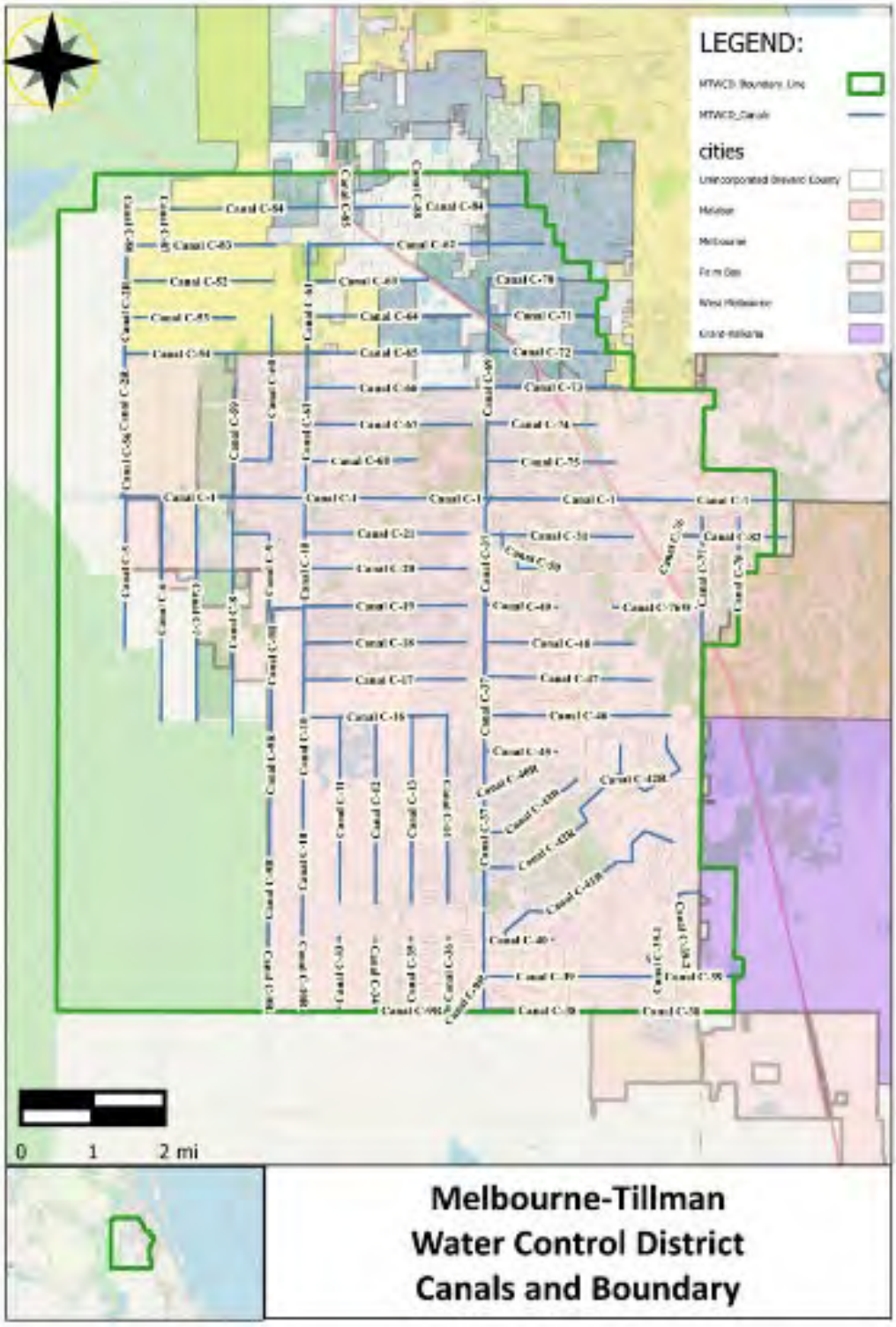

Figure E-5. Map of the MTWCD

SEBASTIAN RIVER IMPROVEMENT DISTRICT (SRID)

The SRID is a "Chapter 189 – Improvement District" that was originally organized as a "Chapter 298 Drainage District." Reorganized under Chapter 189, the district is now known as SRID; however, the district still operates as a single-purpose drainage district.

The Sebastian River Water Control District was initially created by Decree of Incorporation entered by the Circuit Court in 1927 and included approximately 50,000 acres. Following the 1929 Depression, the Plan of Reclamation was scaled back in 1939 to the approximate 11,000 acres of the present day SRID.

The SRID system was designed and constructed as a gravity flow drainage district comprising sublateral canals spaced one-half mile apart in an east to west alignment. These sublateral canals discharge into Lateral Canals C and L which are constructed in a north-south alignment and drain to the north, and discharge into the south fork of the St. Sebastian River that ultimately outfalls into the IRL.

In the late 1950s, radial gate water control structures were constructed in the two outfall canals to (1) reduce irrigation requirements, (2) conserve water, and (3) provide a limited source of supplemental irrigation water.

In 2009, the district undertook a project to create a Survey Inventory of Existing Infrastructure and prepared a report called, "Stormwater Modeling to Evaluate the Works of Improvements of the District." This study resulted in the creation of a computer model of the district's facilities and various revised recommendations for the operations of the district, including the 2-inches-per-day volume discharge limitation.

The SRID contains a few residential areas, churches, a golf course, and schools but remains mostly in agricultural lands that lie within the unincorporated area of Indian River County.

The operation of the radial gate control structures within the district relate directly to the duration and intensity of storm events and the antecedent rainfall conditions. The gates are kept closed the majority of the time, maintaining a minimum elevation of 14.5 and 12.5 ft NAVD, more or less, upstream of the radial gates located in Lateral Canals C and L, respectively.

The district map is shown in **Figure E-6**.

These control gates are opened, or partially opened, following storm events that create flooding conditions in the respective upstream pool elevations of the structures. The gates are opened only for a few hours to relieve flooding conditions in the affected areas. Following major storm events and complete ground saturation, the gates may be left open for a few days to provide groundwater drawdown.

The SRID is isolated from surrounding drainage to the west by a levee. The south and east boundaries are common boundaries with IRFWCD, and each district has levees and boundary canals to manage water within their limits. The north boundary of SRID is isolated with smaller dikes, since the land slopes off the Sebastian River to the north.

The SRID proposes that the listed BMPs will be implemented and reported as active-based strategies. A specific allocation or nutrient reduction target will not be established. Rather, the SRID's activities will assist in the control of nutrients as part of the efforts described in the BMAP. The implementation of the BMPs shall provide compliance with the BMAP.

In selecting the BMPs, in coordination with DEP, the function, operation, and budget of the SRID has been considered. Each year, during the annual report information collection period, the SRID will confirm that these activities continue in its canals and rights-of-way. Each BMP includes a description and the required records.

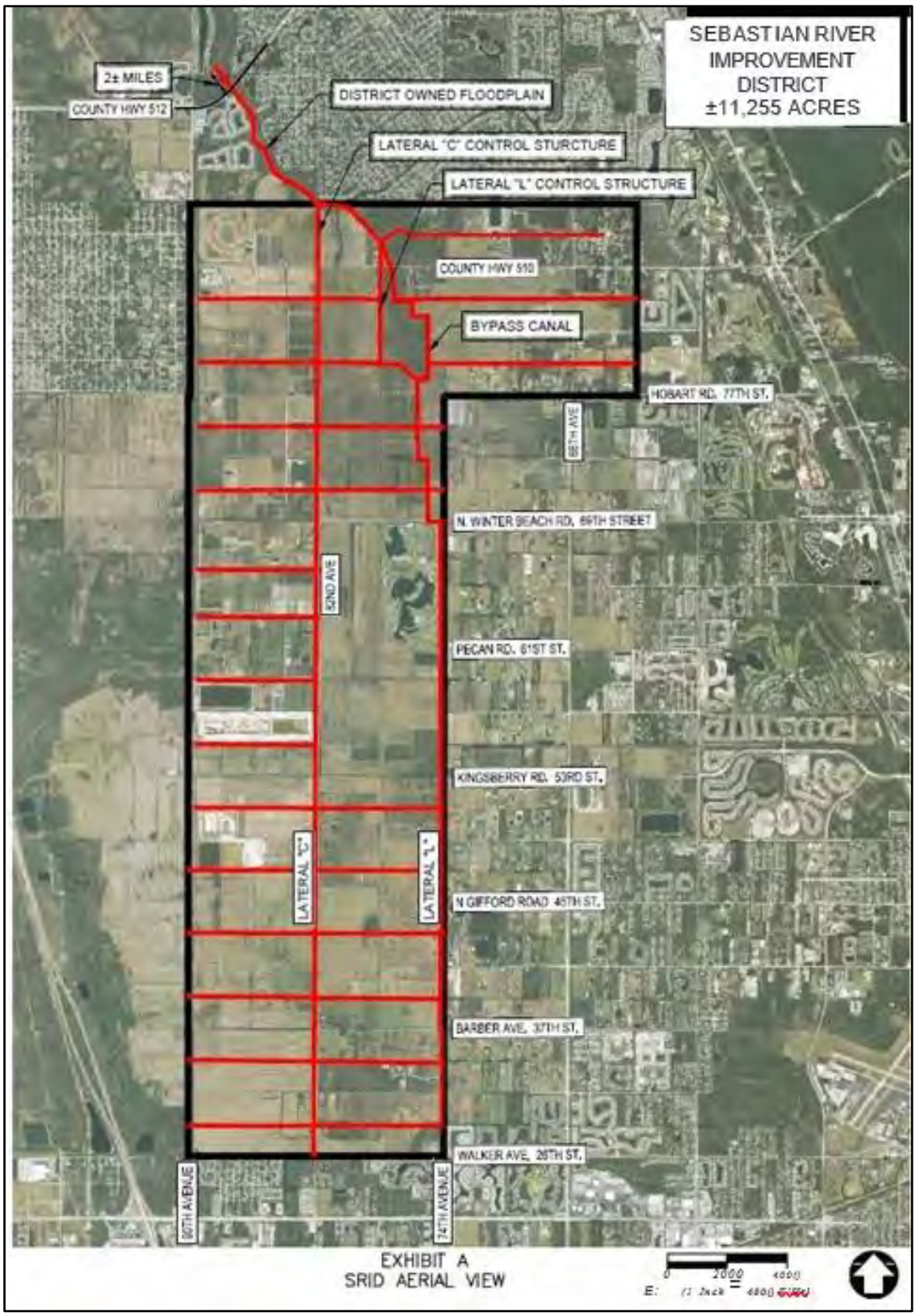

Figure E-6. Map of the SRID

Sebastian River Improvement District BMPs

1. Harvest aquatic vegetation in the canals using mechanical processes along with some necessary herbicide treatment. Vegetation removed from the canals must be of disposed in a location where the material will not be able to reenter the canal. Vegetation harvesting should consider DEP guidelines in *Removal of Aquatic Vegetation for Nutrient Credits in the Indian River Lagoon (IRL) Basin* (September 2012).

    - Report: Dates when harvesting occurred and disposal location.

2. For all new change of land use development projects, exempting single-family residences, a SRID connection permit will require compliance with the stormwater discharge limitation policy of 2 inches/24 hours for any 24-hour period (hour 10–34, hour 14–38, etc.) during a 25-year–24-hour storm event. The SRID will provide the developer's engineer with a boundary condition at the connection point to the SRID system. The boundary condition will include a time stage summary for hours 0–hour 72 of the 24-hour–25-year event.

    - Report: A list of projects permitted over the year will be provided.

3. Assist FDACS, where needed, with identifying and contacting producers within the district boundaries for purposes of participating in the relevant FDACS BMP programs.

    - Report: Number of landowners contacted to assist FDACS, and the names of landowners.

VERO LAKES WATER CONTROL DISTRICT

The Vero Lakes Water Control District (VLWCD) is a Chapter 298 District originally established as Vero Lakes Drainage by Decree of Incorporation of the Ninth Judicial Circuit in Indian River County, dated June 17, 1965. The VLWCD encompasses approximately 6,250 acres located entirely in north Indian River County, Florida. In general, the district is bisected by I-95, with portions of the district lying both east and west of I-95. The entire district is located south of SR 512. See **Figure E-7** to better locate the boundaries of the district (shown in blue).

The entire district is undeveloped, raw land with a single landowner. The entire district is in agriculture for the purpose of cattle raising. The stormwater runoff is collected in various low wetland areas. A primary ditch carries some stormwater from the southwest to the northeast section of the district that lies west of I-95. There are culverts under I-95 that allow some runoff that does not percolate back into the soil to flow east towards the eastern edge of the district.

Eventually, water that does not percolate back into the soil flows east to Lateral D. This does not increase the nutrient load in the runoff. The natural, undeveloped land acts as a filter for any runoff that makes its way east to Lateral D.

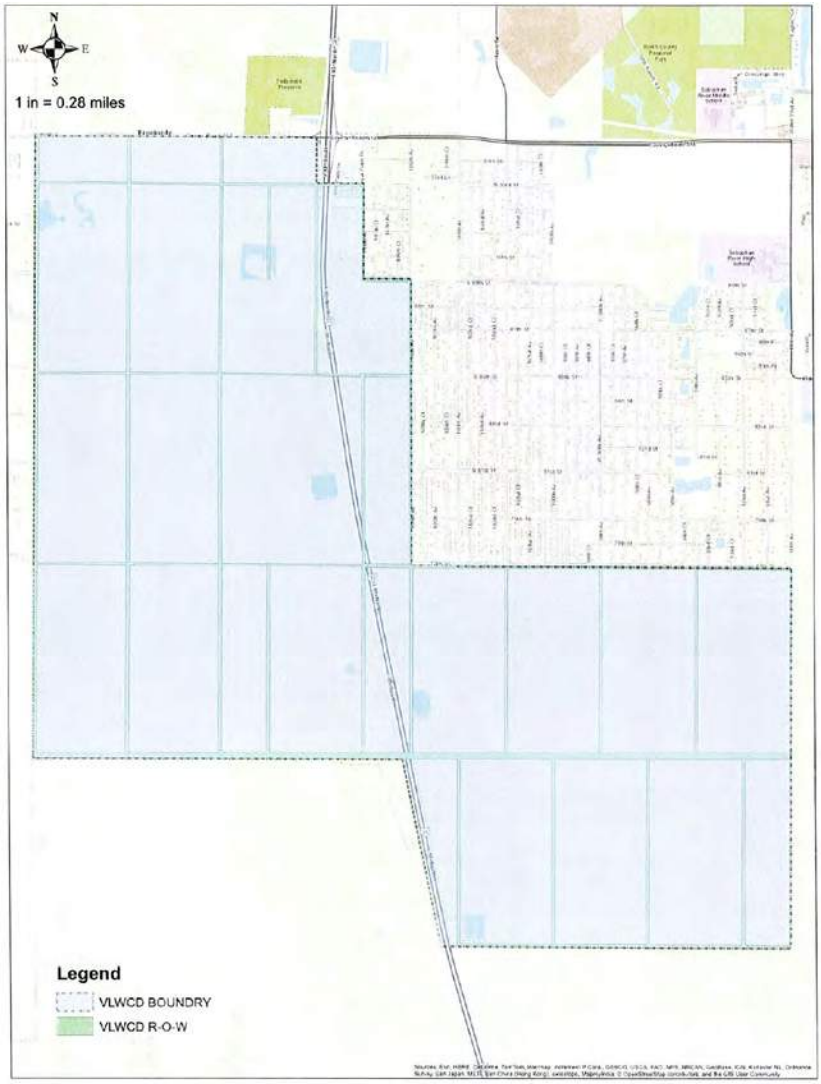

Figure E-7. Map of the VLWCD

The VLWCD proposes that the listed BMPs will be implemented as activity-based strategies. A specific nutrient-based reduction target will not be established. Rather, the VLWCD's activities will assist in the control of nutrients as part of the efforts described in the BMAP. Implementation of the BMPs shall provide compliance with the BMAP.

In selecting the BMPs, in coordination with DEP, the function, operation, and budget of the VLWCD has been considered, and these listed BMPs should not be considered cost-effective,

technically practical, or applicable to any other water control district within the BMAP. Each BMP includes a description and the required records.

The VLWCD will provide DEP with an annual report confirming the following activities:

1. **Public Education and Outreach**

Description: The VLWCD shall include as part of its annual meeting, an agenda item to alert the landowner of the existence of the BMAP and requirements for this landowner.

Report: Annual Landowner's Agenda. A copy of the agenda and material shall be kept on file.

2. **FDACS BMP Assistance**

Description: The VLWCD will provide assistance to FDACS when requested. The VLWCD will identify the current landowner and his contact information as shown on the VLWCD records. The VLWCD will contact the landowner to encourage participation in the FDACS BMP program and encourage him to contact DEP if he have any questions.

Report: Landowner information requested by FDACS and the response provided.

3. **Nutrient Controls**

Description: No nutrients imported via direct land application in the VLWCD rights of way.

Report: Annual verification by VLWCD.

4. **Canal/Ditch Bank Berms**

Description: Minimize sediment transport by constructing berms on top of canal/ditch banks and promoting vegetation to cover. The agricultural pasturelands will continue to drain into the main ditch via smaller tributaries. On a regular basis, sediment is removed from the ditch and Lateral D canal. Vegetation is removed by mechanical methods, and not by herbicide treatment. Bank slopes are maintained at a slope that is flatter to prevent erosion.

Report: Visual observation and dates when sediment is removed.

5. **Control Structures and Culverts**

Description: There are no control structures within the VLWCD. Regular inspection is made to ensure flow is maintained through culverts.

Report: Annual verification by VLWCD.

6. **Fertilizer Cessation**

Description: No application of fertilizer within the VLWCD rights-of-way.

Report: Annual verification by VLWCD.