

# ***Caloosahatchee River and Estuary Basin Management Action Plan***

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

with participation from the  
**Caloosahatchee River and Estuary Stakeholders**

**January 2020**

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## Acknowledgments

The *Caloosahatchee River and Estuary 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 Caloosahatchee River and Estuary stakeholders identified below.

Type of Governmental or Private Entity	Participant
Local Governments	Charlotte County Collier County Glades County Hendry County Lee County City of Cape Coral City of Clewiston City of Fort Myers City of LaBelle City of Moore Haven
Community Development Districts	Copperhead Lucaya Mirada Moody River Estates Port LaBelle Portico River Hall Sail Harbour Sugarland Verandah East Verandah West
Special Districts	Barron Water Control District Clewiston Water Control District Collins Slough Water Control District County Line Drainage District Cow Slough Water Control District Devil's Garden Water Control District Disston Island Conservancy District Flaghole Drainage District Gerber Groves Water Control District Hendry-Hilliard Water Control District Lehigh Acres Municipal Services District Sugarland Drainage District
Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection Florida Department of Transportation District 1 South Florida Water Management District

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## **List of Acronyms and Abbreviations**

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BMAP	Basin Management Action Plan
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
CDD	Community Development District
CR	County Road
CWA	Clean Water Act
DEP	Florida Department of Environmental Protection
DO	Dissolved Oxygen
DOR	Florida Department of Revenue
DWM	Dispersed Water Management
ECWCD	East County Water Control District
EFDC	Environmental Fluid Dynamics Code
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
FEMA	Federal Emergency Management Agency
F.S.	Florida Statutes
FSAID	Florida Statewide Agricultural Irrigation Demand (geodatabase)
FWM	Flow Weighted Mean Concentration
FWRA	Florida Watershed Restoration Act
FYN	Florida Yards and Neighborhoods
GIS	Geographic Information System
HSPF	Hydrological Simulation Program - FORTRAN
LA	Load Allocation
LA-MSID	Lehigh Acres Municipal Services Improvement District
lbs	Pounds
lbs/ac	Pounds Per Acre
lbs/yr	Pounds Per Year
LET	Load Estimation Tool
LOPP	Lake Okeechobee Protection Plan
mgd	Million Gallons Per Day
mg/L	Milligrams Per Liter
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service



O&M	Operations and Maintenance
OAWP	Office of Agricultural Water Policy
OSTDS	Onsite Sewage Treatment and Disposal System
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
RFI	Request for Information
ROC	Regional Operations Center
RRLA	Rapid Rate Land Application
SFWMD	South Florida Water Management District
SR	State Road
STA	Stormwater Treatment Area
STORET	STorage and RETrieval (database)
SWFWMD	Southwest Florida Water Management District
SWMP	Stormwater Master Plan
TBD	To Be Determined
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TRA	Targeted Restoration Area
UAL	Unit Area Load
UF–IFAS	University of Florida Institute of Food and Agricultural Sciences
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WBID	Waterbody Identification (number)
WCD	Water Control District
WIN	Watershed Information Network (Database)
WLA	Wasteload Allocation
WWTF	Wastewater Treatment Facility
WY	Water Year

## **Executive Summary**

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### **Background**

The Caloosahatchee River and Estuary Watershed is located in southwest Florida in Charlotte, Collier, Glades, Hendry, and Lee Counties (see **Figure ES-1**). The Caloosahatchee River runs from Lake Okeechobee through a series of locks to San Carlos Bay. It has both fresh and marine segments: the freshwater segment is from Lake Okeechobee to the Franklin Lock (S-79). The marine segment extends from the Franklin Lock to Shell Point, adjacent to San Carlos Bay, with Pine Island Sound to the northwest and Estero Bay to the southeast. The Caloosahatchee River and Estuary Watershed is comprised of 3 subwatersheds and 27 basins.

The Caloosahatchee River and Estuary and its associated watershed have been subjected to hydrologic, land use, and other anthropogenic modifications over the past century that have degraded water quality in the estuary and several tributaries to the Caloosahatchee River. To help address the nutrient impairment, the Florida Department of Environmental Protection (DEP) adopted total maximum daily loads (TMDLs) for total nitrogen (TN) and total phosphorus (TP) for waterbodies in the watershed. This BMAP represents the joint efforts of multiple stakeholders to identify where nutrients, both nitrogen and phosphorus, can be reduced through regulatory and non-regulatory programs, incentive-based programs, and implementation of projects that will ultimately achieve the TN and TP TMDLs in the waterbodies.

### **TMDLs**

TMDLs are water quality targets designed to address verified impairments for specific pollutants, such as total nitrogen (TN) and total phosphorus (TP). The Florida Department of Environmental Protection (DEP) identified the Caloosahatchee Estuary as impaired for chlorophyll *a* caused by excessive nutrients in 2005. In December 2009, DEP adopted a TMDL for TN in the Caloosahatchee Estuary downstream of the Franklin Lock and Dam. The TMDL proposed a 23 % load reduction from the Caloosahatchee River and Estuary watershed.

In 2005, 2010, and 2016, DEP identified several tributaries to the Caloosahatchee River as impaired for dissolved oxygen (DO). In late 2019, DEP adopted TN, TP, and biochemical oxygen demand (BOD) TMDLs for these tributaries. The TMDL targets are described in **Section 1.1.1**.

### **Caloosahatchee River and Estuary BMAP**

DEP first adopted the Caloosahatchee Estuary BMAP in November 2012 to implement the TN TMDL in the Caloosahatchee Estuary downstream of the Franklin Lock and Dam. BMAPs are designed to be implemented in a phased approach and, at the end of each five-year phase, a review is completed and submitted to the Legislature and Governor. In November 2017, DEP and the local stakeholders completed the first 5-Year Review to evaluate implementation at the end of the first phase and make recommendations for future phases of the BMAP. The

information gathered as part of the 5-Year Review was used to develop this updated BMAP for the Caloosahatchee River and Estuary Watershed.

In addition, in January 2019, Executive Order 19-12 (Item C) included a requirement to update and secure all restoration plans, within one year, for waterbodies impacting south Florida communities, including the Caloosahatchee River and Estuary BMAP. This 2020 BMAP provides information on changes since the 2012 BMAP was adopted, including the expansion of the BMAP boundary to include the East and West Caloosahatchee Subwatersheds, updates to the modeling, updated allocations of load reductions to the responsible stakeholders, management actions to achieve nutrient reductions, and a revised monitoring plan to continue to track trends in water quality. This update sets a goal for achieving load reductions no later than 2032, which is 20 years after the initial BMAP adoption and the original timeline from the 2012 BMAP.

### **Summary of Load Reductions**

DEP asked the stakeholders to provide information on management actions, including projects, programs, and activities, that would reduce nutrient loads from the Caloosahatchee River and Estuary Watershed. Management actions were required by the original BMAP to address nutrient loads to the estuary and had to meet several criteria to be considered eligible for credit. During the development of this update, projects were collected throughout the watershed and benefits to the estuary and impaired tributaries were estimated using the load estimation shapefile developed from the Hydrological Simulation Program – FORTTRAN (HSPF) model. Through June 30, 2019, 124 projects were completed, and an additional 75 projects were underway or planned. A Request for Information (RFI) was released in October 2019 to solicit additional projects from public and private entities in the Caloosahatchee River and Estuary Watershed. The completed activities in the Caloosahatchee River and Estuary Watershed are estimated to achieve total reductions of 563,630 pounds per year (lbs/yr) of TN, which is 62 % of the reductions needed to meet the TN TMDL for the estuary. The activities completed to date are estimated to achieve total reductions to the estuary of 56,301 lbs/yr of TP. **Figure ES-2** shows progress towards the estuary TN TMDL load reductions based on projects completed through June 30, 2019. Since the tributary TMDLs were adopted only a few months prior to this BMAP update, future reports will include progress towards the tributary TMDLs.

To achieve the TMDL in 20 years, stakeholders must identify and submit additional local projects and the Coordinating Agencies (DEP, Florida Department of Agriculture and Consumer Services [FDACS], and South Florida Water Management District [SFWMD]) must identify additional regional projects as well as determine the significant funding that will be necessary. Enhancements to programs addressing basinwide sources will also be required. In addition, the legacy phosphorus contribution in the watershed must be addressed through further studies and projects targeted at this source. Once this additional information is provided, the Coordinating Agencies will address these constraints.

## **Source Requirements**

This BMAP sets TN and TP effluent limits in the Caloosahatchee River and Estuary Watershed for individually permitted domestic wastewater facilities, 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, associated RRLA or reuse activity would not cause or contribute to an exceedance of TMDLs or water quality standards. In U.S. Census–designated urbanized areas and urban clusters, local governments and utilities are also directed to develop master wastewater treatment feasibility analyses to identify specific areas to be sewered within 20 years of BMAP adoption. In areas not targeted for sewerage, local governments should identify alternative methods to address loads from septic systems. The intent of the master wastewater treatment feasibility analysis is to identify noncentral sewered areas so further steps can be taken with alternative treatment options for those areas. Sources of funding to address nutrient loading from septic systems should also be identified.

Agricultural nonpoint sources are the predominant contributor of TN and TP loading to the Caloosahatchee River and Estuary. Attainment of the TMDLs is largely contingent upon addressing the agricultural loading to the river and tributaries. The Caloosahatchee River and Estuary BMAP was originally adopted in November 2012, and many agricultural producers have enrolled and are implementing best management practices (BMPs). However, enrollment still falls well short of the full enrollment requirement under law, and for those producers that have enrolled, onsite verification of BMP implementation is insufficient. This insufficiency in agricultural BMP enrollment and implementation verification can be a constraint to achieving the TMDLs in 20 years, and to address this constraint it is paramount that FDACS carries out its statutory authority and fulfills its statutory obligations by more actively engaging agricultural nonpoint sources to enroll in BMPs and by adequately verifying BMP implementation. FDACS has requested funding for additional positions to enable it to undertake these activities at least every two years.

FDACS is responsible for verifying that all eligible landowners are enrolled in appropriate BMP programs, and within one year of the adoption of this BMAP DEP needs FDACS to provide a list of all agricultural landowners in the Caloosahatchee River and Estuary Watershed with their enrollment status. DEP also needs FDACS to perform regular onsite inspections of all agricultural operations enrolled under a BMP manual to ensure that these practices are being properly implemented. Ideally, these inspections would occur at least every two years.

Further reductions beyond the implementation of required agricultural owner–implemented BMPs will be necessary to achieve the TMDL. As such, pursuant to Subsection 373.4595(3), F.S., where water quality problems are detected for agricultural nonpoint sources despite the appropriate implementation of adopted BMPs, a reevaluation of the BMPs shall be conducted pursuant to Subsection 403.067(7), F.S. If the reevaluation determines that the BMPs or other measures require modification, the applicable rule will be revised to require implementation of the modified practice.

Further reductions can also be achieved through the implementation of additional agricultural projects or activities. The Coordinating Agencies (DEP, FDACS, and SFWMD) will work together to identify cost-share practices and other projects that can be undertaken to achieve these nutrient reductions and identify and implement additional projects and activities in priority targeted restoration areas (TRAs). These additional projects and activities are to be implemented in conjunction with the BMP Program, which needs to achieve full enrollment with verification to ensure that the BMAP goals are achieved. FDACS will also collect nitrogen and phosphorus fertilization records during implementation verification visits from each agricultural producer enrolled in BMPs and provide an annual summary to DEP and SFWMD of aggregated fertilizer use in the BMAP area.

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, F.A.C. 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**

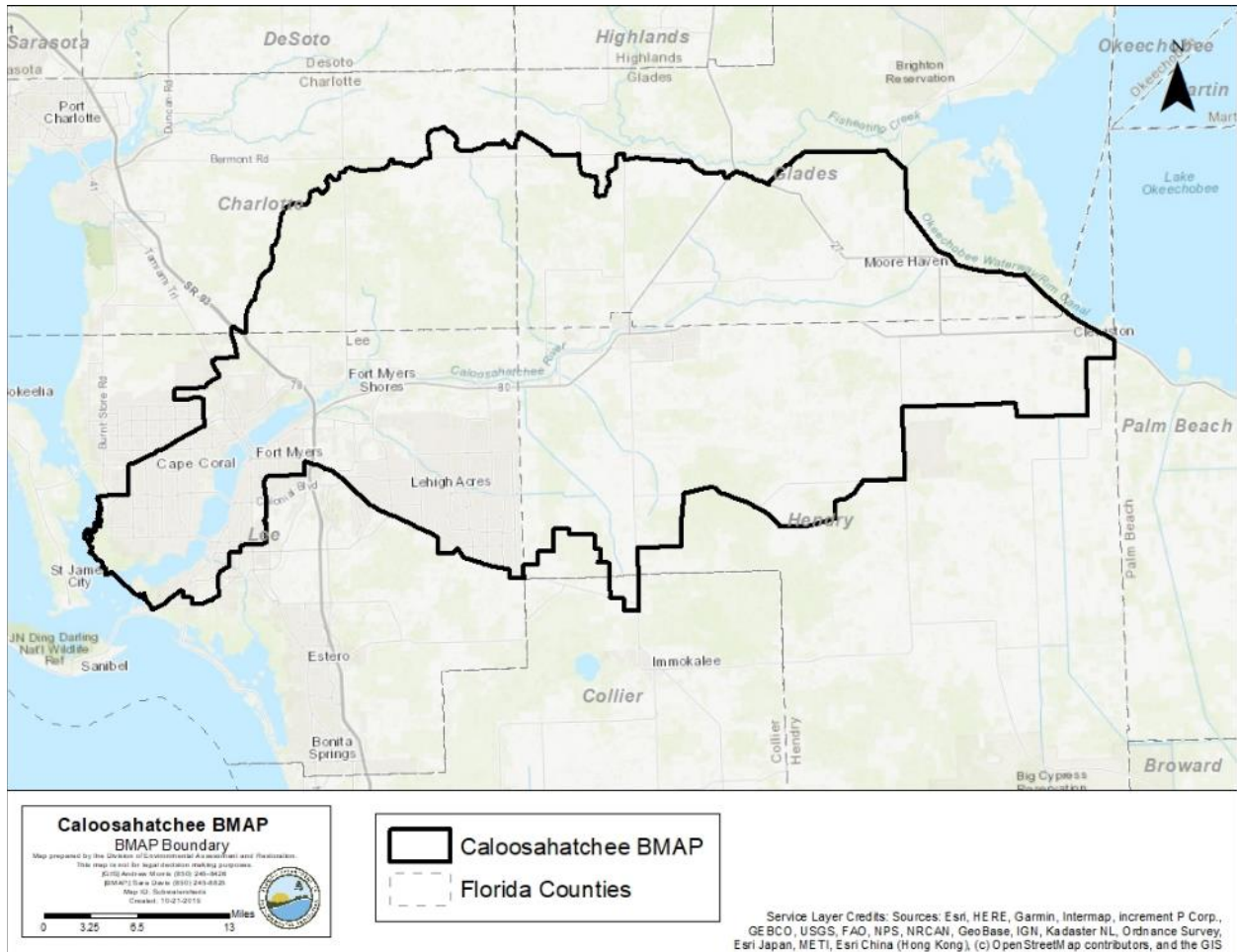
The original BMAP monitoring network included 112 stations within the Tidal Caloosahatchee Subwatershed. The updated monitoring network was expanded to the entire subwatershed and includes 194 stations sampled by local entities, DEP, SFWMD, and U.S. Geological Survey (USGS). Fifteen stations are proposed as part of expanded SFWMD monitoring to improve monitoring in basins throughout the watershed. The monitoring network was revised into tiers as follows: (1) Tier 1 stations are the primary/priority stations used in periodic water quality analysis to track BMAP progress and water quality trends over the long-term. If at any point it is necessary to reduce efforts in the basin, these stations should be the last stations impacted. (2) Tier 2 stations will provide secondary information that can be used to help focus and adaptively manage implementation efforts. (3) Tier 3 stations are the gauges where flow and/or stage are monitored, generally by USGS. The monitoring stations are not specifically BMAP stations—i.e., they are designed for other purposes—but some of the data collected at these sites are used to monitor the effectiveness of BMAP implementation.

### **BMAP Cost**

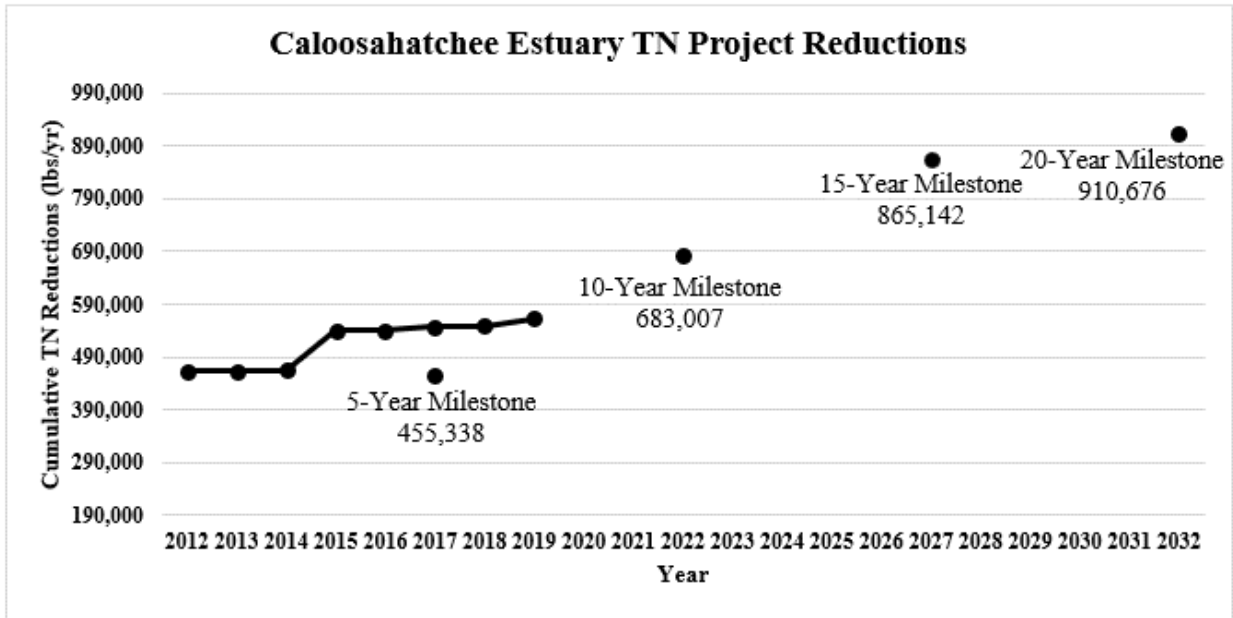
The project costs provided for the BMAP may include capital costs as well as those associated with construction and routine operations and maintenance and monitoring. Many BMAP projects were built to achieve multiple objectives and not just nutrient reductions. Funds for some

projects have already been spent, others have been obligated to ongoing projects, and the remainder are yet to be appropriated.

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



**Figure ES-1. Caloosahatchee River and Estuary BMAP area**



**Figure ES-2. Estimated progress towards meeting the Caloosahatchee Estuary TN TMDL with projects completed through October 31, 2019**

## 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 most of those in the Caloosahatchee River and Estuary Watershed, 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. **Table 1** lists all designated use classifications for Florida surface waters.

**Table 1. Designated use attainment categories for Florida surface waters**

<sup>1</sup> Class I, I-Treated, and II waters additionally include all Class III uses.

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

Section 303(d) of the federal Clean Water Act (CWA) requires that every two years each state must identify its "impaired" waters, 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 annual update to the state "303(d) list."

In 2005, DEP identified the Caloosahatchee Estuary as impaired for chlorophyll *a* caused by excessive nutrients. In 2005, 2010, and 2016 DEP identified various tributaries to the Caloosahatchee River, including the S-4 Basin (waterbody identification [WBID] number 3246), C-19 Canal (WBID 3237E), Lake Hicpochee (WBID 3237C), Long Hammock Creek (WBID 3237B), and Townsend Canal (WBID 3235L) as impaired for DO.

#### 1.1.1. Caloosahatchee River and Estuary TMDLs

A TMDL is the maximum amount of a specific pollutant that a waterbody can assimilate while maintaining its designated uses. The Caloosahatchee Estuary TMDL was adopted in 2009 for



total nitrogen (TN). The TMDL included three segments with WBID numbers 3240A, 3240B, and 3240C. **Table 2** lists the TMDL and pollutant load allocations as a percent reduction and in pounds per year (lbs/yr) implemented by rule (Rule 62-304.800, Florida Administrative Code [F.A.C.], effective August 13, 2009) for the Caloosahatchee Estuary (based on updates to the watershed loading effective November 28, 2012). The 23 % reduction required by the TMDL was used as the basis for the BMAP targets and allocation calculations.

In July 2019, DEP adopted dissolved oxygen (DO) TMDLS for TN, total phosphorus (TP), and biochemical oxygen demand (BOD) for five tributaries in the upper Caloosahatchee River Basin (effective August 13, 2019). **Table 3** lists the TMDL components for nutrients in the Upper Caloosahatchee River Basin Tributaries. For the S-4 Basin, C-19 Canal, Lake Hicpochee, Long Hammock Creek, and Townsend Canal, the TMDLs are expressed as a 7-year rolling average load not to be exceeded.

**Figure 1** shows the locations of the estuary and tributary WBIDs with nutrient TMDLs.

**Table 2. Caloosahatchee River and Estuary TMDLs**

NPDES = National Pollutant Discharge Elimination System.

TMDL covers WBIDs 3240A, 3240B, and 3240C.

<sup>1</sup> From Table 6.1 in the 2009 Final TMDL report.

Parameter	Wasteload Allocation (WLA) for Wastewater (lbs/yr)	WLA for NPDES Stormwater (% Reduction)	Load Allocation (LA, % Reduction)	Margin of Safety	TMDL (lbs/yr)	Current Loading (lbs/yr) <sup>1</sup>
TN	Permitted loads	23	23	Implicit and explicit	9,086,094	11,800,122

**Table 3. Caloosahatchee River and Estuary Tributaries TMDLs**

<sup>1</sup>The TMDL represents a 7-year rolling average of annual loads, not to be exceeded. Dividing by 365 yields daily TMDL loads.

<sup>2</sup>The required percent reductions listed in this table represent the reduction from all sources.

<sup>3</sup>Margin of Safety is implicit.

N/A = not applicable

WBID	Parameter	TMDL (maximum 7-year average load in lbs) <sup>1</sup>	WLA Wastewater (% reduction) <sup>2, 3</sup>	WLA NPDES Stormwater (% reduction) <sup>2, 3</sup>	LA (% reduction) <sup>2, 3</sup>
S-4 Basin (3246)	TN	430,844	N/A	N/A	23
S-4 Basin (3246)	TP	28,622	N/A	N/A	27
S-4 Basin (3246)	BOD	664,946	N/A	N/A	28
C-19 Canal (3237E)	TN	78,114	N/A	N/A	48
C-19 Canal (3237E)	TP	5,167	N/A	N/A	48
C-19 Canal (3237E)	BOD	186,354	N/A	N/A	48
Lake Hicpochee (3237C)	TN	4,175.743	N/A	N/A	2
Lake Hicpochee (3237C)	TP	227,423	N/A	N/A	2
Lake Hicpochee (3237C)	BOD	5,768,701	N/A	N/A	3

WBID	Parameter	TMDL (maximum 7- year average load in lbs) <sup>1</sup>	WLA Wastewater (% reduction) <sup>2, 3</sup>	WLA NPDES Stormwater (% reduction) <sup>2, 3</sup>	LA (% reduction) <sup>2, 3</sup>
Long Hammock Creek (3237B)	TN	330,381	N/A	N/A	42
Long Hammock Creek (3237B)	TP	25,384	N/A	N/A	42
Long Hammock Creek (3237B)	BOD	773,946	N/A	N/A	42
Townsend Canal (3235L)	TN	300,564	N/A	37	37
Townsend Canal (3235L)	TP	28,749	N/A	38	38
Townsend Canal (3235L)	BOD	673,151	N/A	37	37

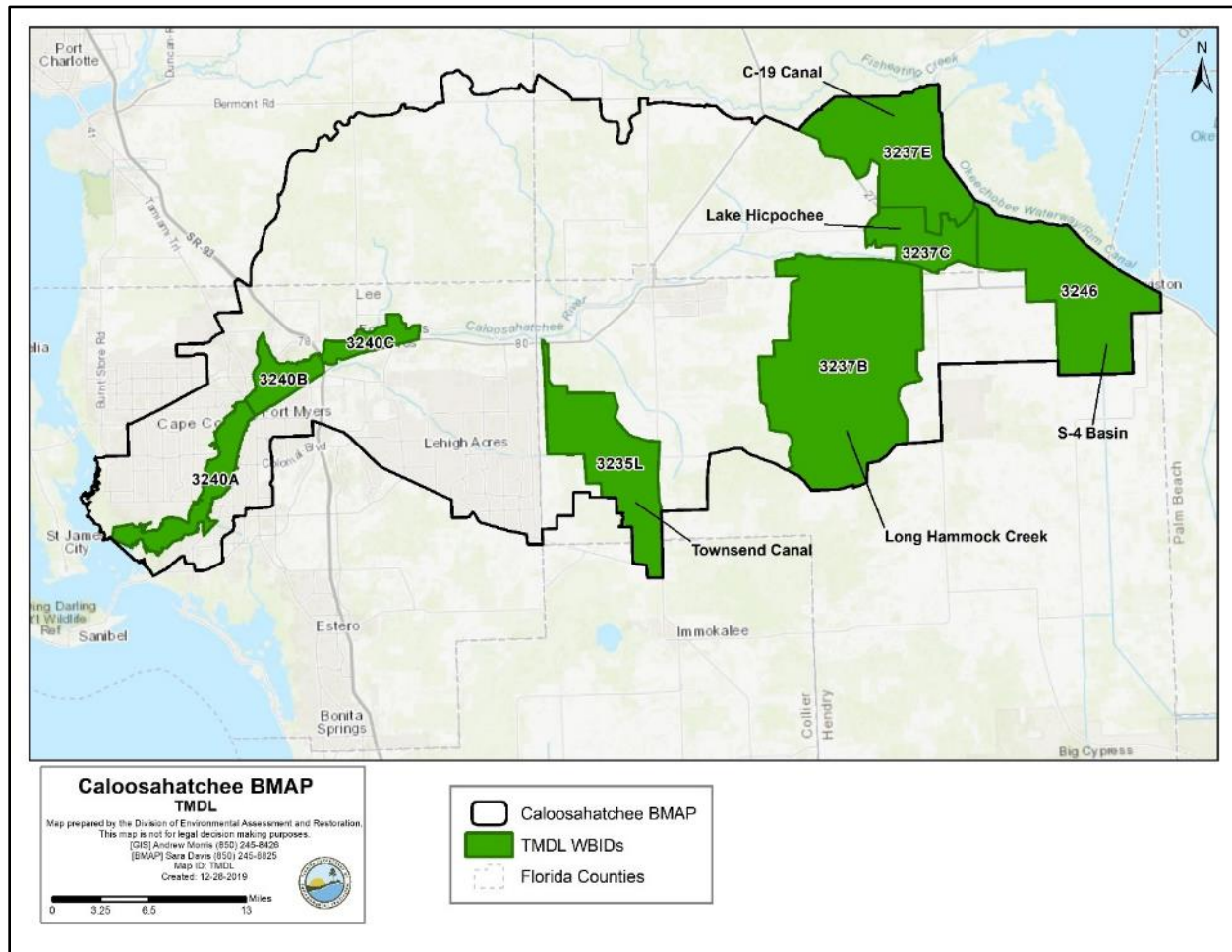


Figure 1. Caloosahatchee River and Estuary TMDL WBIDs

## **1.2. Caloosahatchee River and Estuary Basin Management Action Plan (BMAP)**

DEP implements TMDLs through permits and BMAPs; the latter contain strategies to reduce and prevent pollutant discharges through various cost-effective means. During the watershed restoration process, DEP and the affected stakeholders jointly develop BMAPs or other implementation approaches. Stakeholder involvement is critical to the success of the watershed restoration program and varies with each phase of implementation to achieve different purposes. The BMAP development process is structured to achieve cooperation and consensus among a broad range of interested parties, including the South Florida Water Management District (SFWMD), Florida Department of Agriculture and Consumer Services (FDACS), and stakeholders representing other agencies, governments, and interested parties.

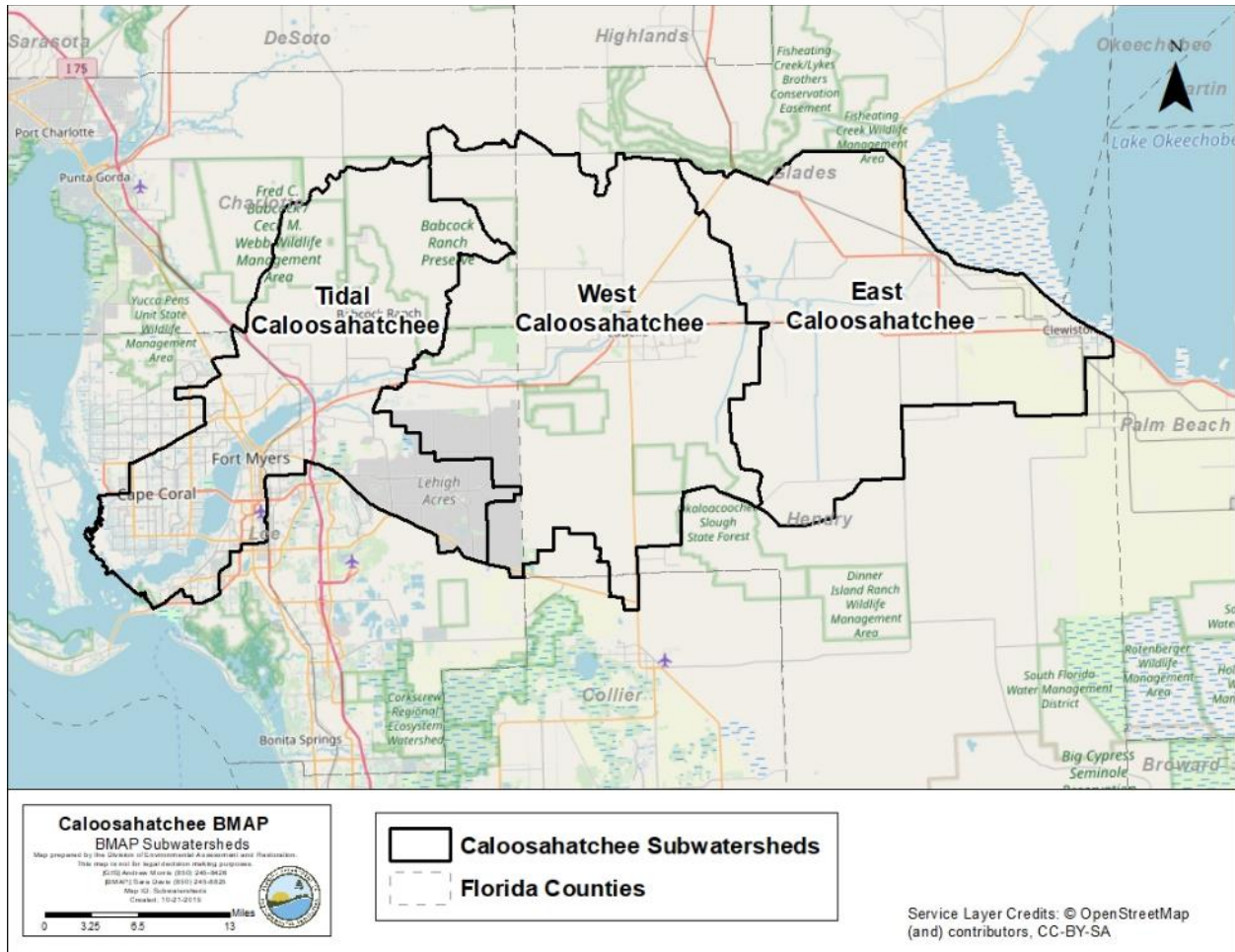
The Florida Watershed Restoration Act (FWRA), Subparagraph 403.067(7)(a)1., Florida Statutes (F.S.), establishes an adaptive management process for BMAPs that continues until the TMDLs are met. This approach allows for incrementally reducing loadings through the implementation of projects and programs, while simultaneously monitoring and conducting studies to better understand water quality dynamics (sources and response variables) in each impaired waterbody. The original Caloosahatchee River and Estuary BMAP was adopted in November 2012, and the first 5-Year Review was completed in November 2017 (Section 373.4595, F.S., calls for a review of the BMAP to be completed and submitted to the Legislature and Governor every five years). This adaptive management process will continue until the TMDLs are met.

In January 2019, Executive Order 19-12 (Item C) included a requirement to update and secure all restoration plans, within one year, for waterbodies impacting south Florida communities, including the Caloosahatchee River and Estuary BMAP. This document serves as an update to the 2012 BMAP based on recommendations from the 5-Year Review, which was completed in November 2017. **Figure 2** shows the Caloosahatchee River and Estuary BMAP area with the subwatershed divisions. The 2012 BMAP was developed for the Tidal Caloosahatchee Subwatershed, and this BMAP expands the boundary to include all three subwatersheds. **Figure 3** shows the basins within the BMAP area. **Figure 4** shows the estimated progress toward meeting the Caloosahatchee Estuary TMDL, as of June 2019, with projects completed through October 31, 2019. Since the tributary TMDLs were adopted only a few months prior to this BMAP update, future reports will include progress towards the tributary TMDLs.

A Request for Information (RFI) was released in October 2019 to solicit additional projects from public and private entities in the Caloosahatchee River and Estuary Watershed. The completed activities are estimated to achieve total reductions of 811,389 pounds per year (lbs/yr) of TN, which is 65 % of the reductions needed to meet the TN TMDL. The activities completed to date are estimated to achieve total reductions of 190,377 lbs/yr of TP, which is 47 % of the reductions needed to meet the TP TMDL.

Subsection 373.4595(4)(d), F.S., requires DEP to set an implementation schedule for achieving the BMAP load reductions. To meet this requirement, DEP establishes a set of five-year

milestones by which a certain percentage of the load reductions must be met. Additionally, stakeholders need to provide DEP with reasonable assurance that they have enough project credits to achieve their required reductions within the period established by the BMAP. The next 5-year milestone will be in 2022 (10 years after the initial BMAP adoption), by which at least 75 % of the TN required reductions for the estuary are expected to be met. The goal established by this BMAP for achieving the full load reductions is 2032, which is 20 years after the initial BMAP adoption.



**Figure 2. Caloosahatchee River and Estuary BMAP subwatersheds**



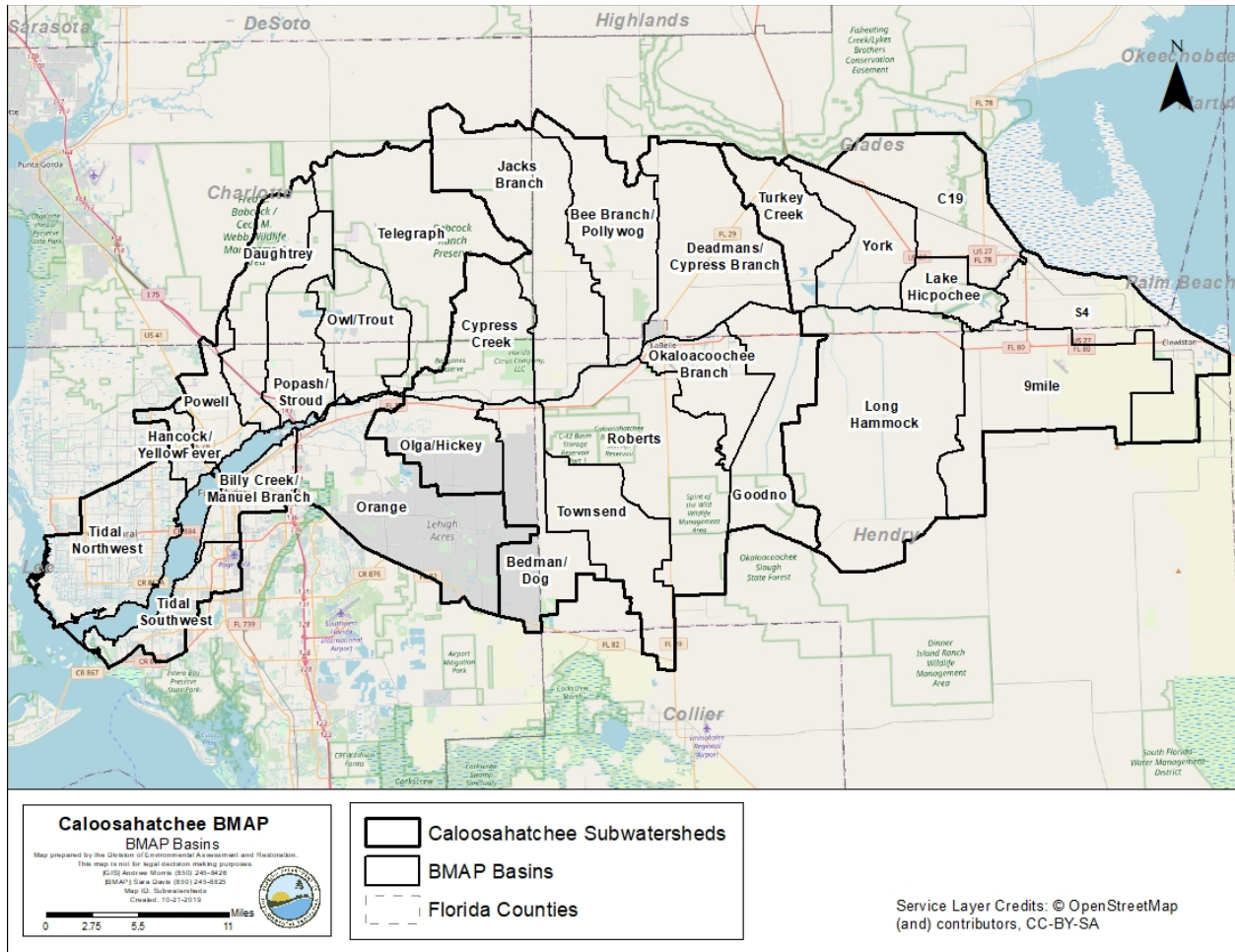
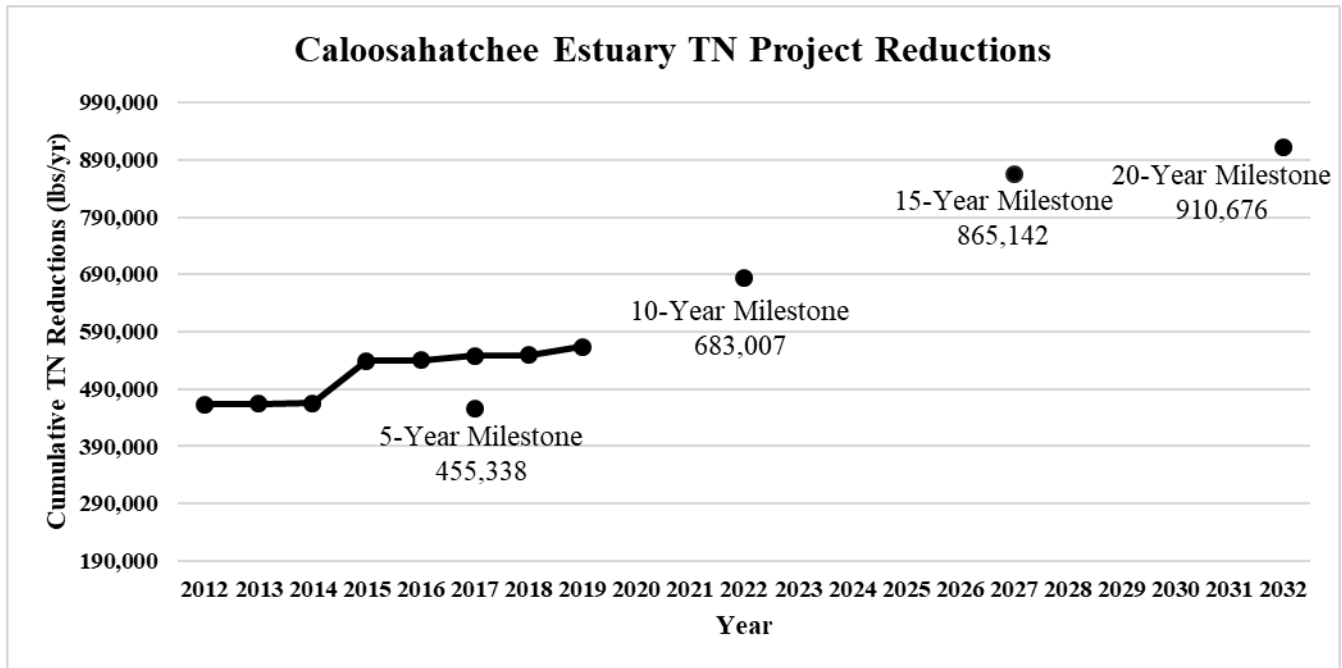


Figure 3. Caloosahatchee River and Estuary BMAP basins



**Figure 4. Estimated progress towards meeting the Caloosahatchee Estuary TMDL with projects completed through October 31, 2019**

### 1.2.1 Five-Year Review

The 5-Year Review, completed in November 2017, provided recommendations for improving the health of the Caloosahatchee River and Estuary Watershed, and these recommendations are included throughout this updated BMAP. The 5-Year Review also included a water quality trend analysis to track trends in TN concentrations in the Tidal Caloosahatchee Subwatershed. The results of this trend analysis are used in the targeted restoration area (TRA) approach described in **Section 2.4**.

The 5-Year Review recommended that allocations and estimated reductions be revised once model updates were complete, and these model updates and allocations are described in **Chapter 2**. Based on the allocations established at the time and the current and future project information provided by stakeholders during the 5-Year Review, DEP anticipated that it was practicable to achieve reductions sufficient to meet the TMDL within 20 years.

The 5-Year Review also recommended changes to the monitoring network, including implementing a new tier system for the sampling stations, adding or removing several stations, and transitioning the primary repository or ambient water quality data to WIN. Updates to the BMAP monitoring network are described in **Section 2.5**.

### 1.2.2 Pollutant Sources

There are various sources of pollution in the Caloosahatchee River and Estuary Watershed. Nonpoint (i.e., diffuse) sources in the watershed contribute the majority of the TN and TP loads to the Caloosahatchee River and Estuary and include urban and agricultural stormwater runoff. Lake Okeechobee loading is being addressed through the Lake Okeechobee BMAP. Several reports (SFWMD; DEP; FDACS; periodic Caloosahatchee River Watershed Protection Plan updates) document more detailed information regarding TN and TP inputs from the Caloosahatchee River and Estuary Watershed.

**Table 4** summarizes the percent contribution of TN and TP loads to the Caloosahatchee Estuary from each land use category in each subwatershed, as determined by the Hydrological Simulation Program – FORTRAN (HSPF) model and load estimation shapefile discussed in **Section 2.1**. The subsections below discuss the sources included in this BMAP in more detail.

**Table 4. Summary of TP and TN loads by land use category by subwatershed**

Subwatershed	Land Use Category*	TN Load to Estuary (% Subwatershed Total)	TP Load to Estuary (% Subwatershed Total)
East Caloosahatchee	Urban	5	16
East Caloosahatchee	Agriculture	90	80
East Caloosahatchee	Natural	5	4
Tidal Caloosahatchee	Urban	43	83
Tidal Caloosahatchee	Agriculture	44	12
Tidal Caloosahatchee	Natural	13	5
West Caloosahatchee	Urban	21	20
West Caloosahatchee	Agriculture	71	73
West Caloosahatchee	Natural	8	7

\* Urban is HSPF model land use codes 1-7; natural lands are HSPF model land use codes 13, 14, 15, and 16; and agriculture is HSPF model land use codes 8, 9, 10, 11, and 12.

### ***1.2.2.1 Agricultural Nonpoint Sources***

The primary agricultural land uses in the Caloosahatchee River and Estuary Watershed are row/field crops, cow/calf operations (pasture), and citrus. Other agricultural land uses include dairy, nursery, sod, and specialty fruit and nut operations. Because of urban encroachment, citrus health issues (freeze/disease), and the downturn in the economy, many 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 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 to implement best management practices (BMPs) adopted by FDACS to help achieve load reductions or demonstrate through monitoring, per Chapter 62-307, F.A.C., that water quality standards are already being met. To date, 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 BMP 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 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 annual surveys submitted by producers enrolled in the BMP Program and site visits by OAWP staff. Producers not implementing BMPs according to the process outlined in Chapter 5M-1, F.A.C., are referred to DEP for enforcement action after attempts at remedial action are exhausted.

FDACS staff conduct site visits to verify that all BMPs are being implemented correctly 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, whether a survey was completed by the producer for the most recent year, and whether the operation has received cost-share funding. FDACS has requested funding for additional positions to enable it to undertake these onsite inspections at least every two years and provide information it obtains to DEP, subject to any confidentiality restrictions.

Pursuant to Subsection 373.4595(3), F.S., where water quality problems are detected for agricultural nonpoint sources despite the appropriate implementation of adopted BMPs, a reevaluation of the BMPs shall be conducted pursuant to Subsection 403.067(7), F.S. If the reevaluation determines that the BMPs or other measures require modification, the applicable rule will be revised to require implementation of the modified practice. Continuing water quality problems may be detected through the monitoring component of the BMAP and other DEP and SFWMD activities. If a reevaluation of the BMPs is needed, FDACS will also include DEP, SFWMD and other partners in the process. **Section 2.3.1** provides further details on the reevaluation of existing practices.

For the BMAP, the implementation of agricultural BMPs will be documented based on participation in FDACS' BMP Program. The program rules provide the presumption of compliance to those agricultural landowners.

**Table 5** and **Table 6** summarize the agricultural land use enrolled in BMP programs for the entire Caloosahatchee River and Estuary Watershed and by subwatershed, respectively. Enrollment is as of June 30, 2019, and the agricultural acreage in each subwatershed is based on the Florida Statewide Agricultural Irrigation Demand (FSAID) VI geodatabase. As new BMAPs are developed or existing BMAP areas are expanded, overlap among BMAPs is increasing. In the Caloosahatchee BMAP area, 186,608 agricultural acres are also included in the Lake Okeechobee BMAP. While calculations, allocations, and projects are specific to each BMAP, the number of acres from the individual BMAP reports, if added, exceeds the total acres in the two



BMAP areas. **Appendix B** provides more information on agricultural activities in the Caloosahatchee River and Estuary Watershed.

**Table 5. Summary of agricultural land use acreage enrolled in the BMP Program in the Caloosahatchee River and Estuary BMAP area**

Category	Acres
FSAID VI agricultural acres in the BMAP	419,369
Total agricultural acres enrolled	302,652
% of FSAID VI agricultural acres enrolled	72 %

**Table 6. Agricultural land use acreage enrolled in the BMP Program in the Caloosahatchee River and Estuary BMAP by subwatershed**

Subwatershed	Total FSAID VI Agricultural Acres	Agricultural Acres Enrolled	% of Agricultural Acreage Enrolled
East Caloosahatchee	186,609	145,152	78 %
Tidal Caloosahatchee	36,939	21,121	57 %
West Caloosahatchee	195,821	136,380	70 %
<b>Total</b>	<b>419,369</b>	<b>302,652</b>	<b>72 %</b>

#### 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 VI features outside of the BMP enrollment areas using geographic information system (GIS) software (see **Appendix B** for details). **Table 7** summarizes the results of that analysis.

**Table 7. Summary of unenrolled agricultural land use acreage in the Caloosahatchee River and Estuary BMAP area**

Category	Acres
Unenrolled agricultural acres	116,717
Acres identified within slivers of unenrolled agricultural areas	1,559
Lands without enrollable agricultural activity (e.g., tribal lands, residential development, and parcels with Department of Revenue (DOR) use codes 70-98)	27,408
<b>Total lands with potentially enrollable agricultural activities</b>	<b>87,749</b>

As of June 30, 2019, OAWP had enrolled 302,652 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 FDACS' BMP Program in the watershed is 390,402 acres. Using this adjusted agricultural acreage, 78 % 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 BMAP model. This effort could help FDACS identify specific parcels with the highest modeled nutrient loading. These parcels could then be targeted for 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. Starting in 1992, DEP and/or the water management districts regulated all aquaculture facilities 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 sell aquatic species to annually acquire an Aquaculture Certificate of Registration and implement Chapter 5L-3, F.A.C., Aquaculture BMPs. Permit holders must 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 in the original BMAP may no longer be in operation and there may be new companies in different parts of the basin. In the Caloosahatchee River and Estuary Watershed, 589 acres of aquaculture are under certification with FDACS' Division of Aquaculture as of September 2019. For 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.

### ***1.2.2.2 Municipal Separate Storm Sewer Systems (MS4s)***

Many of the municipalities in the watershed are regulated by the Florida 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 basin in **Chapter 3**. Phase I and Phase II MS4s are required to implement stormwater management programs 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 stormwater management programs (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.

## **PHASE I MS4 STORMWATER PERMIT REQUIREMENTS**

**Table 8** lists the local governments in the Caloosahatchee River and Estuary Watershed designated as Phase I MS4s as of December 2019. Phase I MS4 permittees were subject to a two-part application process requiring (1) the development of a proposed SWMP that would meet the standard of reducing discharged pollutants to the maximum extent practicable, and (2) the incorporation of the SWMP into an individual permit issued to the MS4 operator. The stormwater management programs for Phase I MS4s include, but are not limited to, the following measures:

- Identify major outfalls and pollutant loadings.
- Detect and eliminate nonstormwater discharges (illicit discharges) to the system.
- Reduce pollutants in runoff from industrial, commercial, and residential areas.
- Control stormwater discharges from new development and redevelopment areas.
- Ensure flood control projects assess the impacts to water quality of receiving waters.
- Implement a program to reduce the stormwater discharge of pollutants related to the storage and application of pesticides, herbicides, and fertilizers.
- Implement an assessment program to determine program effectiveness.

Additionally, in accordance with Section 403.067, F.S., if an MS4 permittee is identified in an area with an adopted BMAP or BMAP in development, the permittee must comply with the adopted provisions of the BMAP that specify activities to be undertaken by the permittee. 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 stormwater master plan to address the assigned wasteload in the TMDL.

**Table 8. Entities in the Caloosahatchee River and Estuary Watershed designated as Phase I MS4s**

<b>Permittee</b>	<b>Permit Number</b>
<b>Lee County</b>	<b>FLS000035</b>
<i>City of Cape Coral</i>	<i>FLS266949</i>
<i>City of Fort Myers</i>	<i>FLS266884</i>
<i>FDOT District 1</i>	<i>FLS266965</i>
<i>Lehigh Acres Municipal Service Improvement District (LA-MSID)</i>	<i>FLS266990</i>
<i>Lucaya Community Development District (CDD)</i>	<i>FLS743585</i>
<i>River Hall CDD</i>	<i>FLS743607</i>

## **PHASE II MS4 STORMWATER PERMIT REQUIREMENTS**

**Table 9** lists the Phase II MS4s in the Caloosahatchee River and Estuary Watershed as of December 2019. Under a generic permit, the operators of regulated Phase II MS4s must develop an 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 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

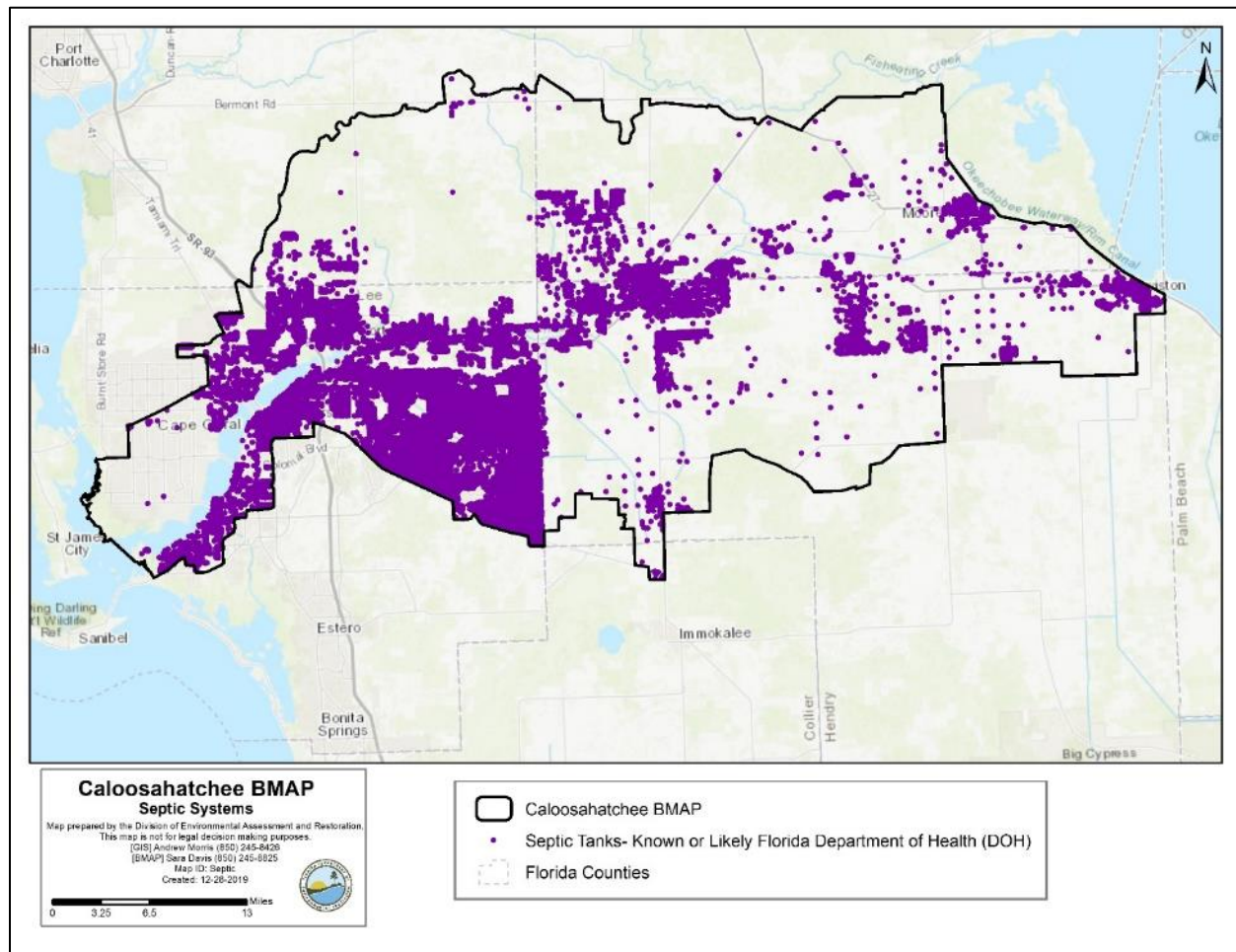
discharges the pollutant(s) of concern. If an MS4 is designated as a regulated Phase II MS4, it is subject to the conditions of the "NPDES Generic Permit for Stormwater Discharges from Phase II MS4s."

**Table 9. Entities in the Caloosahatchee River and Estuary Watershed designated as Phase II MS4s as of December 2019**

Permittee	Permit Number
City of Clewiston	FLR04E134
Charlotte County	FLR04E043
Collier County	FLR04E037
Glades County	FLR04E137
Hendry County	FLR04E138

### 1.2.2.3 Septic Systems

Based on 2019 data from the Florida Department of Health (FDOH), there are 56,603 known or likely septic systems located throughout the Caloosahatchee River and Estuary Watershed (Figure 5). Table 10 summarizes the number of septic systems by subwatershed.



**Figure 5. Locations of septic systems in the Caloosahatchee River and Estuary Watershed**

**Table 10. Septic system counts by subwatershed**

Basin	Number of Septic Systems
East Caloosahatchee	3,758
Tidal Caloosahatchee	37,678
West Caloosahatchee	15,167
<b>Total</b>	<b>56,603</b>

#### **1.2.2.4 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 11** lists the nonpoint sources in the Caloosahatchee River and Estuary Watershed.

**Table 11. Urban nonpoint sources in the Caloosahatchee River and Estuary Watershed**

Type of Entity	Participant
<b>Government Entities and Special Districts</b>	City of LaBelle
	City of Moore Haven
	Copperhead CDD
	Mirada CDD
	Moody River Estates CDD
	Port LaBelle CDD
	Portico CDD
	Sail Harbour CDD
	Sugarland CDD
	Verandah East CDD
	Verandah West CDD
	Barron Water Control District (WCD)
	Clewiston WCD
	Collins Slough WCD
	County Line Drainage District
	Cow Slough WCD
	Devil's Garden WCD
	Disston Island Conservancy District
	Flaghole Drainage District
	Gerber Groves WCD
	Hendry-Hilliard WCD
	Sugarland Drainage District

#### **1.2.2.5 Wastewater Treatment Facilities (WWTFs)**

The Caloosahatchee Estuary TMDL identified 6 permitted NPDES WWTFs in the Tidal Caloosahatchee Subwatershed, and the tributary TMDLs identified 2 permitted NPDES WWTFs,

one in the S-4 Basin, and one in the C-19 Canal watershed. All these facilities met advanced wastewater treatment standards (Section 403.086, F.S.) for nitrogen and provided more stringent phosphorus removal. All offered secondary treatment with additional nutrient removal, and some had high-level disinfection and or dichlorination for public access reuse, which is used for urban irrigation. As of December 2019, there were 53 individually permitted industrial and domestic WWTFs in the Caloosahatchee River and Estuary Watershed. Of these, 8 hold NPDES permits and therefore are authorized, within the limitations of their permits, to discharge directly to surface waters within the Caloosahatchee River and Estuary Watershed. The remaining 45 do not have authorization to discharge directly to surface waters.

### **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.
- 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.
- Reductions in TN and TP loading to the Caloosahatchee tributaries and estuary will increase DO concentrations and reduce chlorophyll *a* concentrations to improve the water quality conditions in these waterbodies.
- The allocations do not include required load reductions from areas identified as natural land use areas in the HSPF model land use coverage. These loads are considered uncontrollable, background sources, and the stakeholders are not required to make reductions on natural lands. The focus of the BMAP allocations is on urban and agricultural stormwater sources and septic tanks in the watershed.
- Achieving the Caloosahatchee Estuary TMDL is contingent on reductions from the Lake Okeechobee watershed, and in the Caloosahatchee River and Estuary allocations, it was assumed that the Lake Okeechobee TMDL had been met. A separate BMAP is adopted for the Lake Okeechobee Watershed.



#### **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:

- **Land Uses** – The loading estimates in the BMAP are based on land uses at a point in time, allowing the model to be validated and calibrated. The loading estimates for this BMAP iteration were based on 2008–09 SFWMD land use data as well as Southwest Florida Water Management District (SWFWMD) land use data that were used in the HSPF model. Based on feedback received during the HSPF model development, DEP disaggregated the agricultural land uses from the original HSPF model into more specific categories to better represent existing conditions and added a land use coverage for the FDOT based on their roads, rights-of-way, and loading estimates.
- **Basin Boundaries** – Since the 2012 BMAP was adopted, DEP has worked to identify an appropriate basin boundary for the expanded BMAP. The BMAP area is based on the HSPF model boundary, with minor modifications. Basins were delineated according to a combination of model basins and other stakeholder input. Basin boundaries may be updated as necessary, based on hydrologic evaluations or other information that becomes available, to more accurately reflect drainage conditions.
- **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.
- **CDD Responsibilities** – DEP had several conversations with the CDDs located in the BMAP area. CDDs were assigned allocations only if three criteria were met: (1) there is development—i.e., roads and infrastructure—on the CDD; (2) the CDD does not discharge to a city or county MS4; and (3) the CDD is responsible for managing stormwater. As further details are provided (e.g., discharge locations from these CDDs), revisions to the allocations and boundaries will be made in future BMAP iterations. Furthermore, some of the CDDs that did not receive an allocation in this BMAP iteration may receive allocations in future BMAP iterations.

- **Chapter 40E-61, F.A.C.** – SFWMD has initiated rulemaking to revise Chapter 40E-61, F.A.C., to ensure its objectives are consistent with Sections 373.4595 and 403.067, F.S.
- **WCDs** – In the 2012 BMAP, one WCD was assigned allocations, but this 2020 BMAP only assigns the canals and rights-of-way to the WCDs 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.
- **Complexity of Problem** – DEP acknowledges the complexity of the dynamics that affect the water quality of the Caloosahatchee River and Estuary Watershed; therefore, this BMAP is designed to encompass a wide variety of projects that will cumulatively act to significantly reduce nutrient loads. In October 2019, DEP released a Request for Information (RFI) to obtain new proposals for restoration projects and technologies to be implemented in the Caloosahatchee River and Estuary Watershed. **Appendix D** describes the projects and technologies submitted through this RFI for any of the 27 basins. Resources will be needed to implement any of these projects throughout the watershed.
- **Legacy Phosphorus** – DEP recognizes that legacy phosphorus may be present in the Caloosahatchee River and Estuary and in the watershed as a result of past anthropogenic activities, and this watershed load has the potential to be transported to the Caloosahatchee Estuary and tributaries. The Coordinating Agencies (DEP, FDACS, and SFWMD) and stakeholders will identify projects and management strategies that will address the legacy load.
- **Previous Restoration Efforts** – DEP recognizes that stakeholders throughout the watershed have implemented stormwater management projects prior to the implementation of the TMDL and that these efforts have benefited water quality. Projects completed in 2000 or later are considered for credits and inclusion in the BMAP.
- **Lake Okeechobee BMAP Overlap** – Portions of the Lake Okeechobee Watershed overlap with the Caloosahatchee River and Estuary Watershed. The projects in these overlap areas are included in both this BMAP and the Lake Okeechobee BMAP. The benefits of these projects will vary by BMAP as the reductions are calculated for the waterbody that is the focus of the BMAP.

## **Chapter 2. Modeling, Load Estimates, and Restoration Approach**

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During development of the 2012 BMAP, stakeholders raised concerns about the existing tidal TMDL and the models used to develop the TMDL. To address these concerns and to update the HSPF watershed model and Environmental Fluid Dynamics Code (EFDC) estuary model for use in additional TMDL development, DEP contracted with Tetra Tech, Inc. and Amec Foster Wheeler, Inc. in 2016. The overall goals of this project were to revise the models so that DEP had the necessary tools to update the BMAP, reevaluate and potentially refine the existing TMDL, and develop TMDLs for impaired waterbodies in the watershed. For both models, the simulation period was extended through 2014, so the model simulation period used was January 1, 1996 through December 31, 2014.

### **2.1. BMAP Modeling**

#### **2.1.1 HSPF Model and Revisions**

The BMAP modeling efforts used the HSPF model results for the watershed. The HSPF model was developed to represent the hydrological and water quality conditions in the Caloosahatchee River and Estuary Watershed and to address the nutrient loadings to the Caloosahatchee River and Estuary. It is capable of simulating the hydrologic and associated water quality processes on pervious and impervious land surfaces and in streams and well-mixed impoundments, and it can simulate one or many pervious or impervious unit areas discharging to one or many river reaches. The HSPF model uses continuous rainfall and other meteorological records as inputs to simulate land surface processes, and the runoff and associated water quality is then integrated with in-stream hydraulic and sediment-chemical interactions. Today, the model is supported and maintained by both EPA and the U.S. Geological Survey (USGS).

To model the hydrologic runoff, the HSPF model simulates processes that impact the volume and timing of surface flow, interflow, and base flow including interception, infiltration, percolation, solid moisture storage, evapotranspiration, ground water recharge, and instream flow transport. The HSPF model can simulate a variety of water quality constituents, including DO, BOD, temperature, sediment, ammonia, nitrite-nitrate, organic nitrogen, orthophosphate, organic phosphorus, and phytoplankton. The model uses a variety of processes to simulate both the land contribution of water quality constituents and the instream chemical transformations.

Various revisions were made to the model, including updating the simulation period and the model land use to the 2008–09 SFWMD and SWFWMD coverages to better represent the model time period and to address stakeholder comments about using a more recent land use coverage in the model. Additional land use classifications were added to better represent the land uses in the watershed, including adding new additional agricultural classifications to meet requests from FDACS. A separate FDOT right-of-way classification was also added. For additional details on model revisions, see the Tetra Tech May 2017 modeling report.

### **2.1.2 Use of HSPF Model for Allocations**

The load estimation tool (LET) was also used to determine load reductions needed to achieve the TMDL and allocations to each of the responsible stakeholders in the watershed. 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 SFWMD 2008–09 land use data related to the natural lands and agriculture categories. The clipping was done sequentially, as follows:

1. Water Management Areas (Dispersed Water Management [DWM], and Comprehensive Everglades Restoration Plan projects in construction or design). The loads from these areas were removed from the allocation calculations as the underlying land uses shown in the model are no longer present.
2. Natural lands (HSPF model land use codes 13, 14, 15, and 16).
3. Agriculture (HSPF model land use codes 8, 9, 10, 11, and 12).
4. Roads (FDOT roads and rights-of-way).
5. WCDs and other special district canals and rights-of-way.
6. CDDs.
7. Cities
8. Remaining area assigned to each county based on boundaries.

The loads associated with WCD canals and natural lands were not assigned to any stakeholder as the TMDL focuses on loads from anthropogenic (urban and agricultural) sources and does not require reductions from natural lands. In addition, the WCDs and other special districts were not assigned a numeric allocation and instead committed to implementing specific BMPs as discussed in **Appendix C**.

### **2.1.3 Use of HSPF Model for Project Estimates**

The revised HSPF model was run for the most recent 10 years of the model period to provide a long-term average load per acre by land use category and attenuation factors from different portions of the watershed. This output was linked with the 2008–09 land use shapefile to create a load estimation shapefile that could be manipulated to calculate allocations and updated baseloads from all existing project treatment areas in the BMAP area. The LET was used to calculate project benefits. The area treated by each structural project was clipped from the LET to determine the starting load for the project area. The appropriate project TN and TP removal efficiencies were then applied to determine the project benefits.

## 2.2. Calculation of Starting Loads and Allocations

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

### 2.2.1 Starting Loads

The allocations were determined in a two-step process. The first step was to determine the existing or starting TN loads to the estuary (lbs/yr) for each entity within the entire watershed, listed in **Table 12**. These loads were calculated following the clipping steps outlined in **Section 2.1.2** to determine the reductions required to achieve the TN TMDL for the estuary. The second step in the process was to determine the existing or starting TN and TP loads for each entity in the tributaries with adopted TMDLs, listed in **Table 13** through **Table 17**. These loads were calculated following the clipping steps outlined in **Section 2.1.2** to determine the reductions required to achieve the TN and TP TMDLs for the tributaries.

**Table 12. Watershed TN starting loads to the estuary by entity**

Entity	Acres	TN starting load to the estuary (lbs/yr)
<b>Agriculture</b>	404,890	2,815,061
<b>Charlotte County</b>	4,142	23,132
<b>City of Cape Coral</b>	26,404	154,987
<b>City of Clewiston</b>	1,941	6,482
<b>City of Fort Myers</b>	9,742	77,536
<b>City of LaBelle</b>	2,137	11,733
<b>City of Moore Haven</b>	642	1,796
<b>Collier County</b>	26	58
<b>FDOT</b>	5,085	25,291
<b>Glades County</b>	9,478	28,437
<b>Hendry County/Port LaBelle CDD</b>	20,190	64,165
<b>Lee County</b>	42,389	235,590
<b>Lehigh Acres MSID</b>	54,932	162,252
<b>Lucaya CDD</b>	41	350
<b>Moody River Estates CDD</b>	249	1,687
<b>Portico CDD</b>	251	1,204
<b>River Hall CDD</b>	1,244	6,667
<b>Sail Harbour CDD</b>	44	505
<b>Verandah East CDD</b>	452	2,119
<b>Verandah West CDD</b>	489	3,279
<b>Natural Lands</b>	262,618	333,189
<b>WCD Canals</b>	983	3,940
<b>Total</b>	<b>848,368</b>	<b>3,959,461</b>

**Table 13. C-19 Canal tributary TN and TP starting loads by entity**

Entity	Acres	TN Starting Load (lbs/yr)	TP Starting Load (lbs/yr)
Agriculture	12,210	57,273	2,626
Glades County	682	1,855	274
FDOT	228	583	99
Natural Lands	1,429	533	38
<b>Total</b>	<b>14,549</b>	<b>60,244</b>	<b>3,036</b>

**Table 14. Lake Hicpochee tributary TN and TP starting loads by entity**

Entity	Acres	TN Starting Load (lbs/yr)	TP Starting Load (lbs/yr)
Agriculture	4,519	22,910	1,137
Natural Lands	4,928	1,668	116
Glades County	305	799	110
FDOT	29	60	12
<b>Total</b>	<b>9,781</b>	<b>25,437</b>	<b>1,375</b>

**Table 15. Long Hammock tributary TN and TP starting loads by entity**

Entity	Acres	TN Starting Load (lbs/yr)	TP Starting Load (lbs/yr)
Agriculture	58,733	406,895	25,389
Natural Lands	17,659	14,315	1,019
Hendry County/Port LaBelle CDD	4,374	13,366	1,338
WCD Canals	258	1,237	100
Glades County	405	1,039	117
FDOT	113	513	131
<b>Total</b>	<b>81,542</b>	<b>437,365</b>	<b>28,094</b>

**Table 16. S-4 Basin tributary TN and TP starting loads by entity**

Entity	Acres	TN Starting Load (lbs/yr)	TP Starting Load (lbs/yr)
Agriculture	30,047	133,796	6,266
Hendry County/Port LaBelle CDD	2,146	7,836	2,096
City of Clewiston	1,941	7,173	1,111
Glades County	594	2,284	701
Natural Lands	2,122	913	65
FDOT	246	843	158
WCD Canals	125	491	96
<b>Total</b>	<b>37,221</b>	<b>153,336</b>	<b>10,493</b>

**Table 17. Townsend Canal tributary TN and TP starting loads by entity**

**Note:** Grey highlighting and boldface type indicate jurisdictions meeting the classification requirements for low priority.

Entity	Acres	TN Starting Load (lbs/yr)	TP Starting Load (lbs/yr)
<b>Agriculture</b>	26,408	249,755	22,481
<b>Natural Lands</b>	3,076	3,080	214
<b>FDOT</b>	157	849	214
<b>Hendry County/Port LaBelle CDD</b>	151	699	140
<b>Collier County</b>	26	<b>80</b>	<b>15</b>
<b>WCD Canals</b>	2	5	1
<b>Total</b>	<b>29,820</b>	<b>254,468</b>	<b>23,065</b>

## 2.2.2 Allocation of Load Reductions

The required load reductions for each entity in the watershed were calculated in several steps. The first step was to apply the required 23 % reduction in TN from the estuary TMDL to the entire watershed load shown in **Table 12** to determine the total TN required reduction of 910,676 lbs/yr. A portion of this reduction was assigned to each entity based on their percentage of the total starting load listed in **Table 18** (minus the natural lands and WCD canals). For example, if an entity was 10 % of the starting load, they received 10 % of the TN required reductions for the estuary.

The next step was to calculate the TN and TP required reductions for the entities within the tributary watersheds. For each tributary, the TMDL TN and TP percent required reductions were applied to the total starting load and the required load reduction was assigned to each entity within that tributary based on their percentage of the starting load for that tributary. The required TN and TP reductions for each entity were added up to determine one overall TN and one overall TP required reduction for the tributaries.

For the tributary entities, their TN allocations for the estuary and tributaries were compared to determine which reduction was higher, and therefore more protective. The higher reduction was assigned as their final TN required reduction. The other stakeholders all received their TN allocation based on the calculation for the estuary. In addition for the tributary entities, the TP allocations calculated for the tributaries were assigned to them. **Table 19** and **Table 20** show the final TN and TP load required reductions by entity, respectively.

### 2.2.2.1 Low Priority Ranking Determination

Several stakeholders contribute less than 0.1 % of the TN loading from the watershed to the Caloosahatchee Estuary or tributaries with TMDLs. 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 at this time; therefore, these entities are currently considered a low priority for implementing reductions for both the estuary and tributary TMDLs.

**Table 18** lists each entity's starting load and percent contribution to the total starting load to the estuary. Stakeholders meeting the classification requirements for low priority for the estuary TMDL are highlighted in grey and include Verandah West CDD, Verandah East CDD, City of Moore Haven, Moody River Estates CDD, Portico CDD, Sail Harbour CDD, Lucaya CDD, and Collier County. For the Townsend Canal TMDL, Collier County meets the low-priority classification. These entities are not required to meet reduction targets for TN but must continue to adhere to all requirements of their 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 updated in future BMAP updates as needed. TN and TP reductions may be needed from the low-priority entities in the future. Therefore, although these stakeholders do not currently have a reduction responsibility, this does not exempt them from such requirements in future BMAP updates. Any actions taken by these entities that result in TN reductions will be documented for credit against any reduction requirements allocated in subsequent BMAP updates.

**Table 18. Entity contributions to total TN starting load to the estuary with low priority ranking cutoff**

**Note:** Grey highlighting and boldface type indicate jurisdictions meeting the classification requirements for low priority.

<b>Entity</b>	<b>TN Starting Load (lbs/yr)</b>	<b>% of Total TN Starting Load</b>
<b>Agriculture</b>	2,815,061	77.71
<b>Lee County</b>	235,590	6.50
<b>LA-MSID</b>	162,252	4.48
<b>City of Cape Coral</b>	154,987	4.28
<b>City of Fort Myers</b>	77,536	2.14
<b>Hendry County/Port LaBelle CDD</b>	64,165	1.77
<b>FDOT</b>	25,291	0.70
<b>Glades County</b>	28,437	0.79
<b>Charlotte County</b>	23,132	0.64
<b>City of LaBelle</b>	11,733	0.32
<b>River Hall CDD</b>	6,667	0.18
<b>City of Clewiston</b>	6,482	0.18
<b>Verandah West CDD</b>	3,279	<b>0.09</b>
<b>Verandah East CDD</b>	2,119	<b>0.06</b>
<b>City of Moore Haven</b>	1,796	<b>0.05</b>
<b>Moody River Estates CDD</b>	1,687	<b>0.05</b>
<b>Portico CDD</b>	1,204	<b>0.03</b>
<b>Sail Harbour CDD</b>	505	<b>0.01</b>
<b>Lucaya CDD</b>	350	<b>0.01</b>
<b>Collier County</b>	58	<b>0.002</b>
<b>Natural Lands</b>	333,189	N/A
<b>WCD Canals</b>	3,940	N/A
<b>Total</b>	<b>3,959,461</b>	<b>100.0</b>



**Table 19. TN load required reductions by entity (lbs/yr)**

Note: Grey highlighting and boldface type indicate jurisdictions meeting the classification requirements for low priority.

Entity	C-19 Canal	Lake Hicpochee	Long Hammock	S-4 Basin	Townsend Canal	Tributaries Total	Estuary	Total
<b>Agriculture</b>	27,737	490	177,197	36,459	93,544	335,426	707,723	707,723
<b>Lee County</b>	N/A	N/A	N/A	N/A	N/A	N/A	59,229	59,229
<b>LA-MSID</b>	N/A	N/A	N/A	N/A	N/A	N/A	40,791	40,791
<b>City of Cape Coral</b>	N/A	N/A	N/A	N/A	N/A	N/A	38,965	38,965
<b>City of Fort Myers</b>	N/A	N/A	N/A	N/A	N/A	N/A	19,493	19,493
<b>Hendry County/Port LaBelle CDD</b>	N/A	N/A	5,821	2,135	262	8,218	16,132	16,132
<b>FDOT</b>	282	1	223	230	318	1,054	6,358	6,358
<b>Glades County</b>	898	17	452	622	N/A	1,990	7,149	7,149
<b>Charlotte County</b>	N/A	N/A	N/A	N/A	N/A	N/A	5,816	5,816
<b>City of LaBelle</b>	N/A	N/A	N/A	N/A	N/A	N/A	2,950	2,950
<b>River Hall CDD</b>	N/A	N/A	N/A	N/A	N/A	N/A	1,676	1,676
<b>City of Clewiston</b>	N/A	N/A	N/A	1,955	N/A	1,955	1,630	1,955
<b>Verandah West CDD</b>	N/A	N/A	N/A	N/A	N/A	N/A	824	<b>0.0</b>
<b>Verandah East CDD</b>	N/A	N/A	N/A	N/A	N/A	N/A	533	<b>0.0</b>
<b>City of Moore Haven</b>	N/A	N/A	N/A	N/A	N/A	N/A	452	<b>0.0</b>
<b>Moody River Estates CDD</b>	N/A	N/A	N/A	N/A	N/A	N/A	424	<b>0.0</b>
<b>Portico CDD</b>	N/A	N/A	N/A	N/A	N/A	N/A	303	<b>0.0</b>
<b>Sail Harbour CDD</b>	N/A	N/A	N/A	N/A	N/A	N/A	127	<b>0.0</b>
<b>Lucaya CDD</b>	N/A	N/A	N/A	N/A	N/A	N/A	88	<b>0.0</b>
<b>Collier County</b>	N/A	N/A	N/A	N/A	30	30	15	<b>0.0</b>
<b>Total</b>	<b>28,917</b>	<b>508</b>	<b>183,6923</b>	<b>41,401</b>	<b>94,154</b>	<b>348,673</b>	<b>910,678</b>	<b>908,237</b>

**Table 20. TP load required reductions by entity (lbs/yr)**

Note: Grey highlighting and boldface type indicate jurisdictions meeting the classification requirements for low priority.

Entity	C-19 Canal	Lake Hicpochee	Long Hammock	S-4 Basin	Townsend Canal	Total
<b>Agriculture</b>	1,276	25	11,106	1,782	8,623	22,811
<b>FDOT</b>	48.2	0	57	45	82	232
<b>City of Clewiston</b>	N/A	N/A	N/A	316	N/A	316
<b>Glades County</b>	133	2	51	199	N/A	386
<b>Hendry County/Port LaBelle CDD</b>	N/A	N/A	585	596	54	1,235
<b>Collier County</b>	N/A	N/A	N/A	N/A	6	<b>0.0</b>
<b>Total</b>	<b>1,457</b>	<b>27</b>	<b>11,799</b>	<b>2,938</b>	<b>8,765</b>	<b>24,980</b>

## **2.3. Basinwide Sources Approach**

### **2.3.1 Agriculture**

When DEP adopts a BMAP that includes agriculture, it is the agricultural landowner's responsibility to implement BMPs adopted by FDACS to help achieve load reductions or demonstrate through monitoring that they are already meeting water quality standards. FDACS is responsible for verifying that all eligible landowners are enrolled in appropriate BMP programs, and within one year of the adoption of this BMAP, DEP needs FDACS to provide a list of all unenrolled landowners in the Caloosahatchee River and Estuary Watershed with their enrollment status. DEP also needs FDACS to perform regular onsite inspections of all agricultural operations enrolled under a BMP manual to ensure that these practices are being properly implemented. Ideally, these inspections would occur at least every two years. From these inspections, FDACS will provide DEP and SFWMD an annual summary of aggregated fertilizer use in the BMAP area, quantifying total applications and providing information on application reductions by subwatershed. FDACS has requested funding for additional positions to enable it to undertake these activities at least every two years.

Although 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, it is also recognized that further reductions, beyond the implementation of required owner-implemented BMPs, will be necessary to achieve the TMDLs. As such, pursuant to Subsection 373.4595(3), F.S., FDACS has committed to updating its existing BMP manuals to incorporate updated BMPs based on the latest scientific and technical research. To expedite further reductions, DEP needs these updates to occur no more than five years from adoption of this BMAP.

Further nutrient reductions can be achieved through implementation of additional agricultural projects or activities. The Coordinating Agencies will continue to collaborate to identify cost-share practices and other projects that can be undertaken to achieve these nutrient reductions and identify and implement additional projects and activities in priority targeted restoration areas (TRAs).

SFWMD is implementing projects that encourage low-input agriculture and water quality improvement technologies. 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. The Coordinating Agencies will also investigate the possibility of implementing other incentive-based programs—such as providing incentives for producers to transition to less intensive crops, changing land use to fallow or native landscape, or changing the type of cropping system—that would reduce nutrient loading in the BMAP area.

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 activities are to be implemented in conjunction with the BMP Program,

which needs to achieve full enrollment with verification to ensure that the BMAP goals are achieved.

### 2.3.2 Septic Systems

In U.S. Census–designated urbanized areas and urban clusters, local governments and utilities will develop master wastewater treatment feasibility analyses that include provisions to address loads from existing and new septic systems (e.g., sewerage, advanced septic system retrofits, prohibiting the installation of new conventional septic systems). The analyses must identify specific areas to be sewerage within 20 years of BMAP adoption. Sources of funding to address nutrient loading from septic systems will also be identified in the analyses. The feasibility analyses will be completed and submitted to DEP within 3 years of the adoption of this BMAP, so that the analyses can inform the selection of management strategies and projects as part of future BMAP updates.

Based on data from FDOH, there are 56,603 known and likely septic systems located throughout the Caloosahatchee River and Estuary Watershed. Of these, 45,038 are located in U.S. Census (2010)–designated urbanized areas or urban clusters. **Table 21** summarizes the TN and TP estimated loads from septic systems in urbanized areas. These loads were calculated based on 2014-2018 U.S. Census Bureau data for the average number of people per household for each county in the Caloosahatchee River and Estuary Watershed, with an estimated wastewater flow of 70 gallons per day per person and TN and TP nutrient concentrations in the effluent from the EPA *Onsite Wastewater Treatment Systems Manual* (2002). This resulted in an average effluent load leaving the septic system of 15 lbs/yr of TN and 1.4 lbs/yr of TP per septic system.

The reductions from addressing these septic systems will be less than the estimated load depending on 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). This effluent load will also attenuate as it travels through the watershed to the Caloosahatchee Estuary; thus the benefits in the estuary from addressing these septic systems will be based on attenuated loads, which have not been calculated. Furthermore, stakeholders will submit projects describing how septic loads are addressed as part of BMAP reporting.

**Table 21. Septic system counts by subwatershed, and estimated effluent loads**

Subwatershed	Total Number of Septic Systems	Number of Septic Systems in the Urbanized Areas and Urban Clusters	Estimated TN Load from Urbanized Septic Systems (lbs/yr)	Estimated TP Load from Urbanized Septic Systems (lbs/yr)
East Caloosahatchee	3,758	2,094	15,459	1,495
Tidal Caloosahatchee	37,678	33,491	178,063	17,219
West Caloosahatchee	15,167	9,453	465,499	45,014
<b>Total</b>	<b>56,603</b>	<b>45,038</b>	<b>659,021</b>	<b>63,728</b>

### **2.3.3 Stormwater**

Stormwater from urban areas is a considerable source of nutrient loading to the Caloosahatchee River and Estuary, 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 five 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 are not currently covered by an MS4 permit and designate eligible entities as regulated MS4s, in accordance with Chapter 62-624, F.A.C.

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 groundwaters 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.

New and existing domestic wastewater facilities and their associated rapid-rate land applications (RRLAs) and reuse activities, must meet the stringent nutrient wastewater limitations set forth in this BMAP. Any such new facilities, their RRLAs, and reuse activities (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 and their associated RRLAs and reuse activities, DEP shall modify the permit limitations and requirements to be consistent with this BMAP at the time of the next permit renewal. In some cases, the owner or operator may require additional time to meet the modified limitations in the renewed permit, in which case, the permit may also establish a compliance schedule not to exceed four and half years after the effective date of the permit.

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 onsite sewage treatment and disposal systems (OSTDS), commonly referred to as 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.

This BMAP requires all individually permitted domestic wastewater facilities and their associated RRLAs and reuse activities to meet the effluent limits listed in **Table 22** and **Table 23**, 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. 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 to the BMAP area. This demonstration may include factors such as dilution; site-specific geological conditions; research/studies, including dye tracer tests; and modeling. Should DEP concur with the reasonable assurance demonstration request, the effluent requirements established here may be modified for the owner or operator or waived. New effluent standards will take effect at the time of permit issuance.

**Table 22** and **Table 23** list the TP and TN effluent limits, respectively, adopted for this BMAP that apply to domestic wastewater facilities and their RRLAs and reuse activities, unless the owner or operator can demonstrate reasonable assurance as listed above. The limits for direct surface discharges apply to individually NPDES-permitted facilities. The limits for RRLA effluent disposal systems apply at the compliance well located at the edge of the zone of discharge for domestic wastewater facilities, RRLAs, or reuse activities having sites such as rapid infiltration basins and absorption fields. The limits for all domestic wastewater discharges not addressed by the direct surface discharge and RRLA limits are specified in the last column of the tables. These limits are applied as an annual average.

Short-term or intermittent discharges are not significant sources of TN or TP in the Caloosahatchee River and Estuary Watershed and are not subject to the limits in **Table 22** and **Table 23**. 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. 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 semi-annual basis are considered insignificant sources of TN and TP.

As of December 2019, there were 53 individually permitted wastewater facilities or activities in the Caloosahatchee River and Estuary Watershed. Of these, 8 hold NPDES permits and therefore are authorized, within the limitations of their permits, to discharge directly to surface waters in the Caloosahatchee River and Estuary Watershed. The remaining 45 do not have authorization to discharge directly to surface waters.

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

**Table 22. TN effluent limits**

mgd = Million gallons per day  
mg/L = milligrams per liter

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	3	10
Less than 0.5 and greater than or equal to 0.01	3	6	10
Less than 0.01	10	10	10

**Table 23. TP effluent limits**

mgd = Million gallons per day  
mg/L = milligrams per liter

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	1	6
Less than 0.5 and greater than or equal to 0.01	1	3	6
Less than 0.01	6	6	6

## 2.4. TRA Approach

### 2.4.1 Overview

To better prioritize and focus resources to most efficiently achieve restoration in the Caloosahatchee River and Estuary Watershed, DEP developed the TRA approach. This approach used measured data collected throughout the watershed to evaluate TN and TP concentrations in each of the Caloosahatchee River and Estuary Watershed subwatersheds and associated basins. Flow data currently exist at three structure stations and several tributary stations within the watershed; however, the TRA approach does not currently include an assessment of water quantity since a flow evaluation has not yet been completed. Once a complete flow evaluation is available, it will be reviewed for inclusion in future BMAP annual updates. The measured nutrient concentrations were compared with selected benchmarks to identify those basins that should be the highest priority for restoration. This advisory process is not intended to be a management strategy under Chapter 403.067, F.S. The benchmarks are not intended to measure progress towards restoration; they were only used to prioritize resources. The overall approach implemented the following steps:

1. Identify smaller areas (e.g., basins) for focused restoration.
2. Delineate each area and locate relevant water quality stations:
  - a. Obtain existing data for TN, TP, and flow.

- b. Recommend additional monitoring where data are lacking.
  - c. Supplement with information from water quality models where appropriate.
- 3. Determine benchmarks for evaluating water quality and water storage:**
  - a. Consider the applicable benchmark (e.g., TN or TP).
  - b. Rely on existing SFWMD information for water storage needs.
- 4. Review measured data:**
  - a. Calculate most recent 5-year average TN and TP concentrations (using available data from water year [WY] 2014–WY2018).
  - b. Compare concentrations to established benchmarks.
  - c. Consult flow weighted mean (FWM) concentrations and unit area loads, where available, to better understand conditions.
- 5. Identify criteria for implementation and funding, and describe restoration types (e.g., water quality, flow) recommended for each TRA:**
  - a. Calculate expected reductions from existing and recommended projects using measured data wherever possible.
  - b. Identify where additional projects are necessary.
- 6. Prioritize areas where new projects would have the most impact to overall restoration:**
  - a. Use water quality (TN and TP) and flow data (where available).
  - b. Compare with benchmarks for each basin.
- 7. Publish an RFI to solicit additional projects and evaluate responses based on benchmarks established for each TRA.**

**Chapter 3** includes the results of the TRA approach for each of the Caloosahatchee River and Estuary basins. **Table D-1** in **Appendix D** lists the projects received from the RFI.

Future steps in this approach include the following:

- Evaluate progress in TRAs annually by comparing measured data with benchmarks for the basins.
- Use responses from RFIs and existing project lists, combined with the prioritized areas and recommended restoration needs, to inform future budget requests for DEP.
- Update existing water quality models based on expanded monitoring efforts.

## **2.4.2 Evaluation**

**Chapter 3** summarizes the results of the TRA evaluation process for the basins in the Caloosahatchee River and Estuary Watershed. For each basin, a priority was assigned based on the TN concentration, TP concentration, and flows (where available). These priorities were set to help focus resources and projects in the basins most in need of improvement. Basins were assessed and prioritized as follows (**Figure 6**):

- 1. Assess the five-year average concentration at representative stations and compare with the benchmark:**
  - a. Priority 1: Concentration is two times greater than the benchmark.
  - b. Priority 2: Concentration is greater than the benchmark but less than two times the benchmark.
  - c. Priority 3: Concentration is less than or equal to the benchmark.
- 2. Assess the five-year average FWM concentration and compare to the benchmark. This step is weighted above Step 1; therefore, the results for the FWM concentrations would supersede the priorities from Step 1.**
  - a. Priority 1: FWM concentration is greater than twice benchmark.
  - b. Priority 2: FWM concentration is greater than benchmark, but less than twice benchmark.
  - c. Priority 3: FWM concentration is equal to or less than benchmark.
- 3. Assess the attenuated unit area load (UAL), which is the average load per acre in each basin from the HSPF model. Compare with the subwatershed UAL target calculated by summing all stakeholder allowable loads in each subwatershed and dividing the sum by the total acres in the subwatershed.**
  - a. Priority increases: UAL is greater than 50% above the basin target UAL.
  - b. Priority decreases: UAL is less than the basin target UAL.
  - c. Priority remains unchanged: UAL is above the basin target UAL, but less than 50 %.
- 4. Assess the water quality trends from the 5-Year Review water quality analysis for statistical significance (as described in the 5-Year Review). This step is weighted above Step 3 where data are available; therefore, results would increase or decrease the priority accordingly:**
  - a. Priority increases: Trend is significantly increasing.
  - b. Priority decreases: Trend is significantly decreasing.
  - c. Priority remains unchanged: No significant trend detected.



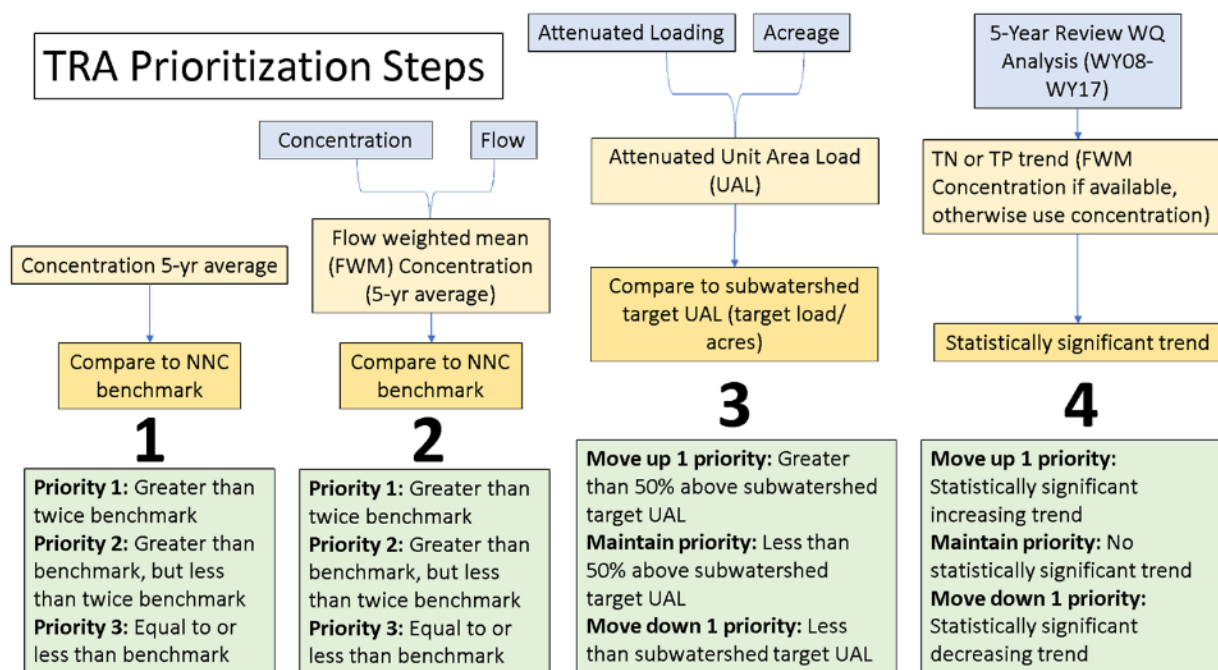


Figure 6. Summary of the TRA prioritization process

## 2.5. Water Quality Monitoring Plan

To help prioritize monitoring and track BMAP progress, the BMAP monitoring network is being revised, as discussed below, to implement a new tiered system for the sampling stations, remove some stations from the network, and add new monitoring locations.

### 2.5.1 Objectives and Parameters

The Caloosahatchee River and Estuary BMAP monitoring plan was designed to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track water quality trends. The information gathered through the monitoring plan measures progress toward achieving the TMDLs and provides a better understanding of watershed loading. The BMAP monitoring plan consists of ambient water quality sampling, sampling at discharge structures, and flow monitoring. In addition, information on water quality throughout the watershed and within the estuary can be found in the latest South Florida Environmental Report, published annually by SFWMD.

Focused objectives are critical for a monitoring strategy to provide the information needed to evaluate implementation success. The primary objective of the monitoring strategy for the Caloosahatchee River and Estuary Watershed, described below, is to evaluate the success of the BMAP and provide information for potential future refinements.

### ***Primary Objective***

- To track trends in TN and TP loads and concentrations by subwatershed and basin.

### ***Secondary Objective***

- To better focus management efforts, measure the effectiveness of individual or collective projects.

To achieve these objectives, the monitoring strategy focuses on the following parameters:

- Alkalinity.
- Ammonia (N).
- BOD.
- Carbon – Organic.
- Carbon – Total.
- Chlorophyll *a*.
- Color.
- DO.
- DO Saturation.
- Flow.
- Nitrate-Nitrite (N).
- Nitrogen – Total Kjeldahl.
- Nitrogen – Total.
- Orthophosphate (P)
- pH.
- Phosphorus – Total.
- Specific Conductance/Salinity.
- Temperature, Water.
- Total Suspended Solids.
- Turbidity.

### **2.5.2 Monitoring Network**

The monitoring network comprises a tiered system for the sampling stations, as follows:

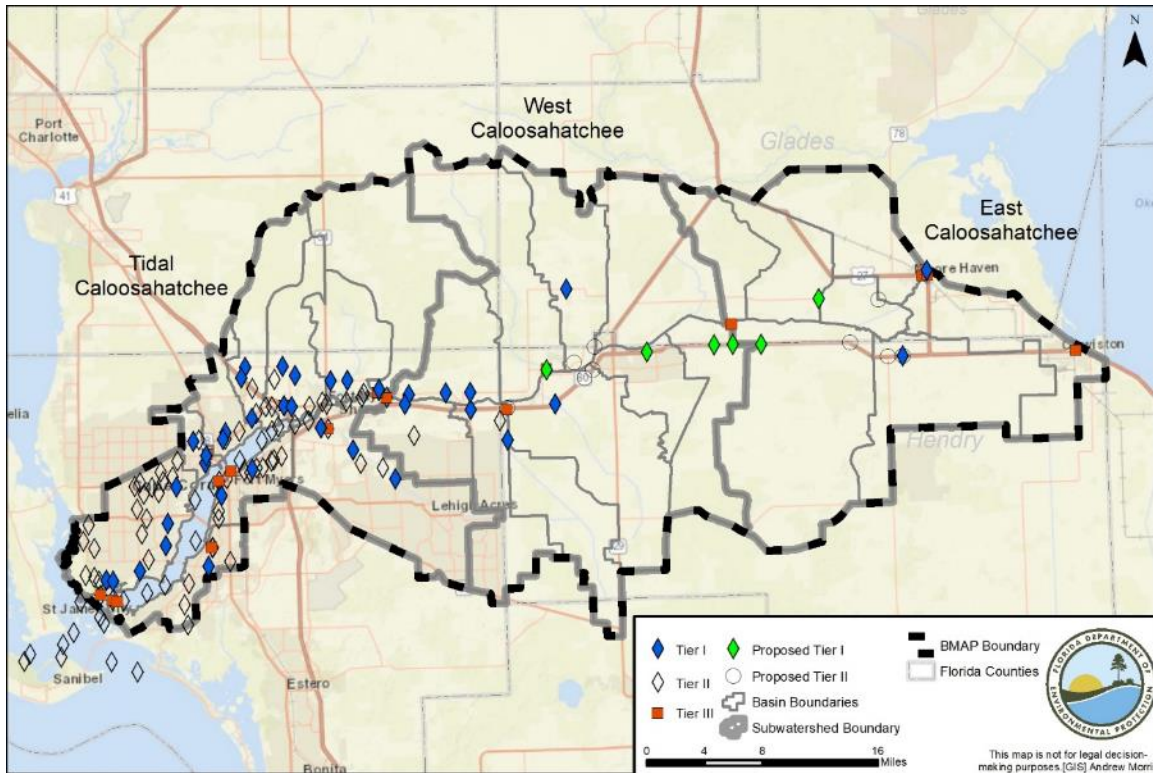
- **Tier 1** stations are the primary/priority stations used in periodic water quality analyses to track BMAP progress and water quality trends over the long term in the watershed. If at any point it is necessary to reduce efforts in the basin, these stations should be the last stations impacted.
- **Tier 2** stations can be used for regional analyses or other secondary analyses.
- **Tier 3** stations are monitored by USGS. Data from these stations are not expected to be uploaded into Watershed Information Network (WIN) and can be used for other purposes as designated by DEP.

**Figure 7** shows the stations included in each of these tiers. **Chapter 3** includes additional information about the BMAP monitoring network and stations used in the TRA process.

### 2.5.3 Data Management and Quality Assurance/Quality Control (QA/QC)

The STorage and RETrieval (STORET) Database served as the primary repository of ambient water quality data for the state until DEP transitioned to the WIN in 2017. BMAP data providers have agreed to upload ambient water quality data at least once every six months on the completion of the appropriate QA/QC checks and have begun uploading data to WIN instead of STORET. Data must be collected following DEP standard operating procedures, and the results must be analyzed by a National Environmental Laboratory Accreditation Program–certified laboratory.

In addition to ambient water quality data, flow data are used to track loading trends for the BMAP. Data collected by the USGS are available through its website, and some flow data are also available through the SFWMD corporate environmental database, DBHYDRO.



**Figure 7. Caloosahatchee River and Estuary BMAP monitoring stations**

## Chapter 3. Subwatersheds

**Section 3.1** through **Section 3.3** provide specific information on the three subwatersheds in the Caloosahatchee River and Estuary Watershed (**Figure 2**). The land use summaries are based the HSPF model land use, and **Appendix B** provides additional details on agricultural land uses. Monitoring network stations in the subwatershed are provided, along with designations for the basin where the station is located, monitoring entity, BMAP monitoring network tier, whether the station is a representative site for the TRA approach discussed in **Section 2.4**, and whether additional data are needed for the TRA approach in that basin or at that station. The TN, TP, and flow priority results of the TRA evaluation are provided for basins with each subwatershed.

Finally, all projects identified as part of this BMAP are provided by subwatershed. The table of existing and planned projects lists those projects submitted by stakeholders to help meet their obligations under the BMAP. Stakeholders have identified future projects to help meet the remaining reductions needed; however, many of these projects are conceptual or in early design stages or have not been fully funded. Information in the tables was provided by the lead entity and is subject to change as the project develops and more information becomes available.

**Appendix D** lists projects and technologies submitted as part of the RFI.

### 3.1. East Caloosahatchee Subwatershed

The East Caloosahatchee Subwatershed covers 249,201 acres of the Caloosahatchee River and Estuary Watershed. As shown in **Table 24**, the most common land uses in this subwatershed are sugar cane and pasture. Stakeholders in the subwatershed include the City of Clewiston, City of Moore Haven, Glades County, Hendry County, Barron WCD, Clewiston Drainage District, Collins Slough WCD, Disston Island Conservancy District, Flaghole Drainage District, Hendry-Hilliard WCD, and Sugarland Drainage District.

**Table 24. Summary of land uses in the East Caloosahatchee Watershed**

HSPF Land Use Code	Land Use Description	Acres	% Total
1	Low Density Residential	4,273	1.7
2	Developed Open Space/Disturbed	5,301	2.1
3	Medium Density Residential	1,976	0.8
4	High Density Residential	109	0.0
5	Commercial/Institutional/Transportation	1,267	0.5
6	Industrial/Extractive	3,477	1.4
7	FDOT Right-of-Way	1,342	0.5
8	Sugar Cane	89,333	35.8
9	Row and Field Crops	2,190	0.9
10	Nurseries/Ornamentals/Vineyards	1,259	0.5
11	Citrus Groves/Other Groves	24,713	9.9
12	Improved Pasture	38,487	15.4
13	Rangeland/Unimproved Pasture/Shrub	19,770	7.9
14	Upland Forest	21,273	8.5
15	Wetland	31,454	12.6
16	Water	2,974	1.2
N/A	<b>Total</b>	<b>249,201</b>	<b>100.0</b>

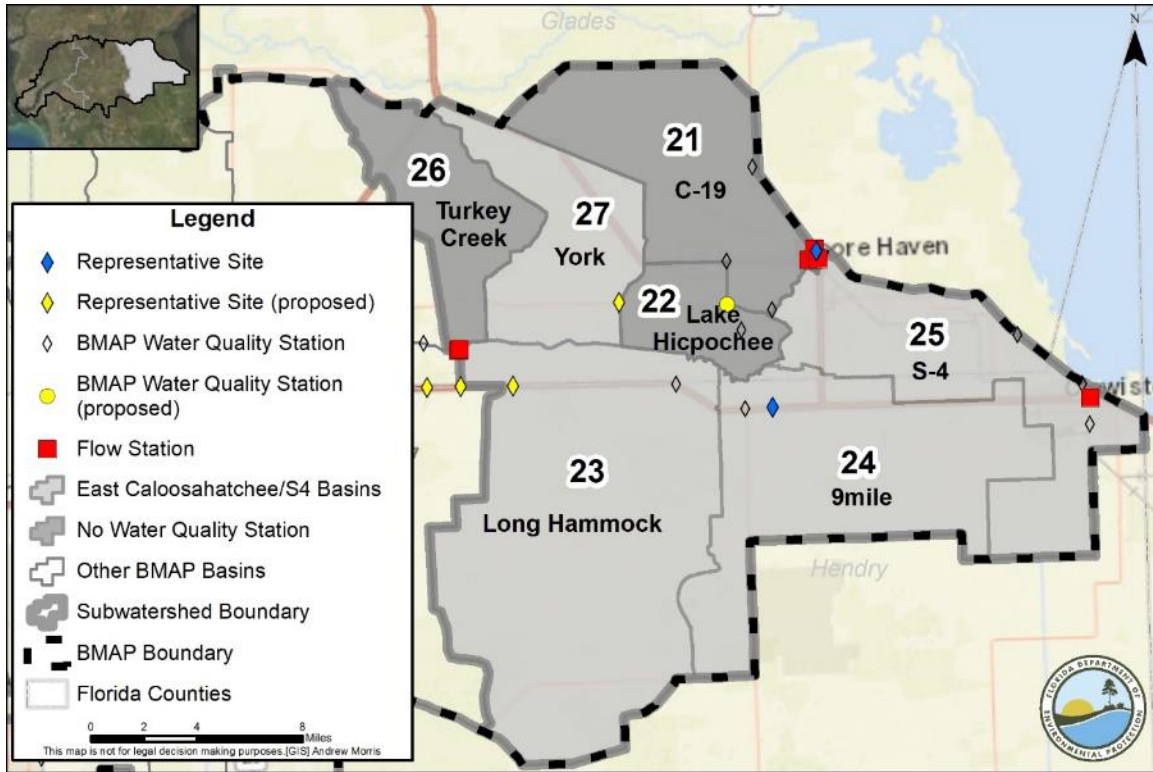
### 3.1.1 Water Quality Monitoring

**Table 25** summarizes the water quality monitoring stations in the East Caloosahatchee Subwatershed, and **Figure 8** shows the station locations. Monitoring stations are located in all but the Turkey Creek basin, and also include monitoring within the river in this subwatershed. Stations are proposed in the Long Hammock, Nine Mile, and York basins to ensure data are collected throughout the subwatershed.

**Table 25. Water quality monitoring stations in the East Caloosahatchee Subwatershed**

Basin	Representative Site?	Entity	Station ID	Tier	Data Needs
C-19	No	SFWMD	5158	2	N/A
C-19	No	DEP Watershed Monitoring Section	52963	2	N/A
C-19	No	DEP South Regional Operations Center (ROC)	G3SD0087	2	N/A
C-19	No	SFWMD	S47D	2	N/A
Lake Hicpochee	No	DEP South ROC	G3SD0102	2	N/A
Long Hammock	Yes	SFWMD	CRFW5	1	Proposed station as part of SFWMD expanded monitoring
Long Hammock	No	SFWMD	CRFW3	2	Proposed station as part of SFWMD expanded monitoring
Nine Mile	No	SFWMD	CRFW1	2	Proposed station as part of SFWMD expanded monitoring
Nine Mile	No	SFWMD	CRFW2	2	Proposed station as part of SFWMD expanded monitoring
Nine Mile	Yes	DEP South ROC	G3SD0088	1	N/A
S-4	No	SFWMD	9690	2	N/A
S-4	No	SFWMD	17370	2	N/A
S-4	No	SFWMD	17948	2	N/A
S-4	No	USGS	2292000	3	N/A
S-4	No	USGS	264514081000000	3	N/A
S-4	Yes	SFWMD	S235	1	N/A
York	Yes	SFWMD	CRFW30	1	Proposed station as part of SFWMD expanded monitoring
In River	No	USGS	2292010 (S-77)	3	N/A
In River	No	USGS (SFWMD)	2292490	3	N/A

Basin	Representative Site?	Entity	Station ID	Tier	Data Needs
In River	No	U.S. Army Corps of Engineers (USACE)	S77_COE	3	N/A
In River	No	USACE	S78_COE	3	N/A



**Figure 8. East Caloosahatchee Subwatershed monitoring stations**

### 3.1.2 Basin Evaluation Results

**Table 26** summarizes the basin evaluation results based on data from WY2014–WY2018 for the East Caloosahatchee Subwatershed. Most of the basins had insufficient data to compare with the TN benchmark of 1.54 mg/L required to meet the TMDL. The TN concentration of the S-4 Basin was 1.77 mg/L, which is above the benchmark. All the basins, with the exception of the Nine Mile Basin, had insufficient data to compare with the TP benchmark of 0.12 mg/L.

The TRA prioritization results for the East Caloosahatchee Subwatershed are shown in **Table 27**, with 1 the highest priority, 2 the next highest priority, and 3 a priority as resources allow.



**Table 26. Basin evaluation results for the East Caloosahatchee Subwatershed**

TRA ID	Basin Name	TN (mg/L) (Benchmark –1.54)	TN FWM Concentration (mg/L)	TN UAL, pounds per acre (lbs/ac)	TN Trend Analysis	TP (mg/L) (Benchmark – 0.12)	TP FWM Concentration (mg/L)	TP UAL (lbs/ac)	TP Trend Analysis
21	C-19	Insufficient Data	Insufficient Data	3	Insufficient Data	Insufficient Data	Insufficient Data	<1	Insufficient Data
22	Lake Hicpochee	Insufficient Data	Insufficient Data	3	Insufficient Data	Insufficient Data	Insufficient Data	<1	Insufficient Data
23	Long Hammock	Insufficient Data	Insufficient Data	4	Insufficient Data	Insufficient Data	Insufficient Data	<1	Insufficient Data
24	Nine Mile	1.07	Insufficient Data	4	Insufficient Data	0.11	Insufficient Data	1	Insufficient Data
25	S-4	1.77	Insufficient Data	3	Insufficient Data	Insufficient Data	Insufficient Data	1	Insufficient Data
26	Turkey Creek	Insufficient Data	Insufficient Data	4	Insufficient Data	Insufficient Data	Insufficient Data	<1	Insufficient Data
27	York	Insufficient Data	Insufficient Data	4	Insufficient Data	Insufficient Data	Insufficient Data	<1	Insufficient Data

**Table 27. TRA evaluation results for the East Caloosahatchee Subwatershed**

Basin	Station	TN Priority	TP Priority
<b>C-19</b>	C19	Insufficient Data	Insufficient Data
<b>Lake Hicpochee</b>	N/A	Insufficient Data	Insufficient Data
<b>Long Hammock</b>	N/A	Insufficient Data	Insufficient Data
<b>Nine Mile</b>	G3SD0088	3	2
<b>S-4</b>	S235	3	Insufficient Data
<b>Turkey Creek</b>	N/A	Insufficient Data	Insufficient Data
<b>York</b>	N/A	Insufficient Data	Insufficient Data

3.1.3 Projects

The tables below summarize the existing and planned and future projects for the East Caloosahatchee Subwatershed that were provided for the BMAP. The existing and planned projects are a BMAP requirement, while future projects will be implemented as funding becomes available for project implementation. **Appendix A** provides additional details about the projects and the terms used in these tables.

3.1.3.1 Existing and Planned Projects

**Table 28** summarizes the existing and planned projects provided by the stakeholders for the East Caloosahatchee Subwatershed.

Table 28. Existing and planned projects in the East Caloosahatchee Subwatershed

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual Operations and Maintenance (O&M)	Funding Source	Funding Amount	DEP Contract Agreement Number
Barron WCD	DEP, FDACS	BD-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Barron WCD	Not provided	N/A
Barron WCD	FDACS	BD-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Barron WCD	Not provided	N/A
Barron WCD	N/A	BD-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Barron WCD	Not provided	N/A
Barron WCD	N/A	BD-04	Canal/Ditch Bank Berms	Minimize sediment transport by constructing berms on top of canal/ditch banks and promoting vegetation cover.	Shoreline Stabilization	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Barron WCD	Not provided	N/A
Barron WCD	N/A	BD-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Barron WCD	Not provided	N/A
Coordinating Agency	SFWMD/ DEP/ FDACS	CA-02	Lake Hicpochee Storage and Shallow Hydrologic Enhancement, Phase 1	Provide shallow water storage, rehydrate a portion of lake bed to promote habitat restoration storage, and increase capacity for ancillary water quality benefit. Project will deliver excess stormwater runoff from C-19 canal to north end of lake as needed.	Hydrologic Restoration	Completed	2019	N/A	N/A	East Caloosahatchee	670	Not provided	Not provided	Not provided	Not provided	Not provided
Coordinating Agency	SFWMD/ DEP/ FDACS	CA-03	Lake Hicpochee Storage and Shallow Hydrologic Enhancement Expansion	Building on Phase I efforts, project will expand regional storage in the Caloosahatchee River Watershed and reduce flows lost to tide on over 2,600 acres of District lands.	Hydrologic Restoration	Underway	To be determined (TBD)	N/A	N/A	East Caloosahatchee	2,648	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual Operations and Maintenance (O&M)	Funding Source	Funding Amount	DEP Contract Agreement Number
Clewiston Drainage District	City of Clewiston, DEP, FDACS	CD-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Clewiston Drainage District	Not provided	N/A
Clewiston Drainage District	FDACS	CD-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Clewiston Drainage District	Not provided	N/A
Clewiston Drainage District	N/A	CD-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Clewiston Drainage District	Not provided	N/A
Clewiston Drainage District	N/A	CD-04	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Clewiston Drainage District	Not provided	N/A
Clewiston Drainage District	N/A	CD-05	Aquatic Vegetation Control	Mechanical removal of vegetation.	Aquatic Vegetation Harvesting	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Clewiston Drainage District	Not provided	N/A
City of Clewiston	Not provided	CL-01	Clewiston Public Education	Not provided.	Education Efforts	Underway	N/A	194.5	29.5	East Caloosahatchee	1,941	Not provided	Not provided	City General Fund	Not provided	Not provided
City of Clewiston	Not provided	CL-02	Clewiston Street Sweeping	Not provided.	Street Sweeping	Underway	N/A	74.1	45.3	East Caloosahatchee	N/A	Not provided	Not provided	City General Fund	Not provided	Not provided
City of Clewiston	Not provided	CL-03	Clewiston Inlet Maintenance	Not provided.	Catch Basin Inserts/Inlet Filter Cleanout	Underway	N/A	10.5	6.7	East Caloosahatchee	N/A	Not provided	Not provided	City General Fund	Not provided	Not provided
City of Moore Haven	Glades County	MH-01	Glades County Caloosahatchee River and Estuary Area Wastewater Grant	Elimination of aging and/or failing existing septic systems in City of Moore Haven. Project also provides for additional conveyance capacity for additional homes and businesses.	OSTDS Phase Out	Planned	2021	1,252.7	N/A	East Caloosahatchee	86.5	\$994,420	Not provided	DEP	\$891,848	LP 22023
Collins Slough WCD	DEP, FDACS	CS-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Collins Slough WCD	Not provided	N/A
Collins Slough WCD	FDACS	CS-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Collins Slough WCD	Not provided	N/A
Collins Slough WCD	N/A	CS-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Collins Slough WCD	Not provided	N/A
Collins Slough WCD	N/A	CS-04	Canal Cleaning Program	Review and field evaluation of sediment accumulation and scheduling of removal, when necessary.	Muck Removal/Restoration Dredging	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Collins Slough WCD	Not provided	N/A
Collins Slough WCD	N/A	CS-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Collins Slough WCD	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual Operations and Maintenance (O&M)	Funding Source	Funding Amount	DEP Contract Agreement Number
Disston Island Conservancy District	DEP, FDACS	DI-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Disston Island Conservancy District	Not provided	N/A
Disston Island Conservancy District	FDACS	DI-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Disston Island Conservancy District	Not provided	N/A
Disston Island Conservancy District	N/A	DI-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Disston Island Conservancy District	Not provided	N/A
Disston Island Conservancy District	N/A	DI-04	Slow Velocity in the Main Canal	Minimize sediment transport by slowing velocity in main canal near main discharge structure.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Disston Island Conservancy District	Not provided	N/A
Disston Island Conservancy District	N/A	DI-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Disston Island Conservancy District	Not provided	N/A
FDACS	Agricultural Producers	FDACS-03	BMP Implementation and Verification	Enrollment and verification of BMPs by agricultural producers. Reductions based on HSPF model. Acres treated based on FDACS OAWP June 2019 Enrollment and FSAID VI.	Agricultural BMPs	Completed	N/A	103,030	4,749.20	East Caloosahatchee	145,152	TBD	TBD	FDACS	TBD	N/A
FDACS	Agricultural Producers	FDACS-06	Cost-Share Projects	Cost-share projects paid for by FDACS. Acres treated based on FDACS OAWP June 2019 Enrollment. Reductions based on HSPF model.	Agricultural BMPs	Completed	N/A	18,470	1,069.50	East Caloosahatchee	26,005	TBD	TBD	FDACS	TBD	N/A
Flaghole Drainage District	DEP, FDACS	FH-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Flaghole Drainage District	Not provided	N/A
Flaghole Drainage District	FDACS	FH-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Flaghole Drainage District	Not provided	N/A
Flaghole Drainage District	N/A	FH-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Flaghole Drainage District	Not provided	N/A
Flaghole Drainage District	N/A	FH-04	Slow Velocity in the Main Canal	Minimize sediment transport by slowing the velocity in main canal near main discharge structure.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Flaghole Drainage District	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual Operations and Maintenance (O&M)	Funding Source	Funding Amount	DEP Contract Agreement Number
Flaghole Drainage District	N/A	FH-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Flaghole Drainage District	Not provided	N/A
Glades County	N/A	GC-01	Education and Outreach	Florida Yards and Neighborhoods (FYN); landscaping, irrigation, and fertilizer ordinances; Public Service Announcement (PSAs), pamphlets, website, and illicit discharge program.	Education Efforts	Completed	N/A	1,564.0	299.1	East Caloosahatchee	9,478	Not provided	\$5,500	Glades County	Not provided	N/A
Glades County	N/A	GC-02	Glades County Caloosahatchee River and Estuary Area Wastewater Grant	Elimination of aging and/or failing existing septic systems in City of Moore Haven. Project also provides for additional conveyance capacity for additional homes and businesses.	OSTDS Phase Out	Planned	2021	1,252.7	N/A	East Caloosahatchee	86.5	\$891,848	\$12,240	GAA	\$891,848	N/A
Hendry-Hilliard WCD	DEP, FDACS	HH-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Hendry-Hilliard WCD	Not provided	N/A
Hendry-Hilliard WCD	FDACS	HH-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Hendry-Hilliard WCD	Not provided	N/A
Hendry-Hilliard WCD	N/A	HH-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Hendry-Hilliard WCD	Not provided	N/A
Hendry-Hilliard WCD	N/A	HH-04	Slow Velocity in the Main Canal	Minimize sediment transport by slowing velocity in main canal near main discharge structure.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Hendry-Hilliard WCD	Not provided	N/A
Hendry-Hilliard WCD	N/A	HH-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Hendry-Hilliard WCD	Not provided	N/A
Sugarland Drainage District	DEP, FDACS	SD-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Sugarland Drainage District	Not provided	N/A
Sugarland Drainage District	FDACS	SD-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Sugarland Drainage District	Not provided	N/A
Sugarland Drainage District	N/A	SD-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Sugarland Drainage District	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual Operations and Maintenance (O&M)	Funding Source	Funding Amount	DEP Contract Agreement Number
Sugarland Drainage District	N/A	SD-04	Slow Velocity in the Main Canal	Minimize sediment transport by slowing velocity in main canal near main discharge structure.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Sugarland Drainage District	Not provided	N/A
Sugarland Drainage District	N/A	SD-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	East Caloosahatchee	N/A	Not provided	N/A	Sugarland Drainage District	Not provided	N/A

3.1.3.2 Future Projects

Table 29 lists the future project provided a stakeholder for the East Caloosahatchee Subwatershed.

Table 29. Future projects in the East Caloosahatchee Subwatershed

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Subwatershed	Cost Estimate	Cost Annual O&M
City of Moore Haven	TBD	F-09	Caloosahatchee River Area Drainage Project	Regional stormwater treatment.	Regional Stormwater Treatment	Planned	TBD	TBD	TBD	East Caloosahatchee	\$920,318	TBD

### 3.2. Tidal Caloosahatchee Subwatershed

The Tidal Caloosahatchee Subwatershed covers 259,761 acres of the Caloosahatchee River and Estuary Watershed. As shown in **Table 30**, the predominant land use in this subwatershed is upland forest and wetland followed by low density residential and developed open space/disturbed land. Stakeholders in the subwatershed include Charlotte County, Lee County, City of Cape Coral, City of Fort Myers, FDOT District 1, LA-MSID, Copperhead CDD, Lucaya CDD, Mirada CDD, Moody River Estates CDD, Sail Harbour CDD, Sugarland CDD, Verandah East CDD, and Verandah West CDD.

**Table 30. Summary of land uses in the Tidal Caloosahatchee Subwatershed**

HSPF Land Use Code	Land Use Description	Acres	% Total
1	Low Density Residential	37,405	14.4
2	Developed Open Space/Disturbed	8,761	3.4
3	Medium Density Residential	36,418	14.0
4	High Density Residential	9,546	3.7
5	Commercial/Institutional/Transportation	11,279	4.3
6	Industrial/Extractive	4,027	1.6
7	FDOT Right-of-Way	2,183	0.8
8	Sugar Cane	0	0.0
9	Row and Field Crops	1,745	0.7
10	Nurseries/Ornamentals/Vineyards	1,513	0.6
11	Citrus Groves/Other Groves	470	0.2
12	Improved Pasture	24,563	9.5
13	Rangeland/Unimproved Pasture/Shrub	30,263	11.7
14	Upland Forest	41,873	16.1
15	Wetland	41,581	16.0
16	Water	8,132	3.1
N/A	<b>Total</b>	<b>259,761</b>	<b>100.0</b>

#### 3.2.1 Water Quality Monitoring

**Table 31** summarizes the water quality monitoring stations in the Tidal Caloosahatchee Subwatershed, and **Figure 9** shows the station locations. There are existing monitoring stations for all the basins within the subwatershed, as well as in the river in the portion of the watershed.

**Table 31. Water quality monitoring stations in the Tidal Caloosahatchee Subwatershed**

Basin	Representative Site?	Entity	Station ID	Tier	Data Needs
Billy Creek/ Manuel Branch	No	City of Ft. Myers	BCP1-10	2	N/A
Billy Creek/ Manuel Branch	No	City of Ft. Myers	BCP4-10	2	N/A
Billy Creek/ Manuel Branch	No	Lee County	BILLGR20	2	N/A
Billy Creek/ Manuel Branch	No	Lee County	BILLGR60	2	N/A
Billy Creek/	No	City of Ft. Myers	CFMBILLY3	2	N/A

<b>Basin</b>	<b>Representative Site?</b>	<b>Entity</b>	<b>Station ID</b>	<b>Tier</b>	<b>Data Needs</b>
<b>Manuel Branch</b>					
<b>Billy Creek/ Manuel Branch</b>	No	City of Ft. Myers	CFMBILLY6	2	N/A
<b>Billy Creek/ Manuel Branch</b>	No	City of Ft. Myers	CFMCARRELL	2	N/A
<b>Billy Creek/ Manuel Branch</b>	Yes	City of Ft. Myers	CFMFSP	1	Representative through averaging multiple stations
<b>Billy Creek/ Manuel Branch</b>	Yes	City of Ft. Myers	CFMMANUEL	1	Representative through averaging multiple stations
<b>Billy Creek/ Manuel Branch</b>	No	City of Ft. Myers	CFMWINKLER	2	N/A
<b>Daughtrey</b>	No	Lee County	20-29GR	2	N/A
<b>Daughtrey</b>	Yes	Lee County	20-9GR	1	N/A
<b>Daughtrey</b>	No	Lee County	20A-11GR	2	N/A
<b>Daughtrey</b>	No	Lee County	20A-19GR	2	N/A
<b>Daughtrey</b>	No	Lee County	21-7GR	2	N/A
<b>Daughtrey</b>	No	Lee County	GATOR91	2	N/A
<b>Hancock/Yellow Fever</b>	No	USGS	2.64006E+14	3	N/A
<b>Hancock/Yellow Fever</b>	No	Lee County	16-18GR	2	N/A
<b>Hancock/Yellow Fever</b>	No	DEP South ROC	CALUSA0025FTM	2	N/A
<b>Hancock/Yellow Fever</b>	No	Lee County	YFC-CI	2	N/A
<b>Hancock/Yellow Fever</b>	Yes	Lee County	16-3GR	1	N/A
<b>Orange</b>	No	USGS (Lee County Contract)	2293055	3	N/A
<b>Orange</b>	No	Lee County	40-18GR	2	N/A
<b>Orange</b>	No	Lee County	40-32GR	2	N/A
<b>Orange</b>	No	DEP South ROC	CALUSA0054FTM	2	N/A
<b>Orange</b>	Yes	DEP South ROC	G3SD0128	1	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 19	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 20	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 21	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 22	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 24	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 27	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 38	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 39	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 40	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 6	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 7	2	N/A
<b>Orange</b>	No	LA-MSID	WQ SITE 8	2	N/A
<b>Owl/Trout</b>	No	Lee County	28-5GR	2	N/A
<b>Owl/Trout</b>	Yes	Lee County	27-6GR	1	Representative through averaging multiple stations
<b>Owl/Trout</b>	Yes	Lee County	27O-GR20	1	Representative through

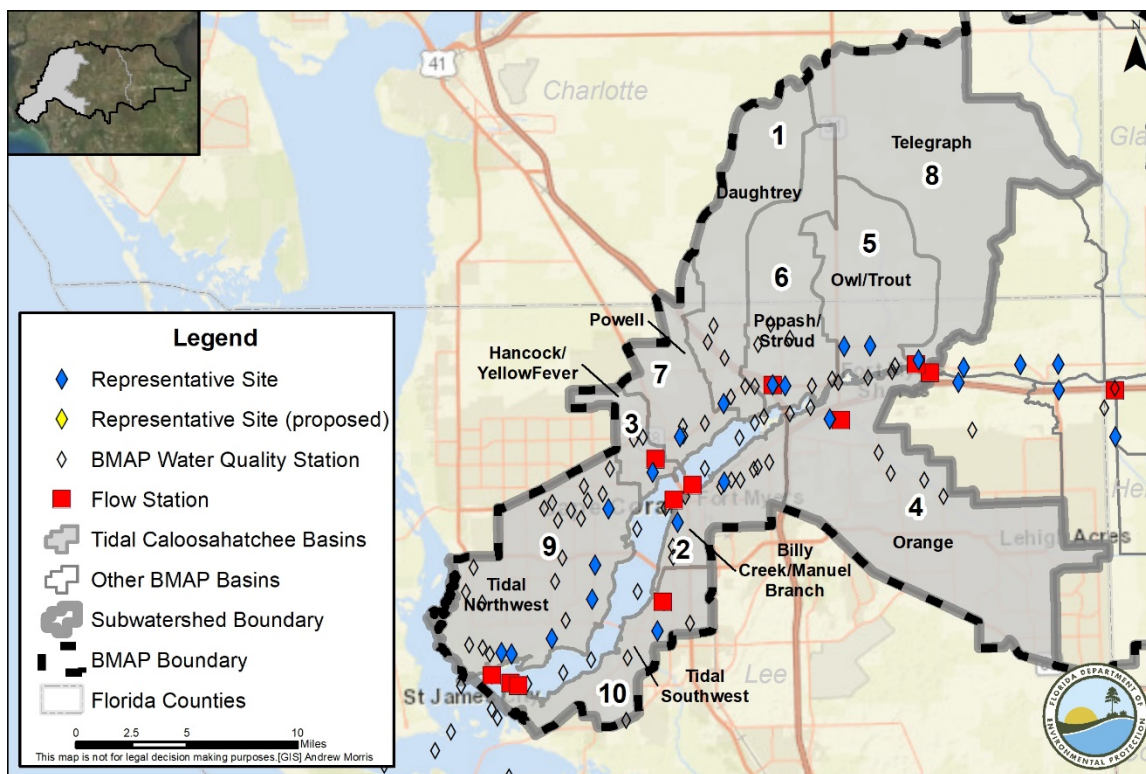


Basin	Representative Site?	Entity	Station ID	Tier	Data Needs
					averaging multiple stations
Popash/Stroud	No	USGS (Lee County Contract)	2293090	3	N/A
Popash/Stroud	No	Lee County	22-18GR	2	N/A
Popash/Stroud	No	Lee County	22-7GR	2	N/A
Popash/Stroud	No	Lee County	23-27GR	2	N/A
Popash/Stroud	Yes	Lee County	23-5GR	1	Representative through averaging multiple stations
Popash/Stroud	No	Lee County	24-19GR	2	N/A
Popash/Stroud	Yes	Lee County	24-7GR	1	Representative through averaging multiple stations
Popash/Stroud	No	Lee County	25-GR20	2	N/A
Popash/Stroud	No	Lee County	26-GR20	2	N/A
Powell	No	Lee County	18-6GR	2	N/A
Powell	Yes	Lee County	POWLGR20	1	N/A
Powell	No	Lee County	POWLGR51	2	N/A
Powell	No	Lee County	POWLGR81	2	N/A
Telegraph	No	USGS (Lee County Contract)	22929176	3	N/A
Telegraph	No	Lee County	29-8GR	2	N/A
Telegraph	No	DEP South ROC	CALUSA0024FTM	2	N/A
Telegraph	Yes	DEP South ROC	G3SD0129	1	N/A
Tidal Northwest	No	City of Cape Coral	210	2	N/A
Tidal Northwest	No	City of Cape Coral	243	2	N/A
Tidal Northwest	No	City of Cape Coral	262	2	N/A
Tidal Northwest	No	City of Cape Coral	275	2	N/A
Tidal Northwest	No	City of Cape Coral	280	2	N/A
Tidal Northwest	No	City of Cape Coral	290	2	N/A
Tidal Northwest	No	City of Cape Coral	295	2	N/A
Tidal Northwest	Yes	City of Cape Coral	300	1	Representative through averaging multiple stations
Tidal Northwest	No	City of Cape Coral	310	2	N/A
Tidal Northwest	No	City of Cape Coral	315	2	N/A
Tidal Northwest	No	City of Cape Coral	355	2	N/A
Tidal Northwest	No	City of Cape Coral	390	2	N/A
Tidal Northwest	Yes	City of Cape Coral	400	1	Representative through averaging multiple stations
Tidal Northwest	No	City of Cape Coral	430	2	N/A
Tidal Northwest	No	City of Cape Coral	445	2	N/A
Tidal Northwest	No	City of Cape Coral	450	2	N/A
Tidal Northwest	No	City of Cape Coral	455	2	N/A
Tidal Northwest	Yes	City of Cape Coral	470	1	Representative through

Basin	Representative Site?	Entity	Station ID	Tier	Data Needs
					averaging multiple stations
<b>Tidal Northwest</b>	No	City of Cape Coral	510	2	N/A
<b>Tidal Northwest</b>	Yes	City of Cape Coral	540	1	Representative through averaging multiple stations
<b>Tidal Northwest</b>	No	City of Cape Coral	550	2	N/A
<b>Tidal Northwest</b>	No	City of Cape Coral	570	2	N/A
<b>Tidal Northwest</b>	No	City of Cape Coral	580	2	N/A
<b>Tidal Northwest</b>	Yes	City of Cape Coral	590	1	Representative through averaging multiple stations
<b>Tidal Northwest</b>	Yes	City of Cape Coral	600	1	Representative through averaging multiple stations
<b>Tidal Southwest</b>	No	USGS	2293230	3	N/A
<b>Tidal Southwest</b>	No	USGS	2.6312E+14	3	N/A
<b>Tidal Southwest</b>	No	DEP South ROC	CALUSA0013FTM	2	N/A
<b>Tidal Southwest</b>	No	Lee County	DEEPGR10	2	N/A
<b>Tidal Southwest</b>	No	Lee County	DEEPGR50	2	N/A
<b>Tidal Southwest</b>	No	Lee County	DEEPGR90	2	N/A
<b>Tidal Southwest</b>	No	Lee County	WHISGR10	2	N/A
<b>Tidal Southwest</b>	Yes	Lee County	WHISGR18	1	N/A
<b>Tidal Southwest</b>	No	Lee County	WHISGR50	2	N/A
<b>In River</b>	No	City of Cape Coral	242	2	N/A
<b>In River</b>	No	City of Cape Coral	350	2	N/A
<b>In River</b>	No	USGS	2293202	3	N/A
<b>In River</b>	No	USGS	2293205	3	N/A
<b>In River</b>	No	USGS	2293210	3	N/A
<b>In River</b>	No	DEP South ROC	28020110	2	N/A
<b>In River</b>	No	DEP South ROC	28020111	2	N/A
<b>In River</b>	No	USGS	263144082000000	3	N/A
<b>In River</b>	No	DEP South ROC	CALUSA0005FTM	2	N/A
<b>In River</b>	No	DEP South ROC	CALUSA0006FTM	2	N/A
<b>In River</b>	No	DEP South ROC	CALUSA0007FTM	2	N/A
<b>In River</b>	No	DEP South ROC	CALUSA0008FTM	2	N/A
<b>In River</b>	No	DEP South ROC	CALUSA0010FTM	2	N/A
<b>In River</b>	No	DEP South ROC	CALUSA0012FTM	2	N/A
<b>In River</b>	No	DEP South ROC	CALUSA0014FTM	2	N/A
<b>In River</b>	No	SFWMD	CES03	2	N/A
<b>In River</b>	No	SFWMD	CES04	2	N/A
<b>In River</b>	No	SFWMD	CES05	2	N/A
<b>In River</b>	No	SFWMD	CES06	2	N/A
<b>In River</b>	No	SFWMD	CES07	2	N/A
<b>In River</b>	No	SFWMD	CES08	2	N/A
<b>In River</b>	No	SFWMD	CES09	2	N/A
<b>In River</b>	No	SFWMD	CES11	2	N/A
<b>In River</b>	No	Lee County	PI-01	2	N/A
<b>In River</b>	No	Lee County	PI-02	2	N/A



Basin	Representative Site?	Entity	Station ID	Tier	Data Needs
In River	No	Lee County	PI-13	2	N/A
In River	No	Lee County	PI-14	2	N/A
In River	No	SFWMD	ROOK471	2	N/A



**Figure 9. Tidal Caloosahatchee Subwatershed monitoring stations**

### 3.2.2 Basin Evaluation Results

**Table 32** summarizes the basin evaluation results based on data from WY2014–WY2018 for the Tidal Caloosahatchee Subwatershed. The current TN concentrations for each of the basins are all below the benchmark of 1.54 mg/L required to meet the TMDL. The current TP concentrations for five of the basins are above the benchmark of 0.12 mg/L.

The TRA prioritization results for the Tidal Caloosahatchee Subwatershed are shown in **Table 33**, with 1 the highest priority, 2 the next highest priority, and 3 a priority as resources allow.

**Table 32. Basin evaluation results for the Tidal Caloosahatchee Subwatershed**

<b>TRA ID</b>	<b>Basin Name</b>	<b>TN (mg/L) (Benchmark –1.54)</b>	<b>TN FWM Concentration (mg/L)</b>	<b>TN UAL, (lbs/ac)</b>	<b>TN Trend Analysis</b>	<b>TP (mg/L) (Benchmark – 0.12)</b>	<b>TP FWM Concentration (mg/L)</b>	<b>TP UAL (lbs/ac)</b>	<b>TP Trend Analysis</b>
2	Billy Creek/Manuel Branch	1.46	Insufficient Data	10	Insufficient Data	0.29	Insufficient Data	8	Insufficient Data
1	Daughtrey	0.83	Insufficient Data	6	Significant decreasing trend	0.12	Insufficient Data	1	Significant decreasing trend
3	Hancock/Yellow Fever	0.92	Insufficient Data	7	No significant trend	0.15	Insufficient Data	2	No significant trend
4	Orange	0.81	Insufficient Data	6	Insufficient Data	0.06	Insufficient Data	1	Insufficient Data
5	Owl/Trout	0.86	Insufficient Data	6	Significant decreasing trend	0.07	Insufficient Data	1	No significant trend
6	Popash/Stroud	1.07	Insufficient Data	7	No significant trend	0.17	Insufficient Data	1	Significant decreasing trend
7	Powell	0.81	Insufficient Data	6	Significant decreasing trend	0.19	Insufficient Data	1	No significant trend
8	Telegraph	0.84	Insufficient Data	6	Insufficient Data	0.08	Insufficient Data	<1	Insufficient Data
9	Tidal Northwest	0.40	Insufficient Data	7	No significant trend	0.08	Insufficient Data	3	Insufficient Data
10	Tidal Southwest	1.29	Insufficient Data	9	Insufficient Data	0.17	Insufficient Data	7	Insufficient Data

**Table 33. TRA evaluation results for the Tidal Caloosahatchee Subwatershed**

<b>Basin</b>	<b>Station</b>	<b>TN Priority</b>	<b>TP Priority</b>
<b>Billy Creek/ Manuel Branch</b>	CFMFSP/ CFMMANUEL	2	1
<b>Daughtrey</b>	20-9GR	3	3
<b>Hancock/Yellow Fever</b>	16-3GR	2	2
<b>Orange</b>	G3SD0128	3	3
<b>Owl/Trout</b>	27-6GR/27O-GR20	3	3
<b>Popash/Stroud</b>	23-5GR/24-7GR	2	3
<b>Powell</b>	POWLGR20	3	2
<b>Telegraph</b>	G3SD0129	3	3
<b>Tidal Northwest</b>	300/400/470/540/590/600	2	3
<b>Tidal Southwest</b>	WHISGR18	2	2

3.2.3 Projects

The tables below summarize the existing and planned and future projects for the Tidal Caloosahatchee Subwatershed that were provided for the BMAP. The existing and planned projects are a BMAP requirement, while future projects will be implemented as funding becomes available for project implementation. **Appendix A** provides additional details about the projects and the terms used in these tables.

3.2.3.1 Existing Projects

**Table 34** summarizes the existing and planned projects provided by the stakeholders for the Tidal Caloosahatchee Subwatershed Basin.

**Table 34. Existing and planned projects in the Tidal Caloosahatchee Subwatershed**

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Cape Coral	University of Florida Institute of Food and Agricultural Sciences (UF-IFAS)	CC-01	Education Efforts	FYN; landscape, irrigation, pet waste, and fertilizer ordinances; pamphlets, PSAs, website, and illicit discharge program.	Education Efforts	Completed	N/A	9,299.2	3,448.3	Tidal Caloosahatchee	26,404	Not provided	\$2,000	City	Not provided	N/A
City of Cape Coral	N/A	CC-02	SE - 1 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales.	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	0	0	Tidal Caloosahatchee	Not provided	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-03	SW - 1 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales.	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	0	0	Tidal Caloosahatchee	Not provided	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-04	SW - 2 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales.	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	0	0	Tidal Caloosahatchee	Not provided	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-05	SW - 3 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales.	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	0	0	Tidal Caloosahatchee	Not provided	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	DEP	CC-06	SW - 4 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales.	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	0	0	Tidal Caloosahatchee	Not provided	Not provided	Not provided	City	\$171,911	TBD
City of Cape Coral	DEP	CC-07	SW - 5 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales.	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	0	0	Tidal Caloosahatchee	Not provided	Not provided	Not provided	City	\$172,629	TBD

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Cape Coral	N/A	CC-08	SE Pipe Replacement	SE pipe replacement.	Stormwater System Rehabilitation	Completed	Prior to 2012	0	0	Tidal Caloosahatchee	Not provided	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-09	Unit 23 – SE 8th Street Drainage	Unit 23–SE 8th Street drainage.	Stormwater System Rehabilitation	Completed	Prior to 2012	0	0	Tidal Caloosahatchee	Not provided	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-10	Freshwater Canal Detention	Regulation of freshwater canals through existing control structures.	Control Structure	Completed	Prior to 2012	4,415.9	3,411.7	Tidal Caloosahatchee	2,086.3	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-11	Freshwater Canal Irrigation	Pump stormwater stored in canals into irrigation supply network.	Stormwater Reuse	Completed	Prior to 2012	796.0	140.8	Tidal Caloosahatchee	2,086.3	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-12	Weir #6 Elevation/ Basin 12	Installed riser on weir in freshwater canal system to provide additional retention volume in canals.	Control Structure	Completed	Prior to 2012	N/A	N/A	Tidal Caloosahatchee	N/A	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-13	Weir #1 Elevation/ Basin 15	Installed riser on weir in freshwater canal system to provide additional retention volume in canals.	Control Structure	Completed	Prior to 2012	N/A	N/A	Tidal Caloosahatchee	N/a	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-14	Street Sweeping	Street sweeping of downtown area, alleys, and commercial roads.	Street Sweeping	Completed	N/A	TBD	TBD	Tidal Caloosahatchee	N/A	Not provided	\$360,000	City	Not provided	N/A
City of Cape Coral	N/A	CC-15	Septic to Sewer Phase Out Project	Phase out septic tanks in Southwest 6/7 area.	Wastewater Service Area Expansion	Completed	2015	66,419.0	N/A	Tidal Caloosahatchee	N/A	Not provided	Not provided	City	Not provided	N/A
City of Cape Coral	N/A	CC-16	Catch Basin Cleanout	Catch basin cleanouts from Caloosahatchee Watershed areas.	Catch Basin Inserts/Inlet Filter Cleanout	Completed	2015	TBD	TBD	Tidal Caloosahatchee	N/A	Not provided	\$170,000	City	Not provided	N/A
City of Cape Coral	N/A	CC-17	Unit 8 – SE 47th Terrace Streetscape Improvements Club Square	Suntree Technologies Skimboss and Bold & Gold Media – Club Square.	Stormwater System Rehabilitation	Completed	2018	TBD	TBD	Tidal Caloosahatchee	TBD	Not provided	Not provided	City of Cape Coral	Not provided	N/A
City of Cape Coral	City of Fort Myers	CC-18	Ft Myers Cape Coral Wastewater Pipeline	Elimination of wastewater treatment plant effluent discharges to river from Ft Myers by conveying wastewater to Cape Coral for reuse in Cape Coral water reclamation system.	WWTF Diversion to Reuse	Underway	TBD	TBD	TBD	Tidal Caloosahatchee	TBD	Not provided	Not provided	City of Cape Coral	Not provided	N/A
City of Cape Coral	Lee County	CC-19	Yellow Fever Creek Hydrologic Restoration	Transfer water from Gator Slough to new reservoir in Yellow Fever Creek and slowly release flow into headwaters of Yellow Fever Creek, extending wetland hydroperiods.	Hydrologic Restoration	Underway	TBD	13.5	18.8	Tidal Caloosahatchee	9.4	TBD	TBD	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Charlotte County	Not provided	CH-01	Education Efforts	FYN Program; landscape, irrigation, and fertilizer ordinances; pamphlets, PSAs, website, inspection/illicit discharge program.	Education Efforts	Completed	N/A	1,272.3	212.4	Tidal Caloosahatchee	4,141.6	Not provided	Not provided	Not provided	Not provided	N/A
FDACS	Agricultural Producers	FDACS-01	BMP Implementation and Verification	Enrollment and verification of BMPs by agricultural producers. Reductions based on HSPF model. Acres treated based on FDACS OAWP June 2019 Enrollment and FSAID VI.	Agricultural BMPs	Completed	N/A	40,297	1,605.70	Tidal Caloosahatchee	21,121	TBD	TBD	FDACS	TBD	N/A
FDACS	Agricultural Producers	FDACS-04	Cost-Share Projects	Cost-share projects paid for by FDACS. Acres treated based on FDACS OAWP June 2019 Enrollment. Reductions based on HSPF model.	Agricultural BMPs	Completed	N/A	20,203	1,254.90	Tidal Caloosahatchee	7,107	TBD	TBD	FDACS	TBD	N/A
FDOT District 1	N/A	FDOT-01	Existing Stormwater Dry Ponds	Dry detention pond; Facility ID = 12010-3505-01.	Dry Detention Pond	Completed	Prior to 2012	30.8	TBD	Tidal Caloosahatchee	2	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-02	Existing Stormwater Dry Ponds	Dry detention pond; Facility ID = 12060-3530-01.	Dry Detention Pond	Completed	Prior to 2012	3.7	TBD	Tidal Caloosahatchee	2	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-03	Existing Stormwater Dry Ponds	Dry detention pond; Facility ID = 12060-3530-02.	Dry Detention Pond	Completed	Prior to 2012	3.7	TBD	Tidal Caloosahatchee	2	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-04	Discontinue Fertilization	No longer fertilizing rights-of-way in watershed.	Fertilizer Cessation	Completed	N/A	1,810.9	453.8	Tidal Caloosahatchee	465	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-05	Education Efforts	Pamphlets, PSAs, illicit discharge program.	Education Efforts	Completed	N/A	252.9	53.7	Tidal Caloosahatchee	5,084.7	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-06	Street Sweeping	2,992 pavement miles swept annually.	Street Sweeping	Completed	N/A	473.0	346.2	Tidal Caloosahatchee	N/A	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-07	Ditch Blocked Swales	Swales with ditch blocks. Facility ID = 12020-3538-02.	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	273	TBD	Tidal Caloosahatchee	56	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 1	N/A	FDOT-08	Ditch Blocked Swales	Swales with ditch blocks. Facility ID = 12020-3541-01	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	179	TBD	Tidal Caloosahatchee	55	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-09	Ditch Blocked Swales	Swales with ditch blocks.	Grass Swales with Swale Blocks or Raised Culverts	Completed	Prior to 2012	318	TBD	Tidal Caloosahatchee	55	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-10	Swales without Ditch Blocks	Swales without blocks.	Grass Swales without Swale Blocks or Raised Culverts	Completed	Prior to 2012	4,617	TBD	Tidal Caloosahatchee	1,353	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-11	Existing Stormwater Wet Ponds	F12001-3516-01.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-12	Existing Stormwater Wet Ponds	F12001-3516-02.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-13	Existing Stormwater Wet Ponds	F12040-3514-01.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-14	Existing Stormwater Wet Ponds	F12040-3515-01.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-15	Existing Stormwater Wet Ponds	F12040-3515-02.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-16	Existing Stormwater Wet Ponds	F12040-3515-03.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-17	Existing Stormwater Wet Ponds	F12040-3515-04.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-18	Existing Stormwater Wet Ponds	F12060-3530-03.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-19	Existing Stormwater Wet Ponds	F12060-3533-01.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-20	Existing Stormwater Wet Ponds	F12060-3533-02.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
FDOT District 1	N/A	FDOT-21	Existing Stormwater Wet Ponds	F12060-3533-03.	Wet Detention Pond	Completed	Prior to 2012	225	TBD	Tidal Caloosahatchee	14	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-22	SR 78 Project	Wet detention pond. FM195705-1, Pond SMF 1A.	Wet Detention Pond	Completed	Prior to 2012	35.7	10.5	Tidal Caloosahatchee	7.4	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-23	SR 78 Project	Wet detention pond. FM195705-1, Pond SMF 1D.	Wet Detention Pond	Completed	Prior to 2012	43.8	12.1	Tidal Caloosahatchee	9.3	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-24	SR 78 Project	Wet detention pond. FM195705-1, Pond SMF 2B.	Wet Detention Pond	Completed	Prior to 2012	66.7	18.1	Tidal Caloosahatchee	14.1	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-25	SR 78 Project	Wet detention pond. FM195705-1, Pond SMF 4C.	Wet Detention Pond	Completed	Prior to 2012	100.5	27.2	Tidal Caloosahatchee	18.7	Not provided	Not provided	Florida Legislature	Not provided	N/A
FDOT District 1	N/A	FDOT-26	SR 82 from Lee Blvd to Shawnee Road	Funding Partnership with LA-MSID (formerly ECWCD) for SW Weirs Project.	Control Structure	Completed	2017	TBD	TBD	Tidal Caloosahatchee	TBD	Not provided	Not provided	FDOT/ DEP/ LA-MSID	Not provided	N/A
FDOT District 1	N/A	FDOT-27	SR 82 from Lee Blvd to Shawnee Road	Funding Partnership with LA-MSID (formerly ECWCD) for West Marsh Preserve.	Stormwater Treatment Areas (STAs)	Underway	2020	TBD	TBD	Tidal Caloosahatchee	TBD	Not provided	Not provided	FDOT/ DEP/ LA-MSID	Not provided	N/A
FDOT District 1	N/A	FDOT-28	SR 82 from Shawnee Rd to Alabama Road	Funding Partnership with LA-MSID (formerly ECWCD) for Moving Water South PH II, Hendry Canal Widening.	Regional Stormwater Treatment	Underway	2020	TBD	TBD	Tidal Caloosahatchee	TBD	Not provided	Not provided	FDOT/ LA-MSID	Not provided	N/A
FDOT District 1	Lee County	FDOT-31	Six Mile Cypress Preserve North Hydrologic Restoration project	Hydrologic restoration project.	Hydrologic Restoration	Completed	2017	718.1	134.1	Tidal Caloosahatchee	114.3	\$1,799,539	\$70,260	County/ SFWMD/ FDOT	\$567,500	N/A
City of Fort Myers	Not provided	FM-01	Country Club Neighborhood Exfiltration Trenches	Exfiltration trenches.	Exfiltration Trench	Completed	Prior to 2012	213.7	26.8	Tidal Caloosahatchee	114.3	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-02	Education Efforts	FYN, fertilizer ordinance, pamphlets, PSAs, website, illicit discharge program.	Education Efforts	Completed	N/A	4,652.2	1,630.4	Tidal Caloosahatchee	9,742.2	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-03	Winkler Avenue Utility and Streetscape Improvements	Installation of Stormceptors™.	Hydrodynamic Separators	Completed	Prior to 2012	TBD	TBD	Tidal Caloosahatchee	TBD	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Fort Myers	Not provided	FM-04	Manuel's Branch Siltation Structures	Installation of siltation structure designed to receive incoming flow, reduce its velocity, and allow for settling of suspended particles. Called sediment trap (near control structure)	Control Structure	Completed	Prior to 2012	485.9	77.7	Tidal Caloosahatchee	640	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-05	Manuel's Branch Control Structures	Series of 2 weirs constructed along Manuels Branch between Royal Palm Avenue and Grand Avenue that act as detention structures for purpose of increasing storage and attenuation in canal.	Control Structure	Completed	Prior to 2012	981.2	310.6	Tidal Caloosahatchee	432	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-06	Billy's Creek Wetland	Filter marsh park.	Filter Marsh	Completed	Prior to 2012	TBD	TBD	Tidal Caloosahatchee	50.7	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-07	Brookhill Drive Utility Drainage Improvement	Installation of 2 nutrient baffle boxes in parallel along Brookhill Dr.	Baffle Boxes-Second Generation with Media	Completed	2013	36.4	3.7	Tidal Caloosahatchee	41.7	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-08	Street Sweeping	All city roads with curb and gutter divided into four zones and swept at varying frequencies based on pollutant accumulation.	Street Sweeping	Completed	N/A	1,851.3	1,173.8	Tidal Caloosahatchee	N/A	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-09	Ford Street Preserve	Constructed wetland treatment system that removes pollutants from Ford Street Canal, which serves 811 acres of highly urbanized watershed.	Filter Marsh	Completed	2015	7,916.4	1,412.0	Tidal Caloosahatchee	813.5	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-10	Riverfront Development Phase 1	Retention pond.	On-line Retention BMPs	Completed	2013	37.4	10.0	Tidal Caloosahatchee	14.5	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-11	Carrell Canal Water Quality Retrofit	Two detention areas, 5 filter marshes, and golf course renovation.	BMP Treatment Train	Completed	2014	639.8	218.3	Tidal Caloosahatchee	951.0	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-12	Aquashores Neighborhood	Installation of 2 Stormceptors™.	Hydrodynamic Separators	Completed	2016	0.0	0.7	Tidal Caloosahatchee	13.3	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-13	Billy and High Street Drainage Improvement	Neighborhood improvement project.	BMP Treatment Train	Underway	TBD	TBD	TBD	Tidal Caloosahatchee	343.1	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
City of Fort Myers	Not provided	FM-14	Ridgewood Park Neighborhood Improvements	Neighborhood improvement projects to be done in phases.	BMP Treatment Train	Planned	TBD	TBD	TBD	Tidal Caloosahatchee	8.7	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-15	Midtown Redevelopment	Area improvements including water quality improvements.	BMP Treatment Train	Planned	TBD	TBD	TBD	Tidal Caloosahatchee	78.9	Not provided	Not provided	Not provided	Not provided	N/A
City of Fort Myers	Not provided	FM-16	Edgewood Neighborhood Improvements	Neighborhood improvement projects to be done in phases.	BMP Treatment Train	Planned	TBD	TBD	TBD	Tidal Caloosahatchee	461.3	Not provided	Not provided	Not provided	Not provided	N/A
LA-MSID (formerly ECWCD)	Not provided	LA-01	Education/Pollution Prevention/Fertilizer	Pollution prevention and fertilizer education.	Education Efforts	Completed	N/A	1,622.5	276.5	Tidal Caloosahatchee	54,932.0	Not provided	Not provided	Not provided	Not provided	N/A
LA-MSID (formerly ECWCD)	Not provided	LA-02	Freshwater Canal Detention	Regulation of freshwater canals through existing control structures.	Control Structure	Completed	Prior to 2012	9,377.9	1,464.9	Tidal Caloosahatchee	64,586.1	Not provided	Not provided	Not provided	Not provided	N/A
LA-MSID (formerly ECWCD)	Not provided	LA-03	Weir Elevation Improvements	Replacement of weir structures at increased control elevations to provide additional attenuation.	Control Structure	Completed	Prior to 2012	8,909.0	1,391.7	Tidal Caloosahatchee	64,586.1	Not provided	Not provided	Not provided	Not provided	N/A
LA-MSID (formerly ECWCD)	Lee County/FDOT	LA-04	Harn's Marsh Phases I and II	Replacement of weir structures and redirection of flows into filter marsh.	Control Structure	Completed	Prior to 2012	0.0	0.0	Tidal Caloosahatchee		Not provided	Not provided	Not provided	Not provided	N/A
LA-MSID (formerly ECWCD)	Not provided	LA-05	Jim Flemming Eco-Park	Wetland rehydration and treatment.	Hydrologic Restoration	Completed	Prior to 2012	7,942.3	1,715.8	Tidal Caloosahatchee	6,898.1	Not provided	Not provided	Not provided	Not provided	N/A
LA-MSID (formerly ECWCD)	Not provided	LA-06	Mirror Lake Phase I	Detention pond.	Wet Detention Pond	Completed	2013	819.1	127.2	Tidal Caloosahatchee	2,577.8	Not provided	Not provided	Not provided	Not provided	N/A
LA-MSID (formerly ECWCD)	DEP/ FDOT	LA-07	Aquifer Benefit and Storage for Orange River Basin (Southwest Lehigh Weirs)	Increase canal control elevations and local groundwater levels by constructing 25 new weirs.	Control Structure	Completed	2017	5,551.0	935.1	Tidal Caloosahatchee	33,209.2	\$2,532,311	Not provided	DEP/ FDOT	DEP - \$1,224,800/ FDOT - \$1,903,200	S0721
LA-MSID (formerly ECWCD)	N/A	LA-08	S-AW-2 Weir Elevation Improvements	Replacement of weir structures at increase control elevations to provide additional attenuation.	Control Structure	Completed	2017	415.7	61.4	Tidal Caloosahatchee	2,636.2	\$400,000	\$15,000	LA-MSID	\$400,000	N/A
LA-MSID (formerly ECWCD)	SFWMD	LA-09	Mirror Lake Phase 2	Detention pond.	Wet Detention Pond	Underway	2018	738.8	108.9	Tidal Caloosahatchee	2,577.8	\$500,000	TBD	LA-MSID/ SFWMD	LA-MSID - \$300,000/ SFWMD - \$200,000	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
LA-MSID (formerly ECWCD)	FDOT/ Lee County	LA-10	West Marsh Preserve	Wetland rehydration and treatment.	Hydrologic Restoration	Underway	2020	TBD	TBD	Tidal Caloosahatchee	TBD	\$12,000,000	TBD	LA-MSID/ FDOT/ Lee County	LA-MSID - \$2,368,300/ FDOT - \$5,000,000/ Lee County - \$4,631,700	N/A
Lee County	N/A	LC-01	Yellow Fever Creek Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	66.1	30.9	Tidal Caloosahatchee	213.4	\$3,323,506	\$11,703	County	\$3,323,506	N/A
Lee County	N/A	LC-02	Billy's Creek Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	46.6	1.6	Tidal Caloosahatchee	50.7	\$2,500,000	N/A	County	\$2,500,000	N/A
Lee County	SFWMD	LC-03	Six Mile Cypress Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	1,625.9	58.9	Tidal Caloosahatchee	1,839.7	\$71,475,196	\$149,212	County/ SFWMD	Not provided	N/A
Lee County	SFWMD/ National Oceanic and Atmospheric Administration (NOAA)	LC-04	Bob Jane's Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	14,714.0	495.3	Tidal Caloosahatchee	5,620.4	\$41,538,620	\$639,924	County/ SFWMD/ NOAA	Not provided	N/A
Lee County	N/A	LC-05	Buckingham Trails Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	1,814.5	68.4	Tidal Caloosahatchee	572.2	\$12,584,000	\$18,708	County	\$12,584,000	N/A
Lee County	Florida Communities Trust (FCT)	LC-06	Caloosahatchee Creeks Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	88.5	11.3	Tidal Caloosahatchee	1,263.8	\$8,175,706	\$81,323	County	\$8,175,706	N/A
Lee County	N/A	LC-07	Deep Lagoon Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	144.1	10.4	Tidal Caloosahatchee	273.2	\$4,475,664	\$9,915	County	\$4,475,664	N/A
Lee County	N/A	LC-08	Hickory Swamp Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	225.7	8.5	Tidal Caloosahatchee	66.6	\$467,000	\$3,856	County	\$467,000	N/A
Lee County	N/A	LC-09	Orange River Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	6.5	1.3	Tidal Caloosahatchee	63.3	\$1,755,000	\$2,966	County	\$1,755,000	N/A
Lee County	FCT	LC-10	Prairie Pines Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	0.1	0.0	Tidal Caloosahatchee	197.0	\$11,790,530	\$190,454	County	\$11,790,530	N/A
Lee County	N/A	LC-11	Telegraph Creek Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	4,676.2	139.7	Tidal Caloosahatchee	1,727.0	\$23,900,000	\$54,639	County	\$23,900,000	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Lee County	N/A	LC-12	West Marsh Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	148.0	41.3	Tidal Caloosahatchee	205.9	\$4,631,625	N/A	County	\$4,631,625	N/A
Lee County	N/A	LC-13	Yellow Fever Creek Preserve	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	N/A	34.1	48.4	Tidal Caloosahatchee	118.7	\$3,323,507	\$11,703	County	\$3,323,507	N/A
Lee County	UF-IFAS Lee County Extension	LC-15	Education Efforts	FYN; landscape, irrigation, and fertilizer ordinances; pamphlets, PSAs, website, illicit discharge program; WETPLAN.	Education Efforts	Completed	N/A	12,957.5	4,993.9	Tidal Caloosahatchee	42,388.9	\$392,441	\$125,000	County	\$12,000	NF060
Lee County	N/A	LC-16	Street Sweeping	Materials from roadway and gutter sweeping.	Street Sweeping	Completed	N/A	571.8	374.1	Tidal Caloosahatchee	N/A	\$694,176	\$248,572	County	N/A	N/A
Lee County	N/A	LC-17	North Fort Myers Surface Water Restoration: Powell Creek Extension and Lost Lane Levee	Conveyance improvements to increase residence time, rehydrate offsite wetlands on adjacent properties, and accommodate offsite flows.	Hydrologic Restoration	Completed	2013	2.4	0.6	Tidal Caloosahatchee	7.9	\$3,485,817	\$17,101	County	N/A	N/A
Lee County	N/A	LC-18	Whiskey Creek Weir Reconstruction	Retention lake weir repairs to restore originally intended design and operation.	Control Structure	Completed	Prior to 2012	0.1	0.0	Tidal Caloosahatchee	0.1	Not provided	N/A	County	N/A	N/A
Lee County	SFWMD/ U.S. Fish and Wildlife Service (FWS)	LC-19	Caloosahatchee Creeks East	Hydrologic restoration.	Hydrologic Restoration	Completed	Prior to 2012	93.5	9.2	Tidal Caloosahatchee	380.4	\$326,955	N/A	County/ SFWMD/ FWS	\$326,955	N/A
Lee County	DEP/ SFWMD	LC-20	Powell Creek Filter Marsh	Created wetland areas, boardwalks, and trails and stabilized crossing of Powell Creek.	Filter Marsh	Completed	2013	40.5	7.5	Tidal Caloosahatchee	77.2	\$1,440,000	\$38,395	County/ SFWMD/ DEP	Not provided	S0606
Lee County	DEP	LC-21	Nalle Grade Stormwater Park	Dry retention and wet detention ponds.	Stormwater Treatment Area (STA)	Underway	2019	17.1	1.3	Tidal Caloosahatchee	75.9	\$3,500,000	TBD	County/ DEP	DEP - \$500,000	S0727
Lee County	SFWMD	LC-22	Deep Lagoon Hydrologic Restoration	Hydrologic restoration and enhancement, water conservation, wildlife habitat enhancement, and flood protection for surrounding area.	Hydrologic Restoration	Completed	Prior to 2012	144.3	26.4	Tidal Caloosahatchee	273.2	\$210,959	N/A	County/ SFWMD	\$3,065,000	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Lee County	DEP	LC-23	Popash Creek Restoration	Hydrologic restoration to more natural flow regime by increasing water storage on property and improving both onsite and offsite flows.	Hydrologic Restoration	Completed	Prior to 2012	271.7	43.9	Tidal Caloosahatchee	307.3	\$1,726,625	\$16,920	County/ DEP	\$1,726,625	LP6838
Lee County	City of Fort Myers	LC-24	Billy's Creek Wetland	Billy Creek Filter Marsh Park.	Filter Marsh	Completed	Prior to 2012	11.6	1.3	Tidal Caloosahatchee	50.7	\$2,500,000	N/A	County/ City of Fort Myers	\$2,500,000	N/A
Lee County	DEP	LC-25	Caloosahatchee Creeks Preserve– West Restoration	Hydrologic restoration.	Hydrologic Restoration	Completed	2016	134.7	10.5	Tidal Caloosahatchee	716.4	\$250,000	N/A	County/ DEP	\$250,000	S0849
Lee County	DEP	LC-26	Yellow Fever Creek – Gator Slough Transfer Facility	Return historical flow from Gator Slough Canal system to Yellow Fever Creek.	Hydrologic Restoration	Underway	2021	4.3	3.4	Tidal Caloosahatchee	9.4	TBD	TBD	County/ DEP	DEP - \$175,000	S0840
Lee County	DEP	LC-27	Prairie Pines Preserve Restoration	Restoration of historical flows and enhancement and restoration of wetlands.	Hydrologic Restoration	Completed	2018	595.5	49.2	Tidal Caloosahatchee	2,675.8	\$600,000	\$28,295	County/ DEP	DEP - \$300,000	S0895
Lee County	N/A	LC-28	BMAP Plan Development – Basin Study	Basin study to identify pollutant sources and identify further actions to reach reduction goals.	Study	Completed	2017	N/A	N/A	Tidal Caloosahatchee	N/A	\$195,831	N/A	County	\$195,831	N/A
Lee County	N/A	LC-29	Caloosahatchee River-North Fort Myers Nutrient and Bacteria Source Identification Study	Watershed study to investigate interactions between OSTDS groundwater, and surface water in Caloosahatchee Estuary.	Study	Underway	2018	N/A	N/A	Tidal Caloosahatchee	N/A	\$181,352	N/A	County/ DEP	DEP - \$89,964	N/A
Lee County	N/A	LC-30	Waterway Estates WWTF Closure	Closure of facility with direct discharge to Caloosahatchee.	WWTF Diversion to Reuse	Completed	2012	295.0	TBD	Tidal Caloosahatchee	N/A	\$61,565	N/A	County	\$61,565	N/A
Lee County	SFWMD/ FDOT	LC-31	Six Mile Cypress Preserve North Hydrologic Restoration	Wetland creation, addition of control structures, berms, berm breaches to connect natural and created wetlands, and restoration of historical hydrologic conditions to reduce discharge into Caloosahatchee River.	Hydrologic Restoration	Completed	2017	724.6	194.4	Tidal Caloosahatchee	1,839.7	\$1,799,539	\$70,260	County/ SFWMD/ FDOT	\$567,500	N/A
Lee County	DEP/ SFWMD	LC-32	Bob Jane's Preserve Environmental Restoration	Hydrologic improvements in portion of preserve via berms, beaches, and ditch blocks.	Hydrologic Restoration	Completed	2017	1,216.4	118.7	Tidal Caloosahatchee	5,620.4	\$200,000	N/A	County/ DEP/ SFWMD	\$100,000	S0871

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Lee County	DEP	LC-33	Telegraph Creek Preserve	Ditch blocks and native plantings in conveyances.	Hydrologic Restoration	Completed	2017	421.1	43.8	Tidal Caloosahatchee	1,727.0	\$107,337	\$54,639	County/ DEP	\$125,000	S0873
Lee County	LA-MSID/ FDOT	LC-34	West Marsh Preserve	Creation and enhancement of wetland marsh ecosystem, including hydraulic connection for water quality improvement and stormwater attenuation.	Filter Marsh	Underway	TBD	TBD	TBD	Tidal Caloosahatchee	150.0	TBD	TBD	County/ LA-MSID	N/A	N/A
Lee County	DEP/ SFWMD	LC-35	C-43 Water Quality Treatment and Testing Facility Project (*study/land acquisition)	Project to demonstrate and implement cost-effective, wetland-based strategies for reduction of dissolved organic nitrogen.	Study	Underway	TBD	N/A	N/A	Tidal Caloosahatchee	N/A	\$10,000,000	N/A	County/ DEP/ SFWMD	Not provided	N/A
Lee County	N/A	LC-38	Deep Lagoon Pollutant Load Reduction Phase 2- Watershed Analysis Report	Basin study to identify pollutant sources and identify further actions to reach reduction goals.	Study	Completed	2018	N/A	N/A	Tidal Caloosahatchee	N/A	\$70,000	N/A	County	N/A	N/A
Lee County	DEP	LC-39	North Fort Myers Florida Power and Light Feasibility Study	Study to identify areas of high nutrient loads and potential BMPs to improve water quality and reduce flooding.	Study	Underway	2019	N/A	N/A	Tidal Caloosahatchee	N/A	\$200,000	N/A	County/ DEP	DEP - \$200,000	S0894
Lee County	DEP	LC-40	Sunniland/Nine Mile Run Drainage Improvements	Replacement of failing water control structures and reconnection of flow-ways to Hickory Swamp and Buckingham Trails Preserve.	Hydrologic Restoration	Underway	2021	TBD	TBD	Tidal Caloosahatchee	278.7	\$2,000,000	TBD	County/ DEP	\$300,000	LP3602 B
Lee County	City of Fort Myers	LC-41	Caloosahatchee Tributary Canal Rehabilitation: L-3	Reshaping canal banks, littoral planting, and possible addition of control structure(s).	Regional Stormwater Treatment	Underway	2021	985.5	189.6	Tidal Caloosahatchee	1,137.0	\$500,000	TBD	County/ City of Fort Myers/ DEP	DEP - \$400,000	LPA006 3
Lee County	N/A	LC-42	Bob Janes Preserve Restoration Feasibility Study	Study to identify areas of high nutrient loads and potential BMPs to improve water quality, and restore historical hydrologic conditions.	Study	Underway	2020	N/A	N/A	Tidal Caloosahatchee	N/A	\$228,285	N/A	County	\$228,285	N/A
Lee County	N/A	LC-43	GS-10	Land purchase and conversion to conservation land use.	Land Acquisition	Completed	2019	15,177.8	10,640.0	Tidal Caloosahatchee	65,083.7	\$3,870,000	TBD	County	\$3,870,000	N/A
Lee County	DEP	LC-44	Powell Creek/ Old Bridge Park Restoration	Filter marsh creation and BMPs.	Filter Marsh	Underway	2021	TBD	TBD	Tidal Caloosahatchee	TBD	\$920,000	TBD	TBD	TBD	TBD



Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Lee County	DEP	LC-45	Deep Lagoon Preserve Water Quality Improvement Project	Retention ponds, channel/ditch modifications, ditch blocks and pumped solutions.	BMP Treatment Train	Underway	2022	TBD	TBD	Tidal Caloosahatchee	273.2	\$2,980,000	TBD	TBD	TBD	TBD
Lucaya CDD	N/A	LU-01	Education/Fertilizer	Education	Education Efforts	Completed	N/A	1.8	0.4	Tidal Caloosahatchee	41.2	Not provided	Not provided	Not provided	Not provided	N/A
Lucaya CDD	N/A	LU-02	Education/Pet Waste	Education	Education Efforts	Completed	N/A	1.8	0.4	Tidal Caloosahatchee	41.2	Not provided	Not provided	Not provided	Not provided	N/A
Verandah East CDD	Lee County	VE-01	Education/Fertilizer	FYN; landscape, irrigation, and fertilizer ordinances; pamphlets, PSAs, website, illicit discharge program; WETPLAN.	Education Efforts	Completed	N/A	116.5	15.1	Tidal Caloosahatchee	452.0	Not provided	Not provided	Not provided	Not provided	N/A
Verandah West CDD	Lee County	VW-01	Education/Fertilizer	FYN; landscape, irrigation, and fertilizer ordinances; pamphlets, PSAs, website, illicit discharge program; WETPLAN.	Education Efforts	Completed	N/A	180.3	29.1	Tidal Caloosahatchee	488.8	Not provided	Not provided	Not provided	Not provided	N/A

3.2.3.2 Future Projects

Table 35 shows the future project submitted by stakeholders in the Tidal Caloosahatchee Subwatershed.

Table 35. Future projects in the Tidal Caloosahatchee Subwatershed

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source
Lee County	TBD	F-01	Lee Civic Center BMP Project	Kickapoo Creek crosses Civic Center, where it is detained in stormwater ponds. Project will improve water quality while addressing problems associated with onsite runoff.	Shoreline Stabilization	Planned	TBD	TBD	TBD	Tidal Caloosahatchee	TBD	TBD	TBD	TBD

### 3.3. West Caloosahatchee Subwatershed

The West Caloosahatchee Subwatershed covers more than 339,764 acres of the Caloosahatchee River and Estuary Watershed. As shown in **Table 36**, improved pasture is the primary land use, comprising 17.2 % of the subwatershed followed by citrus and other groves, which account for 16.2% of the land use in the subwatershed. Stakeholders in the basin include Charlotte County, City of LaBelle, Collier County, FDOT District 1, Glades County, Hendry County, LA-MSID, Lee County, Port LaBelle CDD, Portico CDD, River Hall CDD, Barron WCD, County Line Drainage District, Cow Slough WCD, Devil's Garden WCD, and Gerber Groves WCD.

**Table 36. Summary of land uses in the West Caloosahatchee Subwatershed**

HSPF Land Use Code	Land Use Description	Acres	% Total
1	Low Density Residential	36,140	10.6
2	Developed Open Space/Disturbed	7,888	2.3
3	Medium Density Residential	2,752	0.8
4	High Density Residential	235	0.1
5	Commercial/Institutional/Transportation	1,334	0.4
6	Industrial/Extractive	1,066	0.3
7	FDOT Right-of-Way	1,569	0.5
8	Sugar Cane	2,290	0.7
9	Row and Field Crops	9,822	2.9
10	Nurseries/Ornamentals/Vineyards	931	0.3
11	Citrus Groves/Other Groves	54,891	16.2
12	Improved Pasture	58,592	17.2
13	Rangeland/Unimproved Pasture/Shrub	46,977	13.8
14	Upland Forest	55,589	16.4
15	Wetland	56,212	16.5
16	Water	3,476	1.0
N/A	<b>Total</b>	<b>339,764</b>	<b>100.0</b>

#### 3.3.1 Water Quality Monitoring

**Table 37** summarizes the water quality monitoring stations in the West Caloosahatchee Subwatershed, and **Figure 10** shows the station locations. Monitoring stations are proposed in the Goodno, Jacks Branch, Okaloacoochee Branch, Roberts, and Townsend Basins to ensure that monitoring occurs throughout the subwatershed.

**Table 37. Water quality monitoring stations in the West Caloosahatchee Subwatershed**

Basin	Representative Site?	Entity	Station ID	Tier	Data Needs
Bedman/Dog	No	DEP Watershed Monitoring Section	53176	2	N/A
Bedman/Dog	No	Lee County	37-15GR	2	N/A
Bedman/Dog	Yes	Lee County	37-4GR	1	N/A
Bedman/Dog	No	LA-MSID	WQ SITE 13	2	N/A
Bedman/Dog	No	LA-MSID	WQ SITE 14	2	N/A
Bedman/Dog	No	LA-MSID	WQ SITE 16	2	N/A
Bedman/Dog	No	LA-MSID	WQ SITE 31	2	N/A

<b>Basin</b>	<b>Representative Site?</b>	<b>Entity</b>	<b>Station ID</b>	<b>Tier</b>	<b>Data Needs</b>
<b>Bedman/Dog</b>	No	LA-MSID	WQ SITE 32	2	N/A
<b>Bedman/Dog</b>	No	LA-MSID	WQ SITE 41	2	N/A
<b>Bee Branch/Pollywog</b>	No	DEP South ROC	28020268FTM	2	N/A
<b>Bee Branch/Pollywog</b>	No	SFWMD	CRFW24	2	Proposed station as part of SFWMD expanded monitoring
<b>Bee Branch/Pollywog</b>	No	SFWMD	CRFW25A	2	N/A
<b>Bee Branch/Pollywog</b>	Yes	DEP South ROC	G3SD0085	1	N/A
<b>Bee Branch/Pollywog</b>	No	DEP South ROC	G3SD0098	2	N/A
<b>Cypress Creek</b>	No	SFWMD	18245	2	N/A
<b>Cypress Creek</b>	No	DEP Watershed Monitoring Section	53939	2	N/A
<b>Cypress Creek</b>	No	DEP Watershed Monitoring Section	53948	2	N/A
<b>Cypress Creek</b>	Yes	DEP South ROC	CYPRESSGR	1	Representative through averaging multiple stations
<b>Cypress Creek</b>	Yes	Lee County	FICHTERSGR	1	Representative through averaging multiple stations
<b>Cypress Creek</b>	Yes	Lee County	SPANISHGR	1	Representative through averaging multiple stations
<b>Deadmans/Cypress Branch</b>	No	DEP Watershed Monitoring Section	53174	2	N/A
<b>Deadmans/Cypress Branch</b>	No	DEP Watershed Monitoring Section	53183	2	N/A
<b>Goodno</b>	Yes	SFWMD	CRFW6	1	Proposed station as part of SFWMD expanded monitoring
<b>Goodno</b>	Yes	SFWMD	CRFW7	1	Proposed station as part of SFWMD expanded monitoring
<b>Jacks Branch</b>	No	DEP Watershed Monitoring Section	51904	2	N/A
<b>Jacks Branch</b>	No	DEP Watershed Monitoring Section	53185	2	N/A
<b>Jacks Branch</b>	No	USGS (SFWMD)	2292740	3	N/A
<b>Jacks Branch</b>	No	DEP South ROC	28020238	2	N/A
<b>Jacks Branch</b>	Yes	SFWMD	CRFW23	1	Proposed station as part of SFWMD expanded monitoring
<b>Okaloacoochee Branch</b>	No	DEP South ROC	CALUSA0051FTM	2	N/A



<b>Basin</b>	<b>Representative Site?</b>	<b>Entity</b>	<b>Station ID</b>	<b>Tier</b>	<b>Data Needs</b>
<b>Okaloacoochee Branch</b>	Yes	SFWMD	CRFW09	1	Proposed station as part of SFWMD expanded monitoring
<b>Okaloacoochee Branch</b>	No	DEP South ROC	G3SD0099	2	N/A
<b>Olga/Hickey</b>	No	DEP Watershed Monitoring Section	3568	2	N/A
<b>Olga/Hickey</b>	No	DEP Watershed Monitoring Section	53943	2	N/A
<b>Olga/Hickey</b>	Yes	Lee County	38-3GR	1	N/A
<b>Olga/Hickey</b>	No	Lee County	39-GR20	2	N/A
<b>Olga/Hickey</b>	No	Lee County	CES01SUR	2	N/A
<b>Olga/Hickey</b>	No	LA-MSID	WQ SITE 11	2	N/A
<b>Olga/Hickey</b>	No	LA-MSID	WQ SITE 2	2	N/A
<b>Olga/Hickey</b>	No	LA-MSID	WQ SITE 23	2	N/A
<b>Olga/Hickey</b>	No	LA-MSID	WQ SITE 3	2	N/A
<b>Olga/Hickey</b>	No	LA-MSID	WQ SITE 36	2	N/A
<b>Olga/Hickey</b>	No	LA-MSID	WQ SITE 37	2	N/A
<b>Olga/Hickey</b>	No	LA-MSID	WQ SITE 4	2	N/A
<b>Roberts</b>	No	DEP South ROC	28020241	2	N/A
<b>Roberts</b>	No	DEP South ROC	28020251FTM	2	N/A
<b>Roberts</b>	No	SFWMD	CRFW11	2	Proposed station as part of SFWMD expanded monitoring
<b>Roberts</b>	No	SFWMD	CRFW12	2	Proposed station as part of SFWMD expanded monitoring
<b>Roberts</b>	Yes	DEP South ROC	G3SD0146	1	N/A
<b>Townsend</b>	No	USGS (SFWMD)	2292780	3	N/A
<b>Townsend</b>	No	SFWMD	CRFW15	2	Proposed station as part of SFWMD expanded monitoring
<b>Townsend</b>	Yes	LA-MSID	WQ SITE 15	1	N/A
<b>In River</b>	No	SFWMD	S79	2	N/A
<b>In River</b>	No	USGS	2292900 (S-79)	3	N/A

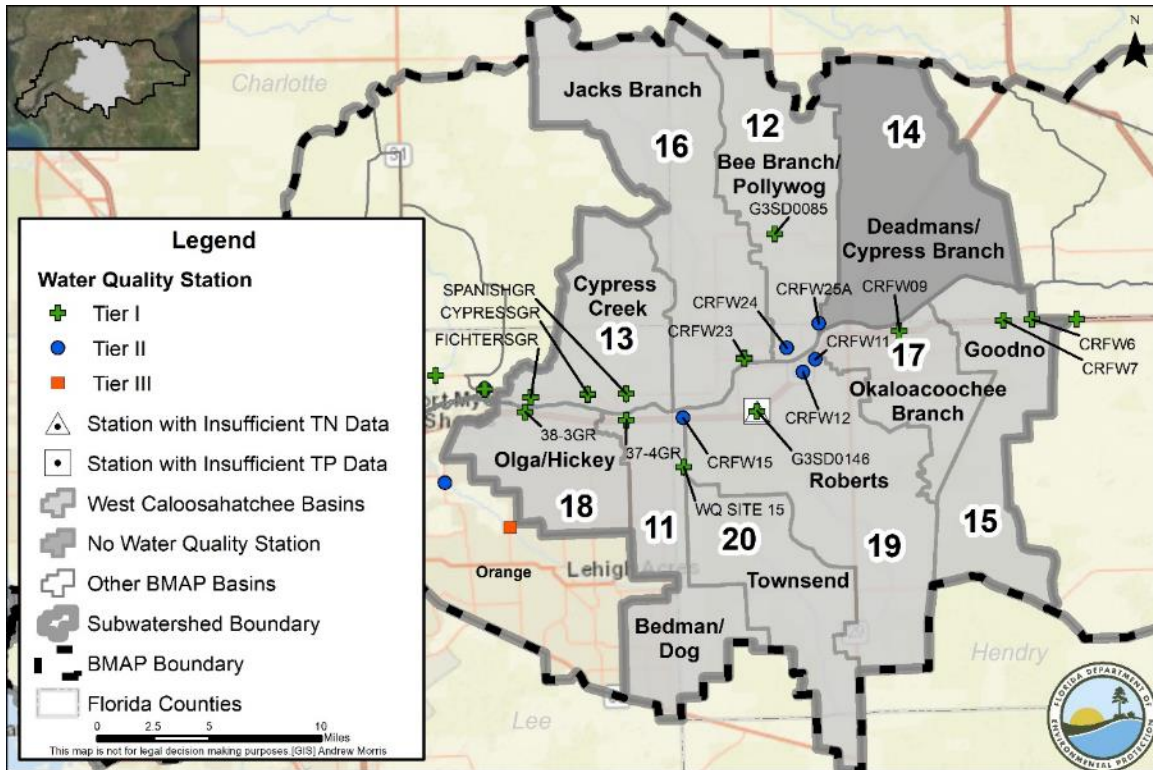


Figure 10. West Caloosahatchee Subwatershed monitoring stations

### 3.3.2 Basin Evaluation Results

**Table 38** summarizes the basin evaluation results based on data from WY2014–WY2018 for the West Caloosahatchee Subwatershed. Most of the basins had insufficient data to compare with the TN and TP benchmarks; however, only Cypress Creek had a TN concentration of 1.72, which was above the 1.54 mg/L benchmark. No exceedances of the TP benchmark (0.12 mg/L) were observed.

The TRA prioritization results for the West Caloosahatchee Subwatershed are shown in **Table 39**, with 1 the highest priority, 2 the next highest priority, and 3 a priority as resources allow.

**Table 38. Basin evaluation results for the West Caloosahatchee Subwatershed**

TRA ID	Basin Name	TN (mg/L) (Benchmark –1.54)	TN FWM Concentration (mg/L)	TN UAL, (lbs/ac)	TN Trend Analysis	TP (mg/L) (Benchmark – 0.12)	TP FWM Concentration (mg/L)	TP UAL (lbs/ac)	TP Trend Analysis
11	Bedman/Dog	0.79	Insufficient Data	5	Insufficient Data	0.02	Insufficient Data	1	Insufficient Data
12	Bee Branch/Pollywog	0.83	Insufficient Data	5	Insufficient Data	0.09	Insufficient Data	1	Insufficient Data
13	Cypress Creek	1.72	Insufficient Data	6	Insufficient Data	0.05	Insufficient Data	1	Insufficient Data
14	Deadmans/Cypress Branch	Insufficient Data	Insufficient Data	4	Insufficient Data	Insufficient Data	Insufficient Data	<1	Insufficient Data
15	Goodno	Insufficient Data	Insufficient Data	5	Insufficient Data	Insufficient Data	Insufficient Data	<1	Insufficient Data
16	Jacks Branch	Insufficient Data	Insufficient Data	5	Insufficient Data	Insufficient Data	Insufficient Data	1	Insufficient Data
17	Okaloocoochee Branch	Insufficient Data	Insufficient Data	6	Insufficient Data	Insufficient Data	Insufficient Data	1	Insufficient Data
18	Olga/Hickey	0.74	Insufficient Data	7	Insufficient Data	0.04	Insufficient Data	1	Insufficient Data
19	Roberts	Insufficient Data	Insufficient Data	6	Insufficient Data	Insufficient Data	Insufficient Data	1	Insufficient Data
20	Townsend	0.61	Insufficient Data	6	Insufficient Data	0.04	Insufficient Data	1	Insufficient Data

**Table 39. TRA evaluation results for the West Caloosahatchee Subwatershed**

Basin	Station	TN Priority	TP Priority
Bedman/Dog	37-4GR	3	3
Bee Branch/Pollywog	G3SD0085	3	3
Cypress Creek	CYPRESSGR/ FICHTERSGR/ SPANISHGR	1	3
Deadmans/Cypress Branch	NA	Insufficient Data	Insufficient Data
Goodno	NA	Insufficient Data	Insufficient Data
Jacks Branch	NA	Insufficient Data	Insufficient Data
Okaloocoochee Branch	NA	Insufficient Data	Insufficient Data
Olga/Hickey	38-3GR	2	3
Roberts	G3SD0146	Insufficient Data	Insufficient Data
Townsend	WQ SITE 15	2	3

3.3.3 Projects

The tables below summarize the existing and planned and future projects for the West Caloosahatchee Subwatershed that were provided for the BMAP. The existing and planned projects are a BMAP requirement, while future projects will be implemented as funding becomes available for project implementation. **Appendix A** provides additional details about the projects and the terms used in these tables.

3.3.3.1 Existing and Planned Projects

**Table 40** summarizes the existing and planned projects provided by the stakeholders for the West Caloosahatchee Subwatershed.

Table 40. Existing and planned projects in the West Caloosahatchee Subwatershed

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Coordinating Agency	SFWMD/ DEP/ FDACS	CA-01	C-43 West Basin Storage Reservoir	Storage of 170,000 acre-feet of local stormwater runoff and releases from Lake Okeechobee. It will reduce volume of lake discharges in wet season and provide freshwater flow to the estuary in dry season to aid in essential flows for more stable salinities.	Hydrologic Restoration	Underway	2023	N/A	N/A	West Caloosahatchee	10,700	Not provided	Not provided	Not provided	Not provided	Not provided
Coordinating Agency	SFWMD/ DEP/ FDACS	CA-04	BOMA Flow Equalization Basin (FEB)	Expand regional storage in the Caloosahatchee River Watershed and reduce flows to the estuary on approximately 1,800 acres of SFWMD lands.	Hydrologic Restoration	Planned	TBD	N/A	N/A	West Caloosahatchee	1,797	Not provided	Not provided	Not provided	Not provided	Not provided
Coordinating Agency	SFWMD/ DEP/ FDACS	CA-05	C-43 Water Quality Treatment and Testing Facility, Phase II - Test Cells	Evaluate the effectiveness of wetland treatment systems in reducing nitrogen at a test-scale.	Study	Planned	TBD	N/A	N/A	West Caloosahatchee	TBD	Not provided	Not provided	Not provided	Not provided	Not provided
Coordinating Agency	SFWMD/ DEP/ FDACS	CA-06	Caloosahatchee Reservoir Water Quality Feasibility Study	Study will evaluate opportunities to improve the water quality leaving the C-43 West Basin Storage Reservoir that is currently under construction.	Study	Underway	2020	N/A	N/A	West Caloosahatchee	N/A	Not provided	Not provided	Not provided	Not provided	Not provided
Coordinating Agency	SFWMD/ DEP/ FDACS	CA-07	Mudge Ranch	304-acre project area, which has an estimated water storage benefit of 396 ac-ft/yr.	Dispersed Water Management (DWM)	Completed	2014	N/A	N/A	West Caloosahatchee	304	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Cow Slough WCD	DEP, FDACS	CSW-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Cow Slough WCD	Not provided	N/A
Cow Slough WCD	FDACS	CSW-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Cow Slough WCD	Not provided	N/A
Cow Slough WCD	N/A	CSW-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Cow Slough WCD	Not provided	N/A
Cow Slough WCD	N/A	CSW-04	Canal/Ditch Bank Berms	Minimize sediment transport by constructing berms on top of canal/ditch banks and promoting vegetation cover.	Shoreline Stabilization	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Cow Slough WCD	Not provided	N/A
Cow Slough WCD	N/A	CSW-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Cow Slough WCD	Not provided	N/A
County Line Drainage District	DEP, FDACS	CL-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	County Line Drainage District	Not provided	N/A
County Line Drainage District	FDACS	CL-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	County Line Drainage District	Not provided	N/A
County Line Drainage District	N/A	CL-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	County Line Drainage District	Not provided	N/A
County Line Drainage District	N/A	CL-04	Canal Cleaning Program	Review and field evaluation of sediment accumulation and scheduling of removal, when necessary.	Muck Removal/Restoration Dredging	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	County Line Drainage District	Not provided	N/A
County Line Drainage District	N/A	CL-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	County Line Drainage District	Not provided	N/A
Devil's Garden WCD	DEP, FDACS	DG-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Devil's Garden WCD	Not provided	N/A
Devil's Garden WCD	FDACS	DG-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Devil's Garden WCD	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Devil's Garden WCD	N/A	DG-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Devil's Garden WCD	Not provided	N/A
Devil's Garden WCD	N/A	DG-04	Canal Cleaning Program	Review and field evaluation of sediment accumulation and scheduling of removal, when necessary.	Muck Removal/Restoration Dredging	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Devil's Garden WCD	Not provided	N/A
Devil's Garden WCD	N/A	DG-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Devil's Garden WCD	Not provided	N/A
FDACS	Agricultural Producers	FDACS-02	BMP Implementation and Verification	Enrollment and verification of BMPs by agricultural producers. Reductions based on HSPF model. Acres treated based on FDACS OAWP June 2019 Enrollment and FSAID VI.	Agricultural BMPs	Completed	N/A	151,951	9,352.70	West Caloosahatchee	136,380	TBD	TBD	FDACS	TBD	N/A
FDACS	Agricultural Producers	FDACS-05	Cost-Share Projects	Cost-share projects paid for by FDACS. Acres treated based on FDACS OAWP June 2019 Enrollment. Reductions based on HSPF model.	Agricultural BMPs	Completed	N/A	26,873	1,556.20	West Caloosahatchee	19,341	TBD	TBD	FDACS	TBD	N/A
FDOT District 1	N/A	FDOT-29	State Road (SR) 80 from Dalton Lane to County Road (CR) 833 (408286-5 and-6)	Widening project provided extra nutrient removal in treatment ponds.	Wet Detention Pond	Underway	2020	TBD	TBD	West Caloosahatchee	TBD	Not provided	Not provided	FDOT	Not provided	N/A
FDOT District 1	N/A	FDOT-30	SR 82 from Gator Slough Lane to SR 29 (430849-1)	Widening project provided extra nutrient removal in treatment ponds.	Wet Detention Pond	Underway	2022	TBD	TBD	West Caloosahatchee	TBD	Not provided	Not provided	FDOT	Not provided	N/A
Gerber Groves WCD	DEP, FDACS	GG-01	Public Education and Outreach	Updates on BMAP and requirements during annual landowner meetings.	Education Efforts	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Gerber Groves WCD	Not provided	N/A
Gerber Groves WCD	FDACS	GG-02	FDACS BMP Assistance	Provide assistance to FDACS, as needed, to encourage landowners to enroll in BMPs.	Agricultural BMPs	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Gerber Groves WCD	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Gerber Groves WCD	N/A	GG-03	Nutrient Controls	No application of fertilizer in district's rights-of-way	Fertilizer Cessation	Completed	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Gerber Groves WCD	Not provided	N/A
Gerber Groves WCD	N/A	GG-04	Canal/Ditch Bank Berms	Minimize sediment transport by constructing berms on top of canal/ditch banks and promoting vegetation cover.	Shoreline Stabilization	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Gerber Groves WCD	Not provided	N/A
Gerber Groves WCD	N/A	GG-05	Control Structures	Annual maintenance of water control structures.	Control Structure	Planned	N/A	N/A	N/A	West Caloosahatchee	N/A	Not provided	N/A	Gerber Groves WCD	Not provided	N/A
LA-MSID (formerly ECWCD)	Natural Resources Conservation Service (NRCS)/ Federal Emergency Management Agency (FEMA)	LA-11	S-H-2 Weir Replacement	Replace failed fabiform weir.	Control Structure	Underway	2019	75.7	7.8	West Caloosahatchee	487.0	\$675,000	TBD	NRCS/ FEMA/ LA-MSID	TBD	TBD
LA-MSID (formerly ECWCD)	FDOT	LA-12	Hendry Canal Widening	Widen 3 miles of Hendry Ext. Canal. Create additional stormwater storage in canal system.	Hydrologic Restoration	Underway	2021	TBD	TBD	West Caloosahatchee	8,993.9	\$5,000,000	TBD	LA-MSID/ FDOT	TBD	TBD
Lee County	DEP/ SFWMD	LC-36	Fichter's Creek Restoration Project	Restoration of hydroperiod and water quality in Fichter's Creek.	Hydrologic Restoration	Completed	2018	14.1	1.6	West Caloosahatchee	53.4	\$2,000,000	\$35,000	County/ DEP/ SFWMD	\$450,000	S0893
Lee County	DEP	LC-37	Spanish Creek at Daniel's Preserve Restoration	Restoration of wetland hydroperiod and sheet flow attenuation.	Hydrologic Restoration	Completed	2014	828.9	46.3	West Caloosahatchee	4,030.7	\$400,000	\$3,000	County/ DEP	\$650,602	S0732
Lee County	N/A	LC-46	Olga Shores Preserve Hydrological Restoration	Filter marsh creation, BMPs.	Hydrologic Restoration	Underway	TBD	TBD	TBD	West Caloosahatchee	TBD	TBD	TBD	TBD	TBD	N/A
Portico CDD		PORT-01	Education/ Fertilizer	FYN; landscape, irrigation, and fertilizer ordinances; pamphlets, PSAs, website, illicit discharge program; WETPLAN.	Education Efforts	Completed	N/A	66.2	7.6	West Caloosahatchee	250.7	Not provided	Not provided	Not provided	Not provided	N/A
Portico CDD		PORT-02	Control Structures	CS-A1 is Modified Type H Inlet, CS-A2 is Modified Type E Inlet, CS-B1 is a Modified Type C Inlet, CS-1B is Modified Type H Inlet.	Control Structure	Completed	N/A	TBD	TBD	West Caloosahatchee	TBD	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)	Subwatershed	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source	Funding Amount	DEP Contract Agreement Number
Portico CDD		PORT-03	Conservation Lands	Conversion of agricultural lands to natural conservation lands	Land Preservation	Completed	N/A	TBD	TBD	West Caloosahatchee	TBD	Not provided	Not provided	Not provided	Not provided	N/A
Portico CDD		PORT-04	Stormwater Aeration System	Aeration systems on surface water management ponds A1, A2, A3, A4, A5, A9, A10, B1, and B2.	Stormwater Aeration System	Completed	N/A	TBD	TBD	West Caloosahatchee	TBD	Not provided	Not provided	Not provided	Not provided	N/A

3.3.3.2 Future Projects

Table 41 summarizes future projects provided by the stakeholders for the West Caloosahatchee Subwatershed

Table 41. Future projects in the West Caloosahatchee Subwatershed

Lead Entity	Partners	Project Number	Project Name	Project Description	Project Type	Project Status	Estimated Completion Date	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)	Location	Acres Treated	Cost Estimate	Cost Annual O&M	Funding Source
FDOT District 1	N/A	F-02	SR 29 from SR 82 to Hendry County Line (417878-4)	Widening project and providing extra nutrient removal in treatment ponds.	Wet Detention Ponds	Design	TBD	TBD	TBD	West Caloosahatchee	TBD	TBD	TBD	FDOT
FDOT District 1	N/A	F-03	SR 29 from Collier County Line to Keri Road (417878-5)	Widening project and providing extra nutrient removal in treatment ponds.	Wet Detention Ponds	Design	TBD	TBD	TBD	West Caloosahatchee	TBD	TBD	TBD	FDOT
FDOT District 1	N/A	F-04	CR 29 from Keri Road to Spencer (Road F) (417878-7)	Widening project and providing extra nutrient removal in treatment ponds.	Wet Detention Ponds	Design	TBD	TBD	TBD	West Caloosahatchee	TBD	TBD	TBD	FDOT
FDOT District 1	N/A	F-05	SR 29 from Spencer (Road F) to Cowboy Way (417878-3)	Widening project and providing extra nutrient removal in treatment ponds.	Wet Detention Ponds	Design	TBD	TBD	TBD	West Caloosahatchee	TBD	TBD	TBD	FDOT
FDOT District 1	N/A	F-06	SR 29 from Cowboy Way to SR 78 (417878-8)	Widening project and providing extra nutrient removal in treatment ponds.	Wet Detention Ponds	Design	TBD	TBD	TBD	West Caloosahatchee	TBD	TBD	TBD	FDOT
Lee County	TBD	F-07	Spanish Creek Restoration (Four Corners)	Land purchase and conversion to conservation land use.	Land Acquisition	Planned	TBD	TBD	TBD	West Caloosahatchee	TBD	\$300,000	TBD	N/A
Lee County	TBD	F-08	Bob Janes Preserve Restoration	Rehydration of wetlands.	Hydrologic Restoration	Planned	TBD	TBD	TBD	West Caloosahatchee	TBD	\$1,000,000	TBD	TBD



## Chapter 4. Summary

### 4.1. TRA Evaluation Results

**Table 42** summarizes the results of the TRA evaluation process presented by subwatershed in **Chapter 3** for the subwatersheds in the Caloosahatchee River and Estuary Watershed. For each basin, a priority was assigned based on the TN and TP concentrations. The TRA evaluation does not currently include an assessment of water quantity since a flow evaluation has not yet been completed. Once a complete flow evaluation is available, it will be reviewed for inclusion in future BMAP reporting.

These priorities were set to help focus resources and projects in the basins that are in most need of improvement. Priorities were set with 1 the highest priority, 2 the next highest priority, and 3 a priority as resources allow.

**Table 42. Summary of the TRA evaluation results**

Subwatershed	Basin	Station	TN Priority	TP Priority
East Caloosahatchee	C-19	C19	Insufficient Data	Insufficient Data
East Caloosahatchee	Lake Hicpochee	N/A	Insufficient Data	Insufficient Data
East Caloosahatchee	Long Hammock	N/A	Insufficient Data	Insufficient Data
East Caloosahatchee	Nine Mile	G3SD0088	3	2
East Caloosahatchee	S-4	S235	3	Insufficient Data
East Caloosahatchee	Turkey Creek	N/A	Insufficient Data	Insufficient Data
East Caloosahatchee	York	N/A	Insufficient Data	Insufficient Data
Tidal Caloosahatchee	Billy Creek/Manuel Branch	CFMFSP/ CFMMANUEL	2	1
Tidal Caloosahatchee	Daughtrey	20-9GR	3	3
Tidal Caloosahatchee	Hancock/Yellow Fever	16-3GR	2	2
Tidal Caloosahatchee	Orange	G3SD0128	3	3
Tidal Caloosahatchee	Owl/Trout	27-6GR/27O- GR20	3	3
Tidal Caloosahatchee	Popash/Stroud	23-5GR/24-7GR	2	3
Tidal Caloosahatchee	Powell	POWLGR20	3	2
Tidal Caloosahatchee	Telegraph	G3SD0129	3	3
Tidal Caloosahatchee	Tidal Northwest	300/400/470/540/ 590/600	2	3
Tidal Caloosahatchee	Tidal Southwest	WHISGR18	2	2
West Caloosahatchee	Bedman/Dog	37-4GR	3	3
West Caloosahatchee	Bee Branch/Pollywog	G3SD0085	3	3
West Caloosahatchee	Cypress Creek	CYPRESSGR/ FICHTERSGR/ SPANISHGR	1	3
West Caloosahatchee	Deadmans/Cypress Branch	N/A	Insufficient Data	Insufficient Data
West Caloosahatchee	Goodno	N/A	Insufficient Data	Insufficient Data
West Caloosahatchee	Jacks Branch	N/A	Insufficient Data	Insufficient Data
West Caloosahatchee	Okalochoochee Branch	N/A	Insufficient Data	Insufficient Data
West Caloosahatchee	Olga/Hickey	38-3GR	2	3
West Caloosahatchee	Roberts	G3SD0146	Insufficient Data	Insufficient Data
West Caloosahatchee	Townsend	WQ SITE 15	2	3

## **4.2. RFI Responses**

To further identify restoration projects for this BMAP, DEP implemented an RFI in October 2019 to generate additional restoration projects or activities from both the public and private sectors. The effort was open to any interested parties who could propose a viable project for restoration and could be considered for inclusion in the final Caloosahatchee River and Estuary BMAP for funding consideration.

Overall, the RFI process generated 33 responses from the private sector. Submittals ranged from on-the-ground projects, such as STAs, to technologies that could be implemented in both aquatic and terrestrial environments. All submittals were reviewed, and **Appendix D** provides a summary of the submittals. Resources will be needed to implement any of these projects throughout the watershed, and they are being considered for DEP funding. Additional details on all responses are on file with DEP.

## **4.3. 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. New development primarily falls into two general source categories: (1) urban, and (2) agriculture. Nutrient impacts from new development are 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.

The recommendations presented in **Chapter 2** should be considered by local governments during master planning and land use decision-making efforts. At the time of BMAP development and adoption, many of these recommendations are not required by statute, but it is anticipated that some, if not all, of the recommendations may be a part of future legislative mandates and future BMAP iterations.

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.

#### **4.4. Compliance**

A compliance methodology was not specified in the estuary TMDL, and the BMAP is tracking loads at major structures and stations where flow and water quality data are collected. For the S-4 Basin, C-19 Canal, Lake Hicpochee, Long Hammock Creek, and Townsend Canal, the TMDLs are expressed as a 7-year rolling average load not to be exceeded. As the BMAP has just been expanded to encompass the Caloosahatchee River and Estuary Watershed and the tributary TMDLs adopted in late 2019, a BMAP compliance methodology has not yet been established. Prior to the next update of this BMAP, a compliance methodology will be established for the estuary and tributaries within the BMAP.

## **Chapter 5. References**

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- Florida Department of Environmental Protection. 2009. TMDL report. *Nutrient TMDL for the Caloosahatchee Estuary*. Tallahassee, FL: Division of Water Resource Management, Bureau of Watershed Management.
- Florida Department of Environmental Protection. 2019. TMDL report. *Dissolved Oxygen TMDLs for the S-4 Basin, C-19 Canal, Lake Hicpochee, Long Hammock Creek, and Townsend Canal (WBIDs 3246, 3237E, 3237C, 3237B, and 3235L)*. Tallahassee, FL: Division of Environmental Assessment and Restoration.
- South Florida Water Management District. Armstrong, Cassondra, Zheng, Fawen, Wachnicka, Anna, Khan, Amanda, Chen, Zhiqiang, Baldwin, Lucia. Chapter 8C: St. Lucie and Caloosahatchee River Watersheds Annual Report. *2019 South Florida Environmental Report*.
- South Florida Water Management District, Florida Department of Environmental Protection, and Florida Department of Agriculture and Consumer Services. 2009. *Caloosahatchee River Watershed Protection Plan*.
- Soil and Water Engineering Technology, Inc. 2016. *Estimation of total phosphorus and nitrogen load reductions associated with FDACS Lake Okeechobee cost-share BMP Program*. Tasks 1 and 2.
- Tetra Tech. 2017. *Hydrology and water quality modeling report for the Caloosahatchee River and Estuary, Florida*.

## **Appendices**

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### **Appendix A. BMAP Projects Supporting Information**

The project tables in this BMAP list the implementation status of the BMAP projects as of June 30, 2019. 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 four 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.

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 within 20 years from the adoption of the original BMAP. 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.

DEP requested information from stakeholders on future projects and released an RFI to obtain proposals for restoration projects and technologies with the potential for additional load reductions in the basin. Funding has not yet been identified for many of these future and RFI projects, and the additional funding of projects is a key part of making reductions required to achieve the TMDLs. The future project tables in **Chapter 3** will be updated as project details are refined and funding is obtained.

## **Appendix B. Agricultural Enrollment and Reductions**

(Language in this appendix was provided by FDACS.)

All agricultural nonpoint sources in the Caloosahatchee River and Estuary 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 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 Followup**

When DEP adopts a BMAP that includes agriculture, it is the agricultural landowner's responsibility to implement BMPs adopted by FDACS to help achieve load reductions. To date, FDACS OAWP has adopted BMP manuals by rule<sup>1</sup> 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 BMP Program, landowners must meet with OAWP to determine the BMPs that are applicable to their operation. The landowner must submit a NOI to implement the BMPs on the BMP checklist from the applicable BMP manual to OAWP. 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.

OAWP is required to verify that landowners are implementing BMPs identified in their NOIs. Procedures used to verify the implementation of agricultural BMPs are outlined in Rule 5M-1.008, F.A.C. BMP implementation is verified using annual surveys submitted by producers enrolled in the BMP program and site visits by OAWP. Producers not implementing BMPs according to the process outlined in Title 5M-1, F.A.C., are referred to DEP for enforcement action after attempts at remedial action are exhausted.

BMP verification site visits are conducted to verify that all BMPs are being implemented correctly 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, whether a survey was completed by the producer or not for the most recent year, and whether the operation has received cost-share funding. FDACS is to conduct an onsite inspection of each producer implementing BMPs at least every two years and provide information it obtains to DEP, subject to any confidentiality restrictions.

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<sup>1</sup> <https://www.fdacs.gov/Agriculture-Industry/Water/Agricultural-Best-Management-Practices>

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

### **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 due to better weather conditions and reduced leaf canopies. While these are favorable conditions for capturing aerial imagery, they make photo interpretation for determining agricultural land use more difficult. Agricultural lands are often fallow in the winter months and can result in inappropriate analysis of the photo imagery.

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

FDACS uses the FSAID geodatabase to estimate agricultural acreages statewide. FSAID is derived from water management district land use data, and is refined using county property appraiser data, OAWP BMP enrollment data, U.S. Department of Agriculture data for agriculture, such as the Cropland Data Layer and Census of Agriculture, FDACS Department of Plant Industry citrus data, water management district water use and permitting data, as well as field verification performed by USGS, the water management districts, and OAWP. Ongoing mapping and ground-truthing efforts of the FSAID dataset provide the best available data on the status of irrigated and nonirrigated 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. When crop types on a specific parcel change, additional NOIs may be required for any new commodities being produced on the parcel, which could result in a reduction in enrolled acreage. 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 prioritizes the enrollment of agricultural land uses. The highest priority parcels include all intensive operations including dairies and nurseries, parcels greater than 50 acres in size, and agricultural parcels adjacent to waterways. In the Caloosahatchee River and Estuary BMAP area, there are approximately 28,734 acres (FSAID VI) of fallow citrus, some of which has been, or is going to be, converted to water farms. Projects to convert 304 acres have been constructed and are operational. Projects comprising another 35,192 acres are under construction or design/permitting.

When considering agricultural land uses and associated nonpoint source loads, it is important to note that the Caloosahatchee BMAP boundary overlaps portions of the Lake Okeechobee BMAP. The total agricultural area represented by the overlap between watersheds is 186,608 acres, which comprises 44 % of the agricultural acreage in the Caloosahatchee BMAP. **Table B-1** and **Table B-2** list the agricultural acreage based on FSAID VI that is enrolled in each OAWP BMP Program commodity or in Lake Okeechobee Protection Plan (LOPP) enrollments. LOPP enrollments were made before OAWP adopted commodity-specific BMP manuals. LOPP enrollments are being reincorporated over time under the appropriate manuals—mostly cow/calf. **Table B-3** shows the agricultural acreage enrolled in the various BMP Programs in the Caloosahatchee River and Estuary Watershed. **Table B-4** through **Table B-6** show the agricultural land use acreage enrolled in the BMP Program by subwatershed. **Figure B-1** shows the parcels enrolled in the BMP Program by commodity in the Caloosahatchee River and Estuary BMAP area, however compliance with Section 403.067, F.S. is based on the NOIs and site visits described in **Section 1.2.2.1**.

**Table B-1. Agricultural land use acreage enrolled summary in the BMP Program in the Caloosahatchee River and Estuary BMAP area as of June 2019**

Category	Acres
FSAID VI agricultural acres in the BMAP area	419,369
Total agricultural acres enrolled	302,652
% of agricultural acres enrolled	72 %

**Table B-2. Agricultural land use acreage enrolled in the BMP Program in the Caloosahatchee River and Estuary BMAP area by subwatershed**

Basin	Total Agricultural Acres	Agricultural Acres Enrolled	% of Agricultural Acreage Enrolled
East Caloosahatchee	186,609	145,152	78
Tidal Caloosahatchee	36,939	21,121	57
West Caloosahatchee	195,821	136,380	70
<b>Total</b>	<b>419,369</b>	<b>302,652</b>	<b>72</b>

**Table B-3. Agricultural land use acreage enrolled in the Caloosahatchee River and Estuary BMAP area by BMP Program**

Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	58,650
Conservation Plan Rule	60,483
Cow/Calf	61,280
Dairy	138
Fruit/Nut	179
LOPP	3,273
Multiple Commodities	46,343
Nursery	602
Row/Field Crop	70,108
Sod	1,597
<b>Total</b>	<b>302,652</b>

**Table B-4. Agricultural land use acreage enrolled in the BMP Program in the East Caloosahatchee Subwatershed**

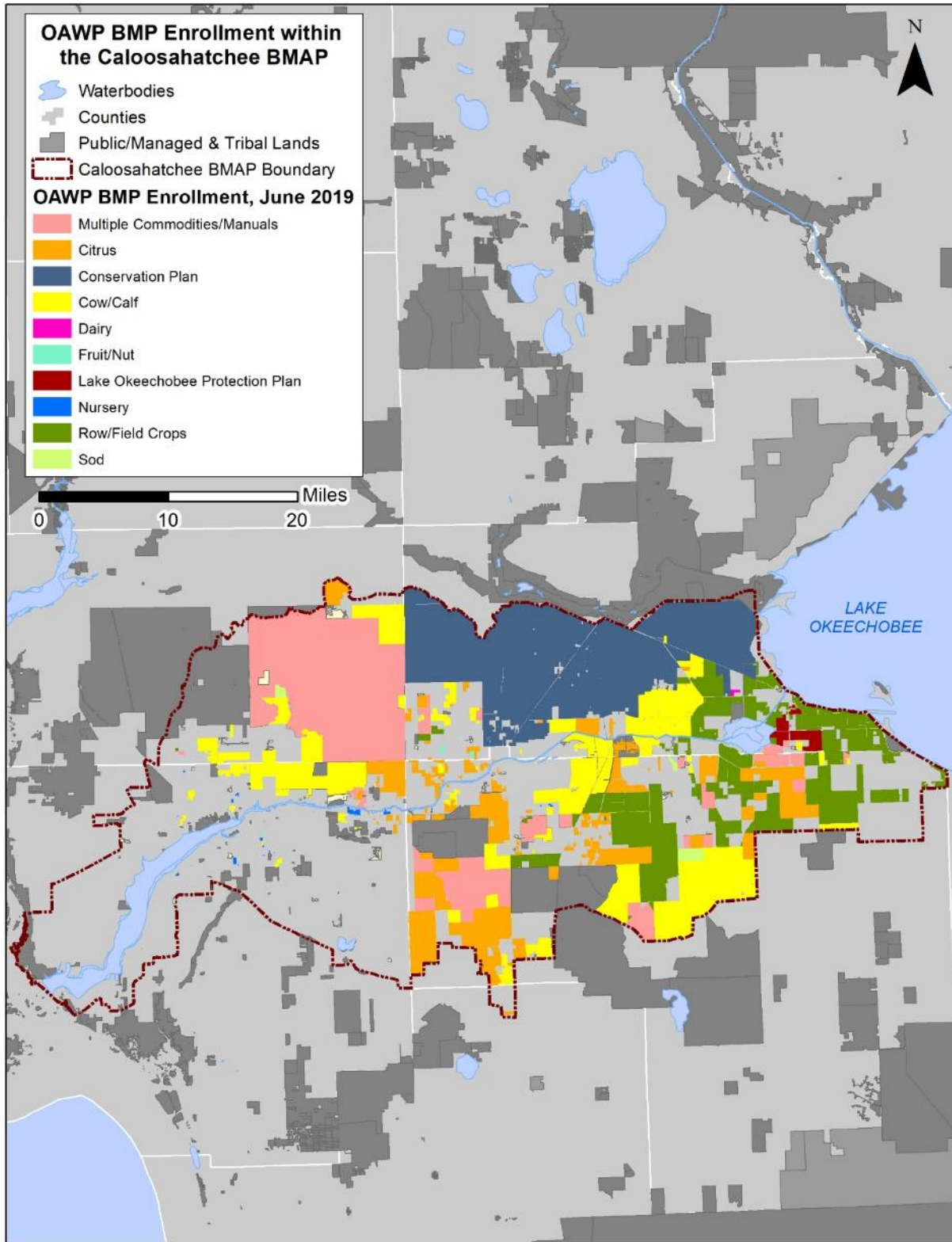
Related OAWP BMP Programs	Agricultural Acres Enrolled
Citrus	15,889
Conservation Plan Rule	20,559
Cow/Calf	30,726
Dairy	138
LOPP	3,273
Multiple Commodities	8,539
Nursery	9
Row/Field Crops	64,668
Sod	1,351
<b>Total</b>	<b>145,152</b>

**Table B-5. Agricultural land use acreage enrolled in the BMP Program in the Tidal Caloosahatchee Subwatershed**

Related OAWP BMP Programs	Agricultural Acres Enrolled
Cow/Calf	7,615
Fruit/Nut	32
Multiple Commodities	12,976
Nursery	216
Row/Field Crops	35
Sod	246
<b>Total</b>	<b>21,121</b>

**Table B-6. Agricultural land use acreage enrolled in the BMP Program in the West Caloosahatchee Subwatershed**

<b>Related OAWP BMP Programs</b>	<b>Agricultural Acres Enrolled</b>
<b>Citrus</b>	42,670
<b>Conservation Plan Rule</b>	39,924
<b>Cow/Calf</b>	22,939
<b>Fruit/Nut</b>	147
<b>Multiple Commodities</b>	24,828
<b>Nursery</b>	376
<b>Row/Field Crops</b>	5,405
<b>Total</b>	<b>136,380</b>



**Figure B-1. BMP enrollment in the Caloosahatchee River and Estuary BMAP area as of June 2019**

## **Unenrolled Agricultural Acreage**

Since the adoption of the Northern Everglades and Estuaries Protection Program, FDACS' goal has been to enroll 100 % of the agricultural acres in the BMP Program. As of June 2019, 72 % of the agricultural acres in the Caloosahatchee River and Estuary BMAP area are enrolled in FDACS' BMP Program and are implementing practices designed to improve water quality. While achieving 100 % enrollment is a laudable goal, the analysis of various land use databases has identified land uses classified as agriculture that are difficult to enroll or where there is a limit to the BMPs that can effectively be implemented onsite. This has required the prioritization and specific identification of agricultural lands that can be enrolled in FDACS' BMP Program.

To address the greatest resource concerns, OAWP has prioritized BMP enrollment by focusing on more intensive operations, including irrigated acreage, dairies and nurseries, parcels greater than 50 acres in size, and agricultural parcels adjacent to waterways. As of June 2019, 81 % of irrigated agricultural acres in the Caloosahatchee River and Estuary BMAP area were enrolled in FDACS' BMP Program.

As these priorities are met, OAWP has identified additional enrollment priorities, typically comprising smaller irrigated agricultural operations ranging from 30 to 50 acres and other targeted areas. Those larger, more intensive operations that have not enrolled are being referred to DEP to either develop individual monitoring plans pursuant to Chapter 62-307, F.A.C., or be subject to enforcement actions under DEP's regulatory authority.

### *General Considerations*

As new BMAPs are developed or existing BMAP areas are expanded, overlap among BMAPs is increasing. In the expanded Caloosahatchee BMAP area, 44 % of the agricultural acres are also included in the Lake Okeechobee BMAP. While calculations, allocations, and projects are specific to each BMAP, it should be noted that the number of acres from the individual BMAP reports, if added, exceed the total acres in the two BMAP areas. The Caloosahatchee BMAP boundary encompasses 87,749 acres of unenrolled agricultural land use, and 35,626 acres of the unenrolled agriculture identified in this BMAP are also identified in the Lake Okeechobee BMAP.

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 FDACS enrollment efforts. Many areas within the Caloosahatchee River and Estuary BMAP area 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." This "urban agriculture"—also called residential agriculture, rural residential, rural estates, equine communities, ranchettes, rural homesteads and other descriptive names for homes with some acreage and agricultural zoning—present a particular challenge for FDACS, since the BMP manuals are not designed for the enrollment of these properties in BMPs targeted for bona fide agricultural production areas.

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. The increasing number of these smaller parcels with nontraditional agricultural production 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 alternative methods to ensure their nutrient loading contribution is being appropriately identified and reduced.

Another challenging area includes those agricultural lands that are inactive or fallow—i.e., lands that, on the day the FDACS representative visits, display no enrollable agricultural activity. These lands may be part of a rotation implemented by a landowner, scheduled for development, listed for sale, etc. The land use information FDACS receives is consistently improving the classification of these areas, but policy options remain limited in scope to ensure the implementation of practices aimed at reducing nutrient inputs from these areas.

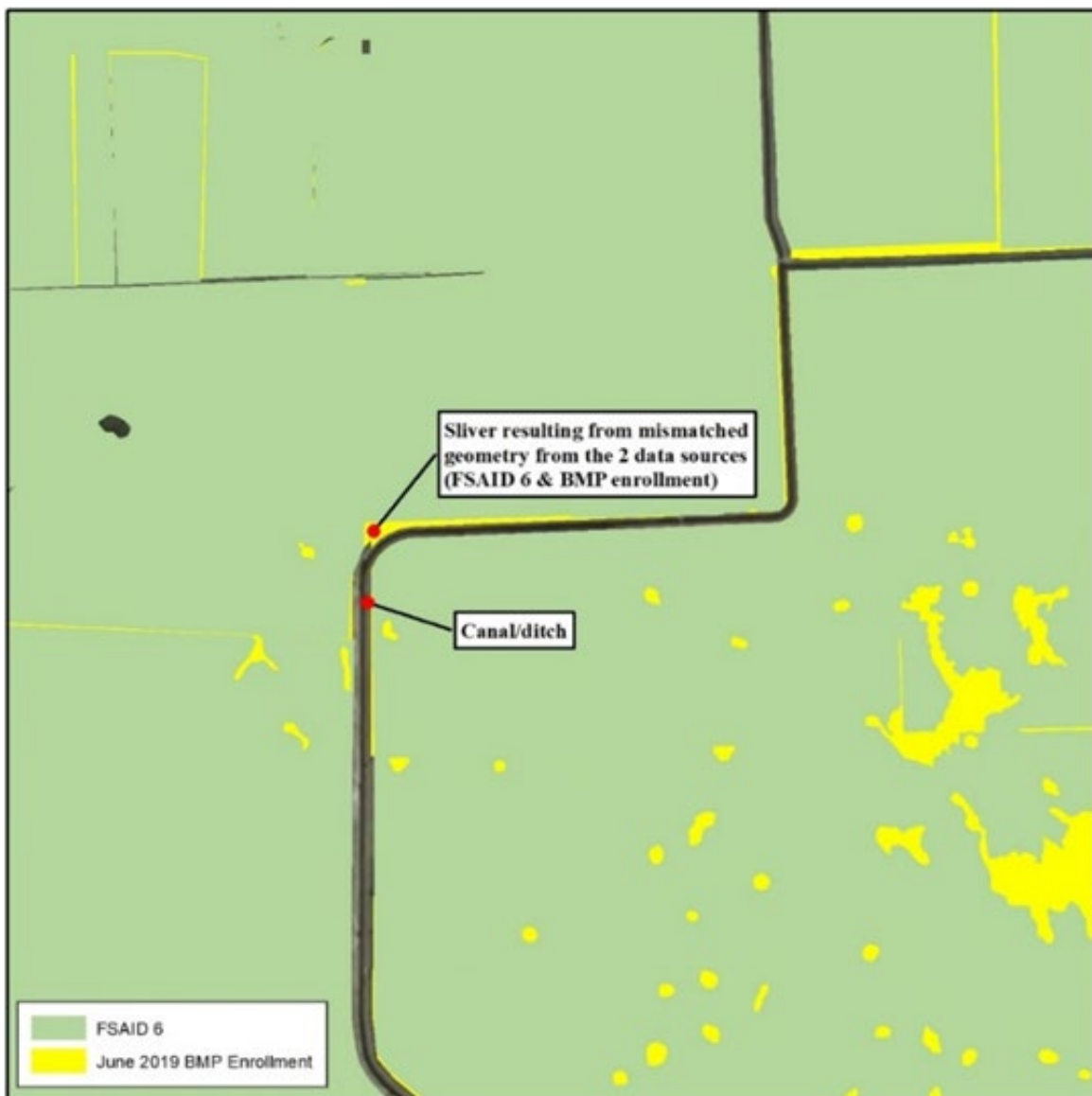
#### *Characterization of Unenrolled Agricultural Lands*

To characterize unenrolled agricultural acres, OAWP identified FSAID VI features outside the BMP enrollment areas within GIS. As previously mentioned, OAWP BMP enrollments are initially delineated based on county property appraiser parcel data, even if the entire parcel is not agriculture, to allow BMPs to be tied to the specific parcels where agricultural activities are occurring. FSAID agricultural lands are delineated based on land use features identified as agriculture and represent a more refined analysis of those areas actually in agricultural production.

Because of differences in their spatial geometries 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. 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 B-2** shows an example of a sliver created when performing geospatial analysis.

OAWP used property appraiser data and manually reviewed aerial imagery to characterize unenrolled lands in the BMAP area. 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 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's Division of State Lands, 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 FDACS' BMP Program as a condition of the lease. Other lands that may be classified as agriculture but are unlikely to have enrollable agricultural activities include lands that may be part of a SFWMD restoration project or water storage project. Future analysis and coordination with the SFWMD will be needed to identify which areas may have enrollable agriculture in the areas identified for restoration and water storage projects.



**Figure B-1. GIS example of a sliver**

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.

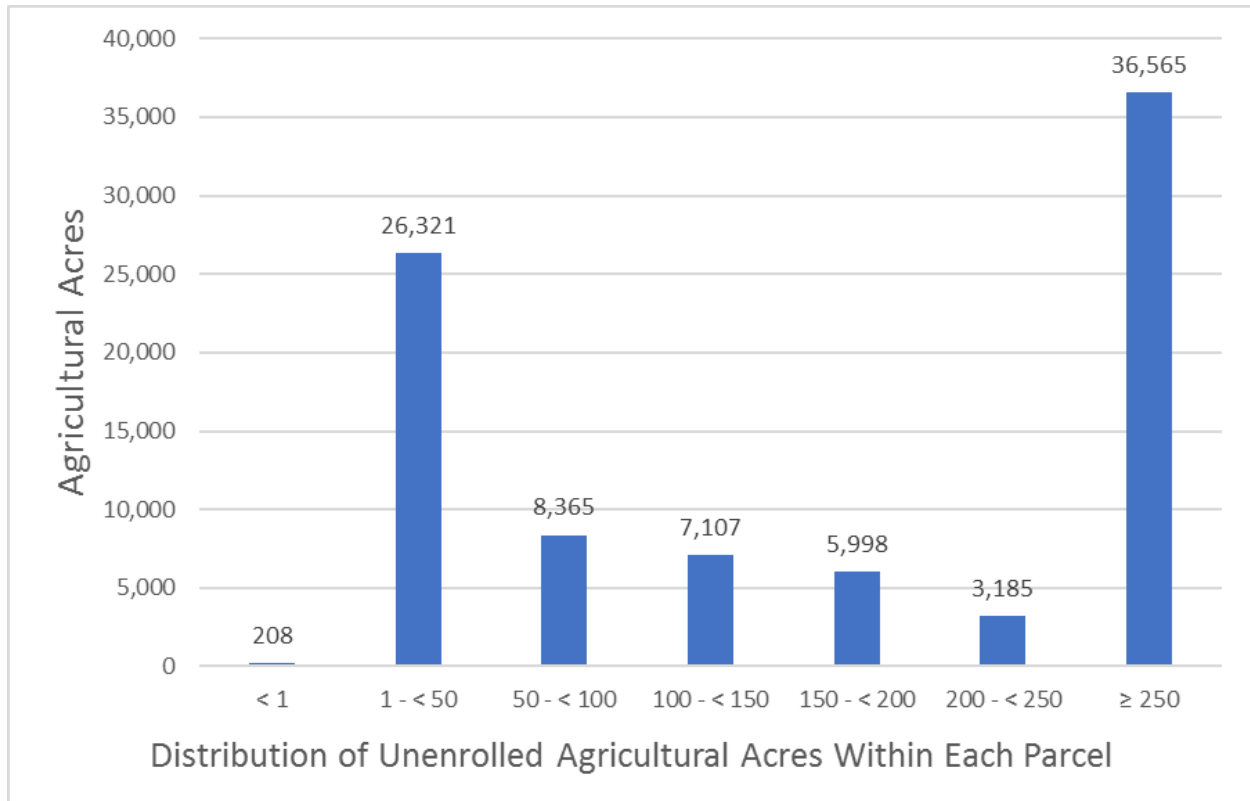
Those agricultural lands that have been identified as "fallow," "former [ag]," and "abandoned," as well as brushland/scrubland/open land, comprise 12 % of the total unenrolled agricultural acres in the Caloosahatchee River and Estuary BMAP area. These acres are still classified as agricultural land for 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 FDACS' BMP Program and also identify the areas most in need of enrollment. **Figure B-3** summarizes the agricultural acres distributed by agricultural acreage found on each parcel.

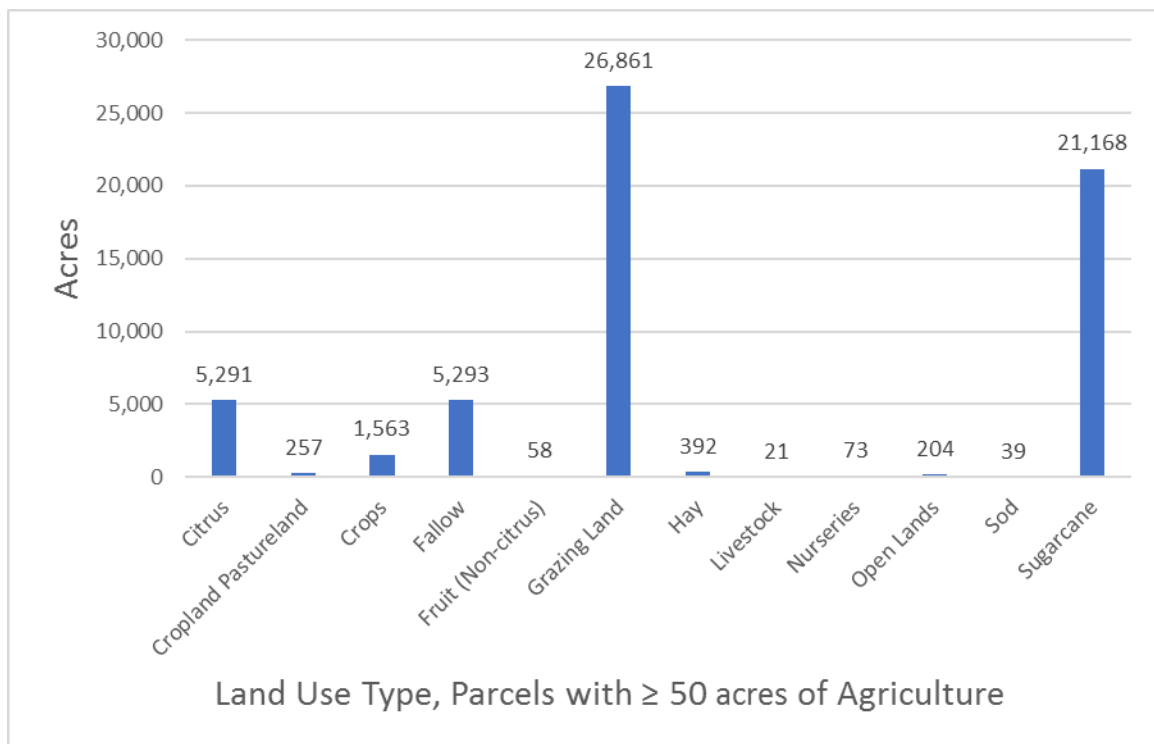
Further analysis was done to characterize the parcels containing 50 acres of agriculture or greater and those parcels with less than 50 acres of agriculture; 61,221 acres of the 87,749 acres of land identified as having potential agricultural activity are found on parcels containing 50 acres of agriculture or greater. **Figure B-4** shows the types of agricultural land use based on FSAID VI found on parcels that contain 50 acres of agriculture or greater. Grazing land comprises 44 % of this acreage.

Of the land identified as agriculture, 26,529 acres are found on parcels with less than 50 acres of agriculture. **Figure B-5** shows the types of agricultural land use found on parcels with less than 50 acres of agriculture. Grazing land comprises 66 % of this acreage. For these parcels, OAWP will prioritize the more intensive agricultural operations, such as sugarcane, citrus, and other row crops, for enrollment.

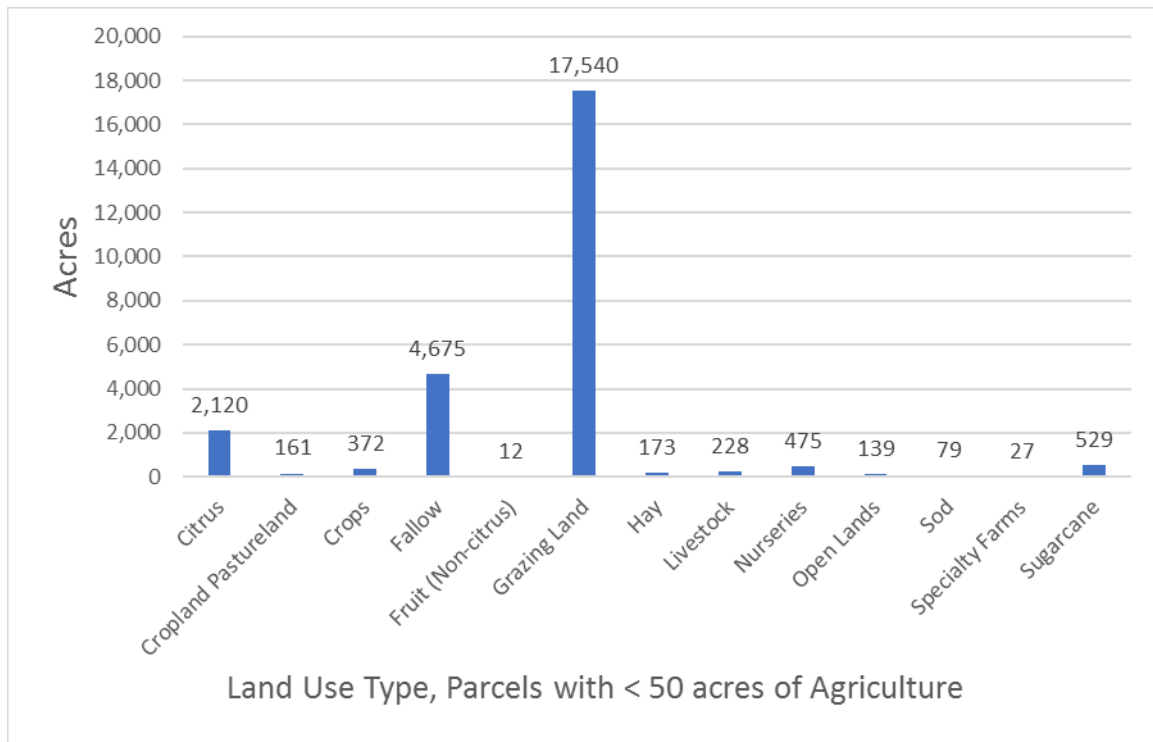




**Figure B-2. Distribution of agricultural acreage on parcels with potential agricultural activity, Caloosahatchee River and Estuary BMAP Area**



**Figure B-3. Agricultural lands on parcels with 50 acres of agriculture and greater, Caloosahatchee River and Estuary BMAP Area**



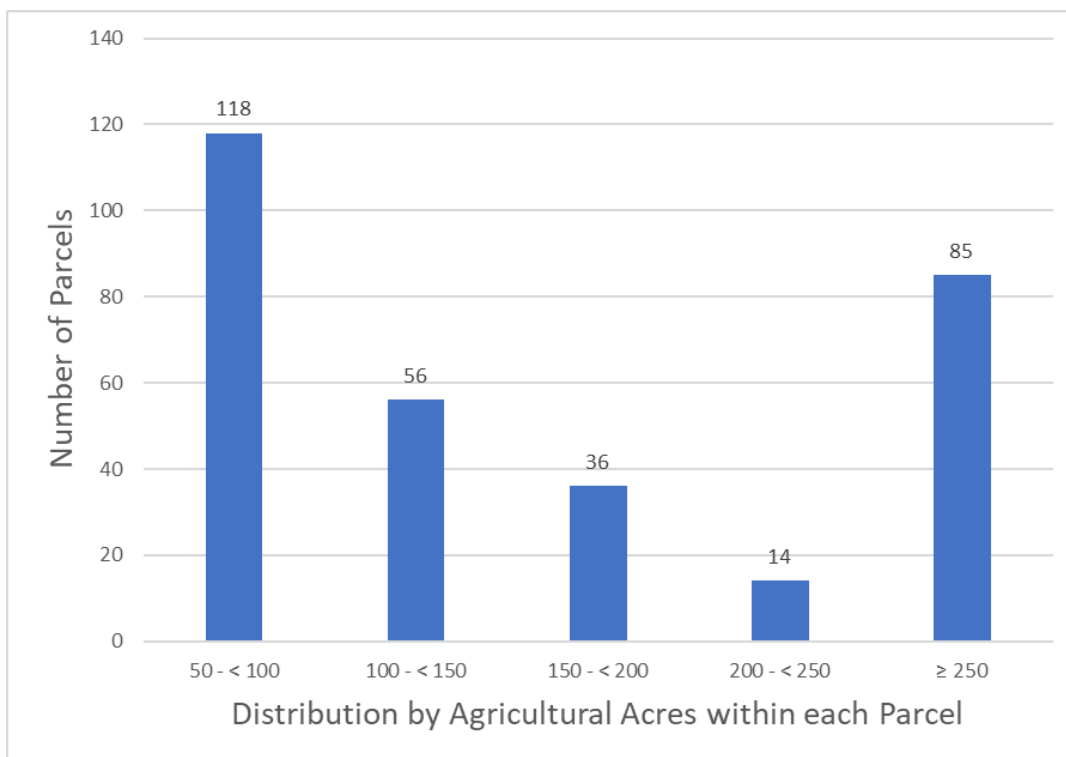
**Figure B-4. Agricultural land uses on parcels with less than 50 acres of agriculture, Caloosahatchee River and Estuary BMAP Area**

**Table B-7** lists the total acreage associated with the identified slivers and the lands that are not likely to have enrollable agricultural activities, along with a remaining total of unenrolled agricultural acres in the BMAP area. **Figure B-6** and **Figure B-7** summarize the unenrolled agricultural acres in Caloosahatchee River and Estuary 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.

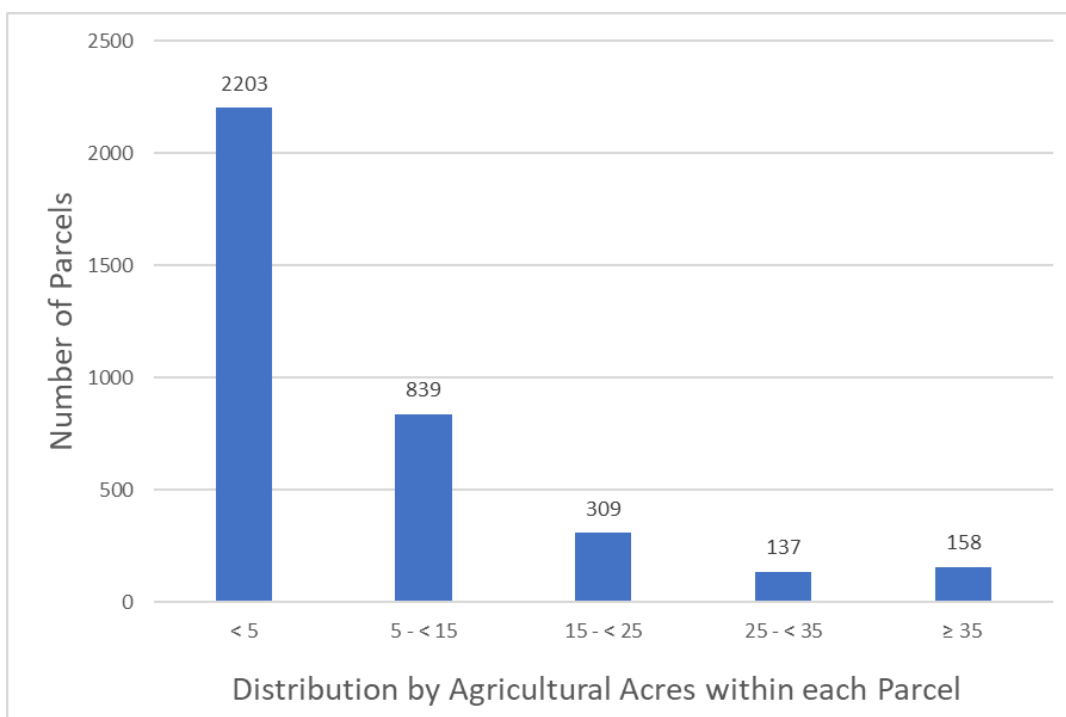
**Table B-7. Summary of unenrolled agricultural land use acreage in the Caloosahatchee River and Estuary BMAP area**

**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 VI Agricultural Acres in the BMAP and the Total Agricultural Acres Enrolled referenced in **Table B-2**.

Category	Acres
Unenrolled agricultural acres	116,717
Acres identified within slivers of unenrolled agricultural areas	1,559
Lands without enrollable agricultural activity (e.g., tribal lands, residential development, and parcels with DOR use codes 70-98)	27,408
Total lands with potentially enrollable agricultural activities	87,749

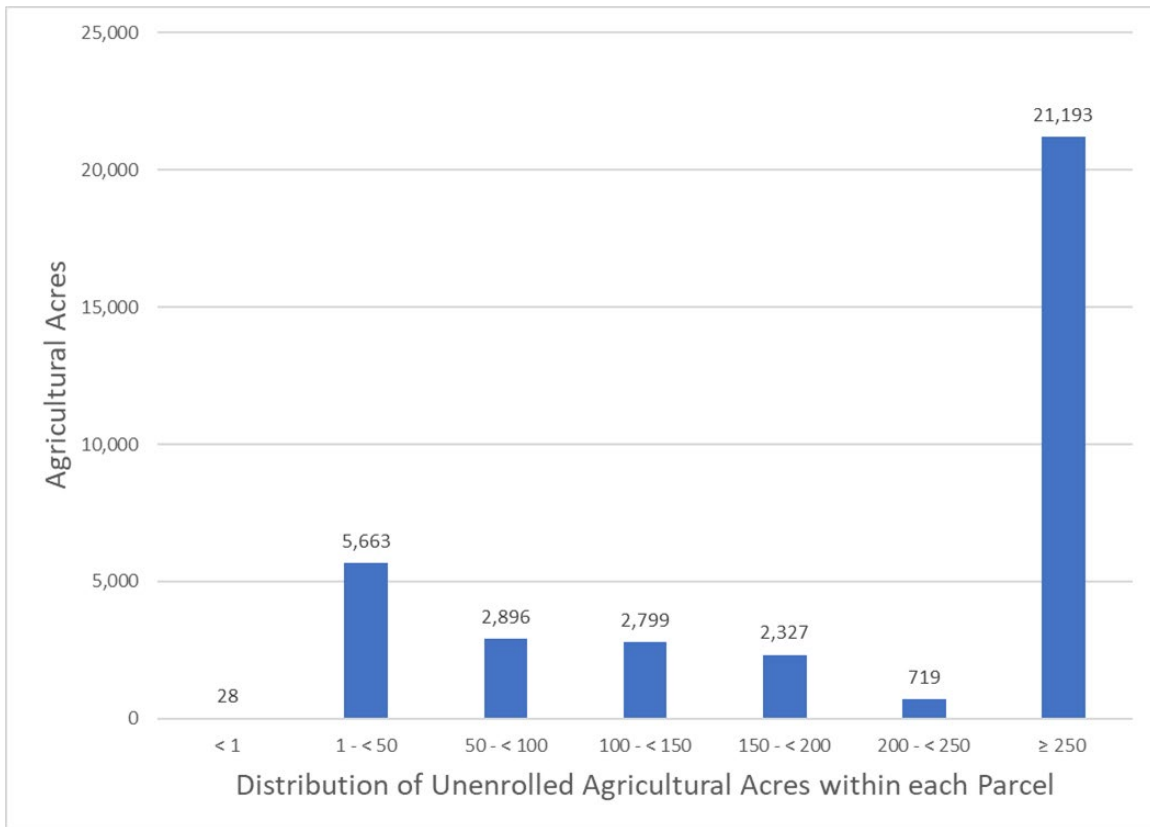


**Figure B-5. Number of parcels with 50 acres of agriculture and greater, Caloosahatchee River and Estuary BMAP area**

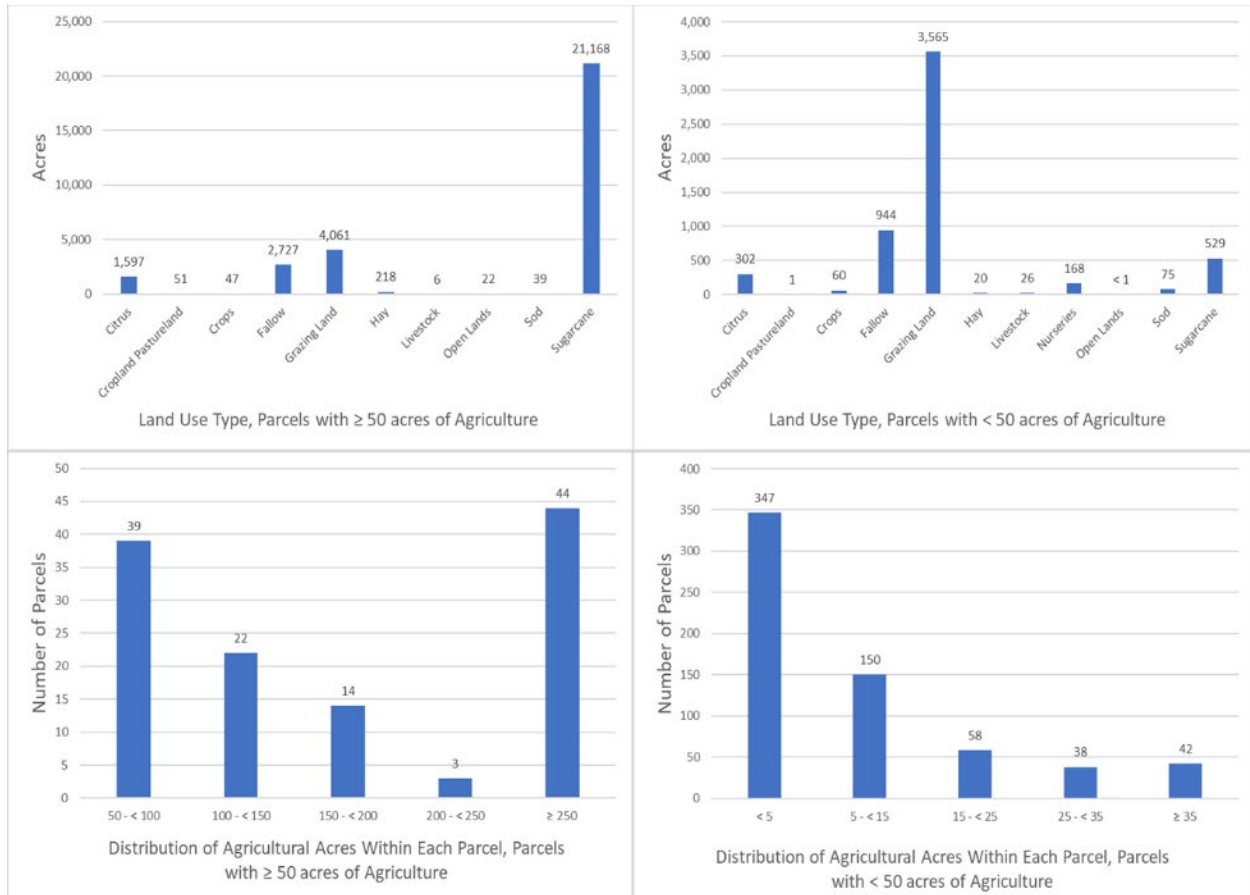


**Figure B-6. Number of parcels with less than 50 acres of agriculture, Caloosahatchee River and Estuary BMAP area**

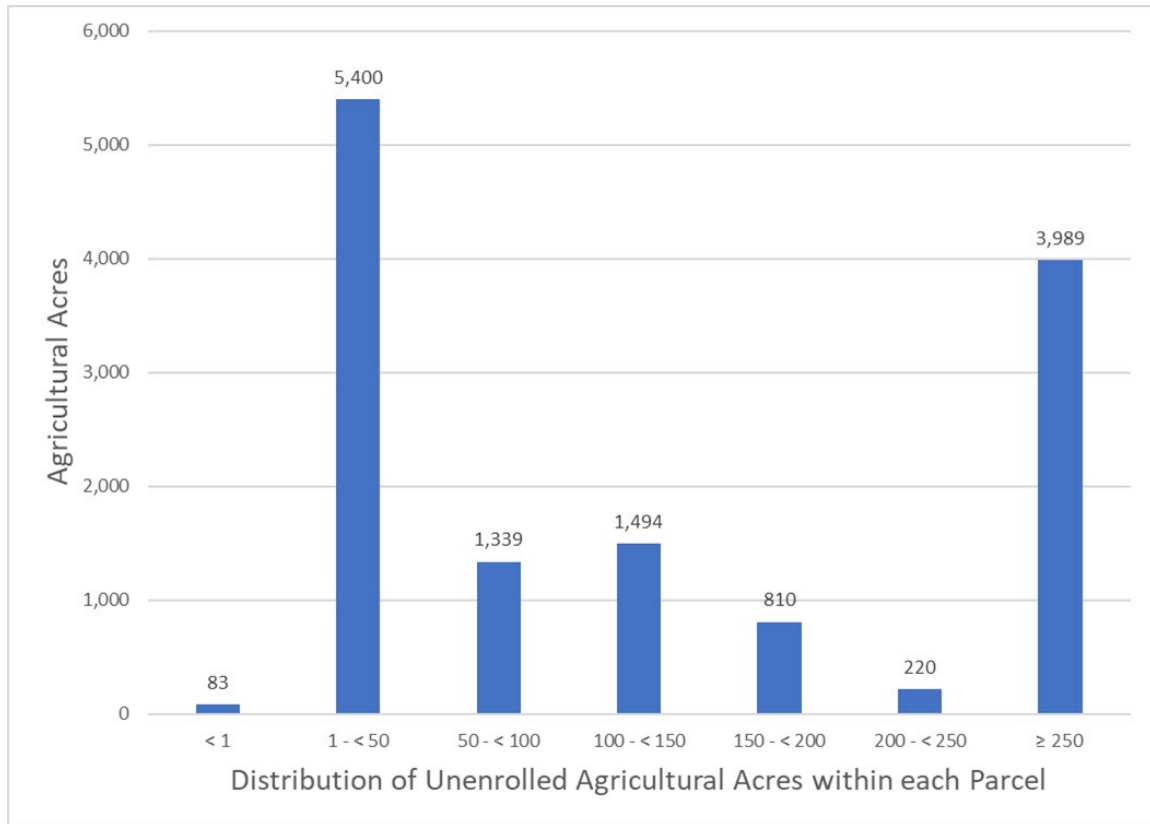
**Figure B-8** through **Figure B-13** characterize information on unenrolled agriculture for each individual subwatershed, including the distribution of agricultural acres within each parcel and land use type.



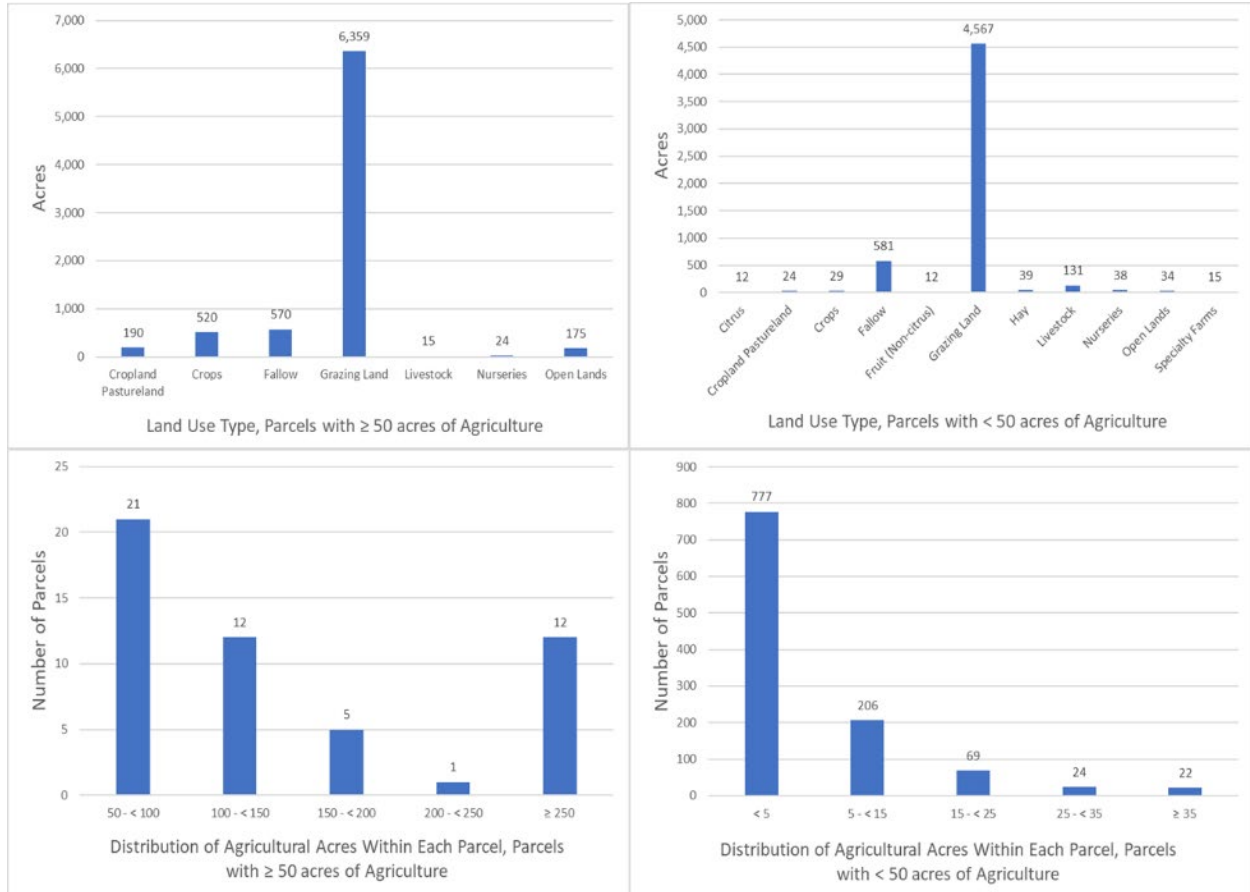
**Figure B-8. Distribution of agricultural acreage on parcels with potential agricultural activity, East Caloosahatchee Subwatershed**



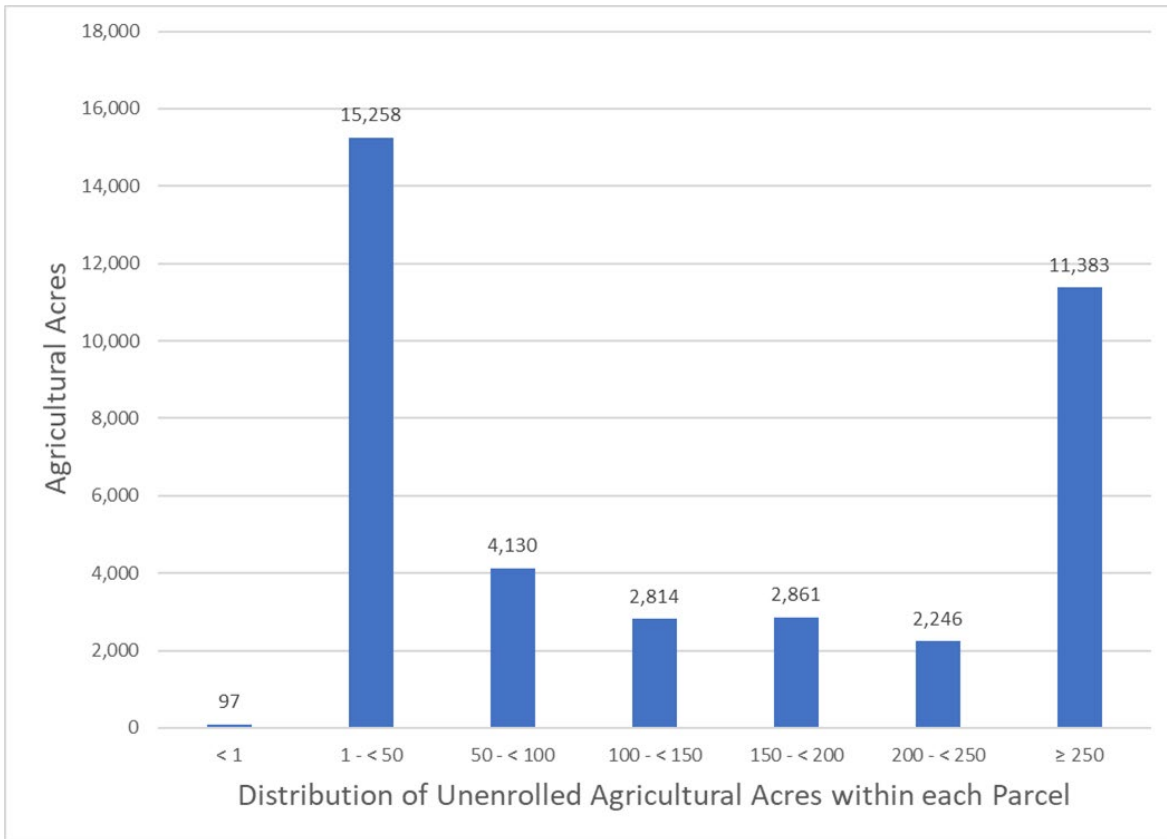
**Figure B-9. Land use type and distribution of agricultural acreage, East Caloosahatchee Subwatershed**



**Figure B-10. Distribution of agricultural acreage on parcels with potential agricultural activity, Tidal Caloosahatchee Subwatershed**

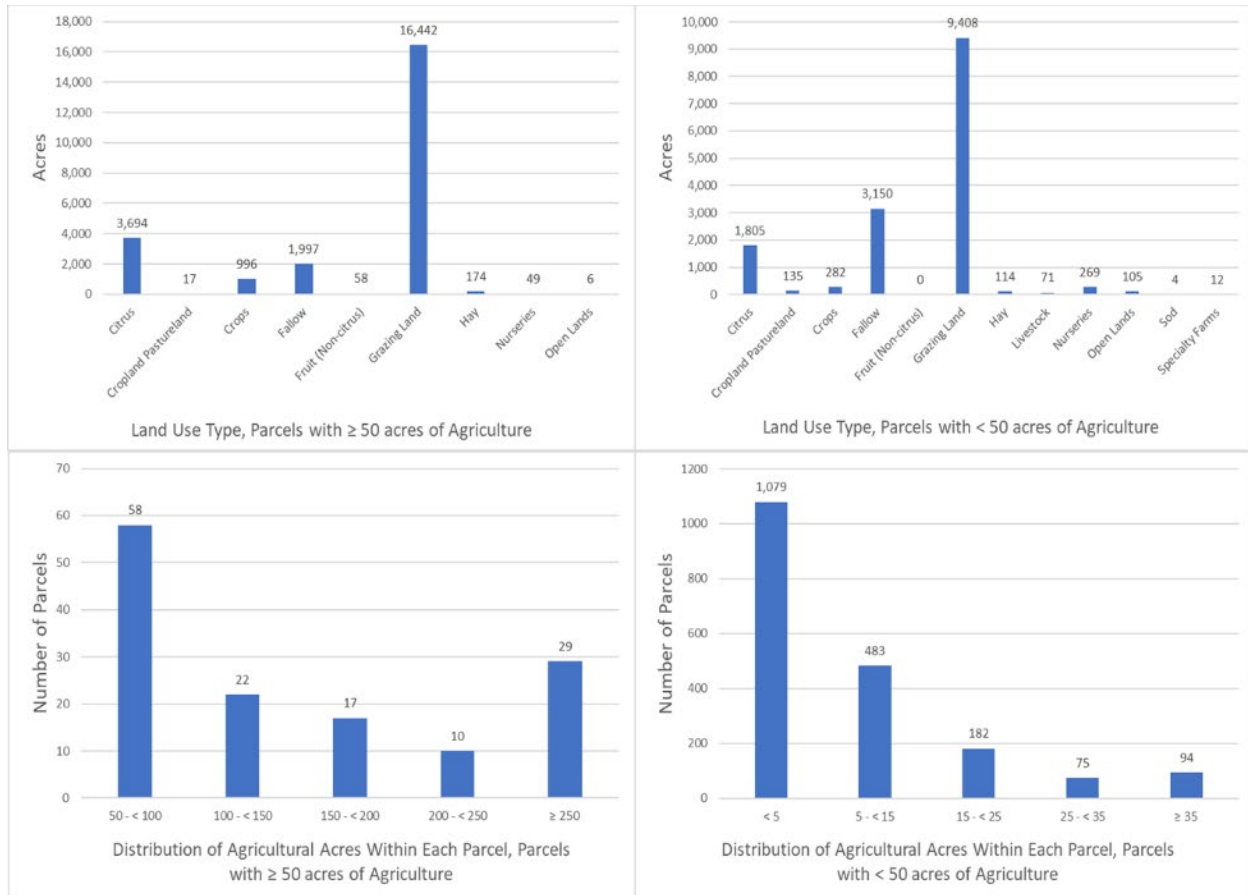


**Figure B-11. Land use type and distribution of agricultural acreage, Tidal Caloosahatchee Subwatershed**



**Figure B-12. Distribution of agricultural acreage on parcels with potential agricultural activity, West Caloosahatchee Subwatershed**





**Figure B-13. Land use type and distribution of agricultural acreage, West Caloosahatchee Subwatershed**

### *Future Efforts*

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.

Additional characterizations of the agricultural land uses need to be conducted for each of the basin in the Caloosahatchee River and Estuary BMAP area. As the DEP analysis identifies the nutrient loading estimates for each associated basin, FDACS will be able to better focus enrollment and cost-share efforts on those basins with the highest estimated loads and characterize the land uses with agricultural production that are consistent with FDACS' BMP Program.

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 to prioritize implementation verification visits in a given basin. The next step to refine the enrollment efforts will have the parcel loading information derived from the HSPF converted to a format that can easily be analyzed with the land use and parcel geodatabases. This effort will help FDACS identify specific parcels with the highest modeled nutrient loading. These parcels would then be prioritized for the enrollment and implementation of BMPs, as well as site visits for the verification of BMP implementation.

#### *Additional Factors Related to Agricultural Lands and Measuring Progress*

Legacy loading, including loading as a result of the operation of the regional water management system and associated infrastructure, can present an additional challenge to measuring progress in many of areas of Florida with adopted BMAPs. Based on research, initial verification by DEP, and long-term trends in water quality in the BMAP area, it is expected that current efforts, such as BMP implementation, will continue to provide improvements in overall water quality despite the impacts from legacy loads. Recognition that there is naturally occurring nitrogen and phosphorus in the system is important when evaluating solutions, as the ubiquity of the source, limitations for treatment, and uncertainty of proportion compared with anthropogenic sources may mask or overwhelm gains achieved through BMP implementation and other site-specific efforts.

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, will be needed to achieve the TMDLs for Caloosahatchee River and Estuary Watershed.

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

#### **Recommended Updates to Land Use**

DEP and OAWP have identified land use–related issues that consistently occur during BMAP development and/or updates. One of these issues is the differentiation between what is classified as agricultural land use in the TMDL or BMAP model and what is no longer agricultural land use.

OAWP has developed a methodology to identify agricultural land use changes. Using GIS, OAWP compared the 2008–09 SFWMD land use data from the model with the latest FSAID land use and OAWP BMP enrollment data. OAWP identified areas classified as agriculture by

the BMAP modeled land use that do not overlap with the latest FSAID or OAWP BMP enrollment data. OAWP reviewed the output of this overlay analysis by using county property appraiser data and aerial imagery to determine if the nonoverlapping areas were still in production. OAWP identified 3,700 acres, classified as agriculture in the 2008–09 SFWMD land use, that are now other land use types such as residential, industrial, or commercial (see **Table B-8**). 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.

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.

**Table B-8. Agricultural land use change by subwatershed**

Subwatershed	Acres
East Caloosahatchee	397
Tidal Caloosahatchee	1,412
West Caloosahatchee	1,891
<b>Total</b>	<b>3,700</b>

### **Potential Site-Specific Nutrient Management Measures in Addition to BMPs**

Beyond enrolling producers in the OAWP 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 B-9** identifies the agricultural technologies that received cost-share assistance in the Caloosahatchee River and Estuary BMAP area and the associated nutrient reductions based on the 2016 Soil and Water Engineering Technology 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 B-9. Cost-share project types and associated nutrient reductions recommended by OAWP**

<sup>1</sup> Reductions for this measure not incorporated as part of this exercise

<sup>2</sup> Reductions for this measure are from Table 5 in the 2016 SWET Report (Bottcher 2016). Each project is 1 unit.

<b>Project Types</b>	<b>TN Reductions (%)</b>	<b>TP Reductions (%)</b>
<b>Chemigation/fertigation</b>	20	20
<b>Composting and/or storage project</b>	N/A	N/A
<b>Crop implements</b>	N/A	N/A
<b>Dairy work</b>	50	50
<b>Drainage improvements, mole drain, ditch cleaning</b>	10	15
<b>Engineering, surveying, planning, modeling</b>	N/A	N/A
<b>Fence</b>	10	10
<b>Irrigation improvements, automation</b>	20	20
<b>Precision agriculture technology</b>	30	10
<b>Retention, detention, tailwater recovery, berms (vegetable and agronomic crops, citrus)</b>	64	70
<b>Retention, detention, tailwater recovery, berms (cow/calf)</b>	25	18
<b>Structure for water control/culvert</b>	17	29
<b>Weather station<sup>1</sup></b>	20	5
<b>Well, pipeline, trough, pond, heavy use protection<sup>2</sup></b>	186 lbs/yr/unit	50 lbs/yr/unit

## **Appendix C. Water Control Districts**

In November 2012, the Caloosahatchee Estuary BMAP was adopted by DEP. In that BMAP, one WCD was included and was assigned a numeric allocation in the same manner as the local governments. This 2020 BMAP only assigns the canals and rights-of-way to the special districts, 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, as summarized below. As part of this BMAP update, additional WCDs and other special districts are included. The included BMP plans were prepared and submitted by each individual WCD listed below and reviewed by DEP.

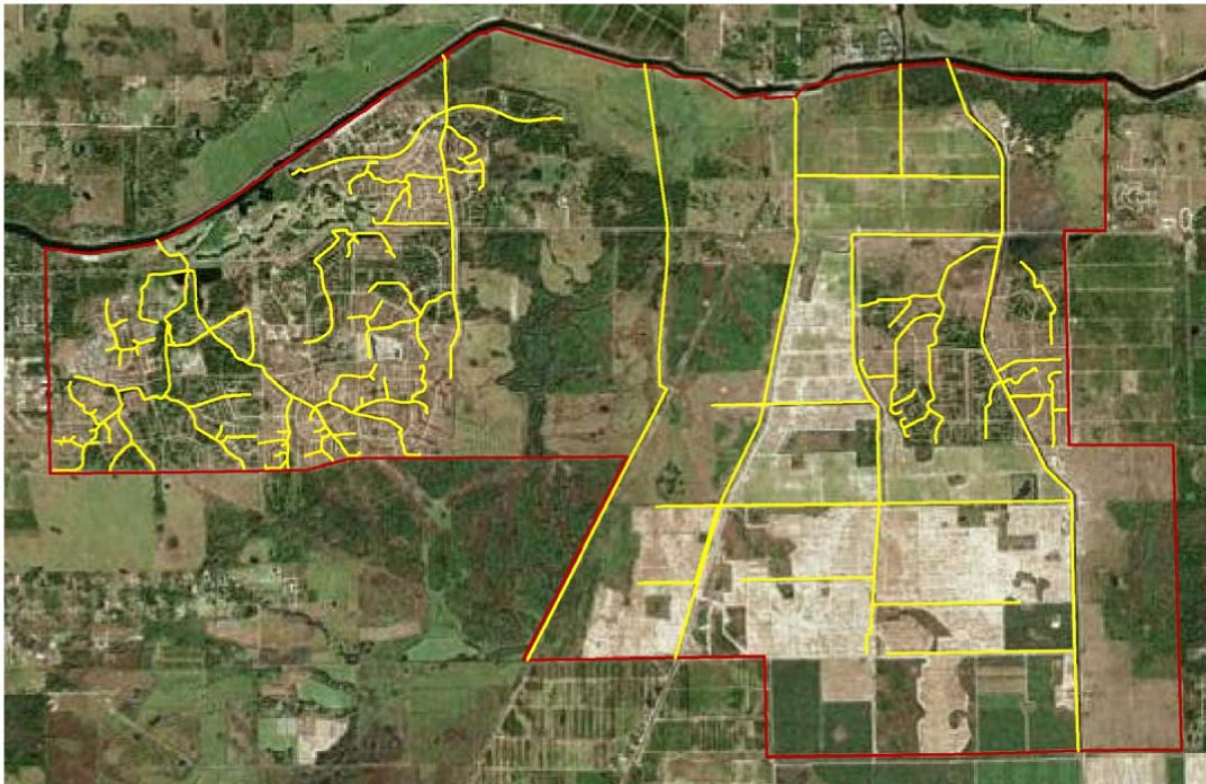
- **Barron Water Control District**
- **County Line Drainage District**
- **Clewiston Drainage District**
- **Collins Slough WCD**
- **Cow Slough WCD**
- **Devil's Garden WCD**
- **Disston Island Conservancy District**
- **Flaghole Drainage District**
- **Gerber Groves WCD**
- **Hendry-Hilliard WCD**
- **Sugarland Drainage District**

**Barron Water Control District BMP Plan  
for  
Caloosahatchee River and Estuary Basin Management Action Plan  
September 2019**

The Barron Water Control District (BWCD) is a Chapter 298 District established in 1975, and presently codified pursuant to Chapter 2001-301. Chapter 2016-260 removed the sunset clause in Section 3a. The BWCD encompasses 31,938 acres of land within Hendry County.

The BWCD encompasses all of the lands within the Port Labelle Community Development District. The BWCD has two distinct areas of land use: urban and agricultural. Both areas are served by a gravity canal system for drainage. Canals in the BWCD accept upstream runoff from MSBU's controlled by Hendry County and adjacent Special Drainage Districts.

The BWCD collects stormwater runoff and discharges the runoff into canals flowing to the C-43. A map of the BWCD drainage canals and associated rights of way within the C-43 basin boundary is shown below.



A map generally depicting the agricultural producers enrolled within the BWCD is on file with FDACS. All agriculture stormwater entering the BWCD canals is subject to the FDACS program.

The BWCD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The BWCD is proposing BMP's to remove nutrients, sequestered in vegetation and sediment, during the transportation process.

The BWCD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the BWCD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

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

The BWCD will provide DEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the BWCD's offices.

### **1. Public Education and Outreach**

Description: The BWCD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. DEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The BWCD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The BWCD will identify current landowner or producer and their contact information based on the BWCD records. The BWCD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact DEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the BWCD's rights of way.

Report: Annual verification by BWCD

#### **4. Canal/Ditch Bank Berms**

Description: Minimize sediment transport by constructing berms on top of canal/ditch banks and promoting vegetative cover. Developed agricultural lands discharge to the canal system through control structures. Sheet flow from urban areas crosses large grass strips to filter nutrients.

Report: Visual Observation

#### **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

Description: No application of fertilizer within the BWCD's rights of way.

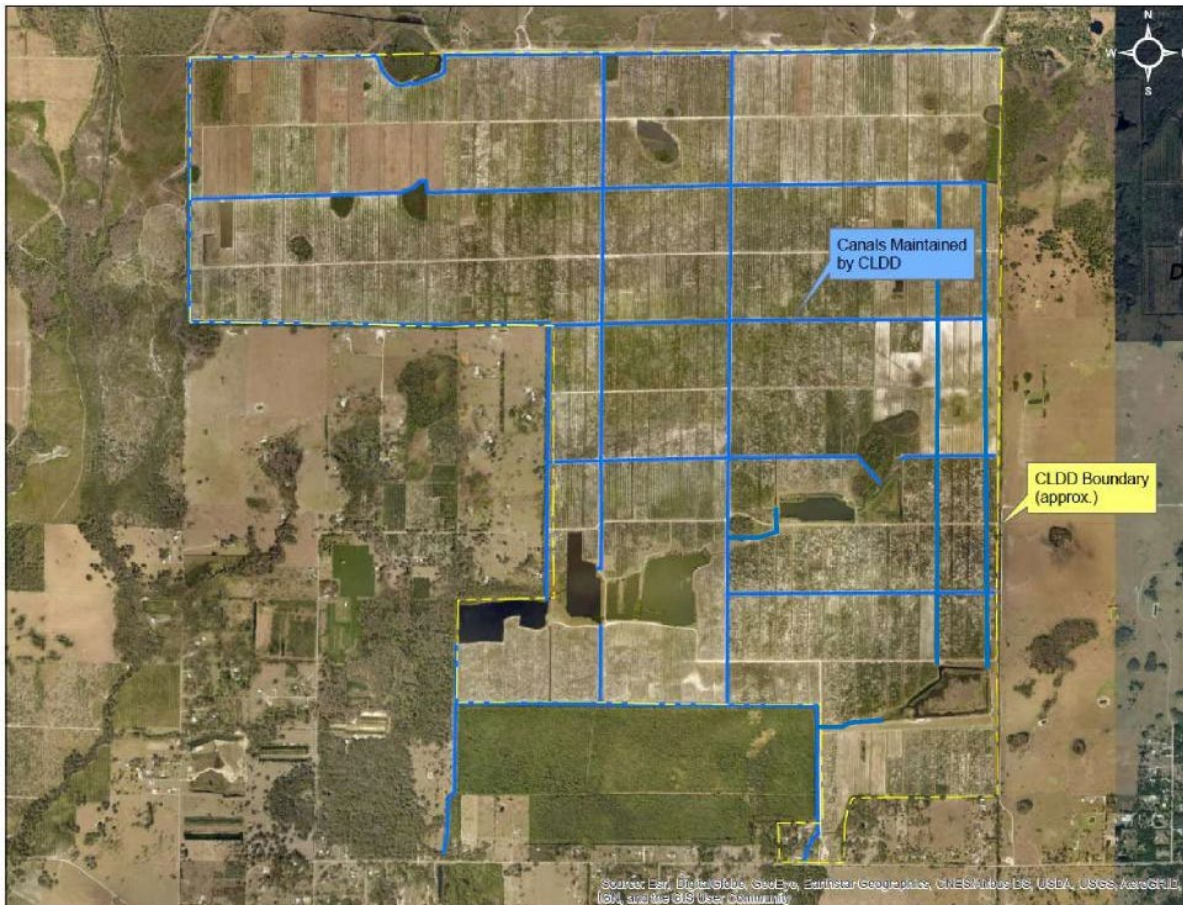
Report: Annual verification by BWCD.



## **Proposed Water Control District BMP Plan for County Line Drainage District for Caloosahatchee River and Estuary Basin Management Action Plan October 2019**

The County Line Drainage District (CLDD) is a Chapter 298 District established in 1967, and presently codified pursuant to Chapter 99-417, Laws of Florida. The CLDD encompasses approximately 3,732 acres of agricultural lands within Lee County. The CLDD collects stormwater runoff and discharges the runoff into canals flowing to the C-43.

A map of the CLDD drainage canals and associated rights of way/ easements is shown below. There are approximately 25.0 miles of canals and rights of way that are maintained by the CLDD.



A map generally depicting the agricultural producers enrolled within the CLDD is on file with the Florida Department of Agriculture and Consumer Services (FDACS). All stormwater entering the CLDD canals is subject to the applicable FDACS best management practices (BMP) program.

The CLDD canals receive runoff from adjacent private lands within the water control district. Additionally, the CLDD canals receive runoff from offsite lands (namely the Babcock Ranch Preserve) to the north of the water control district via water control structures through CLDD's northern perimeter berm. The CLDD canals transmit both the onsite and offsite runoff to discharge points at the south end of the water control district. This practice of transmitting water does not increase the nutrient load in the runoff. The CLDD is proposing BMP's to remove nutrients sequestered in vegetation and sediment during the transportation process.

The CLDD proposes that the listed BMP's will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the CLDD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan (BMAP). Implementation of the BMP's shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the BMP's, in coordination with FDEP, the function, operation and budget of the CLDD has been considered and these listed BMP's should not be considered as 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 CLDD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the CLDD's offices.

### **1. Public Education and Outreach**

Description: The CLDD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The CLDD will provide assistance to the FDACS, when requested. The CLDD will identify current landowner or producer and their contact information based on the CLDD records. The CLDD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the CLDD's rights of way.

Report: Annual verification by CLDD

#### **4. Canal Cleaning Program**

Description: The intent of this BMP is to provide for a systematic review and field evaluation to determine when such sediments are able to be removed in a practical and cost effective method. Not less than every five years, analysis of the canals to determine if sedimentation has accumulated in the canal and is causing increased water velocities. Analysis to be made by visual inspection of the flow and canal condition, probing, and canals may be cross-sectioned (larger canals targeted) at critical points to document sedimentation volumes and impact to flow velocity. If excessive sediments are identified, then establish a schedule to remove the excessive sediments from the canals and/or stabilize the ditch banks. The schedule to remove should then be followed. When removing the sediments, care to be taken to not create steep banks that will continue to erode and add sediments into the canals. When cleaning canals, the canal banks and side slopes will not be disturbed where practical. Spoil material removed from the canals will be placed away from the canal banks where the canal easement has available space. The CLDD will attempt to work with adjacent landowners for disposal of sediment material on adjacent fields.

Report: Records used to identify sediment; schedule for the removal, when identified; work records or purchase orders for sediment removal. Dates when maintenance was performed, maps showing the location of the activities.

#### **5. Control Structures**

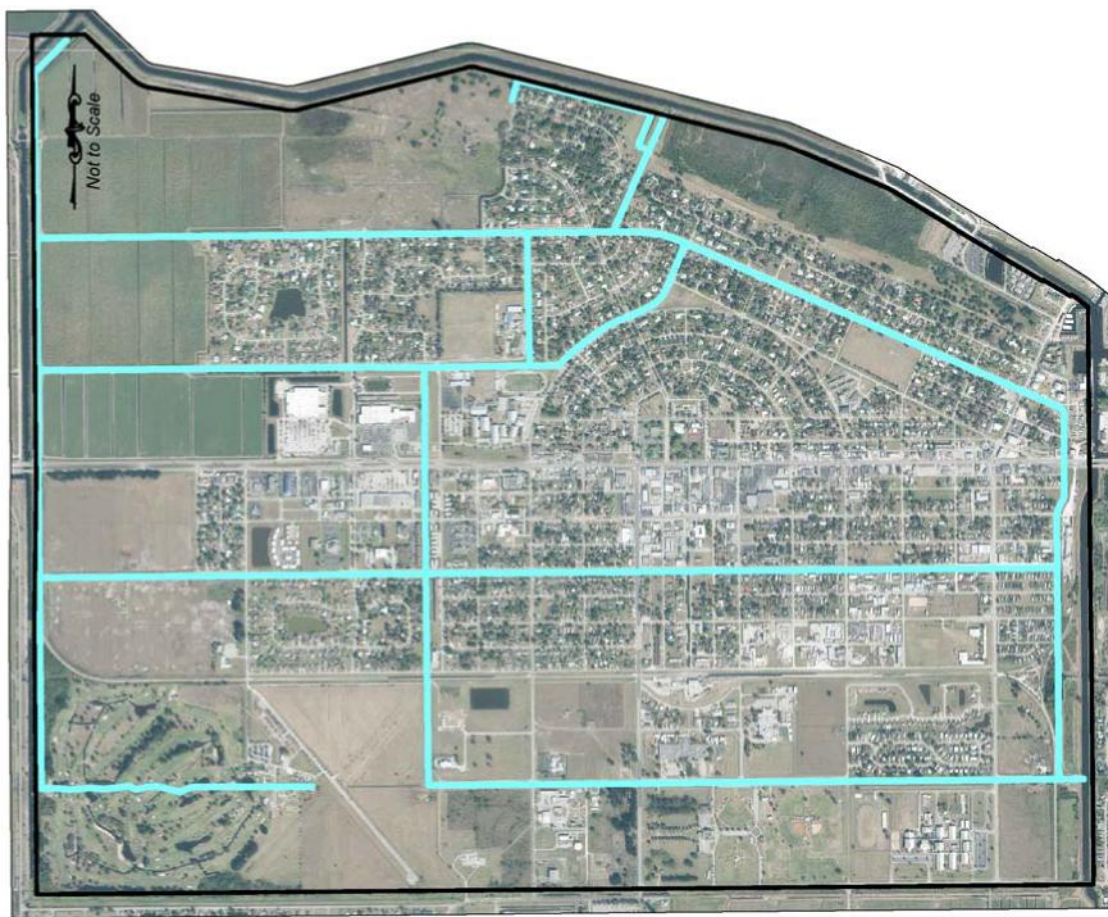
Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results.

## **Clewiston Drainage District BMP Plan for Caloosahatchee River and Estuary Basin Management Action Plan September 2019**

The Clewiston DD (CDD) is a Chapter 298 District established in 1924, and presently codified pursuant to Chapter 2000-453. The CDD encompasses the same lands as the City of Clewiston. The CDD maintains the primary network of canals within the City. The City of Clewiston is responsible for collecting storm water runoff and delivering it to these canals.

A map of the CDD discharge canals and associated rights of way is shown below. There are 13.5 miles of maintained canals.



The City of Clewiston has a MS4 Phase 2 permit issued by the FDEP (FLR04E134) and all agricultural producers within the CDD are required to implement FDACS best management practices, unless the alternative to monitor is permitted. There are approximately 2160 +/- acres of urban lands (residential, commercial, recreational, and industrial lands) and 710 +/- acres of agricultural lands within the CDD. A map generally depicting the agricultural producers enrolled



within the CDD is on file with FDACS. All storm water entering the CDD canals is therefore treated by one of the above requirements.

The CDD receives runoff from the lands within the City and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The CDD is proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The CDD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the CDD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the CDD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records keeping.

It is recognized the CDD is limited by the spatial configuration of the canal and rights-of-way as to the performance of certain bet management practices.

The CDD will provide FDEP an annual report confirming that these activities are as identified below. Detailed records of same will be kept in the CDD's offices.

### **1. Public Education and Outreach**

Description: The CCD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for urban and agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials. The CDD will also meet with the City of Clewiston Public Works department at least annually to emphasize the importance of City and landowners BMP's prior to discharge to the CDD system. Problem areas observed by CDD will be highlighted with the City at this meeting.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file. Maintain a log of meetings with City officials.

### **2. FDACS BMP Assistance**

Description: The CDD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The CDD will identify current landowner or producer and their contact information based on the CDD records. The CDD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No application of fertilizer within the CDD's rights of way.

Report: Annual verification by CDD.

### **4. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results.

### **5. Aquatic Vegetation Control**

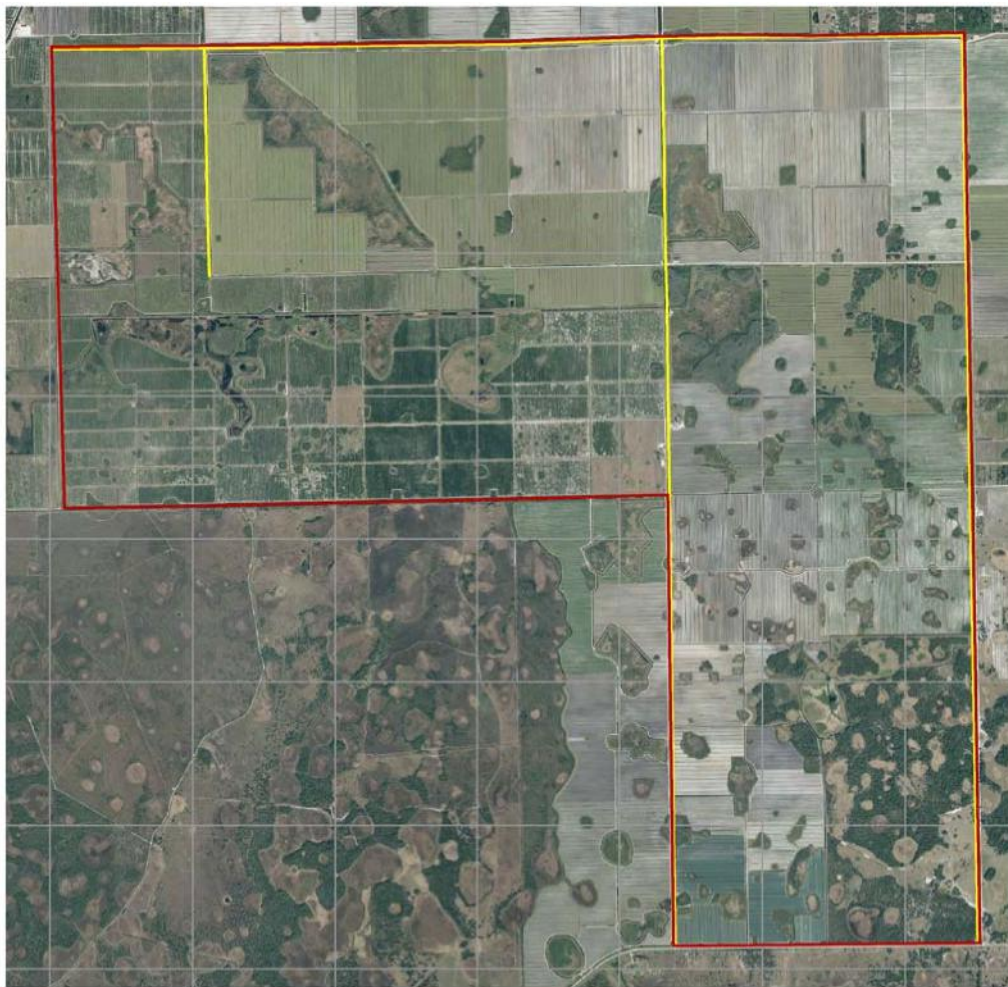
Description: Install and maintain floating vegetation barriers upstream of pump stations to prevent aquatic vegetation from being pulled into the discharge pumps. Mechanically remove accumulated vegetation at the trash located at the discharge pumps.

Report: Document the buildup of aquatic vegetation and removal.

**Collins Slough Water Control District BMP Plan  
for  
Caloosahatchee River and Estuary Basin Management Action Plan  
September 2019**

The Collins Slough Water Control District (CSWCD) is a Chapter 298 District established in 1986, and presently codified pursuant to Chapter 2000-454. The CSWCD encompasses 15,360 acres of agricultural lands within Hendry County. The CSWCD collects stormwater runoff and discharges the runoff into canals flowing to the C-43.

A map of the CSWCD drainage canals and associated rights of way is shown below. There are 19.6 miles of canals and rights of way that are maintained by the CSWCD.



A map generally depicting the agricultural producers enrolled within the CSWCD is on file with FDACS. All stormwater entering the CSWCD canals is subject to the FDACS program.

The CSWCD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The CSWCD is

proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The CSWCD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the CSWCD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the CSWCD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records.

The CSWCD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the CSWCD's offices.

#### **1. Public Education and Outreach**

Description: The CSWCD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

#### **2. FDACS BMP Assistance**

Description: The CSWCD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The CSWCD will identify current landowner or producer and their contact information based on the CSWCD records. The CSWCD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

#### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the CSWCD's rights of way.

Report: Annual verification by CSWCD

#### **4. Canal Cleaning Program**



Description: The intent of this BMP is to provide for a systematic review and field evaluation to determine when such sediments are able to be removed in a practical and cost effective method. Not less than every five years, analysis of the canals to determine if sedimentation has accumulated in the canal and is causing increased water velocities. Analysis to be made by visual inspection of the flow and canal condition, probing, and canals may be cross-sectioned (larger canals targeted) at critical points to document sedimentation volumes and impact to flow velocity. If excessive sediments are identified, then establish a schedule to remove the excessive sediments from the canals and/or stabilize the ditch banks. The schedule to remove should then be followed. When removing the sediments, care to be taken to not create steep banks that will continue to erode and add sediments into the canals. When cleaning canals, the canal banks and side slopes will not be disturbed where practical. Spoil material removed from the canals will be placed away from the canal banks where the canal easement has available space. The CSWCD will attempt to work with adjacent landowners for disposal of sediment material on adjacent fields.

Report: Records used to identify sediment; schedule for the removal, when identified; work records or purchase orders for sediment removal. Dates when maintenance was performed, maps showing the location of the activities.

## **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

Description: No application of fertilizer within the CSWCD's rights of way.

Report: Annual verification by CSWCD.

**Cow Slough Water Control District  
for  
Caloosahatchee River and Estuary Basin Management Action Plan  
September 2019**

The Cow Slough Water Control District (CSWCD) is a Chapter 298 District established in 1989, and presently codified pursuant to Chapter 2000-394. The CSWCD encompasses 8,735 acres of agricultural lands within Hendry and Collier Counties. The CSWCD collects stormwater runoff and discharges the runoff into canals flowing to the C-43.

A map of the CSWCD drainage canals and associated rights of way is shown below. There are 8.8 miles of canals and rights of way that are maintained by the CSWCD.



A map generally depicting the agricultural producers enrolled within the CSWCD is on file with FDACS. All stormwater entering the CSWCD canals is subject to the FDACS program.

The CSWCD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The CSWCD is proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The CSWCD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the CSWCD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the CSWCD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records.

The CSWCD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the CSWCD's offices.

### **1. Public Education and Outreach**

Description: The CSWCD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The CSWCD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The CSWCD will identify current landowner or producer and their contact information based on the CSWCD records. The CSWCD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the CSWCD's rights of way.

Report: Annual verification by CSWCD

#### **4. Canal/Ditch Bank Berms**

Description: Minimize sediment transport by constructing berms on top of canal/ditch banks and promoting vegetative cover. Developed agricultural lands discharge to the canal system through control structures.

Report: Visual Observation.

#### **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

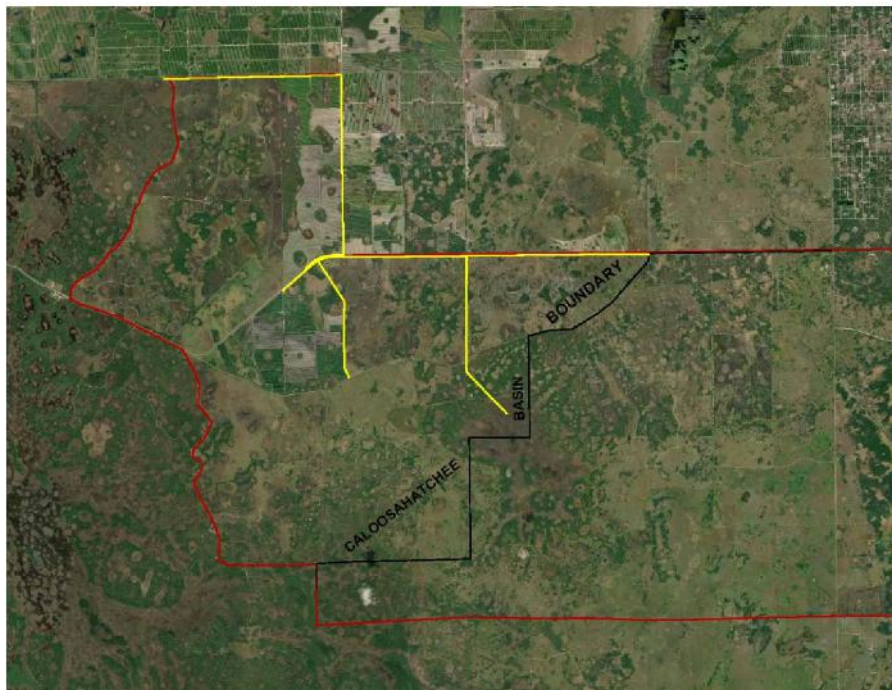
Description: No application of fertilizer within the CSWCD's rights of way.

Report: Annual verification by CSWCD.

## **Devil's Garden Water Control District BMP Plan for Caloosahatchee River and Estuary Basin Management Action Plan September 2019**

The Devil's Garden Water Control District (DGWCD) is a Chapter 298 District established in 1971, and presently codified pursuant to Chapter 2002-340. The DGWCD encompasses 85,365 acres of agricultural lands within Hendry County. The DGWCD collects stormwater runoff and discharges the runoff into canals flowing to the C-43. Not all of these lands and facilities are in the C-43 Basin.

A map of the DGWCD drainage canals and associated rights of way within the C-43 basin boundary is shown below. There are 17.7 miles of canals and rights of way that are maintained by the DGWCD.



A map generally depicting the agricultural producers enrolled within the DGWCD is on file with FDACS. All stormwater entering the DGWCD canals is subject to the FDACS program.

The DGWCD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The DGWCD is proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The DGWCD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be

established. Rather the DGWCD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the DGWCD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records.

The DGWCD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the DGWCD's offices.

### **1. Public Education and Outreach**

Description: The DGWCD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The DGWCD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The DGWCD will identify current landowner or producer and their contact information based on the DGWCD records. The DGWCD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the DGWCD's rights of way.

Report: Annual verification by DGWCD.

### **4. Canal Cleaning Program**

Description: The intent of this BMP is to provide for a systematic review and field evaluation to determine when such sediments are able to be removed in a practical and cost effective method. Not less than every five years, analysis of the canals to determine if sedimentation has accumulated in the canal and is causing increased water velocities. Analysis to be made by visual inspection of the flow and canal condition, probing, and canals may be cross-sectioned (larger canals targeted) at critical points to document sedimentation volumes and impact to flow velocity. If excessive sediments are identified, then establish a schedule to remove the excessive

sediments from the canals and/or stabilize the ditch banks. The schedule to remove should then be followed. When removing the sediments, care to be taken to not create steep banks that will continue to erode and add sediments into the canals. When cleaning canals, the canal banks and side slopes will not be disturbed where practical. Spoil material removed from the canals will be placed away from the canal banks where the canal easement has available space. The DGWCD will attempt to work with adjacent landowners for disposal of sediment material on adjacent fields.

Report: Records used to identify sediment; schedule for the removal, when identified; work records or purchase orders for sediment removal. Dates when maintenance was performed, maps showing the location of the activities.

## **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

Description: No application of fertilizer within the DGWCD's rights of way.

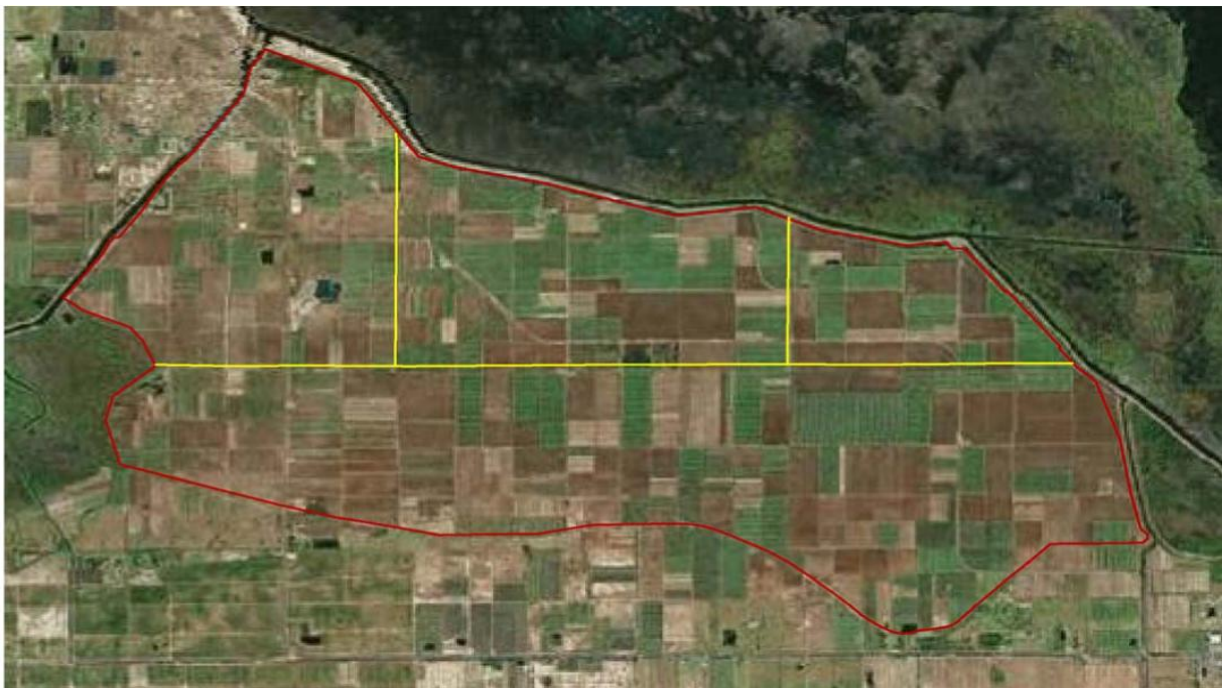
Report: Annual verification by DGWCD.



**Disston Island Conservancy District BMP Plan  
for  
Caloosahatchee River and Estuary Basin Management Action Plan  
September 2019**

The Disston Island Conservancy District (DICD) is a Chapter 298 District established in 1924, and presently codified pursuant to Chapter 2000-447. The DICD encompasses 18,407.1 acres of agricultural lands within Hendry County. The DICD collects stormwater runoff and discharges the runoff into canals flowing to the C-43.

A map of the DICD drainage canals and associated rights of way is shown below. There are 11.8 miles of canals and rights of way that are maintained by the DICD.



A map generally depicting the agricultural producers enrolled within the DICD is on file with FDACS. All stormwater entering the DICD canals is subject to the FDACS program.

The DICD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The DICD is proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The DICD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the DICD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.



In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the DICD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records.

The DICD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the DICD's offices.

### **1. Public Education and Outreach**

Description: The DICD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The DICD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The DICD will identify current landowner or producer and their contact information based on the DICD records. The DICD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the DICD's rights of way.

Report: Annual verification by DICD

### **4. Slow Velocity in the Main Canal**

Description: Minimize sediment transport by slowing the velocity in the main canal near the main discharge structure.

Report: Visual inspections of the sites.

### **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

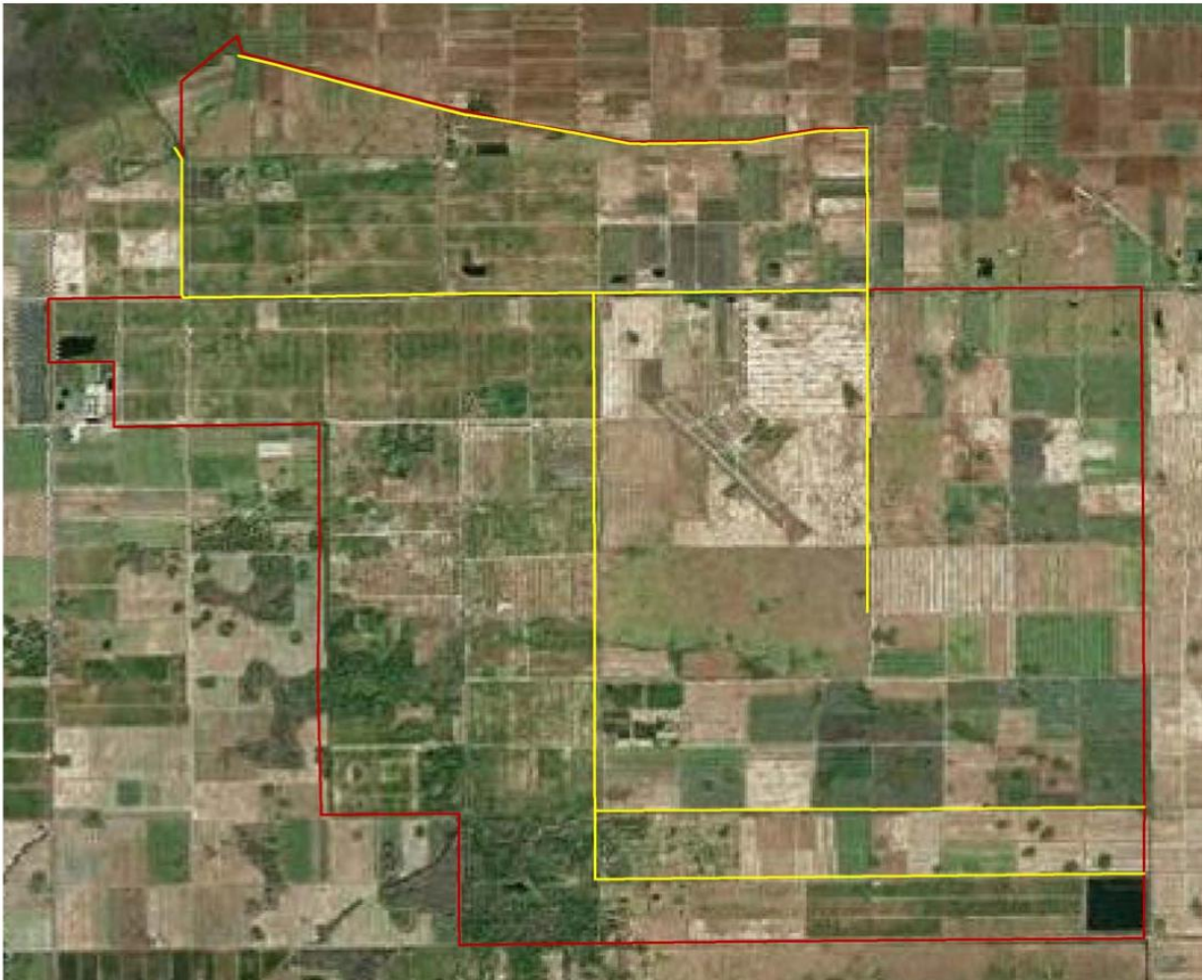
Description: No application of fertilizer within the DICD's rights of way.

Report: Annual verification by DICD.

**Flaghole Drainage District BMP Plan  
for  
Caloosahatchee River and Estuary Basin Management Action Plan  
September 2019**

The Flaghole Drainage District (FDD) is a Chapter 298 District established in 1953, and presently codified pursuant to Chapter 2002-446. The FDD encompasses 22,162 acres of agricultural lands within Hendry County. The FDD collects stormwater runoff and discharges the runoff into canals flowing to the C-43. Not all of these lands and facilities are in the C-43 Basin.

A map of the FDD drainage canals and associated rights of way within the C-43 basin boundary is shown below. There are 23.4 miles of canals and rights of way that are maintained by the FDD.



A map generally depicting the agricultural producers enrolled within the FDD is on file with FDACS. All stormwater entering the FDD canals is subject to the FDACS program.

The FDD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The FDD is proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The FDD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the FDD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the FDD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records.

The FDD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the FDD's offices.

### **1. Public Education and Outreach**

Description: The FDD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The FDD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The FDD will identify current landowner or producer and their contact information based on the FDD records. The FDD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the FDD's rights of way.

Report: Annual verification by FDD

### **4. Slow Velocity in Main Canal**

Description: Minimize sediment transport by slowing the velocity in the main canal near the main discharge.

Report: Annual verification by Water Control District.

## **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

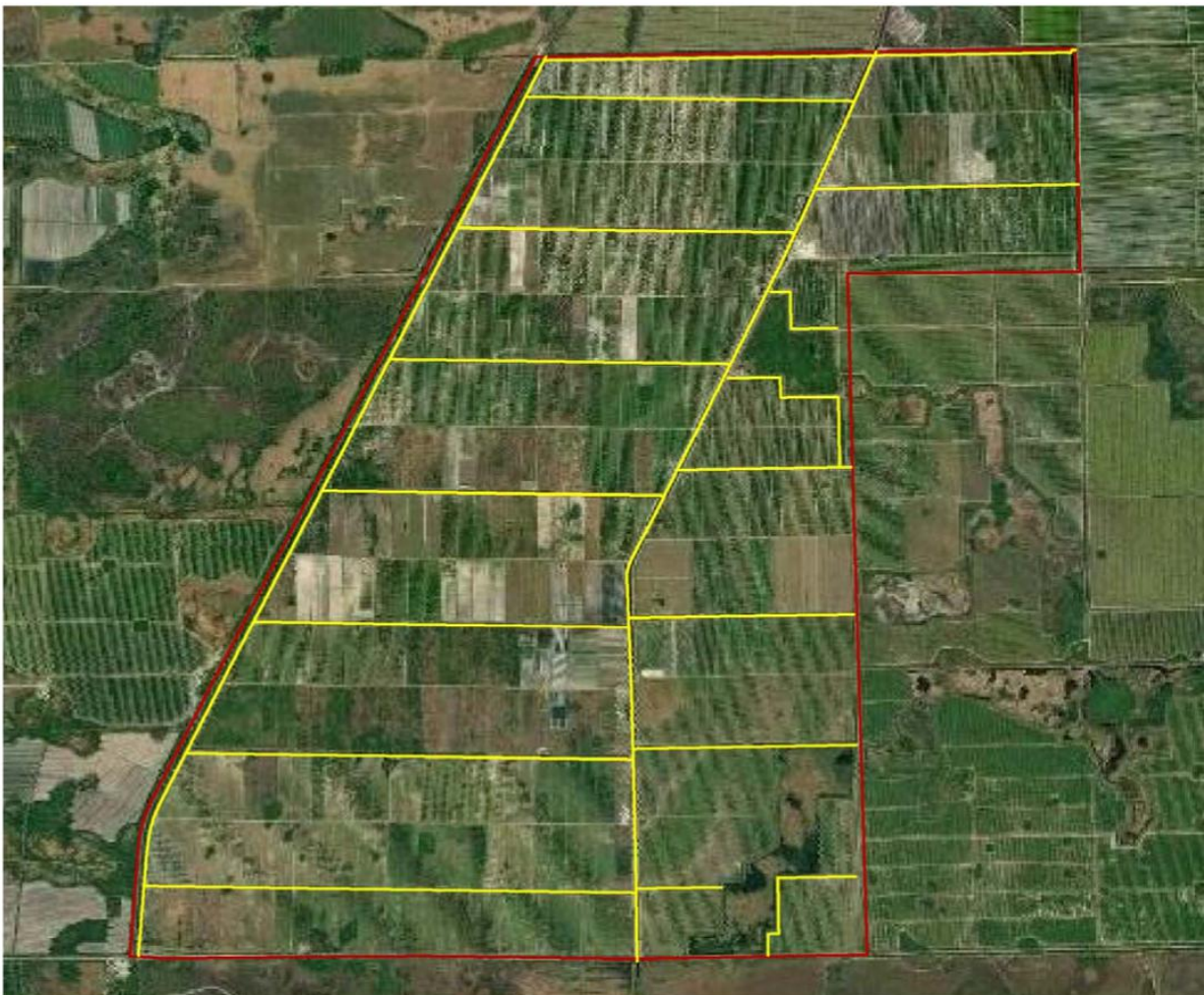
Description: No application of fertilizer within the FDD's rights of way.

Report: Annual verification by FDD.

**Gerber Groves Water Control District BMP Plan  
for  
Caloosahatchee River and Estuary Basin Management Action Plan  
September 2019**

The Gerber Groves Water Control District (GGWCD) is a Chapter 298 District established in 1965. The GGWCD encompasses 6,655.99 acres of agricultural lands within Hendry and Collier Counties. The GGWCD collects stormwater runoff and discharges the runoff into canals flowing to the C-43.

A map of the GGWCD drainage canals and associated rights of way is shown below. There are 31.2 miles of canals and rights of way that are maintained by the GGWCD.



A map generally depicting the agricultural producers enrolled within the GGWCD is on file with FDACS. All stormwater entering the GGWCD canals is subject to the FDACS program.



The GGWCD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The GGWCD is proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The GGWCD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the GGWCD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the GGWCD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records.

The GGWCD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the GGWCD's offices.

### **1. Public Education and Outreach**

Description: The GGWCD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The GGWCD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The GGWCD will identify current landowner or producer and their contact information based on the GGWCD records. The GGWCD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the GGWCD's rights of way.

Report: Annual verification by GGWCD

### **4. Canal/Ditch Bank Berms**

Description: Minimize sediment transport by constructing berms on top of canal/ditch banks and promoting vegetative cover. Developed agricultural lands discharge to the canal system through control structures.

Report: Visual Observation.

## **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

Description: No application of fertilizer within the GGWCD's rights of way.

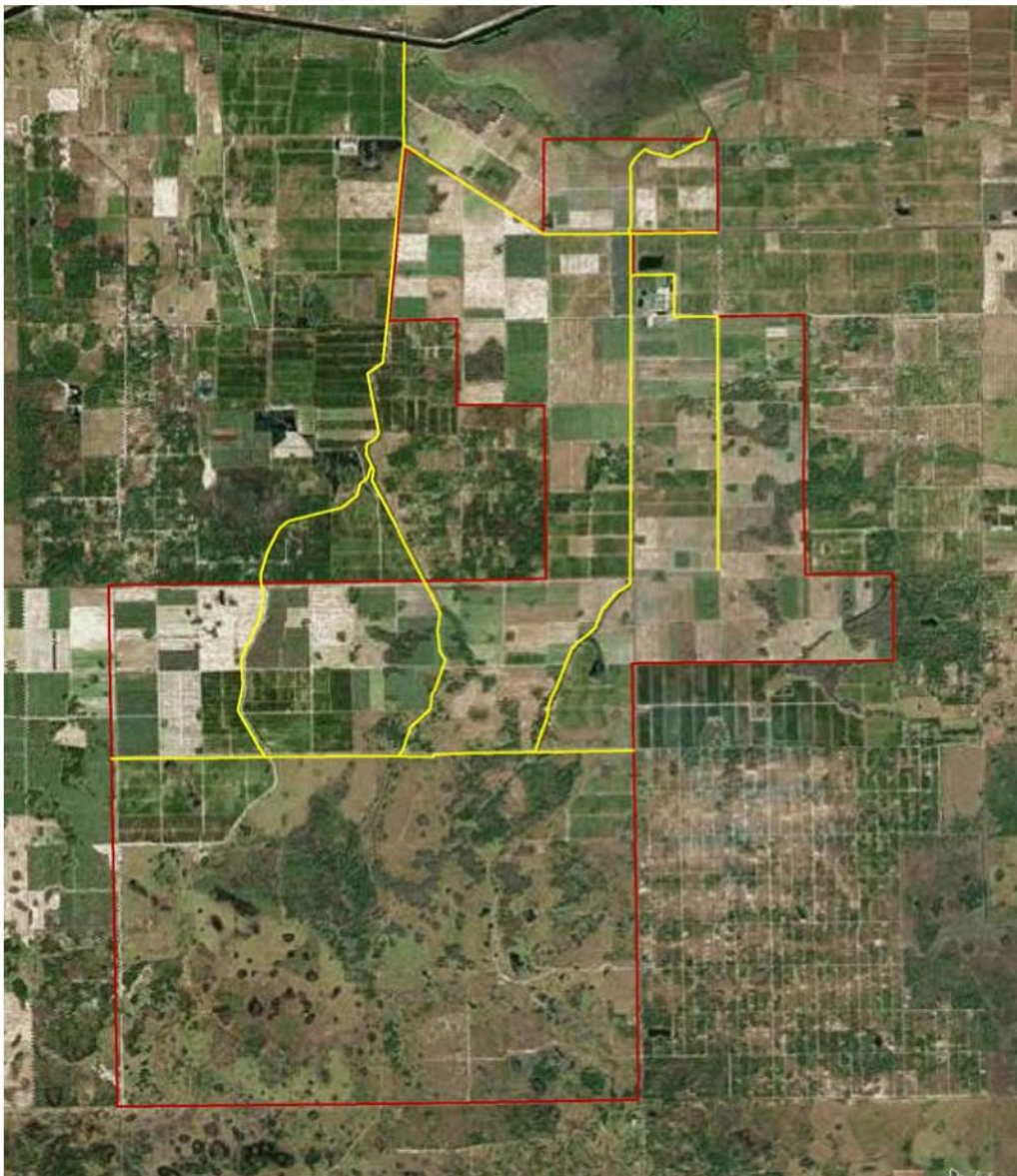
Report: Annual verification by GGWCD.



**Hendry-Hilliard Water Control District BMP Plan  
for  
Caloosahatchee River and Estuary Basin Management Action Plan  
September 2019**

The Hendry-Hilliard Water Control District (CSWCD) is a Chapter 298 District established in 1989, and presently codified pursuant to Chapter 2000-452. The HHWCD encompasses 35,040 acres of agricultural lands within Hendry County. The HHWCD collects stormwater runoff and discharges the runoff into canals flowing to the C-43.

A map of the HHWCD drainage canals and associated rights of way is shown below. There are 35.8 miles of canals and rights of way that are maintained by the HHWCD.



A map generally depicting the agricultural producers enrolled within the HHWCD is on file with FDACS. All stormwater entering the HHWCD canals is subject to the FDACS program.

The HHWCD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The HHWCD is proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The HHWCD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the CSWCD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the HHWCD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records.

The HHWCD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the HHWCD's offices.

### **1. Public Education and Outreach**

Description: The HHWCD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The HHWCD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The HHWCD will identify current landowner or producer and their contact information based on the HHWCD records. The HHWCD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the HHWCD's rights of way.

Report: Annual verification by HHWCD

#### **4. Slow Velocity in Main Canal**

Description: Minimize sediment transport by slowing the velocity in the main canal near the main discharge.

Report: Annual verification by Water Control District.

#### **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

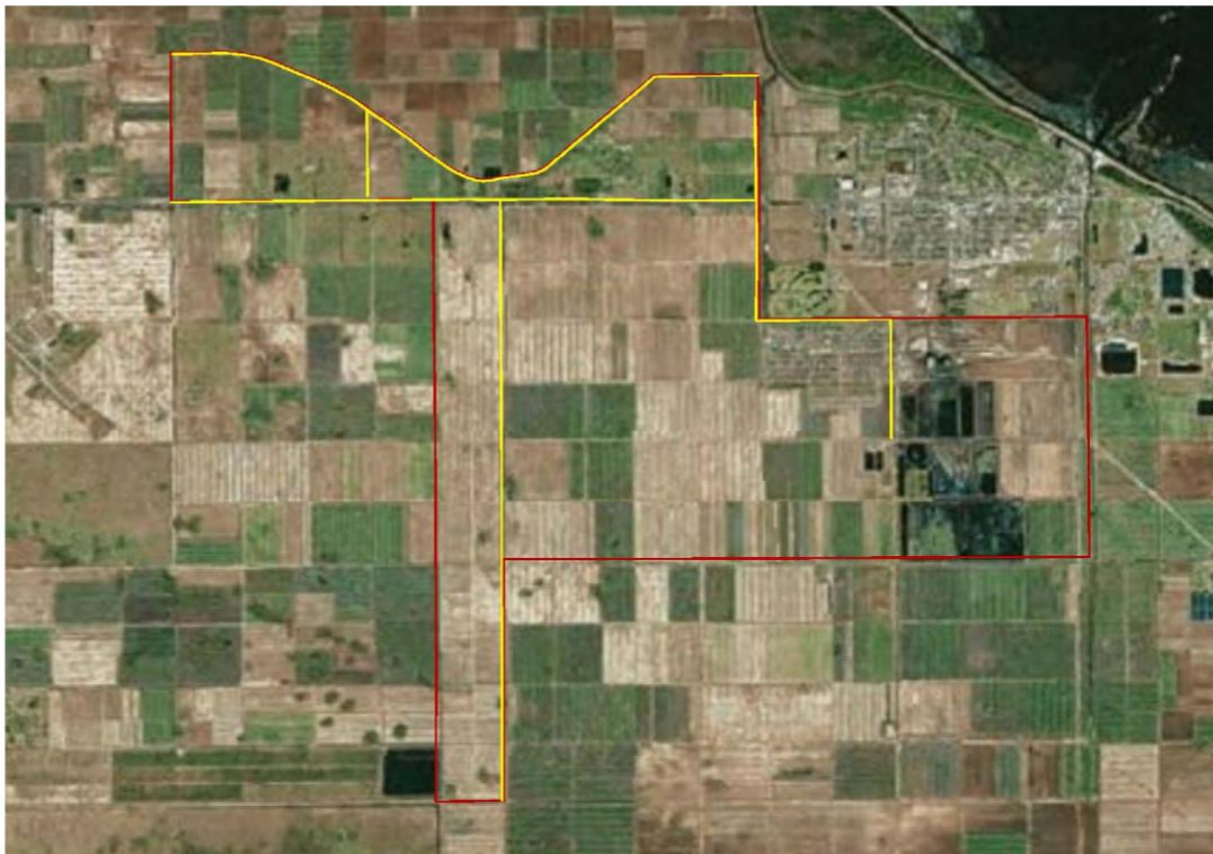
Description: No application of fertilizer within the HHWCD's rights of way.

Report: Annual verification by HHWCD.

**Sugarland Drainage District BMP Plan  
for  
Caloosahatchee River and Estuary Basin Management Action Plan  
September 2019**

The Sugarland Drainage District (SDD) is a Chapter 298 District established in 1924 and presently codified pursuant to Chapter 2000-483. The SDD encompasses 10,801 acres of agricultural lands within Hendry County. The SDD collects stormwater runoff and discharges the runoff into canals flowing to the C-43.

A map of the SDD drainage canals and associated rights of way is shown below. There are 19.1 miles of canals and rights of way that are maintained by the SDD.



A map generally depicting the agricultural producers enrolled within the SDD is on file with FDACS. All stormwater entering the SDD canals is subject to the FDACS program.

The SDD receives runoff from the lands within the landowners and transmits the flow to discharge points. This practice does not increase the nutrient load in the runoff. The SDD is proposing BMP's to remove nutrients sequester in vegetation and sediment during the transportation process.

The SDD proposes that the listed best management practices will be implemented and reported as activity based strategies. A specific allocation or nutrient reduction target will not be established. Rather the SDD's activities will serve to assist in the control of nutrients as part of the efforts described in the Basin Management Action Plan. Implementation of the best management practices shall provide compliance with the BMAP and Chapters 373 and 403 F.S.

In selecting the best management practices, in coordination with FDEP, the function, operation and budget of the SDD has been considered and these listed best management practices should not be considered as cost-effective, technically practical or applicable to any other water control district within the BMAP. Each best management practice includes a description and the required records.

The SDD will provide FDEP an annual report confirming these activities are as identified below. Detailed records of same will be kept in the SDD's offices.

### **1. Public Education and Outreach**

Description: The SDD shall include as part of its annual meeting, an agenda item to alert its landowners of the existence of the BMAP and requirements for agricultural landowners. FDEP and FDACS will assist with the preparation of the agenda materials.

Report: Annual Landowners' Agenda. A copy of the agenda and background materials shall be on file.

### **2. FDACS BMP Assistance**

Description: The SDD will provide assistance to the Florida Department of Agriculture and Consumer Services (FDACS), when requested. The SDD will identify current landowner or producer and their contact information based on the SDD records. The SDD will contact landowners identified by FDACS to encourage the landowner or producer to participate in the FDACS BMP programs and recommend they contact FDEP to learn more about the program.

Report: Number of landowners/producer information requested by FDACS and responses provided.

### **3. Nutrient Controls**

Description: No nutrients imported via direct land application for application on the SDD's rights of way.

Report: Annual verification by SDD

### **4. Slow Velocity in Main Canal**

Description: Minimize sediment transport by slowing the velocity in the main canal near the main discharge.

Report: Annual verification by Water Control District.

## **5. Control Structures**

Description: Maintain existing water control structures to regulate storm water discharges during storm events and to allow nutrients and sediments to settle out in the canals where they can be removed. Evaluate the cost benefit impact of new structures as identified to improve water quality.

Report: Structure type, location, and operation. Identify proposed structures analyzed and the results. Nutrient Controls

Description: No application of fertilizer within the SDD's rights of way.

Report: Annual verification by SDD.



## Appendix D. RFI Responses

To further identify restoration projects for this BMAP, DEP released an RFI in October 2019 to generate additional restoration projects or activities from both the public and private sectors. The effort was open to any interested parties who could propose a viable project for restoration and could be considered for inclusion in the final Caloosahatchee River and Estuary BMAP for funding consideration.

Overall, the RFI process generated 33 responses from the private sector. Submittals ranged from structural projects to new and emerging technologies. All submittals were reviewed; **Table D-1** summarizes the submittals. The TRA IDs and basin names reference the maps for each subwatershed in **Chapter 3**. Resources will be needed to implement any of these projects throughout the watershed, and they are being considered for DEP funding. Additional details on all responses are on file with DEP.

**Table D-1. Summary of responses received for RFI 2020012**

Location Information	Submitted by	Project Name	Project Type
TRA IDs 1-10	Beta Lab Services	Dissolved Nitrate Isotopic Monitoring	Biosorption activated media treatment technology
TRA IDs 1-10	Optic RTC	Continuous Monitoring and Adaptive Control	Monitoring
TRA ID 2	Gerber Pumps	ElectroCoagulation Technology	Technology
TRA ID 2	Youngquist Brothers Inc	Aquifer Storage and Recovery System and Deep Injection Well	Structure
TRA IDs 2, 6, 7	Nclear, Inc	TPX™ Phosphorus Removal Media	Technology
TRA IDs 5, 6, 8, 21, 22	AECOM Technical Services, Inc.	Nutrient Inceptor Removal System	Algae-harvesting technology
TRA ID 13	Florida Citrus Co	Four Corners Rapid Infiltration Project	STA/Storage
TRA IDs 19, 21, 25	Cavortex Tech Intl	The Cavortex System	Technology
TRA IDs 4-27	CB Smith Co	ADS Canal/River Treatment	Technology
TRA IDs 2, 3, 6, 7, 10, 13, 25	Equilibrium Sciences, LLC	ExtraGro™	Land application technology
TRA IDs 26, 27	Lykes Bros. Turkey Branch	Turkey Branch Above Ground Impoundments	Storage/STA
TRA ID 24, 25	McDonalds Consulting Corp	Bioremediation Treatment Technology	Technology
TRA ID 21	Phosphorus Free	Phosphorus Free Water Solutions	Technology

<b>Location Information</b>	<b>Submitted by</b>	<b>Project Name</b>	<b>Project Type</b>
<b>TRA IDs 21, 25, 23, 27, 13</b>	SWET Inc	Stormwater Retention and Reuse with Chemical Treatment System	STA/Storage
<b>TRA ID 23</b>	Sustainable Water Investment Group, LLC	Organic Nitrogen Elimination System	Storage/STA
<b>TRA ID 21 (Graham 3 Dairy Farm)</b>	TSI Strategies	Shallow Manure Injection	Technology
<b>All TRAs listed</b>	Aquamon	Water Quality Monitoring Station Construction and Deployment	Monitoring
<b>All TRAs listed</b>	Aquatic Vegetation Control	Bio-Zyme	Technology
<b>All TRAs listed</b>	Eco Librium	Water Cleanser	Technology
<b>All TRAs listed</b>	Ferrate Solutions	Ferrate Treatment Systems	Technology
<b>All TRAs listed</b>	Higgins Env	A-Pod	Technology
<b>All TRAs listed</b>	HSC Organics LLC	HSC Organics Soil Treatment	Bioremediation treatment technology
<b>All TRAs listed</b>	LatAm Services	LatAm Services Technology	Bioremediation/Land application technology
<b>All TRAs listed</b>	Nano Pure	NanoBOT N50	STA/DWM structure
<b>All TRAs listed</b>	OnSyte Performance, LLC	Septic to Sewer Program	Technology
<b>All TRAs listed</b>	PDS Health Inc	PDS Health Technology	Technology
<b>All TRAs listed</b>	Peace USA	Nualgi	Algae-harvesting technology
<b>All TRAs listed</b>	Shade2000 (late entry)	Soil Amendment Application	Bioremediation/land application technology
<b>All TRAs listed</b>	Universal Engineering Sciences Inc	Universal Engineering Sciences Bioremediation	Technology
<b>All TRAs listed</b>	Water Warriors	Poseidon™ Carbonate Pellets	Technology
<b>Any Tier 2 station</b>	OxSolve, LLC	OxSolve Aeration System	Technology
<b>Not provided</b>	ECS Water	Bold & Gold Filtration Media	Biosorption activated media
<b>Not provided</b>	HydroLibria Consortium Inc	Water Management Organization	Bioremediation treatment technology