FINAL

BASIN MANAGEMENT ACTION PLAN

for the Implementation of Total Maximum Daily Loads for Nutrients Adopted by the Florida Department of Environmental Protection

in the

Caloosahatchee Estuary Basin

developed by the
Caloosahatchee Estuary Basin Technical Stakeholders

in cooperation with the
Florida Department of Environmental Protection
Division of Environmental Assessment and Restoration
Bureau of Watershed Restoration
Tallahassee, Florida 32399

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CALOOSAHATCHEE ESTUARY BASIN PARTICIPANTS

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Florida Department of Environmental Protection
South Florida Water Management District
Florida Department of Agriculture and Consumer Services
City of Cape Coral
City of Fort Myers
East County Water Control District
Lucaya Community Development District
Lee County
Florida Department of Transportation – District 1

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LIST OF ACRONYMS

AWT	Advanced Wastewater Treatment
BMAP	Basin Management Action Plan
BMP	Best Management Practice
BOD5	Biochemical Oxygen Demand
CDD	Community Development District
CDS	Continuous Deflective Separation (Unit)
C.F.R.	Code of Federal Regulations
CHNEP	Charlotte Harbor National Estuary Program
CRWPP	Caloosahatchee River Watershed Protection Plan
C&SF	Central and South Florida
CREW	Corkscrew Regional Ecosystem Watershed
DMR	Discharge Monitoring Report
DOC	Dissolved Organic Carbon
ECWCD	East County Water Control District
EMAP	Environmental Monitoring and Assessment Program
EPA	U.S. Environmental Protection Agency
ERP	Environmental Resource Permit
F.A.C.	Florida Administrative Code
FAW	Florida Administrative Weekly
FDACS	Florida Department of Agriculture and Consumer Services
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
FLUCCS	Florida Land Use and Cover Classification System
F.S.	Florida Statutes
FWRA	Florida Watershed Restoration Act
FYN	Florida Yards and Neighborhoods
IWR	Impaired Surface Waters Rule
LA	Load Allocation
LID	Low Impact Development
LORS	Lake Okeechobee Regulation Schedule
MEP	Maximum Extent Practicable
MS4	Municipal Separate Storm Sewer System
NEEPP	Northern Everglades and Estuaries Protection Program
NELAC	National Environmental Laboratory Accreditation Conference
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
OAWP	Office of Agricultural Water Policy
OFARR	Office of Fiscal Accountability and Regulatory Reform
PAR	Photosynthetically Active Radiation
PCS	Permit Compliance System
POTW	Publicly Owned Treatment Works
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
SAV	Submerged Aquatic Vegetation
SCCF	Sanibel-Captiva Conservation Foundation

SFWMD	South Florida Water Management District
SOP	Standard Operating Procedure
SWMP	Stormwater Management Program
TMDL	Total Maximum Daily Load
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TOC	Total Organic Carbon
TSS	Total Suspended Solids
TT	Treatment Train
UF-IFAS	University of Florida-Institute of Food and Agricultural Sciences
USACOE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WAFR	Wastewater Facility Regulation
WBID	Waterbody Identification
WLA	Wasteload Allocation
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

CALOOSAHATCHEE ESTUARY BASIN

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 extends for over 40 miles from Lake Okeechobee to the Franklin Lock and Dam (S-79). The marine segment, which is referred to as the Caloosahatchee Estuary or Tidal Caloosahatchee, extends for about 25 miles from the Franklin Lock and Dam (Control Structure S-79) to Shell Point, adjacent to San Carlos Bay, with Pine Island Sound to the northwest and Estero Bay to the southeast. The Caloosahatchee Estuary receives freshwater input from S-79 and from various tributaries and canal systems that discharge directly to the estuary downstream of S-79. It is the watershed that drains into the tidal portion of the Caloosahatchee system—excluding the watersheds that contribute flows to the estuary at S-79—that are addressed in this document. The subject watershed is referred to here as the Caloosahatchee Estuary Basin (**Figure 1**). The basin encompasses portions of Lee County and Charlotte County, as well as areas within the cities of Cape Coral and Fort Myers. Approximately 75% of the Tidal Caloosahatchee watershed is located in Lee County, with the remaining 25% in Charlotte County (**Figure 1**).

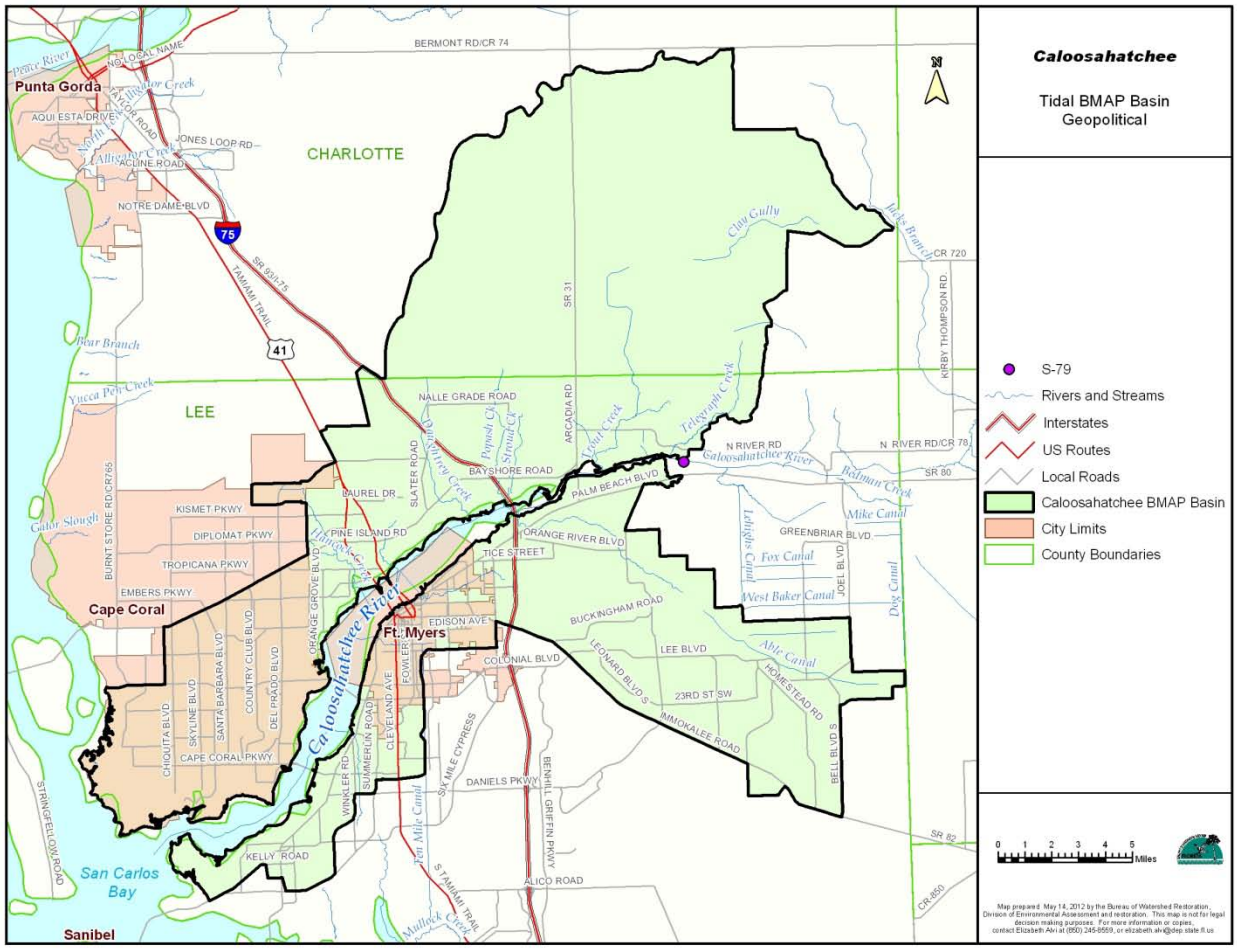

FIGURE 1: CALOOSAHATCHEE ESTUARY BASIN

TOTAL MAXIMUM DAILY LOADS

Total Maximum Daily Loads (TMDLs) are water quality targets, based on state water quality standards, for specific pollutants (such as excessive nitrogen and phosphorus). The Florida Department of Environmental Protection (FDEP) identified the Caloosahatchee Estuary to be impaired by nutrients (chlorophyll-a [chl*a*]). In August 2009, FDEP adopted the Caloosahatchee Estuary TMDL for total nitrogen (TN), which has been linked to high chl*a* concentrations in the Caloosahatchee River and Estuary downstream of the Franklin Lock and Dam (S-79). The TMDL accounts for the total load at the estuary, inclusive of loads from the upstream freshwater portions of the Caloosahatchee River as well as Lake Okeechobee, and requires a 23% reduction in this total TN load. The table below summarizes the existing TN loading to the Caloosahatchee Estuary.

EXISTING TN LOADING TO THE CALOOSAHATCHEE ESTUARY

[1] This is the total existing loading from Lake Okeechobee as defined by the TMDL (FDEP 2009). It has been estimated that the TN load from Lake Okeechobee once the adopted TMDL for Lake Okeechobee has been achieved will be 6,222,155 lbs/yr.
[2] The Nonpoint Source (NPS) Loading includes loads from MS4s, agricultural lands, and nonpoint sources.
[3] The Domestic Wastewater Treatment Plant (WWTP) loads have been updated (2011) from the original TMDL report.
[4] The NPS Loading below S-79 has been updated from the original TMDL report. This load includes loads from MS4s, agricultural lands, and nonpoint sources.
- = Empty cell/no data

SOURCES OF NITROGEN	LOADING (LBS/YR)	% OF TOTAL LOAD
Upstream of S-79	**-**	**-**
Lake Okeechobee[1]	7,004,379	61.0%
Nonpoint Source Loading[2]	2,731,660	23.8%
Subtotal Upstream of S-79	9,736,039	84.7%
Downstream of S-79 (Estuarine Portion)	**-**	**-**
Domestic Wastewater Treatment Plant Loads[3]	64,158	0.6%
Nonpoint Source Loading[4]	1,690,084	14.7%
Subtotal Downstream of S-79	1,754,242	15.3%
Total Load	**11,490,281**	**100.0%**

The purpose of this Basin Management Action Plan (BMAP) is to address TN load reductions in the portion of the watershed that drains to the Caloosahatchee Estuary below S-79 identified in the previous table as the Estuarine Portion. FDEP recognizes that approximately 85% of the total current loading of TN comes from sources upstream of S-79 and that reduction of loads from the watershed below S-79 alone will not result in the restoration of the Estuary. The TN sources above S-79, although important, are not addressed in this BMAP but will be addressed through other efforts. Similarly, the proper control of high and low flows is also important in this basin. The development of this BMAP does not diminish the additional work needed in the basin to restore the Estuary to its designated uses; however, it does take an important step forward by addressing the portion of the TN loading discharged below S-79.

THE CALOOSAHATCHEE ESTUARY BASIN MANAGEMENT ACTION PLAN

The purpose of this BMAP is to implement TN reductions for the portion of the loading generated in the Caloosahatchee Estuary Basin. The BMAP provides for phased implementation under Paragraph 403.067(7)(a)1, Florida Statutes (F.S.). The management actions and adaptive management approach described in the BMAP will address nutrient

reductions within the basin downstream of S-79, and the process will continue until the TMDL applicable to the Estuarine Portion is attained. The phased BMAP approach allows for the implementation of projects designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand the water quality dynamics (sources and response variables) in the watershed. The total required reductions to meet the TMDLs are spread out over multiple phases.

During the course of developing the BMAP, concerns were presented by various stakeholders with regards to portions of the TMDL. The TMDL is scheduled to be refined over the next few years. While the TMDL modeling is refined, FDEP requested that the stakeholders provide activities and projects that would begin reducing the TN load. In the first phase of this BMAP, the activities identified are not expected to completely achieve the TMDL. Rather, this BMAP only requires the implementation of projects and other activities listed here, or comparable projects and activities as approved by FDEP. Accordingly, to the extent that the projects and other activities listed in **Appendix E** (or comparable projects and other activities approved by FDEP) are implemented on a timely basis, those applicable entities shall be presumed to be in compliance with the BMAP. The projects and other activities listed in this document are estimated to achieve TN reductions of 148,000 pounds per year (lbs/yr) by the end of the phase. During this time, FDEP anticipates amending the TMDL to reflect updated modeling. After the first phase of BMAP implementation, stakeholders will evaluate progress and make adjustments in an adaptive way, as needed to meet future refined TMDLs.

An important consideration for the restoration of the Caloosahatchee Estuary is that the majority of the loading to the impaired waterbodies comes from sources upstream of the estuarine portion of the river. The Caloosahatchee River receives flow from Lake Okeechobee, several streams and canals between control structures S-77 and S-78, 14 tributaries between S-78 and S-79, and 23 waterbodies that discharge directly to the estuary below S-79. Approximately half of the volume of water that reaches S-79 is water that has passed through S-77 from Lake Okeechobee (FDEP 2009). Therefore, implementing projects in the watershed below S-79 alone is not expected to achieve the TMDL; reductions from the upstream sources and proper control of freshwater flows must occur before water quality standards can be met in the impaired WBIDs. Ultimately, for high and low flow periods, proper control of fresh water will be accomplished by additional projects not covered in the current BMAP. Some of these activities include the Comprehensive Everglades Restoration Plan, Central Everglades Planning Project, Caloosahatchee River Minimum Flows and Levels Recovery Strategy, and Caloosahatchee River Watershed Protection Plan (CRWPP).

The Northern Everglades and Estuaries Protection Program (NEEPP) required the CRWPP to include a pollutant load reduction implementation plan consistent with the Caloosahatchee Estuary BMAP (Section 373.4595, F.S.). As a result, during TMDL development and the BMAP preparation, South Florida Water Management District (SFWMD) staff collaborated frequently to support FDEP. While the analysis of nutrient loading used by FDEP and SFWMD was different, similar results were identified, corroborating the need for nutrient load reduction in the basin.

KEY ELEMENTS OF THE BMAP

This BMAP addresses the key elements required by the Florida Watershed Restoration Act (FWRA), Chapter 403.067, F.S., including the following:

- *Document how the public and other stakeholders were encouraged to participate or participated in developing the BMAP (**Section 1.3.1** and **Appendix C**);*
- *Equitably allocate pollutant reductions in the basin (**Chapter 4**);*

- *Identify the mechanisms by which potential future increases in pollutant loading will be addressed (**Section 1.5**);*
- *Document management actions/projects to achieve the TMDLs (**Chapter 5** and **Appendix E**);*
- *Document the implementation schedule, funding, responsibilities, and milestones (**Appendix E**); and*
- *Identify monitoring, evaluation, and a reporting strategy to evaluate reasonable progress over time (**Section 6.1**).*

ANTICIPATED OUTCOMES OF BMAP IMPLEMENTATION

Through the implementation of projects, activities, and additional source assessment in this BMAP, stakeholders expect the following outcomes:

- *Modest improvements in water quality trends in the Caloosahatchee Estuary;*
- *Decreased loading of the target pollutant (TN);*
- *Increased coordination between state and local governments and within divisions of local governments in problem solving for surface water quality restoration;*
- *Determination of effective projects through the stakeholder decision-making and priority-setting processes;*
- *Enhanced public awareness of pollutant sources, pollutant impacts on water quality, and corresponding corrective actions; and*
- *Enhanced understanding of basin hydrology, water quality, and pollutant sources.*

BMAP COST

Costs totaling $10.7 million were provided for approximately 10% of the activities identified in the BMAP. It is important to note that since the TMDL is scheduled to be refined during the next few years, stakeholders were asked to provide activities and projects that would reduce the TN load in the meantime. The large majority (90%) of projects submitted by stakeholders for this phase of the BMAP have already been completed. Technical stakeholders will continue 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.

BMAP FOLLOW-UP

FDEP will work with the technical stakeholders to organize the monitoring data and track project implementation. The results will be used to evaluate whether the plan is effective in reducing TN loads in the watershed. The technical stakeholders will meet at least every 12 months after the adoption of the BMAP to follow up on plan implementation, share new information, and continue to coordinate on TMDL-related issues.

Additionally, FDEP shall conduct post-BMAP adoption workshops with Lee County and non-agricultural nonpoint sources outside the County's MS4 boundaries to encourage communication and coordination between these entities on sub-regional and regional projects, activities, and public/private partnerships. The ultimate goals of these workshops are to ensure that non-agricultural nonpoint sources are taking appropriate pollutant reduction actions and commence a dialogue on additional projects or other activities that may be appropriate to attain desired pollutant load reduction goals in future phases of this BMAP.

COMMITMENT TO BMAP IMPLEMENTATION

The stakeholders have committed to implementing the projects and activities included in this BMAP. The entities provided to FDEP, as needed, letters of commitment or resolutions of support to ensure that as staff and board members change over time, the entity has a way to show support for the BMAP and the efforts included.

CHAPTER 1: CONTEXT, PURPOSE, AND SCOPE OF THE PLAN

1.1 WATER QUALITY STANDARDS AND TOTAL MAXIMUM DAILY LOADS

Florida's water quality standards are designed to ensure that surface waters can be used for their designated purposes, such as drinking water, recreation, and agriculture. Currently, most surface waters in Florida, including those in the Caloosahatchee Estuary Basin, are categorized as Class III waters, meaning that they must be suitable for recreation and must support the propagation and maintenance of a healthy, well-balanced population of fish and wildlife. **Table 1** shows all designated use categories.

Under Section 303(d) of the federal Clean Water Act, every two years each state must identify its "impaired" waters, including estuaries, lakes, rivers, and streams, that do not meet their designated uses and are not expected to improve within the subsequent two years. The Florida Department of Environmental Protection (FDEP) is responsible for developing this "303(d) list" of impaired waters.

TABLE 1: DESIGNATED USE ATTAINMENT CATEGORIES FOR FLORIDA SURFACE WATERS

* Class I and II waters include the uses of the classifications listed below them.

CATEGORY	DESCRIPTION
Class I*	Potable water supplies
Class II*	Shellfish propagation or harvesting
Class III	**Recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife**
Class IV	Agricultural water supplies
Class V	Navigation, utility, and industrial use (*no current Class V designations*)

Florida's 303(d) list identifies hundreds of waterbody segments that fall short of water quality standards. The three most common water quality concerns are fecal coliform, nutrients, and oxygen-demanding substances. The listed waterbody segments are candidates for more detailed assessments of water quality to determine whether they are impaired according to state statutory and rule criteria. FDEP develops and adopts Total Maximum Daily Loads (TMDLs) for the waterbody segments it identifies as impaired. A TMDL is the maximum amount of a specific pollutant that a waterbody can assimilate while maintaining its designated uses.

The water quality evaluation and decision-making processes for listing impaired waters and establishing TMDLs are authorized by Section 403.067, Florida Statutes (F.S.), known as the Florida Watershed Restoration Act (FWRA), and contained in Florida's Identification of Impaired Surface Waters Rule (IWR), Rule 62-303, Florida Administrative Code (F.A.C.). The impaired waters in the Caloosahatchee River Basin addressed in this plan are all Class III waters. TMDLs have been established for these waters, identifying the amount of total nitrogen (TN) they can receive and still maintain Class III designated uses.

TMDLs are developed and implemented as part of a watershed management cycle that rotates through the state's 52 river basins every 5 years (see **Appendix A**) to evaluate waters, determine impairments, and develop and implement management strategies to restore impaired waters to their designated uses. **Table 2** summarizes the five phases of the watershed management cycle.

TABLE 2: PHASES OF THE WATERSHED MANAGEMENT CYCLE

PHASE	ACTIVITY
Phase 1	Preliminary evaluation of water quality
Phase 2	Strategic monitoring and assessment to verify water quality impairments
Phase 3	Development and adoption of TMDLs for waters verified as impaired
Phase 4	Development of management strategies to achieve the TMDL(s)
Phase 5	Implementation of TMDL(s), including monitoring and assessment

1.2 TMDL IMPLEMENTATION

Rule-adopted TMDLs may be implemented through Basin Management Action Plans (BMAPs), which contain strategies to reduce and prevent pollutant discharges through various cost-effective means. During Phase 4 of the TMDL process, FDEP and the affected stakeholders in the various basins jointly develop BMAPs or other implementation approaches. A basin may have more than one BMAP, based on practical considerations. The FWRA contains provisions that guide the development of BMAPs and other TMDL implementation approaches. **Appendix B** summarizes the statutory provisions related to BMAP development.

Stakeholder involvement is critical to the success of the TMDL 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. Under statute, FDEP invites stakeholders to participate in the BMAP development process and encourages public participation to the greatest practicable extent. FDEP must hold at least one noticed public meeting in the basin to discuss and receive comments during the planning process. Stakeholder involvement is essential to develop, gain support for, and secure commitments to implement the BMAP.

1.3 THE CALOOSAHATCHEE ESTUARY BASIN MANAGEMENT ACTION PLAN

The Caloosahatchee Estuary BMAP and the Caloosahatchee River Watershed Protection Plan (CRWPP) (South Florida Water Management District [SFWMD] *et al.* 2009 and 2012) are both requirements of the Northern Everglades and Estuaries Protection Program (NEEPP) (Section 373.4595, F.S.) and have water quality goals of achieving the estuarine TMDL. According to NEEPP, the SFWMD is the lead agency in developing and updating the CRWPP, which is done in collaboration with FDEP and FDACS. It was originally published in January 2009, prior to adoption of the estuarine TN TMDL and initiation of the BMAP development, and subsequently updated in 2012. As a result, SFWMD staff collaborated with and provided technical assistance to FDEP frequently during the TMDL and BMAP development process. In addition, SFWMD and FDEP staff worked closely to ensure that the water quality strategies and projects included in the CRWPP provided the basis for those considered in the BMAP process. This close coordination between FDEP and SFWMD staff during BMAP development minimized duplicative efforts between the agencies and improved consistency between these two related NEEPP efforts. The SFWMD is considered a collaborative partner with FDEP in the preparation of this BMAP.

1.3.1 STAKEHOLDER INVOLVEMENT

Stakeholder involvement was a key component in developing the Caloosahatchee Estuary BMAP. The BMAP process engages local stakeholders and promotes coordination and collaboration to address the reductions for TN to achieve the Caloosahatchee Estuary TMDL.

The following organizations and entities are key stakeholders with assigned load reductions in the Caloosahatchee Estuary BMAP:

- *City of Cape Coral;*
- *Charlotte County;*
- *East County Water Control District (ECWCD);*
- *Florida Department of Agriculture and Consumer Services (FDACS);*
- *Florida Department of Transportation (FDOT) District 1;*
- *City of Ft. Myers;*
- *Lee County; and*
- *Lucaya Community Development District (CDD).*

Starting in September 2009, FDEP initiated the BMAP development process and held a series of technical meetings involving key stakeholders and the general public. Technical meetings were open to the public and noticed in the *Florida Administrative Weekly* (FAW). The purpose of these meetings was to consult with key stakeholders to gather information on the impaired WBIDs and their contributing areas, in order to aid in the development of the BMAP and identify specific management actions that would reduce TN loading. Since 2009, a kickoff meeting and six technical meetings were held to gather information; identify potential sources; conduct field reconnaissance; define programs, projects, and actions currently under way; and develop the BMAP contents and actions that will result in reduction of TN with the ultimate goal of achieving the TMDL target reductions. Stakeholder involvement is essential to develop, gain support for, and secure commitments to implement the BMAP.

In addition to technical meetings, FDEP also met with stakeholders in one-on-one meetings. The purpose of these meetings was to discuss project-specific information with stakeholders.

Except as specifically noted in subsequent sections, this BMAP document reflects the input of the stakeholders, along with public input from workshops and meetings held to discuss key aspects of the TMDL and BMAP development.

1.3.2 Other Support and Interested Parties

In addition to the key stakeholders previously mentioned, several other interested parties and entities participated in the Caloosahatchee Estuary BMAP meetings, as shown in **Table 3**.

TABLE 3: OTHER BMAP MEETING PARTICIPANTS

ENTITY	ENTITY
Bonita Bay Group	Gulf Citrus Growers
Charlotte Harbor National Estuary Program (CHNEP)	Hendry County
City of Naples	University of Florida Institute of Food and Agricultural Sciences (UF-IFAS)
City of Sanibel	J.N. Ding Darling National Wildlife Refuge
Collier County	Lee County Health Department
Collier County Audubon Society	Lee County Farm Bureau
Conservancy of Southwest Florida	National Oceanic and Atmospheric Administration (NOAA)
Corkscrew Regional Ecosystem Watershed (CREW) Land and Water Trust	Sanibel-Captiva Conservation Foundation (SCCF)
Clean Water Network of Florida	South Florida Water Management District (SFWMD)
Duda	Sierra Club
Hendry Glades Farm Bureau	Southwest Florida Regional Planning Council
Florida Gulf Coast University	U.S. Army Corps of Engineers (USACOE)
Florida Farm Bureau Federation	U.S. Department of Agriculture
Friends of Billy Creek	U.S. Fish and Wildlife Service
Town of Fort Myers Beach	U.S. Geological Survey (USGS)

1.3.3 PLAN PURPOSE AND SCOPE

The purpose of this BMAP is to implement TN load reductions to achieve the TN TMDL assigned to stakeholders below S-79 in the Caloosahatchee Estuary Basin. This plan outlines specific projects that will provide load reductions and a schedule for implementation for the first 5 years. The document also details a monitoring approach to measure progress toward meeting load reductions and to report on how this portion of the TMDL is being accomplished. The stakeholders will meet at least annually to review progress made towards achieving this portion of the TMDL.

In 2009, FDEP adopted a nutrient TMDL for the Caloosahatchee Estuary (waterbody identification [WBID] units 3240A, 3240B and 3240C). The Caloosahatchee Estuary TMDL includes the impaired main stem of the tidal portion (downstream of the Franklin Lock and Dam [Control Structure S-79]) of the Caloosahatchee River. The BMAP basin includes the northwest portion of Lee County, the southern portion of the City of Cape Coral, and a significant portion of the City of Fort Myers. The focus of this BMAP is the 259,727-acre basin (previously shown in **Figure 1**) that discharges flows to the Caloosahatchee Estuary.

1.3.4 BMAP APPROACH

This BMAP provides for phased implementation following Subsection 403.067(7)(a)1, F.S. The management actions and adaptive management approach described in the BMAP will address TN reductions and the process will continue until the TMDLs are attained. The phased BMAP approach allows for the implementation of projects designed to achieve incremental reductions, while simultaneously monitoring and conducting studies to better understand the water quality dynamics (sources and response variables) in the watershed. The total reduction for the Caloosahatchee Estuary TMDL is spread over multiple years.

During the course of the BMAP, concerns were presented by various stakeholders with regards to portions of the TMDL modeling and/or allocations. The TMDL models and allocations are scheduled to be refined in the next few years. This refinement may affect the overall TMDL load reduction target; however, stakeholders in this BMAP will be held to their first 5-year interim targets and project commitments regardless. If that results in a higher reduction than required in the adjusted 5-year target, the overage will be credited towards future phases. This BMAP identifies TN reduction activities or projects that have been, or will be, completed over the first phase. After the first phase of BMAP implementation, stakeholders will evaluate progress and make adjustments as needed to meet future refined TMDLs. Phase II of the BMAP will then be developed to address the need for additional reductions for the second phase.

1.3.5 Pollutant Reduction and Discharge Allocations

1.3.5.1 Categories for Rule Allocations

The rules adopting TMDLs must establish reasonable and equitable allocations that will alone, or in conjunction with other management and restoration activities, attain the TMDL. Allocations may be to individual sources, source categories, or basins that discharge to the impaired waterbody. The allocations identify either how much pollutant discharge in pounds per year (lbs/yr) or the percent of its loading the source designation must reduce (reduction allocation). Currently, the TMDL allocation categories are as follows:

- ***Wasteload Allocation (WLA)*** *is the allocation to point sources permitted through the National Pollutant Discharge Elimination System (NPDES) Program. It includes the following:*
    - **Wastewater Allocation** is the allocation to industrial and domestic wastewater facilities.
    - **NPDES Stormwater Allocation** is the allocation to NPDES stormwater permittees that operate municipal separate storm sewer systems (MS4s). These permittees are treated as point sources under the TMDL Program.
- ***Load Allocation (LA)*** *is the allocation to nonpoint sources, including agricultural runoff and stormwater from areas that are not covered by an MS4.*

1.3.5.2 Initial and Detailed Allocations

Under the FWRA, the TMDL allocation adopted by rule may be an "initial" allocation among point and nonpoint sources. In such cases, the "detailed" allocation to specific point sources and specific categories of nonpoint sources must be established in the BMAP. The FWRA further states that the BMAP may make detailed allocations to individual "basins" (i.e., sub-basins) or to all basins as a whole, as appropriate. Both initial and detailed allocations must be determined based on a number of factors listed in the FWRA, including cost-benefit, technical and environmental feasibility, implementation time frames, and others (see **Appendix B**).

1.3.6 Caloosahatchee Estuary Basin TMDLs

The nutrient TMDLs for the Caloosahatchee Estuary Basin were adopted by FDEP in August 2009. This BMAP includes the three WBIDs that make up the tidal Caloosahatchee River: WBID 3240A, WBID 3240B, and WBID 3240C. **Table 4** lists the TMDL and pollutant load allocations adopted by rule for the watershed (based on updates to the loading to the watershed).

TABLE 4: CALOOSAHATCHEE ESTUARY TMDLS

[1] The Domestic Wastewater Treatment Plant (WTTP) and stormwater loads have been updated since the original TMDL report.
[2] The TMDL load applies only to stormwater loads and is based on loads that have been updated since the original TMDL.

PARAMETER	WLA FOR WASTEWATER (LBS/YR)	CURRENT DOMESTIC WASTEWATER LOADING (LBS/ YR)[1]	WLA FOR NPDES STORMWATER (% REDUCTION)	LA (% REDUCTION)	CURRENT STORMWATER LOADING (LBS/ YR)[1]	TMDL LOAD (LBS/ YR)[2]
TN	Permitted loads	64,158	23%	23%	1,690,084	1,301,365

1.4 ASSUMPTIONS AND CONSIDERATIONS REGARDING TMDL IMPLEMENTATION

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. In addition, there are important considerations about the nature of the BMAP and its long-term implementation. These assumptions and considerations are discussed below.

1.4.1 ASSUMPTIONS

The following assumptions were used during the BMAP process:

- *BMAP load reduction credits were considered only for projects and best management practices (BMPs) that were completed by January 1, 2000, and later, and that provided treatment over and above the permitted requirements. Other considerations for reduction credits included the proper operation and maintenance of an existing project. Examples of BMPs that were given credit include wet detention, retention, fertilizer ordinance(s), public education, constructed wetlands, street sweeping, increased retention or detention due to weir height increases, baffle boxes, and catch basin inserts.*
- *No credit was given to projects located outside the Caloosahatchee Estuary watershed, projects that did not reduce TN loading, flood control projects with no ancillary water quality benefits, maintenance projects, litter removal, pipe replacement, or conservation land purchases without a change in land use.*
- *The 2004 Florida Land Use and Cover Classification System (FLUCCS) data for the area were used in calculating allocations. These data were also used for the TMDL.*
- *Water and wetland land uses were not removed from allocation calculations because these areas were included in the TMDL modeling.*
- *FDEP default BMP TN reduction values were applied to projects where justifiable load reduction information or monitoring data were not available or not provided by the stakeholder requesting credit. The FDEP TN removal efficiencies are shown in **Table 5**.*
- *Load reduction was not given for failing septic systems, as these were not explicitly modeled in the TMDL. It should be noted that the Caloosahatchee Estuary remodeling may consider septic tank loads explicitly—in this event, credits for the fixing or removal of septic tanks will be reconsidered.*

- *During the course of the BMAP, some concerns were presented by various stakeholders with regards to portions of the TMDL modeling and/or allocations. The TMDL models and allocations are scheduled to be refined over the next few years. While the TMDL modeling is refined, FDEP requested that the stakeholders provide activities and projects that would reduce the TN load to some degree—these are the projects listed in Chapter 5. The actions and remaining load reductions for Phases 2 and 3 will be decided in the future and will be based on the results of the modeling update.*

TABLE 5: FDEP TN REMOVAL EFFICIENCIES

BMPS	TN % REDUCTION
Off-line Retention 0.25-in. treatment volume	40%
Off-line Retention 0.50-in. treatment volume	62%
Off-line Retention 0.75-in. treatment volume	75%
Off-line Retention 1.00-in. treatment volume	84%
On-line Retention 0.25-in. treatment volume	30%
On-line Retention 0.50-in. treatment volume	52%
On-line Retention 0.75-in. treatment volume	65%
On-line Retention 1.00-in. treatment volume	74%
Grass swales with swale blocks or raised culverts	Use on-line retention BMPs above
Grass swales without swale blocks or raised culverts	50% of value for grass swales with swale blocks or raised culverts
Wet detention ponds	% Removal = (43.75 * td)/(4.38 + td); where td is the mean annual residence time
BMP treatment trains using a combination of BMPs	Use BMP Treatment Train (TT) equation: BMP TT Efficiency = Eff1 +((1-Eff1)*Eff2)
Dry detention	10%
Baffle box	0.5%
Nutrient baffle box (2nd generation)	19.05%
Catch basins/inlet filters	Determine kg of materials removed and multiply by 467.2 mg/kg (commercial), 773.8 mg/kg (residential), or 785.4 mg/kg (highway)
Street sweeping	Determine kg of materials removed and multiply by 429.6 mg/kg (commercial), 832.4 mg/kg (residential), or 546.4 mg/kg (highway)
Alum injection	50%
Stormwater reuse	Estimate amount water not discharged annually because used for irrigation.
Stormceptor	2%
Continuous deflective separation (CDS) units	Not applicable
Floating islands	20%
Public education	1-6%, depending on extent of program
Low impact development practices	Cannot quantify

1.4.2 Considerations

This BMAP requires stakeholders to implement their projects to achieve reductions as soon as practicable. However, the full implementation of this BMAP will be a long-term process. While some of the projects and activities contained in the BMAP were recently completed or are currently ongoing, several projects require more time to design, secure funding, and construct. While funding the projects could be an issue, funding limitations do not affect the requirement that every entity must implement the activities listed in the BMAP.

Since BMAP implementation is a long-term process, the TMDL established for this basin will not be achieved in the next five years, nor will it be achieved by the actions of the stakeholders within the Estuarine Portion alone. It is understood that all waterbodies can respond differently to the implementation of reduced loadings in order to meet applicable water quality standards. Regular follow-up and continued coordination and communication by the stakeholders will be essential to ensure the implementation of management strategies and assessment of incremental effects. Additional management actions for the stakeholders in the Estuarine Portion required to meet the target load TN reduction in the TMDL will, if necessary, be developed as part of the BMAP follow-up.

During the BMAP process, several items were identified that should be addressed in future watershed management cycles for the consideration of the load reductions for stakeholders below S-79 to ensure that future BMAPs use the most accurate information. FDEP has agreed to remodeling and recalculating allocations in the next TMDL/BMAP cycle. It is expected that the next iteration of modeling will review and address the following items:

- ***Allocations to a city for county roads located within city limits.*** *There were concerns with allocation assignments for county roads that route through city limits. Based on FDEP's review of these data, it will be reviewed in the next BMAP update.*
- ***FDOT Rights-of-Way.*** *In the next BMAP iteration, FDOT rights-of-way will be separated out and allocations will be updated.*
- ***Land Use Disaggregation.*** *For the TMDL calculation, all land uses were lumped into 10 generalized land uses. Based on stakeholder feedback, FDEP will look into disaggregating the land uses into more specific categories to better represent existing conditions in the TMDL update.*
- ***Septic Tank Loading.*** *Septic tank loading was not explicitly included in the TMDL. The magnitude of septic tank TN loading is undefined at this point and additional study and information are needed before the value of septic tank controls can be identified. It is expected that FDEP will review and re-evaluate future data in the upcoming TMDL update.*

1.5 Future Growth in the Watershed

The FWRA (Paragraph 403.067[7][a][2], F.S.) requires that BMAPs "identify the mechanisms by which potential future increases in pollutant loading will be addressed." This BMAP does not include a specific allocation for new development because of Environmental Resource Permit (ERP) Program requirements. The ERP Program requires that all new discharges into the basin cannot increase existing loads. All ERP applications must include documentation demonstrating compliance with state water quality standards, as well as showing that the project does not adversely affect the quality of receiving waters resulting in water quality standards violations. The Caloosahatchee Estuary Basin includes impaired waters that do not currently meet state

water quality standards; therefore, new development in the basin must demonstrate a net-improvement in nutrient loads to the waterbodies above the current condition of the development site.

So that future growth does not add to the degradation of the waterbodies, the local governments are encouraged to pursue low impact development (LID) standards and Florida friendly landscaping to further minimize the impacts of existing development and new development through local development regulations. LID is an approach to development that employs land planning, design practices, and technologies to conserve natural resources and reduce infrastructure costs. These activities could offset loads from future growth and, therefore, may reduce the reductions needed from the entities in future BMAP iterations.

CHAPTER 2: CALOOSAHATCHEE ESTUARY BASIN SETTING

2.1 JURISDICTIONS, POPULATION, AND LAND USES

Approximately 75% of the Tidal Caloosahatchee watershed is located in Lee County, with the remaining 25% in Charlotte County. The major population centers in the watershed include Cape Coral (population 157,476) and Fort Myers (population 63,512), (U.S. Census Bureau 2012).

Land use categories for the Caloosahatchee Estuary Basin were aggregated using the simplified Level 1 codes as well as the more detailed Level 2 codes. **Table 6** displays the Level 1 land uses for the Caloosahatchee Estuary Basin. The largest Level 1 land use in the basin is urban and built-up (39.1%). The remaining Level 1 land uses with over 10% of land acreage in the basin include agriculture (15.0%), upland forests (15.2%), and wetlands (18.3%). "Wetland" constitutes the highest percentage of undeveloped land use in the basin. **Figures 2A** and **2B** display the Level 1 and Level 2 land use categories for the Caloosahatchee Estuary Basin graphically.

TABLE 6: LEVEL 1 LAND USES IN THE TIDAL CALOOSAHATCHEE WATERSHED

- = Empty cell/no data

LEVEL 1 LAND USE CODE	LAND USE	ACRES	% TOTAL
1000	Urban and Built-Up	101,566.8	39.1%
2000	Agriculture	39,048.5	15.0%
3000	Rangeland	19,081.6	7.4%
4000	Upland Forests	39,402.1	15.2%
5000	Water	8,777.9	3.4%
6000	Wetlands	47,538.9	18.3%
7000	Barren Land	499.6	0.2%
8000	Transportation, Communication and Utilities	3,548.3	1.4%
-	**Total**	**259,464**	**100%**

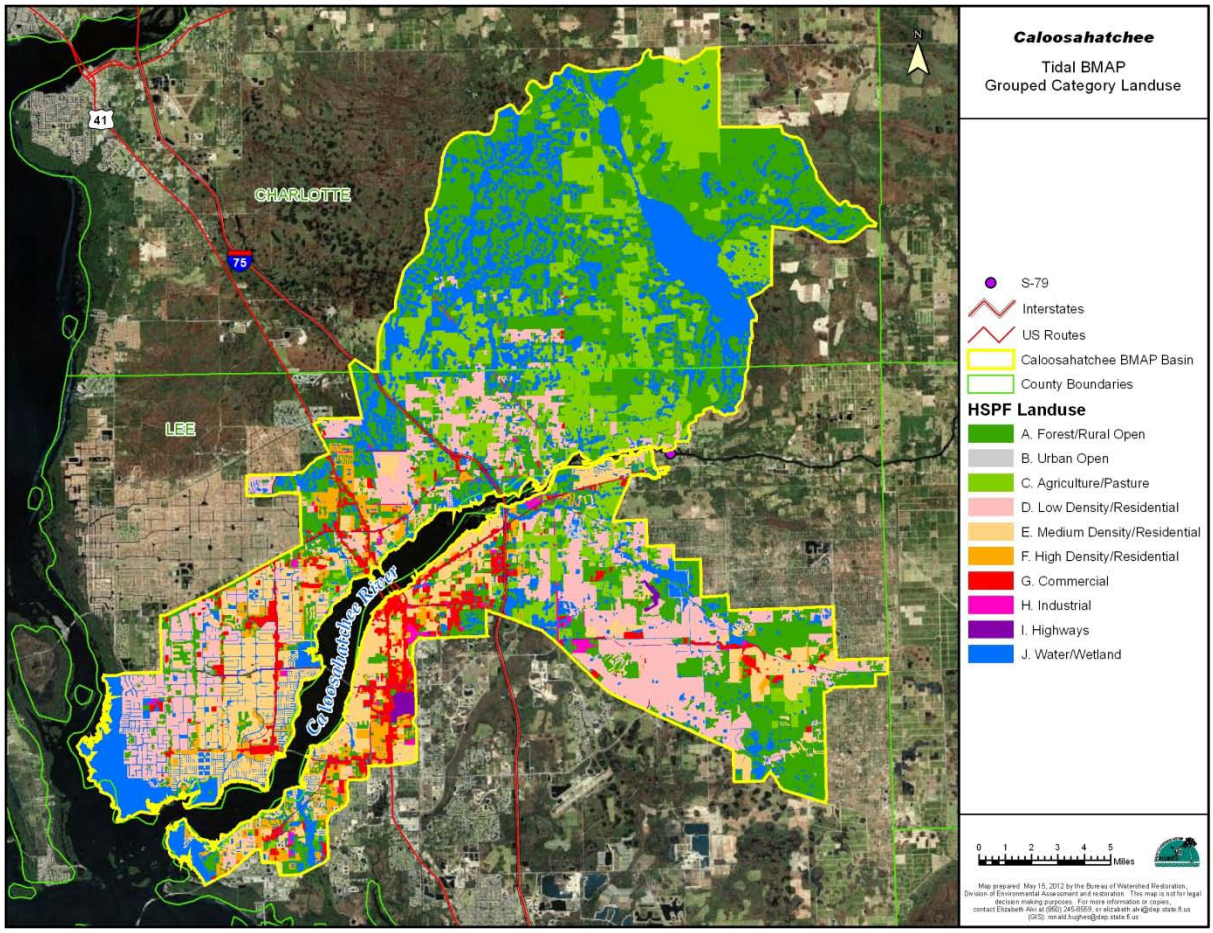

FIGURE 2A: LEVEL 1 LAND USES IN THE CALOOSAHATCHEE ESTUARY BASIN

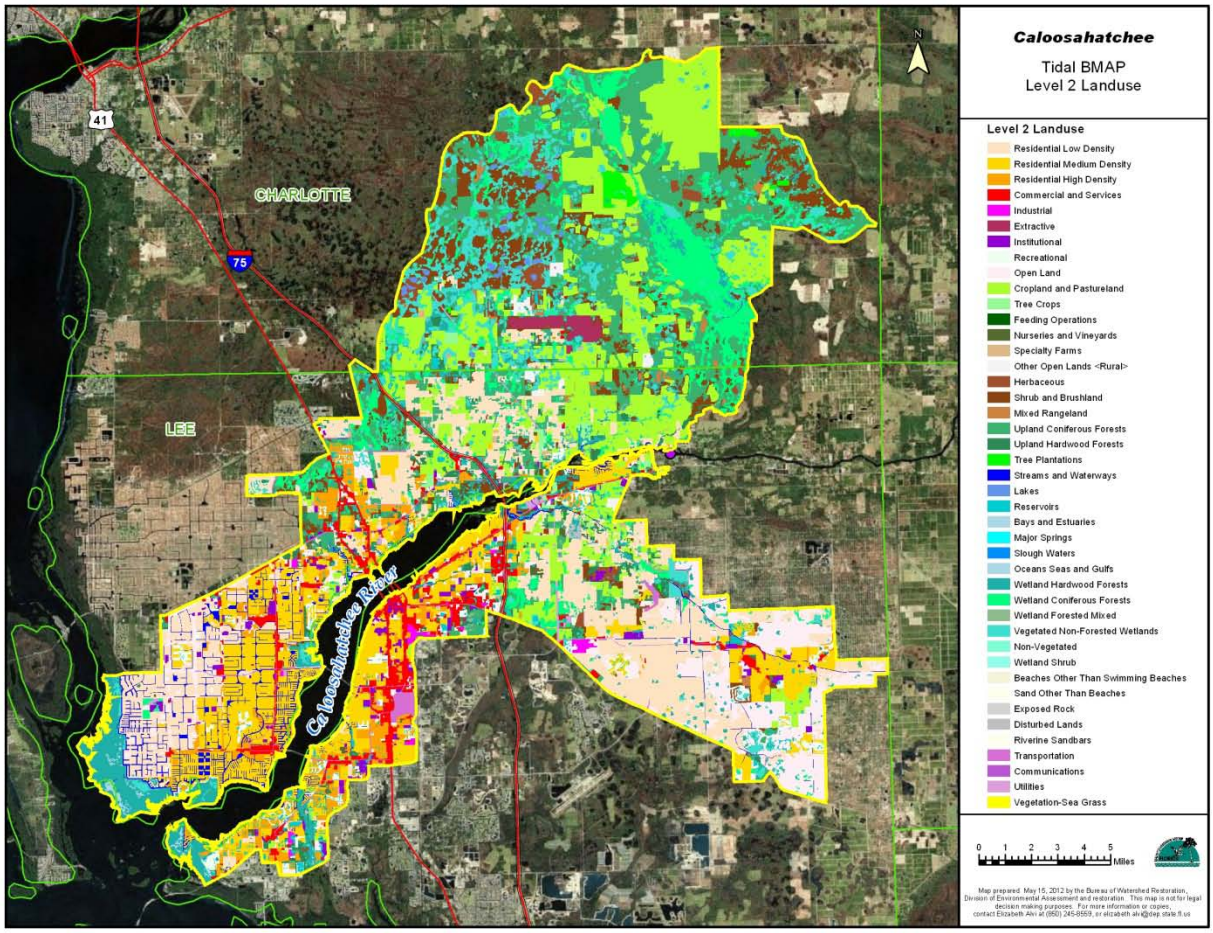

FIGURE 2B: LEVEL 2 LAND USES IN THE CALOOSAHATCHEE ESTUARY BASIN

2.2 HYDROLOGY

The 75-mile-long Caloosahatchee River (**Figure 3**) originates as the C-43 Canal at the southwest corner of Lake Okeechobee at Structure S-77, and then flows predominantly east to west, eventually discharging into the Gulf of Mexico at San Carlos Bay. Water flow is controlled by the USACOE, crossing over 3 control structures: the Moore Haven Lock (flow from Lake Okeechobee over S-77 into the C-43/Caloosahatchee River), the Ortona Lock (S-78), and the Franklin Lock (S-79). The distance along C-43 from Moore Haven to the Ortona Lock is approximately 15.5 miles, and the distance from the Ortona Lock to the Franklin Lock is approximately 27.9 miles. The Franklin Lock separates the freshwater portion of the Caloosahatchee Canal on the east from the 33.2-mile-long, saline tidal estuarine portion of the Caloosahatchee River on the west.

The locks at S-77 and S-78 were constructed in the 1930s, while the locks at S-79, along with other channel improvements, were completed in 1965 to improve navigation and flood control along the length of the canal. The USACOE constructed these structures and operates them with regular input from the SFWMD. The Final Adaptive Protocols for Lake Okeechobee Operations document (SFWMD 2010) describes the process for SFWMD staff and Governing Board recommendations to the USACOE concerning the 2008 Lake Okeechobee Regulation Schedule (LORS) and Water Control Plan (USACOE 2008) provisions while considering the

District's multiple statutory objectives and responsibilities outlined in Chapter 373, F.S. These adaptive protocols are intended to be used for the lake stage in the Low, Baseflow, and Beneficial Use sub-bands to provide guidance to water managers for discretionary releases for ecosystem benefits or to improve conditions related to C&SF Project purposes. The document provides operational guidance in support of District recommendations but is not intended to establish, dictate, or regulate water levels or operations. Full discretion of the USACOE to operate the C&SF Project is retained, as provided in the Water Control Plan.

Because of the Caloosahatchee River's alterations over history and highly managed condition, the freshwater inflows to the Estuary and the resultant salinity regime have been significantly altered from natural conditions. The ecology of the Estuary has been negatively affected by both the altered freshwater inflows as well as excessive nutrients, in particular, TN. Addressing the hydrologic issues of the system and the excessive nitrogen loads are critical for the overall health of the Estuary; however, this document focuses solely on addressing the TN loading to the Estuary from stakeholders in the basin below S-79. Additional controls for freshwater inputs and nitrogen loads above S-79 are needed but will be addressed outside of this BMAP.

The Caloosahatchee Estuary proper extends from the Franklin Lock (S-79) to Shell Point, adjacent to San Carlos Bay, with Pine Island Sound to the northwest and Estero Bay to the southeast. The Caloosahatchee River receives flow from Lake Okeechobee, several streams and canals between S-77 and S-78, 14 tributaries between S-78 and S-79, and 23 waterbodies that discharge directly to the estuary below S-79. Approximately half of the volume of water that reaches S-79 is water that has passed through S-77 from Lake Okeechobee.

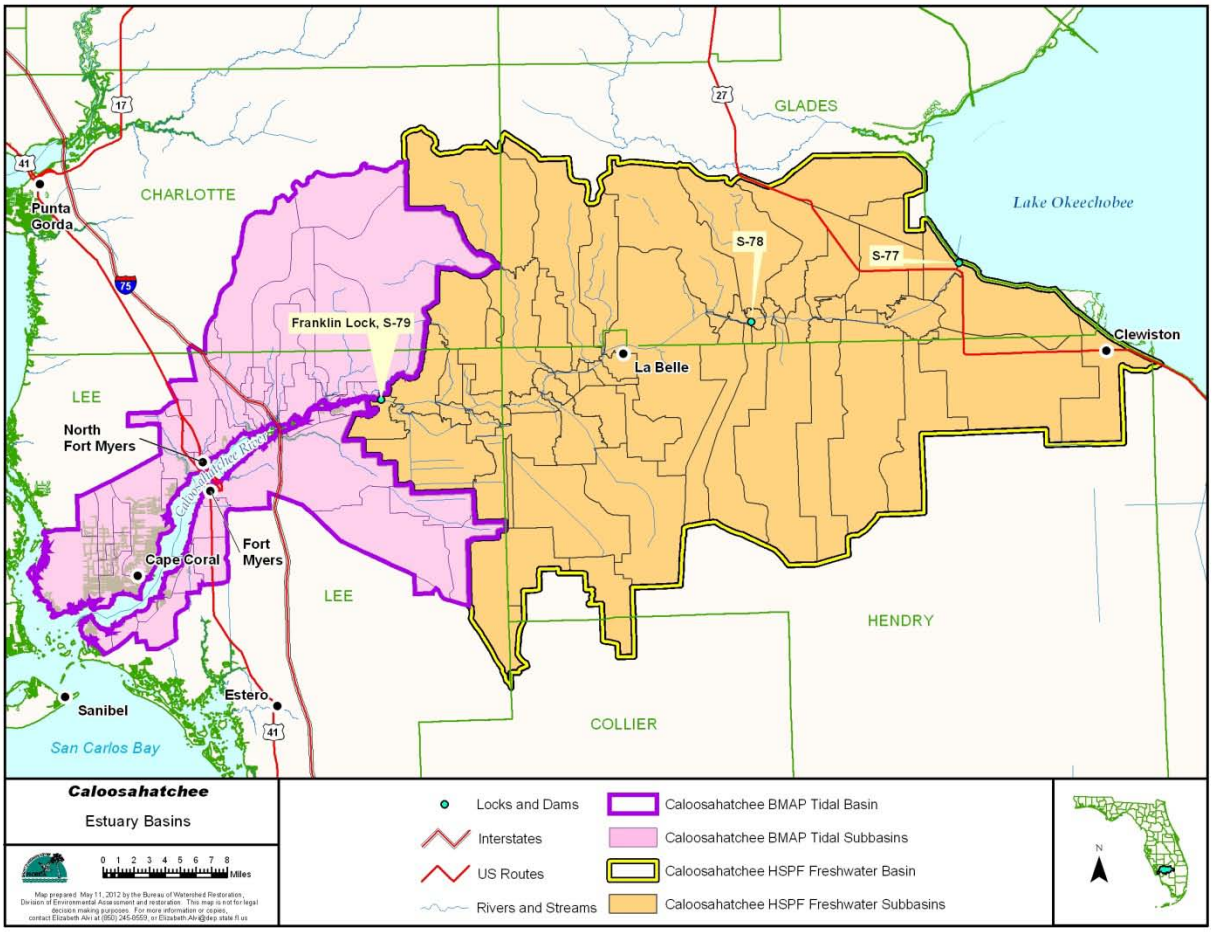

FIGURE 3: CALOOSAHATCHEE FRESHWATER AND ESTUARY BASINS

2.3 WATER QUALITY TRENDS

As part of the Caloosahatchee River Watershed Protection Plan Update (SFWMD 2012), the SFWMD evaluated long-term trends in flows, water quality, and submerged aquatic vegetation (SAV) on a calendar year basis from 1995–2010. Flows in the Caloosahatchee River Estuary are inversely related to salinity; however, direct relationships between flows and TP, TN, and chlorophyll-a (chl*a*) concentrations are not as evident because of the significant influence of biological processes on these constituents. For example, the effect of the drought, which started in 2006 and continued through 2008, was evident as flows decreased and salinity increased. In contrast, TP concentrations were generally higher in 2007–2009 with evidence of seasonality. TN concentrations over this time remained within a narrow range of approximately 0.6–1.5 milligrams per liter (mg/L) and did not exhibit larger fluctuations. Water column chl*a* exhibited greater magnitude and variability from 2006–2010 than the previous wetter period of 2004–2005. Chl*a* concentrations were approximately 70, 45, and 50 micrograms per liter (µg/L) among 3 stations during the dry seasons of 2008–2009. While these values were comparatively high, they are difficult to relate to a single factor such as inflow or salinity, as submarine light penetration, inorganic nutrient availability, transport, and grazing all interact to modulate phytoplankton biomass production (SFWMD 2012)

Much research has been carried out in the Caloosahatchee Basin and southwest Florida on the observed relationships between SAV and nutrients (McPherson and Miller 1987; Corbett and Hale 2006; Janicki Environmental 2003; Corbett 2006; Corbett *et al.* 2005). Many research activities focused on the developed relationships between chl*a*, color, and turbidity, and the percentage of photosynthetically active radiation (PAR) reaching the seagrass meadows. The critical area of seagrass was determined to be the "media deep edge," and this became the target depth for the receipt of minimum PAR percentage consistent with a healthy meadow. That was shown to be 25% PAR (Corbett and Hale 2006). The critical depth varied, depending on the bay, estuary, or riverbed in question. Chl*a* is a function of TN concentration. This allows for the connection between TN and percent PAR (FDEP 2009). It should be noted that PAR is also a function of color and turbidity.

Considering longer-term trends, shoot density data results from 2004–2010 reveal significant fluctuation in SAV throughout the Caloosahatchee River Estuary and San Carlos Bay. Shoot density is a measure of standing crop and showed fluctuations that appear to be related to freshwater discharges. High freshwater discharges, such as those occurring in 2005 (Hurricane Wilma) and 2009 (Tropical Storm Fay), caused a notable decline in shoal and turtle grass densities at the marine end of the system (Iona Cove and San Carlos Bay). By contrast, during the drought in 2007–2008, the density of marine seagrass increased while densities of tape grass in the upper estuary declined to zero (SFWMD 2012).

CHAPTER 3: POLLUTANT SOURCES AND ANTICIPATED OUTCOMES

3.1 SUMMARY OF SOURCES IN THE TMDL

The TMDL includes estimates of TN loading in the Caloosahatchee Estuary Basin from watershed stormwater sources, point source facilities, and main stem upstream inputs (Lake Okeechobee and Caloosahatchee River). The upstream inputs will be addressed by separate TMDLs (existing and future) for loads generated above Control Structure S-79. This TMDL focuses on load reductions from stormwater sources generated below S-79. As domestic wastewater loads were less than 1% of the TN loading to the Caloosahatchee Estuary Basin, they were considered *"de minimus"* loads and do not require a reduction. The existing loads and required reductions in the TMDL are shown in **Table 7**. Additional details about the sources that are included in this BMAP are provided in the subsections below.

TABLE 7: TN REQUIRED REDUCTIONS IN THE CALOOSAHATCHEE ESTUARY BASIN

[1] The Domestic WWTP loads have been updated from the original TMDL report.
[2] The stormwater runoff load is that load below S-79 and has been updated from the original TMDL report.
[3] Required reduction is based on the 23% reduction defined in the original TMDL report.

CALOOSAHATCHEE ESTUARY BASIN	DOMESTIC WWTP POINT SOURCES (LBS/YR)	STORMWATER RUNOFF LOAD (LBS/YR)	TOTAL LOAD (LBS/YR)
TN Existing Load	64,158[1]	1,690,084[2]	1,754,242
Required Reduction[3]	0	388,719	388,719

3.1.1 POINT SOURCE FACILITIES

Point sources include both domestic and industrial wastewater treatment facilities. Chapter 62-620, F.A.C., defines domestic wastewater facilities as those facilities that are principally designed "to collect and treat sanitary wastewater or sewage from dwellings or homes, business buildings, institutions, and the like." This rule defines industrial wastewater as "process and non-process wastewater from manufacturing, commercial, mining, and silvicultural facilities or activities, including the runoff and leachate from areas that receive pollutants associated with industrial or commercial storage, handling or processing, and all other wastewater not otherwise defined as domestic wastewater."

In 1995, the U.S. Environmental Protection Agency (EPA) authorized FDEP to implement the NPDES Program to permit wastewater discharges to state surface water, including industrial and domestic wastewater facilities. Permits are issued under the applicable provisions of Chapter 403, F.S., and appropriate rules in Chapter 62-600, F.A.C., with applicable sections of 40 Code of Federal Regulations (C.F.R.) incorporated by reference. These regulations, rules, and statutes give FDEP the authority to regulate domestic and industrial wastewater facilities. A list of these facilities is included in Chapter 4.

3.1.2 MUNICIPAL SEPARATE STORM SEWER SYSTEMS

Many of the municipalities in the basin are regulated by the Florida NPDES Stormwater Program because these municipalities discharge stormwater and qualify as a "municipal separate storm sewer system." MS4 means a conveyance or system of conveyances such as roads with stormwater systems, municipal streets, catch basins, curbs, gutters, ditches, constructed channels, or storm drains, that has the following characteristics:

- *Is owned or operated by a state, city, town, county, special district, association, or other public body (created by or pursuant to state law) having jurisdiction over management and discharge of stormwater and that discharges to surface waters of the state;*
- *Is designed or used for collecting or conveying stormwater;*
- *Is not a combined sewer; and*
- *Is not part of a Publicly Owned Treatment Works (POTW). POTW means any device or system used in the treatment of municipal sewage or industrial wastes of a liquid nature which is owned by a "state" or "municipality." This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.*

The basic requirements of this program serve as a foundation for the stormwater management efforts of these communities. The EPA developed the federal NPDES stormwater permitting program in two phases. Phase I, which began in 1990, addresses large and medium MS4s located in incorporated areas and counties with populations of 100,000 or more, as well as specific industrial activities. Phase II, which started in 1999, addresses small MS4s that are designated according to population and other criteria established in federal and state rules. Small MS4s include MS4s that serve a population of 1,000 or more and are located within an urbanized area.

In October 2000, the EPA authorized FDEP to implement the NPDES stormwater permitting program in the state. This permitting has remained separate from state Stormwater/ERP Programs and local stormwater/water quality programs, which have their own regulations and permitting requirements. Florida's rules for MS4s can be found in Chapters 62-4, 62-620, 62-621 and 62-624, F.A.C. Entities that are currently designated as MS4 permittees in the Caloosahatchee Estuary Basin are listed in **Table 8**.

TABLE 8: LOCAL GOVERNMENTS IN THE CALOOSAHATCHEE RIVER BASIN DESIGNATED AS MS4S

MS4 TYPE	PERMITTEE	PERMIT NUMBER
Phase I	Lee County	FLS000035
Phase I	City of Fort Myers	FLS000035
Phase I	City of Cape Coral	FLS000035
Phase I	ECWCD	FLS000035
Phase I	Lucaya CDD	FLS000035
Phase I	FDOT District 1	FLS000035
Phase II	Charlotte County	FLR04E043
Phase II	FDOT District 1	FLR04E048

3.1.2.1 Phase I MS4 Stormwater Permit Requirements

Lee County and its co-permittees currently hold a Phase I MS4 permit. Phase I MS4 permittees were subject to a two-part permit application process requiring the development of a proposed stormwater management program (SWMP) that would meet the standard of reducing (discharged) pollutants to the Maximum Extent Practicable (MEP), and incorporation of the

SWMP into an individual permit issued to the MS4 operator. The SWMPs for Phase I MS4s include, but are not limited to, the following measures:

- *Identify major outfalls and pollutant loadings;*
- *Detect and eliminate non-stormwater 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; and*
- *Implement a monitoring program.*

To avoid the need for re-opening MS4 permits each time a TMDL or BMAP is adopted, the following language is included in the Phase I MS4 permits that automatically requires the implementation of any stormwater requirements in an adopted BMAP. This "TMDL clause" states: "*In accordance with Section 403.067, F.S., NPDES permits must be consistent with the requirements of adopted TMDLs. Therefore, when a Basin Management Action Plan (BMAP) and/or an implementation plan for a TMDL for a water body into which the permitted MS4 discharges the pollutant of concern is adopted pursuant to Section 403.067(7), F.S., the MS4 operator must comply with the adopted provisions of the BMAP and/or implementation plan that specify activities to be undertaken by the permittee during the permit cycle."* Also, according to Section 403.067(7)(a)4, the BMAP is adopted by Secretarial Order pursuant to Chapter 120.

3.1.2.2 Phase II MS4 Stormwater Permit Requirements

Charlotte County and FDOT District 1 both have Phase II MS4 permits. Under a generic permit, operators of regulated Phase II MS4s must develop a SWMP that includes BMPs, with measurable goals, to effectively implement the following six minimum control measures:

- ***Public Education and Outreach****: Perform educational outreach regarding the harmful impacts of polluted stormwater runoff.*
- ***Public Participation/Involvement****: Comply with state and local public notice requirements and encourage other avenues for citizen involvement.*
- ***Illicit Discharge Detection and Elimination****: Implement a plan to detect and eliminate any non-stormwater discharges to the MS4, and create a system map showing outfall locations. Section 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 pursuant to a 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, improper disposal of auto and household toxics, and spills from roadway accidents.*
- ***Construction Site Runoff Control****: Implement and enforce an erosion and sediment control program for construction activities.*
- ***Post-construction Runoff Control****: Implement and enforce a program to address discharges of post-construction stormwater runoff from new development and redevelopment areas. (Note: This minimum control is generally met through state stormwater permitting requirements under Part IV, Chapter 373, F.S., as a qualifying alternative program.)*

- ***Pollution Prevention/Good Housekeeping****: Implement a program to reduce pollutant runoff from municipal operations and property and perform staff pollution prevention training.*

The Phase II generic permit (Section 62-621.300[7][a], F.A.C.) also has a self-implementing clause that compels a permittee to implement its stormwater pollutant load responsibilities within an adopted BMAP. It states: *"If a TMDL is approved for any water body into which the Phase II MS4 discharges, and the TMDL includes requirements for control of stormwater discharges, the operator must review its stormwater management program for consistency with the TMDL allocation. If the Phase II MS4 is not meeting its TMDL allocation, the operator must modify its stormwater management program to comply with the provisions of the TMDL Implementation Plan applicable to the operator in accordance with the schedule in the Implementation Plan."*

3.1.3 AGRICULTURE

The primary agricultural land use in the Caloosahatchee Estuary Basin is cow/calf operations (pasture). Other agricultural land uses include nurseries, row/field crops, citrus, and horse farms. The majority of the horse farms are characterized as small, non-commercial hobby farms. The 2004 land use data also include dairies, but field staff and county UF-IFAS Extension staff in the area have not observed any that are still in production. FDACS Division of Animal Industry confirmed there are no active dairies in the basin.

Due to urban encroachment, citrus health issues (freeze/disease), and the downturn in the economy, many citrus and nursery operations either have been abandoned or have significantly lowered their production acreage. In recent years, some of this acreage may have been shifted to other commodities or to non-agricultural/urban uses.

3.2 ANTICIPATED OUTCOMES OF BMAP IMPLEMENTATION

With implementation of the projects outlined in this BMAP, reductions in the nutrient loads to the Caloosahatchee Estuary Basin are expected to decrease the contribution of TN to the Estuary contributed by stakeholders below S-79. As noted previously, additional controls for freshwater flows and upstream TN contributions are needed before the full TMDL is achieved. The following outcomes are expected from BMAP implementation:

- *Modest improvement in water quality trends in the watershed tributaries and the Caloosahatchee Estuary;*
- *Decreased loading of the target pollutant (TN);*
- *Increased coordination between state and local governments and within divisions of local governments in problem solving for surface water quality restoration;*
- *Determination of effective projects through the stakeholder decision-making and priority-setting processes;*
- *Enhanced public awareness of pollutant sources, pollutant impacts on water quality, and corresponding corrective actions; and*
- *Enhanced understanding of basin hydrology, water quality, and pollutant sources.*

CHAPTER 4: DETAILED ALLOCATIONS

4.1 DETERMINING DETAILED ALLOCATIONS

During the initial stages of the BMAP, FDEP worked with the stakeholders to disaggregate the total TN load by entity. The acreage and loading information for each stakeholder were calculated using output from the HSPF model. Geographic Information Systems (GIS) were then used to help determine allocations. The steps to calculate the detailed allocations are outlined below.

The TMDL did not include detailed allocations for the WWTFs in the basin; therefore, the BMAP only assigned detailed allocations for the stormwater sources within the Tidal Caloosahatchee Basin. Scenarios that were simulated during TMDL development (Existing Conditions, TMDL and Background Conditions) were used to determine allocations. The background condition scenario was a simulation of the loading to the estuary after all developed land uses were changed back to natural conditions (wetland and upland forests) combined with a flow from Lake Okeechobee at the target nutrient levels established by the Lake Okeechobee phosphorus TMDL (FDEP 2001). The TMDL run simulated the condition in the estuary where light attenuation in the target area (San Carlos Bay) is at a level consistent with maintaining a healthy seagrass growth at 2.2 meters. A comparison of the Existing Conditions to the TMDL and Background Conditions as well as previous research in the estuary demonstrated a required 23% TN load reduction. This meant reducing the present 1,690,084 lbs/yr by 388,719 lbs/yr. The load reduction was allocated based on a stakeholder's percent of the developed load.

Individual entity shapefiles were created by clipping each jurisdiction from the GIS base map as follows:

- *Areas with agricultural land uses;*
- *FDOT roads and rights-of-way;*
- *Municipalities each to its own jurisdictional boundary; and*
- *Remaining area assigned to each county using their jurisdictional boundaries.*

This load, called nonpoint source (NPS) background load, was theoretically the load below which it was unreasonable for a stakeholder to reduce. For example, if stakeholder A represented 20% of the developed load, then the stakeholder would be allocated 20% of the load reduction (0.20 x 388,719), or 77,744 lbs/yr. Using this method, stakeholders with minimal developed lands would not be required to reduce loading to less than natural conditions.

4.1.1 BACKGROUND LOADS

The first step in determining the stormwater loads was to calculate the NPS background load using the information from the TMDL simulation. The NPS background load was defined in the TMDL as the load resulting from the watershed if all loads were converted to non-urban land uses. Existing land uses in the TMDL simulation were modified to replace all urban and agricultural land uses with wetland or upland forest. These changes provide a basis for estimation of nonpoint source loads from natural land uses and evaluation of the impact of manmade changes in the watershed. A GIS-based pre-development land use coverage available from the SFWMD was used to estimate the distribution of wetland and upland forest in the watershed under pre-development conditions. Acreages of wetland and/or upland forest

areas in the watershed were then used to replace the land use data in the TMDL simulation in order to create the background simulation. The TN background loads by entity are shown in **Table 9**.

TABLE 9: BACKGROUND LOADS BY ENTITY

ENTITY	TOTAL AREA (ACRES)	AVERAGE ANNUAL TN EXISTING LOAD (LBS/YR)	NONPOINT SOURCE BACKGROUND LOADING (LBS/YR)	% OF TOTAL AREA TN LOADING
City of Cape Coral	36,678	328,225	185,333	56.5%
City of Fort Myers	11,802	158,547	102,000	64.3%
ECWCD	32,982	158,808	106,667	67.2%
Lucaya CCD	134	803	620	77.2%
Unincorporated Lee County	64,375	500,623	306,000	61.1%
Charlotte County	72,285	232,990	231,687	99.4%
FDOT	2,256	23,934	11,333	47.4%
Agriculture	39,215	286,154	209,333	73.2%
Total	**259,727**	**1,690,084**	**1,152,974**	**68.2%**

4.1.2 NON- BACKGROUND LOADS

The second step was to determine the NPS non-background load, which is the difference between the existing load and the NPS background load. It is essentially the anthropogenic NPS load that was used to allocate load reductions. To assign allocations, the percent of the total NPS non-background load was determined for each entity as shown in **Table 10**.

TABLE 10: NON-BACKGROUND LOADS BY ENTITY

ENTITY	NON-BACKGROUND LOAD (LBS/YR)	% OF TOTAL NON-BACKGROUND LOAD
City of Cape Coral	142,892	26.6%
City of Fort Myers	56,547	10.5%
ECWCD	52,141	9.7%
Lucaya CCD	183	0.0%
Unincorporated Lee County	194,623	36.2%
Charlotte County	1,303	0.2%
FDOT	12,601	2.3%
Agriculture	76,821	14.3%
Total	**537,110**	**100.0%**

4.1.3 ALLOWABLE LOADS

Table 11 shows the load reductions that were allocated to each stakeholder based on the percent of the current developed loads.

TABLE 11: INITIAL ALLOWABLE LOAD DETERMINATION

ENTITY	ALLOWABLE LOAD BY % NON-BACKGROUND (LBS/YR)	BACKGROUND + ALLOWABLE NON-BACKGROUND LOAD (LBS/YR)	LOAD REDUCTION (LBS/YR)
City of Cape Coral	39,478	224,811	103,414
City of Fort Myers	15,623	117,623	40,924
ECWCD	14,405	121,072	37,736
Lucaya CCD	51	671	132
Unincorporated Lee County	53,770	359,770	140,853
Charlotte County	360	232,047	943
FDOT	3,481	14,815	9,119
Agriculture	21,224	230,557	55,597
Total	**148,391**	**1,301,365**	**388,719**

The nonpoint source allocations to each entity using this approach are outlined in the sections below by source. It should be recognized that the results of this process are based on the original TMDL modeling. This is expected to be refined as part of the updated modeling to be performed in the near future. These values do not, therefore, represent final allocations; rather an initial application of the allocation process.

4.2 ALLOCATIONS BY SOURCE

4.2.1 POINT SOURCE FACILITIES

The allocations for the NPDES facilities were included in the Caloosahatchee Estuary Basin TMDL. The TMDL assigned each of the six facilities in the basin its current permitted load because the facilities all carry out advanced wastewater treatment (AWT) for nitrogen and provide more stringent phosphorus removal. The facilities identified in the TMDL are listed in **Table 12**

TABLE 12: DOMESTIC WWTFS IN THE CALOOSAHATCHEE ESTUARY BASIN

[1] Both the Everest Wastewater Treatment Facility (WWTF) and Southwest WWTF operate under the City of Cape Coral permit.

FACILITY NAME	PERMIT NUMBER	AVERAGE TN LOAD TO THE CALOOSAHATCHEE RIVER (LBS/YR)	AVERAGE TN LOAD TO REUSE (LBS/YR)
Fort Myers Central	FL0021261	49,598	7,651
Fort Myers South	FL0021270	74,713	0
City of Cape Coral[1]	FL0030007	5,550	7,860
Waterway Estates	FL0030325	1,408	118
Fiesta Village	FL0039829	15,807	8,492

The information for the domestic wastewater treatment facilities was updated in 2011. **Table 13** shows the updated loading for each of the facilities. It should be noted that a significant portion of the domestic wastewater loading is not discharged to the Caloosahatchee Estuary. Values were calculated from monthly flow and TN concentrations reported from the Wastewater Facility Regulation (WAFR) and Permit Compliance System (PCS) datasets and checked against the submitted discharge monitoring reports (DMRs).

TABLE 13: NPDES DOMESTIC WASTEWATER TREATMENT PLANTS IN THE CALOOSAHATCHEE ESTUARY BASIN (UPDATED 2011)

[1] The City of Cape Coral facility did not discharge to the Caloosahatchee in 2011. TN for this facility was not reported—3 mg/L was assumed as the effluent concentration.

FACILITY NAME	PERMIT #	DISCHARGED TO CALOOSAHATCHEE ESTUARY (LBS/YR)	AVERAGE TN LOAD TO REUSE (LBS/YR)	AVERAGE TN LOAD TO INJECTION WELL (LBS/YR)
Fort Myers Central	FL0021261	11,890	10,886	0
Fort Myers South	FL0021270	48,727	0	0
City of Cape Coral[1]	FL0030007	0	63,762	1,353
Waterway Estates	FL0030325	512	2,583	0
Fiesta Village	FL0039829	3,029	4,550	0

4.2.2 MS4s

As noted previously, the TMDL modeling and final load reductions required were subject to significant debate during the BMAP process. As a result, FDEP decided to revisit the TMDL modeling and allocation process during the first few years of the BMAP as long as the stakeholders made progress toward TN load reductions. As shown in Chapter 5 such reductions were offered. It should be noted that the committed projects identified in Chapter 5 are estimated to achieve a load reduction of approximately 148,000 lbs/yr, which represents almost 40% of the total load reduction required in the original TMDL (see **Table 15**).

4.2.3 AGRICULTURE

Table 14 gives a breakdown of agricultural land uses in the Caloosahatchee Estuary Basin, according to 2004 SFWMD land use data. **Figure 4** shows the approximate location of these agricultural lands in the basin.

Land use data are helpful as a starting point for estimating agricultural acreage and developing BMP implementation strategies; however, their inherent limitations must be noted. To begin with, the time of year during which land use data are collected (through aerial photography) affects the accuracy of photo interpretation. This potential issue can result in the inappropriate analysis of the data and can hamper decision making. Another limitation is that the specific agricultural activity being conducted is not always apparent. For example, some acreage in the improved pasture classification may be used for cattle grazing, some may consist of forage grass that is periodically harvested and sold for hay, and/or some may comprise a fallow vegetable field awaiting planting. Operations that may fall into this land use category fertilize at different rates (e.g., hay operations and some other commodities typically fertilize at or less than rates recommended by UF-IFAS); therefore, it would be meaningful for the purposes of evaluating potential nutrient impacts to know specific land uses.

Because of error in the collection and characterization of land use data and changes in land use with time, the land use acreages are subject to adjustment, as discussed in Chapter 5.

TABLE 14: AGRICULTURAL LAND USES IN THE CALOOSAHATCHEE ESTUARY BASIN (2004 SFWMD LAND USE DATA)

- = Empty cell/no data

LAND USE/LAND COVER CODE	CODE DESCRIPTION	TOTAL ACRES
2100	Cropland and Pastureland	224.7
2120	Unimproved Pasture	4,861.1
2130	Woodland Pasture	3,849.5
2110	Improved Pasture	20,954.8
2140	Row Crop	1,559.9
2150	Field Crops	4,521.9
2210	Citrus	817.7
2220	Fruit Orchards	11.6
2230	Other Groves	142.5
2430	Tree Nurseries	230.3
2431	Ornamentals	285.1
2500	Specialty Farms	67.2
2510	Horse Farm	24.3
2520	Dairies	37.9
2600	Other Open Lands - Rural	160.6
2610	Fallow Cropland	1,499.3
-	**Total:**	**39,347.4**

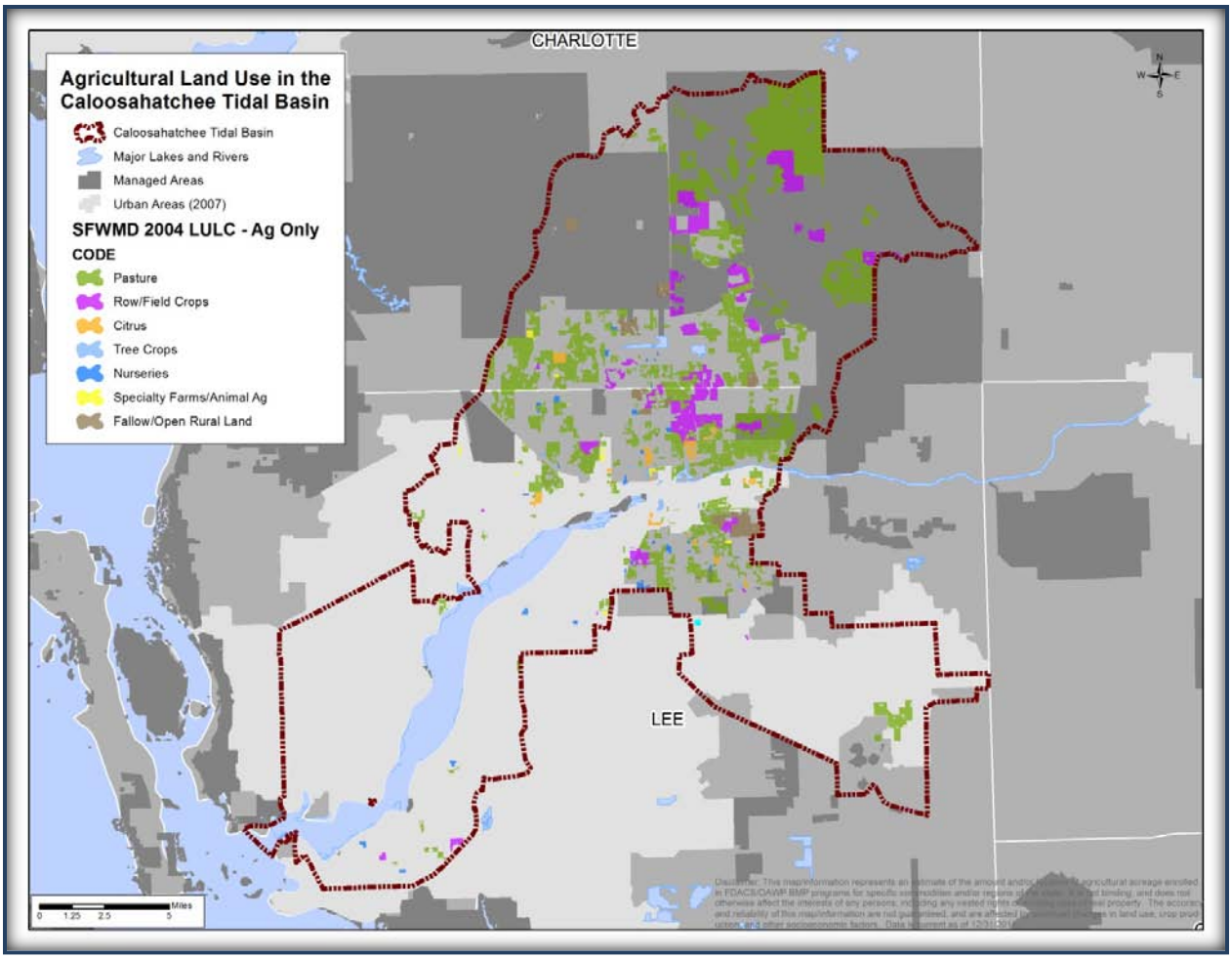

FIGURE 4: AGRICULTURAL LANDS IN THE CALOOSAHATCHEE TIDAL BASIN

CHAPTER 5: MANAGEMENT ACTIONS

5.1 MANAGEMENT ACTIONS TYPE AND ELIGIBILITY

"Management actions" refers to the suite of activities that the entities that are assigned reductions to achieve long-term TN goals in the Caloosahatchee Estuary. These include structural and nonstructural activities.

Management actions had to meet several criteria to be considered eligible for credit for the BMAP. All projects, programs and activities were required to address nutrient (TN) loads to receive credit. Projects completed after January 1, 2000, were eligible for BMAP credit. Management actions were only given credit for the portion of the load reduction that was over and above any permit requirements. This criterion was needed since permit conditions are established to maintain the current condition (prevent further impacts from new development) and do not contribute to the improvement of water quality in the Caloosahatchee Estuary.

Based on these eligibility requirements, the entities submitted structural and nonstructural projects to reduce the nonpoint stormwater loading. These projects were submitted to provide reasonable assurance to FDEP that each entity has a plan on how they will meet their allocation. The projects submitted by the MS4s, non-MS4s, and agriculture are outlined in the sections below.

5.2 CREDIT PROCESS

A credit is defined as the benefit received from a BMP that results in an overall net reduction in loading to the watershed compared to the baseline condition. During the stakeholder process, it was defined what types of projects would be eligible for credit compared to those that would be ineligible. Eligible projects include traditional structural BMPs (e.g., wet detention, retention), fertilizer ordinances, education, constructed wetlands, and street sweeping. Examples of ineligible projects include those outside the watershed, flood control projects that provide no water quality benefit, maintenance projects, litter removal, pipe replacements, and conservation land purchases with no change in land use. Credits were calculated by determining the existing load for the BMP treatment area and then applying the removal efficiency assigned to the BMP in order to calculate the load reduction. FDEP provided a list of pre-approved removal efficiencies for various BMPs. In the case where a BMP was not included on the list, the stakeholders were able to provide removal efficiencies.

Several of the MS4s also operate and maintain extensive drainage networks that are controlled by weirs. The detention provided by these weir structures was not accounted for in the original TMDL model. Therefore some credit was applied to these systems. In addition, there were also weir replacement projects where the surface water control elevation was increased, thus increasing attenuation upstream. These types of projects also received some credit under the management activities.

5.3 CONSERVATION LAND PURCHASE CREDIT

One of the activities proposed by the stakeholders is the purchase of lands for conservation—that is, the transfer of land from one stakeholder to another for a cost, thus eliminating the previous, potentially deleterious land use. The issue is the amount of nutrient reduction credit to be offered for this activity, if any.

In order to allow a nutrient reduction credit for the purchase of conservation lands, there must be a net reduction of nitrogen loading to the estuary. The purchase of property, with no change in land use, simply transfers the load from one stakeholder to the purchasing stakeholder. There is no credit if the land use remains the same. For this reason, in order for a credit to be achieved, the historical use of the land prior to purchase must be urban or agricultural and the use of the land after purchase is to be natural (i.e., not urban or agricultural). The credit allowed, then, is the difference in the urban or agricultural land use loading and the background load. The background load is the loading for the type of land use at the time of purchase.

As an example, suppose 1,000 acres of agricultural land is purchased by a stakeholder. Agricultural land has an average loading factor of 7.30 pounds per acre per year (lbs/ac/yr) (based on HSPF modeling results) and a background loading factor of 5.34 lbs/ac/yr. Thus, if the land is converted to background after purchase, then the load difference is 1,000 acres times (7.30 – 5.34 lbs/ac/yr) or 1,960 lbs/yr. This means that the load reduction is 1,960 lbs/yr—this is assigned as a credit to the purchasing stakeholder.

Therefore, for each conservation land purchase, the urban and agricultural land uses were identified and the background loading factor was multiplied to get the new loading. The difference between the original land use loading and the new conservation land loading was assigned as a credit to the purchaser.

5.4 MS4 Projects

All NPDES permits, including MS4 permits, must be consistent with the requirements of adopted TMDLs. Section 403.067 (7)(b), F.S., prescribes the criteria for TMDL implementation. In accordance with this section, implementation of a TMDL or BMAP for holders of NPDES MS4 permits shall be achieved to the MEP, through the use of BMPs or other management measures. These management measures include, but are not limited to, the following:

- *Non-regulatory and incentive based programs including BMPs, cost sharing, waste minimization, pollution prevention, public education;*
- *Non-structural BMPs;*
- *Water quality management and restoration activities;*
- *Public works including capital facilities;*
- *Land acquisition;*
- *Local ordinances; and*
- *Regulatory incentive programs.*

To comply with the MEP standard, the SWMP must be designed and implemented to reduce the discharge of pollutants to surface waters of the state. Implementation of BMPs consistent with the provisions of the SWMP required pursuant to an MS4 permit constitutes compliance with the standard of reducing pollutants to the MEP for discharges to unimpaired waters. However, MS4s must also continue to assess and adjust their list of approved projects (**Appendix E**) to achieve the greatest reduction of pollutants practicable to protect receiving waters in accordance with an adopted TMDL or BMAP. A summary of the load reductions by stakeholder based on approved projects is shown in **Table 15**.

Entities that fail to implement their list of approved projects in order to reduce pollutants to the MEP standard will be subject to enforcement action in accordance with Sections 403.061,

403.121, and 403.161, F.S., and Rule 62-650.300(4), F.A.C. In addition, both MS4 Phase I and Phase II permits include provisions for revising the effluent limitations, monitoring requirements, and stormwater management programs to meet applicable TMDL allocations that are consistent with the assumptions and requirements of the adopted BMAP.

The projects and time frames for implementation submitted by the entities to achieve their first five-year BMAP reductions are summarized in and detailed in **Appendix E**. These projects were submitted to provide reasonable assurance to FDEP that the MS4 permittee has a plan on how they will meet their allocation. However, this list of projects is meant to be flexible enough to allow for changes that may occur over time, provided that the reduction is still met within the specified timeframe. New projects may be substituted for those identified in **Appendix E** during the annual BMAP progress report process.

TABLE 15: SUMMARY OF MS4 LOAD REDUCTIONS BY PROJECT TYPE

N/A = Not applicable

ENTITY	STRUCTURAL STORMWATER	PUBLIC EDUCATION/ORDINANCES	STREET SWEEPING	CONSERVATION LAND PURCHASE	HYDROLOGIC RESTORATION	TOTAL (LBS/YR)
City of Cape Coral	32,056	15,429	N/A	N/A	N/A	47,484
City of Fort Myers	15,575	2,101	2,582	N/A	N/A	20,258
ECWCD	5,358	1,646	N/A	N/A	N/A	23,169
Lucaya CCD	N/A	N/A	N/A	N/A	N/A	0
Unincorporated Lee County	8,041	20,445	196	106	16,921	45,708
Charlotte County	N/A	69	N/A	N/A	N/A	69
FDOT	8,740	2,173	471	N/A	N/A	11,384
Total	**69,770**	**41,863**	**3,249**	**106**	**16,921**	**148,072**

5.5 ADDRESSING AGRICULTURAL NONPOINT POLLUTION

Section 403.067(7)(b), F.S., requires that nonpoint pollutant sources (such as agriculture) included in a BMAP demonstrate compliance with pollutant reductions needed to meet a TMDL, either by implementing appropriate BMPs (adopted by FDACS or FDEP, as applicable), or conducting water quality monitoring prescribed by FDEP or the applicable water management district. If entities controlling these pollutant sources do not either implement BMPs or conduct monitoring, the entities may be subject to enforcement by FDEP or the applicable water management district.

Pursuant to Section 403.067(7)(c), F.S., the implementation of FDACS-adopted, FDEP-verified BMPs in accordance with FDACS rule provides a presumption of compliance with state water quality standards. In addition, growers who implement BMPs may be eligible for cost share from the water management district, FDACS, or others. Through the Office of Agricultural Water Policy (OAWP), Florida Forest Service, and Division of Aquaculture, FDACS develops, adopts, and assists producers in implementing agricultural BMPs to improve water quality and water conservation.

5.5.1 Agricultural BMPs

BMPs are individual or combined practices determined through research, field testing, and expert review to be the most effective and practicable means for improving water quality, taking into account economic and technological considerations. Two categories of FDACS-adopted BMPs are nutrient management and irrigation management. Nutrient management is the amount, timing, placement, and type of fertilizer. Irrigation management is the maintenance, scheduling, and overall efficiency rating of irrigation systems. In several areas of the state, FDACS-funded Mobile Irrigation Labs identify and demonstrate irrigation efficiency techniques to growers.

Table 16 identifies the key nutrient and irrigation management BMPs that would most likely be applicable to agricultural operations in the basin. By definition, BMPs are technically and economically feasible. However, FDACS BMP manuals contain some BMPs that may only be affordable with financial assistance. The BMP checklists allow producers to indicate whether a BMP is not economically feasible, on a case-by-case basis. As BMP cost-share becomes available to the basin, FDACS will work with producers to implement applicable key BMPs that otherwise are not affordable.

OAWP BMPs and staff contact information are located at http://www.floridaagwaterpolicy.com. Printed BMP manuals can be obtained in the local extension office at county agricultural extension centers, or by contacting OAWP field staff.

5.5.2 FDACS OAWP Role in BMP Implementation and Follow-Up

The OAWP assists agricultural producers enrolled in its programs in implementing BMPs. The OAWP employs field staff and has contracts with service providers to work with producers to submit Notices of Intent (NOIs) to implement the BMPs appropriate for their operations. Depending on the region of the state, these providers include the soil and water conservation districts, UF-IFAS, and natural resource development and conservation councils. They also give technical assistance to producers and, as funding allows, help implement cost-share programs that leverage regional, state, and federal funds.

The OAWP will recruit producers within the Caloosahatchee Estuary Basin to enroll in adopted BMP programs applicable to their operations. OAWP staff and contractors will identify existing growers, to the greatest extent possible, with the help of grower associations, information on county agricultural exemptions, field staff knowledge, and other means. Staff/contractors will assist producers in selecting the appropriate BMPs, with emphasis on nutrient management, irrigation management, sediment/erosion control, stormwater management, and record keeping.

TABLE 16: KEY NUTRIENT-RELATED BMPS ADOPTED BY FDACS OAWP

KEY NUTRIENT-RELATED BMPS
DETERMINING NUTRIENT NEEDS
Soil and Tissue Testing: Used to base fertilizer applications on plant needs and available nutrients in the soil; helps prevent over-application of fertilizer.
Nutrient Budgeting: Adjustment of fertilizer regime to account for other nutrient sources, such as bio-solids, legumes, manure, and nutrient-laden irrigation water; helps prevent over-application of fertilizer.
MANAGING NUTRIENT APPLICATION
Precision Application of Nutrients: Use of specialized equipment for precise placement of nutrients on targeted areas at specified rates; reduces total amount used and prevents stray applications.
Equipment Calibration/Maintenance: Ensures proper functioning of equipment; prevents misapplication or over-application of fertilizer materials.
Split Fertilizer Applications: Multiple applications timed with optimal growth stages; allows plants to assimilate nutrients more efficiently; reduces nutrient loss in leaching and runoff.
Fertigation: Application of fertilizer through irrigation water; allows for direct nutrient application to the crop root zone and more efficient assimilation by plants, reducing nutrient loss in leaching and runoff.
Controlled-Release Fertilizer: Use of fertilizer formulations that have a controlled nutrient release curve; reduces nutrient loss to leaching and runoff.
Fertilizer Application Setbacks from Waterbodies (wetlands, watercourses, sinks, springs, etc.): Establishes a zone where no fertilizer will be applied; reduces nutrient loadings to waterbodies.
MANAGING IRRIGATION
Irrigation Scheduling: Planning when to irrigate to reduce water and nutrient losses, based on available soil moisture content, evapotranspiration levels, recent rainfall, and time of day.
Monitoring Soil Moisture and Water Table: Use of devices that measure the water table level and the amount of water in the soil; is a key component of proper irrigation scheduling.
Tailwater Recovery: Use of down-gradient catchment ponds to trap irrigation tailwater to be reused on cropland; reduces offsite transport of nutrients and conserves water.
TREATMENT AND EROSION CONTROL
Filter Strips: Vegetated strips of land designed to reduce nutrients and sediments in surface water runoff from fields, pastures, and livestock high-intensity areas before it reaches downstream waterbodies.
Vegetative Buffers: Establishment of riparian and/or wetland buffers to attenuate and assimilate nutrient- or sediment-laden surface flows coming from cropped/grazed areas.
Ditch Maintenance and Retrofits: Use of rip rap, sediment traps, staging structures, and permanent vegetative bank cover to minimize erosion and transport of nutrient-laden sediments.
LIVESTOCK MANAGEMENT (APPLICABLE TO COW/CALF AND EQUINE OPERATIONS)
Alternative Water Sources: Use of upland livestock watering ponds and/or water troughs; minimizes manure deposition in waterbodies.
Rotational Grazing: Movement of cattle to different grazing areas on a planned basis; prevents concentrated waste accumulations and denuding of pasture areas. May involve fencing.
High-Intensity Areas Location: Siting of cowpens, supplemental feed areas, etc., away from waterbodies to minimize nutrient loadings.
OPERATIONS MANAGEMENT
Fertilizer Storage: Proper location/**s**torage of bulk fertilizer products to prevent nutrient loadings.
Fertilizer Mix/Load: Use of appropriate dedicated or temporary mix/load areas located away from waterbodies to prevent nutrient loading.
Employee Training: Training provided to farm workers on how to implement BMPs.
Record Keeping: Proper record keeping provides accountability in the implementation of BMPs, and assists the producer in making nutrient and irrigation management decisions.

In addition to enrolling targeted operations in the relevant BMP programs, the OAWP will do the following:

- *Document the submitted NOIs, which will include a list of the BMPs to be implemented.*
- *Document the amount of total agricultural acreage covered by the NOIs.*
- *Assist growers in understanding and implementing BMPs properly.*
- *On a rotating basis by program, mail written surveys to all operations in the Caloosahatchee Estuary Basin under an active FDACS NOI, to evaluate BMP implementation and update information on ownership, land use, acreage, etc.*
- *Through regional field staff and contractors, follow up on identified areas/operations of particular concern.*
- *Participate in annual BMAP reporting on enrollment efforts and estimated load reductions, new manuals adopted, and any new efforts planned.*

The FWRA requires that, where water quality problems are demonstrated despite the proper implementation of adopted agricultural BMPs, FDACS must re-evaluate the practices, in consultation with FDEP, and modify them if necessary. Continuing water quality problems will be detected through the BMAP monitoring component and other FDEP and SFWMD activities. If a re-evaluation of the BMPs is needed, FDACS will also include SFWMD and other partners in the process.

The FWRA states that nonpoint source dischargers who fail either to implement the appropriate BMPs or conduct water quality monitoring prescribed by FDEP or a water management district may be subject to enforcement action by either of those agencies.

5.5.3 BMP Enrollment Goals and Load Reduction Estimates

Table 17 summarizes the land use data figures for agriculture in the BMAP area, the acres addressed by BMP manuals, the acres enrolled in BMP programs, and the goal for enrolling additional acres in the basin. The acreage used to calculate the starting point agricultural nutrient load is based on 2004 land use information from the SFWMD. Based on aerial imagery and local staff observation, FDACS adjusted these figures to reflect the current agricultural land use acreage more accurately. The FDACS-adjusted acreage shows approximately 6% less total acreage than indicated in the 2004 figures, due primarily to urban conversion and citrus freeze/disease issues. In addition, some of the acreage is no longer in production and would not be necessary to enroll in BMPs. The FDACS enrollment goal is 50% of the adjusted agricultural acres in the first 5 years.

It is important to understand that, even if all targeted agricultural operations are enrolled, not all of the acreage listed as agriculture in **Table 17** will be included in enrollment figures. The NOIs will document the estimated total number of acres on which applicable BMPs are implemented, not the entire parcel acreage. This is because land use data can contain nonproduction acres (such as buildings, parking lots, and fallow acres) that will not be counted on the NOIs submitted to FDACS. There also may be significant amounts of acreage that do not need to be enrolled, such as lands that are not actively involved in commercial agriculture (operations conducted as a business). These areas are often low-density residential uses on large parcels of grassed

TABLE 17: AGRICULTURAL ACREAGE, BMP ENROLLMENT AND FUTURE ENROLLMENT GOALS – CALOOSAHATCHEE ESTUARY BASIN

[1] FDACS staff-adjusted acreage for purposes of enrollment is based on a review of more recent aerial imagery in the basin and local staff observations.
[2] FDACS staff has observed no active dairy operations in the BMAP area, and this was confirmed by FDACS Division of Animal Industry.
[3] Please see the discussion on BMP Enrollment Goals.
- = Empty cell/no data
N/A = Not applicable

2004 SFWMD LAND USE	2004 ACRES	FDACS-ADJUSTED ACRES FOR ENROLLMENT[1]	RELATED FDACS BMP PROGRAMS	ACREAGE ENROLLED[1]	RELATED NOIS/ CERTIFICATION
Pasture (2100, 2110, 2120, 2130)	29,890.2	28,981.2	Cow/Calf Future (hay)	0.0	0
Row/Field/Mixed Crops	6,081.9	6,041.3	Vegetable/Agronomic Crops	128.0	1
Fallow Cropland	1,499.3	N/A	N/A	N/A	N/A
Horse Farm	24.3	24.3	Future Equine	N/A	N/A
Citrus	817.7	359.1	Ridge Citrus Flatwoods Citrus	0.0	0
Abandoned Groves	0.0	N/A	No enrollment needed	N/A	N/A
Fruit Orchards/Other Groves	154.1	154.1	Specialty Fruit & Nut	0.0	0
Tree Nurseries	230.3	230.3	Future Nursery Specialty Fruit & Nut	0.0	0
Ornamentals	285.1	285.1	Container Nursery	276.5	23
Specialty Farms	67.2	105.0	Conservation Plan Rule	0.0	0
Dairies[2]	37.9				
Aquaculture	*97.3*	*50.9*	*(FDACS Aquaculture Division)*	*50.9*	*Certification, 2*
TOTALS	39,347.4	36,108.4	-	455.4	26
FIVE-YEAR ENROLLMENT GOAL (50%)	-	18,054.2	-	-	-
ACREAGE ENROLLED (AS OF DECEMBER 31, 2011)[1]	-	455.4	-	-	-
REMAINING ACRES TO ENROLL[3]	-	17,598.8	-	-	-

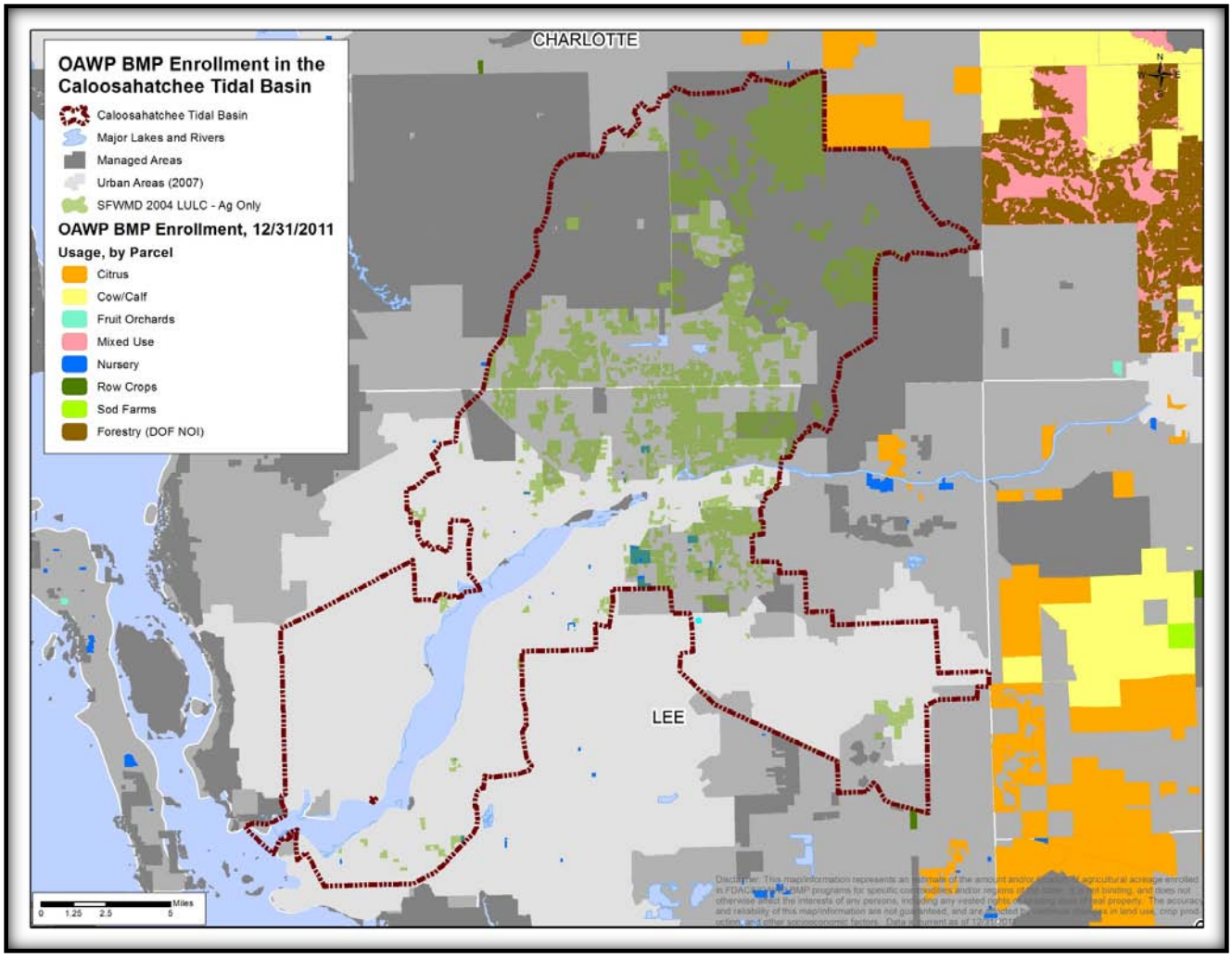

FIGURE 5: BMP ENROLLMENT AS OF DECEMBER 31, 2011 – CALOOSAHATCHEE ESTUARY BASIN

land, or land that was but is no longer in commercial agricultural production. This information frequently is impossible to discern in the photo interpretation process used to generate land use data. Local government, SFWMD, or FDEP BMPs may address these noncommercial sources. **Figure 5** is a map of the acres enrolled in BMPs as of December 31, 2011.

Due to the inaccuracies in 2004 land use information and changes in land use since 2004, agricultural loadings may be less than indicated in the TMDL. The region is expected to have continuing shifts from agricultural to residential/urban land uses, which will reduce the agricultural load further. More precise information will be incorporated into the next iteration of the TMDL, and the estimated agricultural load will be adjusted to reflect the updated acreage figure. The potential refinement of a basin- and commodity-specific agricultural loading/reduction model should be considered during the first BMAP cycle.

The estimates of agricultural load reduction due to the implementation of BMPs, shown in **Table 18**, are based on commodity-specific methods developed for the Lake Okeechobee watershed. These values may assume conditions, such as typical nitrogen fertilization rates, that differ from actual field conditions, but are the best available information. Based on an average 30% BMP

effectiveness for TN reductions, the OAWP estimates that the goal of 50% enrollment within the first five years (Phase 1) will achieve a reduction of 34,583 pounds of TN. This reduction represents approximately 62% of the total required load reduction allocation for agriculture in the basin. BMP-based reductions coupled with land use changes to lower intensity land uses provide more than sufficient reductions to meet the Phase 1 target, even if BMPs are not as effective as the 30% average.

TABLE 18: AGRICULTURAL TN LOAD REDUCTION ALLOCATION AND ESTIMATED REDUCTIONS

ESTIMATED LOADS	TN (LBS/YR)
Load Reduction Allocation for Agriculture	57,869
Estimated Load Reductions via BMPs, 50% Target Enrollment Goal (Phase I)	34,583

In compliance with the FWRA, when FDEP adopts a BMAP that includes agriculture, it is the agricultural producer's responsibility to implement BMPs adopted by FDACS and verified as effective by FDEP in helping to achieve load reductions. If acreage adjustments and BMP implementation do not fully account for the current agricultural load reduction allocation, it will be necessary to develop and implement cost-assisted field- and/or regional-level treatment options that remove nutrients from farm discharges. In that case, FDACS will work with FDEP and the SFWMD to identify appropriate options for achieving further agricultural load reductions.

5.6 SFWMD POLLUTANT SOURCE CONTROL PROGRAM

As described in the Caloosahatchee River Watershed Protection Plan (SFWMD 2012), the SFWMD is amending its existing 40E-61 Works of the District Regulatory Source Control Program (Chapter 40E-61, F.A.C.) to include source controls for nitrogen in the Tidal Caloosahatchee sub-watershed and other Caloosahatchee tributaries upstream of S-79. The Regulatory Source Control Program is a multi-faceted approach for improving the management of pollution sources within the Northern Everglades watersheds pursuant to the NEEPP. Requirements under the Regulatory Source Control Program will be complementary to those being implemented by the coordinating agencies, including BMPs, on-site treatment technologies, stormwater and wastewater infrastructure upgrades, and master planning, and regulatory programs focused on water quality and quantity. The goal of the Regulatory Source Control Program is to assure full implementation of source controls including success indicators and schedules for implementation.

The existing Regulatory Nutrient Source Control Program was adopted in 1989, as a result of the Lake Okeechobee Surface Water Improvement and Management Plan, to provide a regulatory source control program specifically for phosphorus. The NEEPP legislation expanded the program boundary to the river watersheds and included nitrogen, in addition to phosphorus, as the focus of nutrient source controls. The program applies to new and existing activities with the goal of reducing nutrients in offsite discharges.

The SFWMD is proposing to modify Chapter 40E-61, F.A.C., to be compatible with the amendments to NEEPP. As reported in the 2012 Caloosahatchee River Watershed Protection Plan Update, the District will coordinate with the Office of Fiscal Accountability and Regulatory Reform (OFARR) prior to initiating rule development. The rule development process will be closely coordinated with stakeholders via technical and regulatory workshops with the goal of having a regulatory program in place within five years. The District will continue to annually report progress. While specific rule language will be completed during the rule development and consultation process, the amended rule is expected to accomplish the following:

- *Implement a nutrient source control program utilizing BMPs for all land uses within the Northern Everglades, including the Caloosahatchee Watershed;*
- *Recognize agricultural lands that are participating in the FDACS BMP program as meeting the intent of the proposed rule, to prevent duplication of effort;*
- *Define the monitoring network necessary to gauge the collective effectiveness of the source control programs implemented by the coordinating agencies, to make water quality performance determinations as necessary, to identify priority areas of water quality concern, and to provide data to evaluate and enhance performance of downstream treatment facilities;*
- *Establish water quality performance criteria specific to the collective source control programs, and develop a plan for optimizing the collective BMP programs, should the expected water quality performance criteria not be met;*
- *Establish nutrient concentration limits for sites utilized for septage application or disposal;*
- *Ensure that the rule is consistent with the Caloosahatchee River Watershed Protection Plan; and*
- *Include incentives to participate in nutrient reduction demonstration and research projects that will provide valuable data for expanding, accelerating, and optimizing the implemented BMPs to meet water quality objectives and for further refinement of the source control programs, as necessary.*

CHAPTER 6: ASSESSING PROGRESS AND MAKING CHANGES

Successful BMAP implementation requires commitment and follow-up. In the Commitment to Plan Implementation (see **Chapter 7**), stakeholders have expressed their intention to carry out the plan, monitor its effect, and continue to coordinate within and across jurisdictions to achieve water quality targets. The FWRA requires that an assessment be conducted every five years to determine whether there is reasonable progress in implementing the BMAP and achieving pollutant load reductions. This chapter contains the water quality monitoring component sufficient to make this evaluation.

6.1 TRACKING IMPLEMENTATION

FDEP will work with the stakeholders to organize the monitoring data and track project implementation. This information will be presented in an annual report. The stakeholders have agreed to meet at least every 12 months after the adoption of the BMAP to follow up on plan implementation, share new information, and continue to coordinate on TMDL-related issues. The following types of activities may occur at annual meetings:

- *Implementation Data and Reporting*
    - Collect project implementation information from the stakeholders and MS4 permit reporting and compare with the BMAP schedule**. Table 19** provides a sample annual reporting form on BMAP project implementation (to be completed by the entities).
    - Discuss the data collection process, including any concerns and possible improvements to the process.
    - Review the monitoring plan implementation, as detailed in **Section 6.2**.
- *Sharing New Information*
    - Report on results from water quality monitoring and trend information.
    - Provide updates on new projects and programs in the watershed that will help reduce nutrient loading.
    - Identify and review new scientific developments on addressing nutrient loads and incorporate any new information into annual progress reports.
- *Coordinating TMDL-Related Issues*
    - Provide updates from FDEP on the basin cycle and activities related to any impairments, TMDLs, and BMAP.
    - Obtain reports from other basins where tools or other information may be applicable to the Caloosahatchee River TMDL.

Covering all of these topics is not required for the annual meetings, but the list provides examples of the types of information that should be considered for the agenda to assist with BMAP implementation and improve coordination among the agencies and stakeholders.

TABLE 19: PROPOSED BMAP ANNUAL REPORTING FORM

2012 Caloosahatchee Estuary BMAP

___YEAR__ ANNUAL IMPLEMENTATION REPORT

REPORTING ENTITY: _____ **DATE**: _____

Note: Relevant MS4 activities, whether contained in the BMAP or not, may be included in this report.

IMPLEMENTATION STATUS – BMAP MANAGEMENT STRATEGIES

- = Empty cell

[1] BMAP PROJECT #	AFFECTED AREA (WBID)	[2] BRIEF DESCRIPTION	[3] PROJECTED START/ END	[4] PROJECT/ ACTIVITY STATUS	[5] PROJECT MONITORING RESULTS	[6] COMMENTS
Shade if also an MS4 activity	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

NEW MANAGEMENT STRATEGIES

- = Empty cell

[1] BMAP PROJECT #	AFFECTED AREA (WBID)	[2] BRIEF DESCRIPTION	[3] PROJECTED START/ END	[4] PROJECT/ ACTIVITY STATUS	[5] PROJECT MONITORING RESULTS	[6] COMMENTS
Shade if also an MS4 activity	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

Directions for BMAP Annual Reporting Format:

1. BMAP PROJECTS: This component includes projects and other management strategies. Use the project number assigned in the BMAP Activities tables (e.g., A-1). Please include all management strategies for which you have lead responsibility in the BMAP, regardless of their status. **New Management Strategies**: Include new projects/activities that are not included in the BMAP in the New Management Strategies table. Create a project number for new management strategies by using the prefix, then -N# (e.g., A-N1). **If a management action listed in either table is part of your MS4, please shade the project number box in grey**.

2. BRIEF DESCRIPTION: Include a brief description of the management action being reported (e.g., street sweeping removing gross debris on all streets with "L curbs" – 5 miles performed each month).

3. PROJECTED START/END: If applicable, include the start and end dates for the management action. If not applicable, put “N/A” or, if it is a continuous activity, put “Continuous” and indicate how often the activity takes place (e.g., for street sweeping).

4. PROJECT ACTIVITY/STATUS: Clearly summarize the status of the management action, in a way that makes sense for the item listed. For instance, for educational activities, list pertinent publications, events, etc., including name and/or topic for each. Include specific or general time frames (e.g., two public workshops on pet waste disposal in July 2011). Also, describe any significant changes to the management action that have taken place.

5. PROJECT MONITORING RESULTS: As applicable: If monitoring is required as part of a management action (e.g., in a cost-share situation), or is conducted voluntarily (e.g., as part of an effort to collect information on BMAP effectiveness), include the monitoring results to date, as practicable.

6. COMMENTS: Include comments on any implementation obstacles, including weather, funding, technical difficulties, etc. Include any other comments you consider important.

6.2 Water Quality Monitoring

6.2.1 Water Quality Monitoring Objectives

Focused objectives are critical for a monitoring strategy to provide the information needed to evaluate implementation success. The primary and secondary objectives of the monitoring strategy for the Caloosahatchee Estuary are described below. These objectives will be used to evaluate the success of the BMAP, help interpret the data collected, and provide information for potential future refinements of the BMAP.

Primary Objective

- *The primary objective of the BMAP monitoring plan is to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track water quality trends. This information will measure progress toward achieving the TMDL and provide a better understanding of the watershed loading.*

Secondary Objective

- *To identify areas or tributaries within the watershed with high loadings of nutrients to better focus management efforts.*

6.2.2 Water Quality Indicators and Resource Responses

To achieve the objectives above, the monitoring strategy focuses on two types of indicators to track water quality trends: core and supplemental (**Table 20**). The core indicators are directly related to the parameters causing impairment in the river. Supplemental parameters are monitored primarily to support model development and refinement. Supplemental indicators will also be used for the interpretation of core water quality parameters. At a minimum, the core parameters will be tracked to determine progress towards meeting the TMDL.

TABLE 20: WATER QUALITY INDICATORS AND FIELD PARAMETERS

[1] Should be monitoring as a core parameter in WBIDs with dissolved oxygen impairments.
- = Empty cell/no data

CORE PARAMETERS	SUPPLEMENTAL PARAMETERS
Chlorophyll-a (corrected)	Biochemical Oxygen Demand (BOD5)[1]
Dissolved Oxygen	Color
Nitrate/nitrite as N	Dissolved Organic Carbon (DOC)
pH – field	Total Organic Carbon (TOC)
Specific Conductance/Salinity	Turbidity
Temperature	-
Total Kjeldahl Nitrogen (TKN)	-
Total Phosphorus	-
Total Suspended solids (TSS)	-

In addition to the water quality parameters, biological monitoring is being conducted to assess the overall health of the Caloosahatchee Estuary (**Table 21**).

TABLE 21: BIOLOGICAL MONITORING

[1] 20 haphazardly generated points in the upper CRE. Points are generated monthly dependent on the previous month's results.
[2] 3m x 3m quadrant divided into 9 - 1 m^2 quadrants.

AGENCY	PROJECT	STATION NAME	SAMPLING FREQUENCY
FDEP	Seagrass Monitoring	CR02	Quarterly
FDEP	Seagrass Monitoring	CR04	Quarterly
FDEP	Seagrass Monitoring	CR05	Quarterly
FDEP	Seagrass Monitoring	SC03	Quarterly
FDEP	Seagrass Monitoring	MP04	Quarterly
FDEP	Seagrass Monitoring	MP05	Quarterly
SFWMD	Estuary Patch Scale Seagrass Monitoring	Upper CRE[1]	Monthly- 20 Quadzilla[2]
SFWMD	Estuary Patch Scale Seagrass Monitoring	CRE_2	Bimonthly -30 Quads
SFWMD	Estuary Patch Scale Seagrass Monitoring	CRE_4	Bimonthly -30 Quads
SFWMD	Estuary Patch Scale Seagrass Monitoring	CRE_5	Bimonthly -30 Quads
SFWMD	Estuary Patch Scale Seagrass Monitoring	CRE_6	Bimonthly -30 Quads
SFWMD	Estuary Patch Scale Seagrass Monitoring	CRE_6B	Bimonthly -30 Quads
SFWMD	Estuary Patch Scale Seagrass Monitoring	CRE_7	Bimonthly -30 Quads
SFWMD	Estuary Patch Scale Seagrass Monitoring	CRE_8	Bimonthly -30 Quads
SFWMD	Oyster Monitoring	Pepper Tree Pointe	Monthly
SFWMD	Oyster Monitoring	Iona Cove	Monthly
SFWMD	Oyster Monitoring	Bird Island	Monthly
SFWMD	Oyster Monitoring	Kitchel Key	Monthly

6.2.3 MONITORING NETWORK

The monitoring network for this plan builds on existing efforts in the basin by the following entities:

- *Charlotte County*
- *City of Cape Coral*
- *City of Fort Myers*
- *ECWCD*
- *FDEP*
- *Lee County*
- *SCCF*

- *SFWMD*
- *USGS*

Table 22 lists the stations that are included in the BMAP monitoring network. The water quality monitoring will be conducted on a monthly basis to assess the conditions in the watershed and within the Caloosahatchee River to determine changes in water quality from the actions implemented as part of the BMAP. The stations in the monitoring network are also shown in **Figures 6** and **7**. The monitoring stations listed are separated into a tiered sampling design as follows:

- ***Tier 1:*** *Stations listed in the BMAP monitoring plan as essential and mandatory for tracking water quality trends both in the Caloosahatchee River and stations that document watershed reductions. Stations should be sampled monthly for all core parameters. Sampling stations, parameters, frequency, and other elements of this strategy may be modified as appropriate to match changing environmental conditions and funding resources. However, any modifications made shall not affect the ability of the monitoring network to fulfill the objectives noted below.*
- ***Tier 2:*** *Stations that are currently sampled either within the BMAP basin or in a tributary contributing to the overall load. These stations will help in the understanding of the total load within the watershed and FDEP supports the continued monitoring.*
- ***Tier 3:*** *Non-stakeholder sampling stations. Data from these stations are extremely useful and FDEP supports continued monitoring.*
- ***Tier 4:*** *State of Florida (FDEP/SFWMD) sampling stations.*

TABLE 22: BMAP MONITORING NETWORK

[1] Stations that are currently listed as an NPDES outfall station. The station data will not be included in any ambient monitoring analysis.
[2] Scheduled to be discontinued by April 1, 2013.
- = Empty cell/no data

AGENCY	TIER	NPDES OUTFALL[1]	RIVER OR WATERSHED	LABEL	LATITUDE	LONGITUDE
City of Cape Coral	1	-	Watershed	400	26.600036	-81.941153
City of Cape Coral	1	-	Watershed	470	26.577628	-81.943761
City of Cape Coral	1	-	Watershed	540	26.552647	-81.973419
City of Cape Coral	1	-	River	350	26.623058	-81.909744
City of Cape Coral	1	-	Watershed	300	26.636611	-81.930506
City of Cape Coral	1	-	Watershed	590	26.543933	-82.010739
City of Cape Coral	1	-	Watershed	600	26.542819	-82.003256
City of Ft. Myers	1	-	Watershed	CFMMANUEL	26.627138	-81.880023
City of Ft. Myers	1	-	Watershed	CFMWINKLER	26.604067	-81.883770
Lee County	1	N	Watershed	29-8GR	26.730683	-81.701632
Lee County	1	N	Watershed	27-6GR	26.740151	-81.736947
Lee County	1	N	Watershed	28-5GR	26.727144	-81.718961
Lee County	1	N	Watershed	20-9GR	26.704126	-81.844718
Lee County	1	N	Watershed	27O-GR20	26.740289	-81.755697
Lee County	1	N	Watershed	23-5GR	26.715748	-81.808624
Lee County	1	N	Watershed	24-7GR	26.715065	-81.799786
Lee County	1	Y	Watershed	POWLGR51	26.683622	-81.874903
Lee County	1	N	Watershed	POWLGR20	26.683132	-81.877392
Lee County	1	N	Watershed	18-6GR	26.691420	-81.858909
Lee County	1	Y	Watershed	WHISGR10	26.575010	-81.890989
Lee County	1	N	Watershed	DEEPGR10	26.539163	-81.918465
Lee County	1	N	Watershed	DEEPGR50	26.518371	-81.923522
Lee County	1	N	River	PI-01	26.507070	-82.018390
Lee County	1	N	River	PI-02	26.522700	-82.040350
Lee County	1	N	River	PI-14	26.492660	-82.048300
Lee County	1	N	Watershed	16-3GR	26.659968	-81.897703
City of Cape Coral	2	-	River	242	26.643928	-81.874258
City of Cape Coral	2	-	Watershed	275	26.642108	-81.945542
City of Cape Coral	2	-	Watershed	295	26.636181	-81.957922
City of Cape Coral	2	-	Watershed	280	26.641394	-81.971525
City of Cape Coral	2	-	Watershed	290	26.637489	-81.977625
City of Cape Coral	2	-	Watershed	355	26.614642	-81.975044
City of Cape Coral	2	-	Watershed	390	26.604944	-81.964767
City of Cape Coral	2	-	Watershed	310	26.629583	-81.967428
City of Cape Coral	2	-	Watershed	315	26.630661	-81.950550
City of Cape Coral	2	-	Watershed	430	26.589622	-81.970453
City of Cape Coral	2	-	Watershed	510	26.564136	-81.963339

Agency	Tier	NPDES Outfall[1]	River or Watershed	Label	Latitude	Longitude
City of Cape Coral	2	-	Watershed	262	26.646497	-81.934619
City of Cape Coral	2	-	Watershed	243	26.651781	-81.948353
City of Cape Coral	2	-	Watershed	210	26.662617	-81.929131
City of Cape Coral	2	-	Watershed	445	26.599600	-82.029917
City of Cape Coral	2	-	Watershed	450	26.583544	-82.035844
City of Cape Coral	2	-	Watershed	455	26.576278	-82.024108
City of Cape Coral	2	-	Watershed	550	26.549261	-82.034086
City of Cape Coral	2	-	Watershed	570	26.547361	-82.024378
City of Cape Coral	2	-	Watershed	580	26.543108	-82.018925
City of Ft. Myers	2	-	Watershed	BCP1-10	26.662389	-81.820797
City of Ft. Myers	2	-	Watershed	BCP4-10	26.660671	-81.823615
City of Ft. Myers	2	-	Watershed	CFMBILLY3	26.653933	-81.833575
City of Ft. Myers	2	-	Watershed	CFMBILLY6	26.649746	-81.847768
City of Ft. Myers	2	-	Watershed	CFMCARRELL	26.611403	-81.884043
Lee County	2	N	Watershed	20A-19GR	26.734018	-81.843601
Lee County	2	N	Watershed	20A-11GR	26.708620	-81.839682
Lee County	2	Y	Watershed	YFC-CI	26.683220	-81.904270
Lee County	2	N	Watershed	16-18GR	26.681925	-81.910913
Lee County	2	N	Watershed	20-29GR	26.755381	-81.851405
Lee County	2	N	Watershed	GATOR91	26.744585	-81.855695
Lee County	2	N	Watershed	23-27GR	26.755464	-81.809495
Lee County	2	N	Watershed	24-19GR	26.746217	-81.795398
Lee County	2	N	Watershed	POWLGR81	26.689801	-81.874989
Lee County	2	N	Watershed	22-7GR	26.715140	-81.821969
Lee County	2	N	Watershed	22-18GR	26.742630	-81.818660
Lee County	2	N	Watershed	25-GR20	26.714956	-81.780001
Lee County	2	N	Watershed	21-7GR	26.715181	-81.828960
Lee County	2	N	Watershed	26-GR20	26.718929	-81.765178
Lee County	2	N	Watershed	BILLGR20	26.654238	-81.840397
Lee County	2	Y	Watershed	BILLGR60	26.665215	-81.812236
Lee County	2	N	Watershed	40-32GR	26.640761	-81.685127
Lee County	2	N	Watershed	40-18GR	26.670344	-81.731887
Lee County	2	Y	Watershed	WHISGR50	26.560851	-81.872139
Lee County	2	N	Watershed	DEEPGR90	26.498273	-81.920290
Lee County	2	N	River	PI-13	26.471758	-82.097578
SCCF	3	N	River	RECON-Fort Myers	26.641590	-81.882730
SCCF	3	N	River	RECON-Shell Point	26.525480	-82.003150
SCCF	3	N	River	RECON-Tarpon Bay	26.467945	-82.062975
SCCF	3	N	River	RECON-Gulf of Mexico	26.451980	-81.977850
USGS	3	N	Watershed	Telegraph Creek[2]	26.729940	-81.701860
USGS	3	N	Watershed	Orange River[2]	26.691920	-81.759440

Agency	Tier	NPDES Outfall[1]	River or Watershed	Label	Latitude	Longitude
USGS	3	N	Watershed	Hancock Creek[2]	26.667220	-81.896390
USGS	3	N	River	Caloosahatchee River at Marker #52[2]	26.641530	-81.882920
USGS	3	N	River	Caloosahatchee River at Punta Blanca[2]	26.529000	-82.017780
USGS	3	N	Watershed	Popash Creek[2]	26.715780	-81.808670
USGS	3	N	Watershed	Billy's Creek[2]	26.651670	-81.854720
USGS	3	N	River	Caloosahatchee River at Shell Point [2]	26.523940	-82.004440
USGS	3	N	Watershed	Whiskey Creek	26.574890	-81.891390
USGS	3	N	River	McIntyre Creek at Sanibel Island	26.46428	-82.10456
FDEP	4	N	Watershed	28020109	26.691810	-81.759610
FDEP	4	N	Watershed	CALUSA0024FTM	26.730040	-81.701740
FDEP	4	N	Watershed	CALUSA0025FTM	26.667100	-81.896450
FDEP	4	N	River	CALUSA0014FTM	26.529000	-82.017722
FDEP	4	N	River	CALUSA0013FTM	26.523889	-82.004444
FDEP	4	N	River	CALUSA0012FTM	26.538306	-81.945194
FDEP	4	N	River	CALUSA0011FTM	26.641528	-81.882944
FDEP	4	N	River	CALUSA0010FTM	26.662000	-81.859417
FDEP	4	N	River	CALUSA0009FTM	26.681917	-81.834306
FDEP	4	N	River	CALUSA0008FTM	26.691278	-81.822278
FDEP	4	N	River	28020111	26.695278	-81.815556
FDEP	4	N	River	CALUSA0007FTM	26.696833	-81.796500
FDEP	4	N	River	28020110	26.700600	-81.781180
FDEP	4	N	River	CALUSA0006FTM	26.719333	-81.738556
FDEP	4	N	River	CALUSA0005FTM	26.723361	-81.720972
SFWMD	4	N	River	CES01	26.721332	-81.693234
SFWMD	4	N	River	Point Ybel, R8	26.462369	-82.006581
SFWMD	4	N	River	S79	26.722929	-81.693201
SFWMD	4	N	River	CES09	26.501167	-82.014333
SFWMD	4	N	River	CES03	26.716694	-81.760600
SFWMD	4	N	River	CES05	26.636600	-81.888700
SFWMD	4	N	River	CES04	26.681700	-81.833800
SFWMD	4	N	River	CES06	26.582300	-81.910200
SFWMD	4	N	River	CES07	26.530222	-81.965600
SFWMD	4	N	River	CES08	26.523300	-81.992006
SFWMD	4	N	River	CES11	26.480556	-82.060278

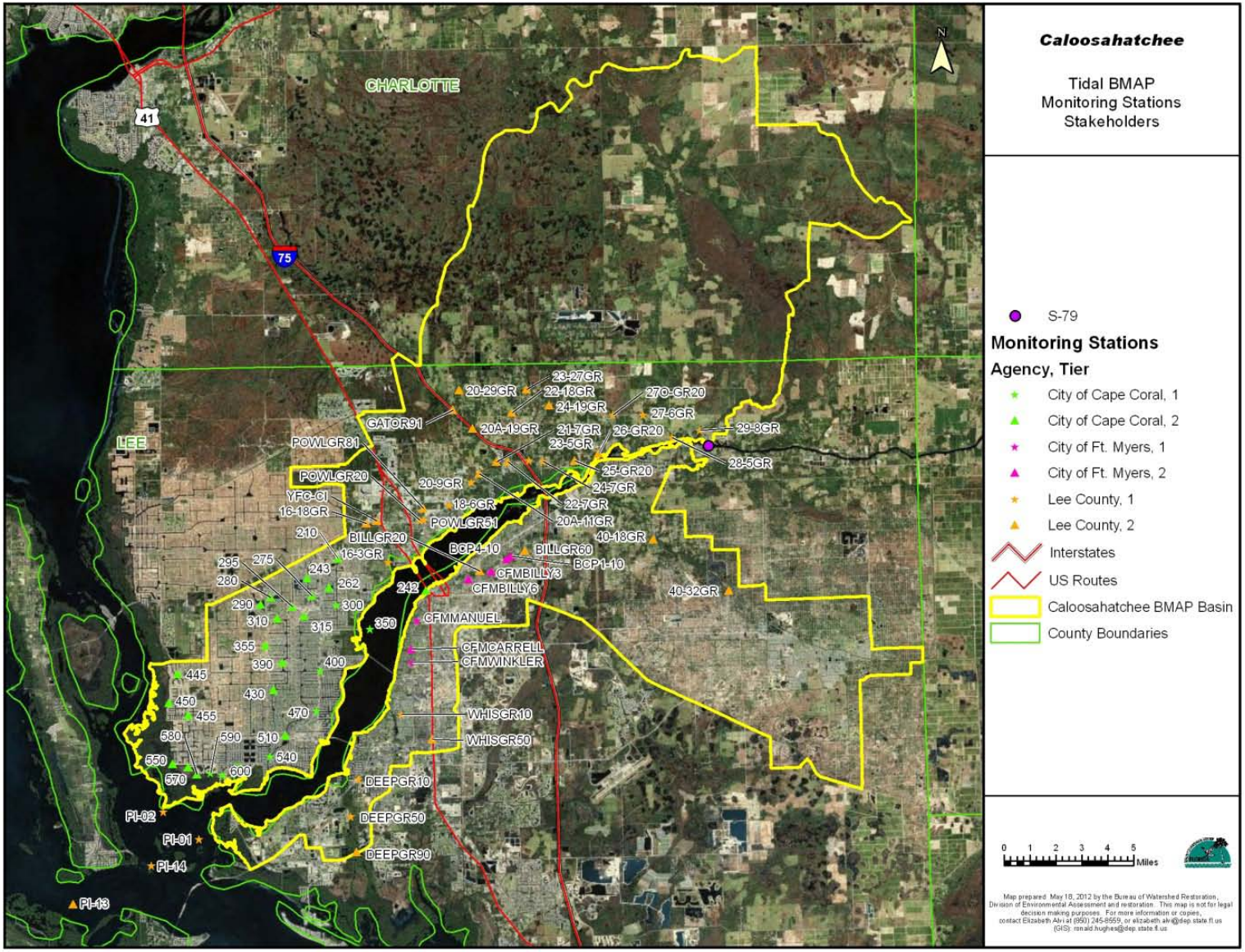

FIGURE 6: MONITORING NETWORK FOR THE CALOOSAHATCHEE ESTUARY (STAKEHOLDERS)

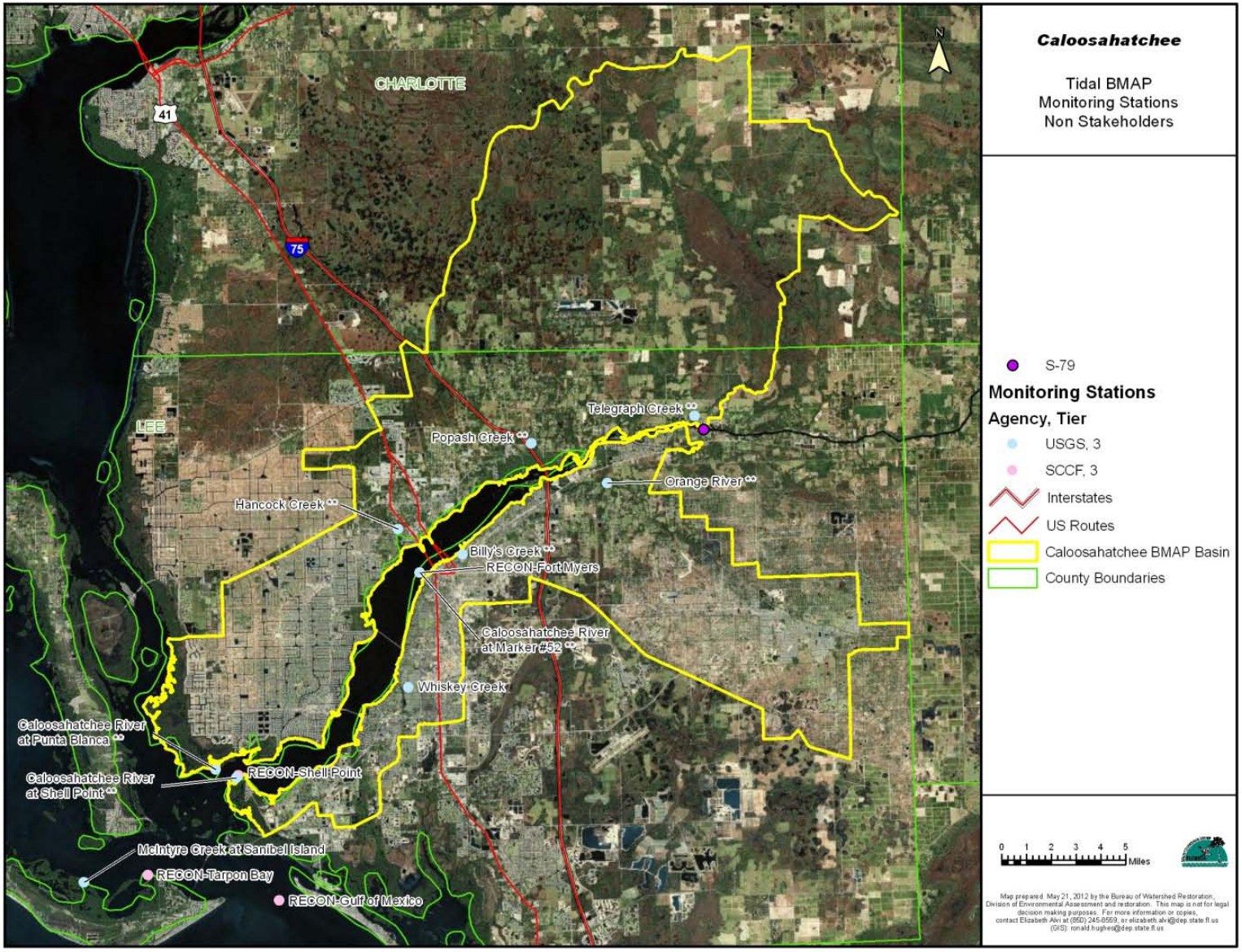

FIGURE 7: MONITORING NETWORK FOR THE CALOOSAHATCHEE ESTUARY (NON-STAKEHOLDERS)

In addition to the BMAP monitoring network, the entities in the basin are also conducting sampling that will provide supplemental data to meet the monitoring strategy objectives. This additional monitoring includes the Charlotte Harbor National Estuary Program (CHNEP) random sampling areas of Tidal Caloosahatchee, San Carlos Bay, and Matlacha Pass (**Figure 8**). The program consists of a long-term monitoring strategy to track status and trends of fish and wildlife habitat, hydrologic and water quality conditions for the greater Charlotte Harbor watershed. This long-term strategy uses a stratified, random sampling design based on the U.S. Environmental Protection Agency's Environmental Monitoring and Assessment Program (EMAP) for the region's coastal water quality programs. The coastal areas of the watershed are divided into sampling grids and five sites are randomly chosen and sampled monthly for core analytes. Data from these stations are extremely useful, and FDEP supports the continued monitoring of this program as a Tier 2 sampling effort.

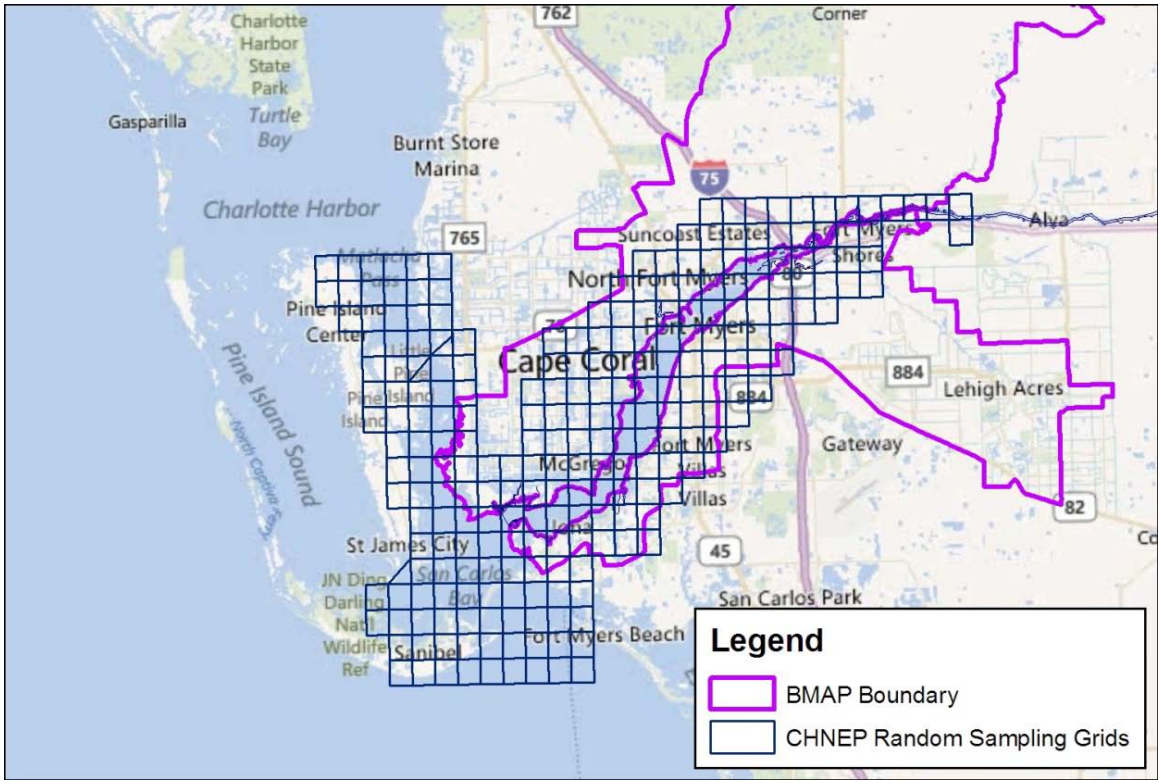

FIGURE 8: CHNEP RANDOM SAMPLING GRID

6.2.4 DATA MANAGEMENT AND ASSESSMENT

The Florida STORET database serves as the primary repository of ambient water quality data for the state of Florida. FDEP pulls water quality data used for impaired water evaluations and TMDL development directly from the STORET database. Ambient water quality data collected as part of the BMAP will be uploaded into STORET for long-term storage and availability. SFWMD, FDEP, and some local stakeholders currently upload water quality data into STORET. All BMAP data providers have agreed to upload ambient water quality data to STORET at least once every six months, upon completion of the appropriate quality assurance/quality control (QA/QC) checks.

Other data, such as biological and storm event, may also be collected and the STORET database is not equipped to store these types of data. Stakeholders agree to provide these

data to other BMAP partners upon request and when appropriate for inclusion in BMAP data analyses and adaptive management evaluations.

The water quality data will be analyzed after four years of BMAP implementation to determine trends in water quality. A wide variety of statistical methods are available for trend analyses. The selection of an appropriate data analysis method depends on the frequency, spatial distribution, and period of record available from existing data. Specific statistical analyses were not identified during BMAP development; however, commonly accepted methods of data analysis will be used that are consistent with the TMDL model.

6.2.5 Quality Assurance/Quality Control

Stakeholders participating in the monitoring plan must collect water quality data in a manner consistent with FDEP's SOPs for QA/QC. The most current version of these procedures can be downloaded from http://www.dep.state.fl.us/water/sas/sop/sops.htm. For BMAP-related data analyses, entities should use National Environmental Laboratory Accreditation Conference (NELAC) certified labs (http://www.dep.state.fl.us/labs/cgi-bin/aams/index.asp) or other labs that meet the certification and other requirements outlined in the SOPs.

6.3 Adaptive Management Measures

Adaptive management involves setting up a mechanism for making adjustments in the BMAP when circumstances change or feedback indicates the need for a more effective strategy. Adaptive management measures include the following:

- *Procedures to determine whether additional cooperative strategies are needed;*
- *Criteria/processes for determining whether and when plan components need revision due to changes in costs, environmental impacts, social effects, watershed conditions, or other factors; and*
- *Descriptions of the stakeholders' role after BMAP completion.*

Key components of adaptive management to share information and expertise are tracking plan implementation, monitoring water quality and pollutant loads, and holding periodic meetings.

BMAP execution will be a long-term process. Some projects will extend beyond the first phase of the BMAP cycle. The stakeholders will track implementation efforts and monitor water quality to measure effectiveness and ensure BMAP compliance. The stakeholders will meet at least every 12 months to discuss implementation issues, consider new information, and, if the watershed is not projected to meet the TMDL, determine additional corrective actions. Project implementation as well as program and activity status will be collected annually from the participating entities. The stakeholders will review these reports to assess progress towards meeting the BMAP's goals.

CHAPTER 7: COMMITMENT TO PLAN IMPLEMENTATION

Section 403.067(7), F.S., lays out the mechanisms for BMAP implementation *(*see **Appendix B***)*. While the BMAP is linked by statute to permitting and other enforcement processes that target individual entities, successful implementation mandates that local stakeholders willingly and consistently work together to attain adopted TMDLs. This collaboration fosters the sharing of ideas, information, and resources. The stakeholders have demonstrated their willingness to confer with and support each other in their efforts.

Paragraph 403.067(7)(a)1., F.S., authorizes FDEP to adopt BMAPs that provide for phased implementation of the strategies necessary to ultimately achieve the associated TMDL. Phased BMAPs are re-evaluated every five years as part of the Department's rotating basin approach. This BMAP provides for such phased implementation.

FDEP will ask for letters of commitment or resolutions of support for the BMAP from the entities to ensure that as staff and board members change over time, the entity has a way to show support for the BMAP and the efforts included. This process will occur concurrently with BMAP adoption, and the written statements of commitment will be added to this chapter of the BMAP as they are received.

LETTERS OF COMMITMENT WILL BE ADDED HERE.

APPENDICES

Appendix A: TMDL Basin Rotation Schedule

TMDLs are developed, allocated, and implemented through a watershed management approach (managing water resources within their natural boundaries) that addresses the state's 52 major hydrologic basins in five groups, on a rotating schedule. **Table A-1** shows the hydrologic basins within each of the five groups, with the FDEP District office of jurisdiction.

TABLE A-1: MAJOR HYDROLOGIC BASINS BY GROUP AND FDEP DISTRICT OFFICE

FDEP DISTRICT	GROUP 1 BASINS	GROUP 2 BASINS	GROUP 3 BASINS	GROUP 4 BASINS	GROUP 5 BASINS
NW	Ochlockonee–St. Marks	Apalachicola–Chipola	Choctawhatchee–St. Andrews Bay	Pensacola Bay	Perdido Bay
NE	Caloosahatchee	Lower St. Johns	Not applicable	Nassau–St. Marys	Upper East Coast
Central	Ocklawaha	Middle St. Johns	Upper St. Johns	Kissimmee	Indian River Lagoon
SW	Tampa Bay	Tampa Bay Tributaries	Sarasota Bay–Peace–Myakka	Withlacoochee	Springs Coast
S	Everglades West Coast	Charlotte Harbor	Caloosahatchee	Fisheating Creek	Florida Keys
SE	Lake Okeechobee	St. Lucie–Loxahatchee	Lake Worth Lagoon–Palm Beach Coast	Southeast Coast–Biscayne Bay	Everglades

Each group will undergo a cycle of five phases on a rotating schedule:

Phase 1: Preliminary evaluation of water quality
Phase 2: Strategic monitoring and assessment to verify water quality impairments
Phase 3: Development and adoption of TMDLs for waters verified as impaired
Phase 4: Development of basin management action plan (BMAP) to achieve the TMDL
Phase 5: Implementation of the BMAP and monitoring of results

The Caloosahatchee River Basin is a Group 3 basin. As such, the Cycle 1 list of verified impaired waters was developed in 2005 and the Cycle 2 list was developed in 2010. Subsequent TMDL and BMAP development is occurring on a schedule driven by the 1998 303(d) list (see http://www.dep.state.fl.us/water/tmdl/ for more information) and FDEP staff resource availability. FDEP will re-evaluate impaired waters every five years to determine whether improvements are being achieved, and to refine loading estimates and TMDL allocations using new data. If any changes in a TMDL are required, the applicable TMDL rule may be revised. Changes to a TMDL would prompt revisions to the applicable BMAP, which will be revisited at least every five years and modified as necessary, regardless of whether the TMDL is modified.

Appendix B: Summary of Statutory Provisions Guiding BMAP Development and Implementation

SECTIONS 403.067(6) AND (7), F.S. - *Summary of Excerpts*

ALLOCATIONS

- The TMDL shall include reasonable and equitable allocations of the TMDL between or among point and nonpoint sources that will alone, or in conjunction with other management and restoration activities, provide for the attainment of pollutant reductions established pursuant to paragraph (a) to achieve applicable water quality standards.
- The allocations may establish the maximum amount of the pollutant that may be discharged or released in combination with other discharges or releases.
- Allocations may also be made to individual basins and sources or as a whole to all basins and sources or categories of sources of inflow to the water body or water body segments.
- An initial allocation of allowable pollutant loads may be developed as part of the TMDL; in such cases detailed allocations to specific point sources and categories of nonpoint sources shall be established in the basin management action plan.
- The initial and detailed allocations shall be designed to attain pollutant reductions established pursuant to paragraph (a) and shall be based on consideration of:
    1. Existing treatment levels and management practices;
    2. Best management practices established and implemented pursuant to paragraph (7)(c);
    3. Enforceable treatment levels established pursuant to state or local law or permit;
    4. Differing impacts pollutant sources may have on water quality;
    5. The availability of treatment technologies, management practices, or other pollutant reduction measures;
    6. Environmental, economic, and technological feasibility of achieving the allocation;
    7. The cost benefit associated with achieving the allocation;
    8. Reasonable timeframes for implementation;
    9. Potential applicability of any moderating provisions such as variances, exemptions, and mixing zones; and
    10. The extent to which non-attainment of water quality standards is caused by pollution sources outside of Florida, discharges that have ceased, or alterations to water bodies prior to the date of this act.

GENERAL IMPLEMENTATION

- **DEP is the lead agency** in coordinating TMDL implementation, through existing water quality protection programs.
- **Application of a TMDL by a water management** district does not require WMD adoption of the TMDL.
- **TMDL implementation may include**, but is not limited to:
    - Permitting and other existing regulatory programs
    - Non-regulatory and incentive-based programs
    - Other water quality management and restoration activities, such as Surface Water Improvement and Management (SWIM) plans or **basin management action plans**
    - Pollutant trading or other equitable economically based agreements
    - Public works
    - Land acquisition

BASIN MANAGEMENT ACTION PLAN DEVELOPMENT

- DEP may develop a basin management action plan that addresses some or all of the watersheds and basins tributary to a TMDL waterbody.
- A basin management action plan **shall**:
  - Integrate appropriate management strategies available to the state through existing water quality protection programs.
  - Equitably allocate pollutant reductions to individual basins, all basins, each identified point source, or category of nonpoint sources, as appropriate.
  - Identify the mechanisms by which potential future increases in pollutant loading will be addressed.
  - Specify that for nonpoint sources for which BMPs have been adopted, the initial requirement shall be BMPs developed pursuant to paragraph (c).
  - Establish an implementation schedule.
  - Establish a basis for evaluating plan effectiveness.
  - Identify feasible funding strategies.
  - Identify milestones for implementation and water quality improvement, and an associated water quality monitoring component to evaluate reasonable progress over time.
  - Be adopted in whole or in part by DEP Secretarial Order, subject to chapter 120.
- A basin management action plan **may**:
  - Give load reduction credits to dischargers that have implemented load reduction strategies (including BMPs) prior to the development of the BMAP. (*Note: this assumes the related reductions were not factored into the applicable TMDL*.)
  - Include regional treatment systems or other public works as management strategies.
  - Provide for phased implementation to promote timely, cost-effective actions.
- An assessment of progress in achieving milestones shall be conducted every 5 years and the basin management action plan revised, as appropriate, in cooperation with basin stakeholders, and adopted by secretarial order.
- DEP shall assure that key stakeholders are invited to participate in the basin management action plan development process, holding at least one noticed public meeting in the basin to receive comments, and otherwise encouraging public participation to the greatest practicable extent.
- A basin management action plan shall not supplant or alter any water quality assessment, TMDL calculation, or initial allocation.

BASIN MANAGEMENT ACTION PLAN IMPLEMENTATION

- NPDES Permits
  - Management strategies related to a discharger subject to NPDES permitting shall be included in subsequent applicable NPDES permits or permit modifications when the permit expires (is renewed), the discharge is modified (revised), or the permit is reopened pursuant to an adopted BMAP.
  - Absent a detailed allocation, TMDLs shall be implemented through NPDES permit conditions that include a compliance schedule. The permit shall allow for issuance of an order adopting the BMAP within five years. (***Note**: Intended to apply to individual wastewater permits – not MS4s*)
  - Once the BMAP is adopted, the permit shall be reopened, as necessary, and permit conditions consistent with the BMAP shall be established.
  - Upon request by a NPDES permittee, DEP may establish individual allocations prior to the adoption of a BMAP, as part of a permit issuance, renewal, or modification (revision).
  - To the maximum extent practicable, MS4s shall implement a TMDL or BMAP through the use of BMPs or other management measures.
  - A BMAP does not take the place of NPDES permits or permit requirements.
  - Management strategies to be implemented by a DEP permittee shall be completed

according to the BMAP schedule, which may extend beyond the 5-year term of an NPDES permit.
    - Management strategies are not subject to challenge under chapter 120 when they are incorporated in identical form into a NPDES permit or permit modification (revision).
- Management strategies assigned to nonagricultural, non-NPDES permittees (state, regional, or local) shall be implemented as part of the applicable permitting programs.
- Nonpoint source dischargers (e.g., agriculture) included in a BMAP shall demonstrate compliance with the applicable TMDLs by either implementing appropriate BMPs established under paragraph 7(c), or conducting water quality monitoring prescribed by **DEP or a WMD**. (***Note**: this is not applicable to MS4s, as they are considered point sources under the federal Clean Water Act and TMDL Program*.)
    - Failure to implement BMPs or prescribed water quality monitoring may be subject to **DEP or WMD** enforcement action.
- Responsible parties who are implementing applicable BMAP strategies shall not be required to implement additional pollutant load reduction strategies, and shall be deemed in compliance with this section. However, this does not limit DEP's authority to amend a BMAP.

BEST MANAGEMENT PRACTICES

- DEP, in cooperation with WMDs and other interested parties, may develop interim measures, BMPs, or other measures for non-agricultural nonpoint sources to achieve their load reduction allocations.
    - These measures may be adopted by **DEP or WMD** rule. If adopted, they shall be implemented by those responsible for non-agricultural nonpoint source pollution.
- DACS may develop and adopt by rule interim measure, BMPs, or other measures necessary for agricultural pollutant sources to achieve their load reduction allocations.
    - These measures may be implemented by those responsible for agricultural pollutant sources. **DEP, the WMDs, and DACS** shall assist with implementation.
    - In developing and adopting these measures, DACS shall consult with DEP, DOH, the WMDs, representatives of affected farming groups, and environmental group representatives.
    - The rules shall provide for a notice of intent to implement the practices and a system to ensure implementation, including recordkeeping.
- Verification of Effectiveness and Presumption of Compliance -
    - DEP shall, at representative sites, verify the effectiveness of BMPs and other measures adopted by rule in achieving load reduction allocations.
    - DEP shall use best professional judgment in making the initial verification of effectiveness, and shall notify **DACS and the appropriate WMD** of the initial verification prior to the adoption of a rule proposed pursuant to this paragraph.
    - Implementation of rule-adopted BMPs or other measures initially verified by DEP to be effective, or verified to be effective by monitoring at representative sites, provides a presumption of compliance with state water quality standards for those pollutants addressed by the practices.
- Reevaluation –
    - Where water quality problems are demonstrated despite implementation, operation, and maintenance of rule-adopted BMPs and other measures, **DEP, a WMD, or DACS**, in consultation with DEP, shall reevaluate the measures. If the practices require modification, the revised rule shall specify a reasonable time period for implementation.

Appendix C: Stakeholder Involvement in BMAP Development

CALOOSAHATCHEE ESTUARY BMAP STAKEHOLDER INVOLVEMENT

The stakeholders involved in the technical meetings provided valuable information during the BMAP process. The technical meetings began in September 2009 to organize and review the technical information that is the basis of the BMAP. The technical stakeholders also identified management actions to improve water quality in the watershed. The technical meetings were held regularly throughout the BMAP development process on the following dates:

- *September 24, 2009;*
- *February 24, 2010;*
- *September 22, 2010;*
- *March 8, 2011; and*
- *December 14, 2011.*

PUBLIC PARTICIPATION IN MEETINGS

All technical meetings were open to the public and noticed in FAW. Technical meetings were open to anyone interested in participating in the technical discussions. In addition, public meetings were held on the Verified Lists, the adoption of the TMDLs, and the BMAP document.

PUBLIC MEETING(S)

Public meetings on the proposed Lerified list and the Caloosahatchee Estuary TMDL were held before each was adopted. In addition, a public workshop on the BMAP was held on October 24, 2013.

PLAN RECOMMENDATION APPROVAL AND ADOPTION

The final BMAP is to be adopted by FDEP Secretarial Order.

Appendix D: Summary of EPA-Recommended Elements of a Comprehensive Watershed Plan

The following is an excerpt on the nine elements of a watershed plan from the EPA's *Draft Handbook for Developing Watershed Plans to Restore and Protect Our Waters.* Additional information regarding these elements can be found in the full version of the handbook located online at: http://www.epa.gov/owow/nps/watershed_handbook/.

NINE MINIMUM ELEMENTS TO BE INCLUDED IN A WATERSHED PLAN FOR IMPAIRED WATERS FUNDED USING INCREMENTAL SECTION 319 FUNDS

Although many different components may be included in a watershed plan, EPA has identified a minimum of nine elements that are critical for achieving improvements in water quality. EPA requires that these nine elements be addressed for watershed plans funded using incremental Section 319 funds and strongly recommends that they be included in all other watershed plans that are intended to remediate water quality impairments.

The nine elements are provided below, listed in the order in which they appear in the guidelines. Although they are listed as *a* through *i*, they do not necessarily take place sequentially. For example, element *d* asks for a description of the technical and financial assistance that will be needed to implement the watershed plan, but this can be done only after you have addressed elements *e* and *i*.

Explanations are provided with each element to show you what to include in your watershed plan.

NINE ELEMENTS

a. Identification of causes of impairment and pollutant sources or groups of similar sources that need to be controlled to achieve needed load reductions, and any other goals identified in the watershed plan. *Sources that need to be controlled should be identified at the significant subcategory level along with estimates of the extent to which they are present in the watershed (e.g., X number of dairy cattle feedlots needing upgrading, including a rough estimate of the number of cattle per facility; Y acres of row crops needing improved nutrient management or sediment control; or Z linear miles of eroded streambank needing remediation)*.

What does this mean?
Your watershed plan should include a map of the watershed that locates the major sources and causes of impairment. Based on these impairments, you will set goals that will include (at a minimum) meeting the appropriate water quality standards for pollutants that threaten or impair the physical, chemical, or biological integrity of the watershed covered in the plan.

b. An estimate of the load reductions expected from management measures.

What does this mean?
You will first quantify the pollutant loads for the watershed. Based on these pollutant loads, you'll determine the reductions needed to meet the water quality standards.

You will then identify various management measures (see element *c* below) that will help to reduce the pollutant loads and estimate the load reductions expected as a result of these management measures to be implemented, recognizing the difficulty in precisely predicting the performance of management measures over time.

Estimates should be provided at the same level as that required in the scale and scope component in paragraph *a* (e.g., the total load reduction expected for dairy cattle feedlots, row crops, or eroded streambanks). For waters for which EPA has approved or established TMDLs, the plan should identify and incorporate the TMDLs.

Applicable loads for downstream waters should be included so that water delivered to a downstream or adjacent segment does not exceed the water quality standards for the pollutant of concern at the water segment boundary. The estimate should account for reductions in pollutant loads from point and nonpoint sources identified in the TMDL as necessary to attain the applicable water quality standards.

c. A description of the management measures that will need to be implemented to achieve load reductions in paragraph 2, and a description of the critical areas in which those measures will be needed to implement this plan.

What does this mean?
The plan should describe the management measures that need to be implemented to achieve the load reductions estimated under element *b*, as well as to achieve any additional pollution prevention goals called out in the watershed plan. It should also identify the critical areas in which those measures will be needed to implement the plan. This can be done by using a map or a description.

d. Estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon to implement this plan.

What does this mean?
You should estimate the financial and technical assistance needed to implement the entire plan. This includes implementation and long-term operation and maintenance of management measures, information and education (I/E) activities, monitoring, and evaluation activities. You should also document which relevant authorities might play a role in implementing the plan. Plan sponsors should consider the use of federal, state, local, and private funds or resources that might be available to assist in implementing the plan. Shortfalls between needs and available resources should be identified and addressed in the plan.

e. An information and education (I/E) component used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing the nonpoint source management measures that will be implemented.

What does this mean?
The plan should include an I/E component that identifies the education and outreach activities or actions that will be used to implement the plan. These I/E activities may support the adoption and long-term operation and maintenance of management practices and support stakeholder involvement efforts.

f. Schedule for implementing the management measures identified in this plan that is reasonably expeditious.

What does this mean?
You need to include a schedule for implementing the management measures outlined in your watershed plan. The schedule should reflect the milestones you develop in *g*.

g. A description of interim measurable milestones for determining whether management measures or other control actions are being implemented.

What does this mean?
You'll develop interim, measurable milestones to measure progress in implementing the management measures for your watershed plan. These milestones will measure the implementation of the management measures, such as whether they are being implemented on schedule, whereas element *h* (see below) will measure the effectiveness of the management measures, for example, by documenting improvements in water quality.

h. A set of criteria that can be used to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining water quality standards.

What does this mean?
Using the milestones you developed above, you'll develop a set of criteria (or indicators) with interim target values to be used to determine whether progress is being made toward reducing pollutant loads. These interim targets can be direct measurements (e.g., fecal coliform concentrations) or indirect indicators of load reduction (e.g., number of beach closings). You must also indicate how you'll determine whether the watershed plan needs to be revised if interim targets are not met and what process will be used to revise the existing management approach. Where a nonpoint source TMDL has been established, interim targets are also needed to determine whether the TMDL needs to be revised.

i. A monitoring component to evaluate the effectiveness of the implementation efforts over time, measured against the criteria established under item h immediately above.

What does this mean?
The watershed plan must include a monitoring component to determine whether progress is being made toward attainment or maintenance of the applicable water quality standards. The monitoring program must be fully integrated with the established schedule and interim milestone criteria identified above. The monitoring component should be designed to determine whether loading reductions are being achieved over time and substantial progress in meeting water quality standards is being made. Watershed-scale monitoring can be used to measure the effects of multiple programs, projects, and trends over time. In stream monitoring does not have to be conducted for individual BMPs unless that type of monitoring is particularly relevant to the project.

Appendix E: Projects to Achieve the TMDL

The projects and time frames for implementation submitted by the entities to reduce their TN loading for the first iteration of the BMAP are summarized in the tables below. Additional reductions may be necessary in future BMAP iterations to meet the loads specified in the updated TMDLs. The tables provide information on the nutrient reduction attributed to each individual project, shown in lbs/yr. These projects were submitted to provide reasonable assurance to FDEP that the entity has a plan on how they will address initial TN reductions; however, this list of projects is meant to be flexible enough to allow for changes that may occur over time, provided that the reduction is still met within the specified time frame.

CITY OF CAPE CORAL

[1] Projects were listed but had unproven credit.
- = Empty cell/no data

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	STATUS	TN REDUCTION (LBS/YR)
Cape Coral	CC-1	Education Efforts	Florida Yards and Neighborhoods (FYN), landscaping ordinance, irrigation ordinance, fertilizer ordinance, pet waste ordinance, pamphlets, public service announcements (PSAs), website, illicit discharge program	Completed	15,429
Cape Coral	CC-2	SE-1 Swale/Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales	Completed	0[1]
Cape Coral	CC-3	SW-1 Swale/Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales	Completed	0[1]
Cape Coral	CC-4	SW-2 Swale/Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales	Completed	0[1]
Cape Coral	CC-5	SW-3 Swale/Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales	Completed	0[1]
Cape Coral	CC-6	SW-4 Swale/Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales	Completed	0[1]
Cape Coral	CC-7	SW-5 Swale/Inlet Replacement	Installed raised inlets to provide additional water quality in roadside swales	Completed	0[1]
Cape Coral	CC-8	SE Pipe Replacement	SE Pipe Replacement	Completed	0[1]
Cape Coral	CC-9	Unit 23-SE 8th Street Drainage	Unit 23-SE 8th Street Drainage	Completed	0[1]
Cape Coral	CC-10	Freshwater Canal Detention	Regulation of freshwater canals through existing control structures	Completed	4,769
Cape Coral	CC-11	Freshwater Canal Irrigation	Pump stormwater stored in canals into irrigation supply network	Completed	11,507
Cape Coral	CC-12	Weir #6 Elevation/Basin 12	Installed riser on weir in freshwater canal system which provides additional retention volume in canals	Completed	7,597
Cape Coral	CC-13	Weir #1 Elevation/Basin 15	Installed riser on weir in freshwater canal system which provides additional retention volume in canals	Completed	8,184
Cape Coral	**-**	**-**	**Total Projects Reduction**	**-**	**47,484**

CITY OF FORT MYERS

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ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	STATUS	TN REDUCTION (LBS/YR)
Ft. Myers	FM-1	Manuels Branch Watershed Imp.	Exfiltration Trenches	Completed	836
Ft. Myers	FM-2	Education Efforts	FYN, fertilizer ordinance, pamphlets, PSAs, website, illicit discharge program	Completed	2,101
Ft. Myers	FM-3	Utility & Streetscape Improvements	Installation of Stormceptors™	Completed	40
Ft. Myers	FM-4	Manuels Branch Siltation Structures	Installation of siltation structure designed to receive incoming flow, reduce its velocity and allow for settling of suspended particles.	Completed	1,078
Ft. Myers	FM-5	Manuels Branch Control Structures	A series of two weirs constructed along the Manuel's Branch between Royal Palm Avenue and Grand Avenue that act as detention structures for the purpose of increasing storage and attenuation within the canal.	Completed	2,202
Ft. Myers	FM-6	Billy's Creek Wetland	Billy Creek Filter Marsh Park	Completed	4,025
Ft. Myers	FM-7	Brookhill Utility Drainage Improvement	Installation of Stormceptors™	Future	11
Ft. Myers	FM-8	Street Sweeping	Four zones swept at varying frequencies based on pollutant accumulation.	Completed	2,582
Ft. Myers	FM-9	Ford Street Preserve	A constructed wetland treatment system that shall remove pollutants from the Ford Street Canal, which serves 811 acres of highly urbanized watershed.	Future	7,293
Ft. Myers	FM-10	Riverfront Development Phase 1	Wet detention	Future	90
Ft. Myers	**-**	**-**	**Total Projects Reduction**	**-**	**20,258**

ECWCD

- = Empty cell/no data
N/A = Not applicable

Entity	Project Number	Project Name	Project Detail	Status	TN Reduction (lbs/yr)
ECWCD	EC-1	Education/Fertilizer	N/A	Completed	1,646
ECWCD	EC-2	Freshwater Canal Detention	Regulation of freshwater canals through existing control structures	Completed	7,940
ECWCD	EC-3	Weir Elevation Improvements	Replacement of weir structures at increase control elevations to provide additional attenuation	Completed	7,543
ECWCD	EC-4	Harn's Marsh Phases I & II	Replacement of weir structures and re-direction of flows into filter marsh	Completed	4,682
ECWCD	EC-5	Jim Flemming Eco-Park	Wetland Rehydration and Treatment	Completed	N/A
ECWCD	EC-6	Mirror Lake Phase I	Detention Pond	Future	1,357
ECWCD	**-**	**-**	**Total Projects Reduction**	**-**	**23,169**

Lucaya CCD

- = Empty cell/no data
N/A = Not applicable

Entity	Project Number	Project Name	Project Detail	Status	TN Reduction (lbs/yr)
Lucaya CCD	LU-1	Education/Fertilizer	N/A	Completed	0
Lucaya CCD	**-**	**-**	**Total Projects Reduction**	**-**	**0**

UNINCORPORATED LEE COUNTY

[1] Projects were listed but had unproven credit.
- = Empty cell/no data

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	STATUS	TN REDUCTION (LBS/YR)
Lee County	LC-1	Yellow Fever Creek Preserve	Purchase and Conversion to Conservation Lands	Completed	32
Lee County	LC-2	Billy's Creek Preserve	Purchase and Conversion to Conservation Lands	Completed	17
Lee County	LC-3	Six Mile Cypress Preserve	Purchase and Conversion to Conservation Lands	Completed	13
Lee County	LC-4	Bob Jane's Preserve	Conservation Purchase	Completed	0[1]
Lee County	LC-5	Buckingham Trails Preserve	Purchase and Conversion to Conservation Lands	Completed	13
Lee County	LC-6	Caloosahatchee Cks Preserve	Purchase and Conversion to Conservation Lands	Completed	15
Lee County	LC-7	Deep Lagoon Preserve	Purchase and Conversion to Conservation Lands	Completed	3
Lee County	LC-8	Hickory Swamp Preserve	Purchase and Conversion to Conservation Lands	Completed	3
Lee County	LC-9	Orange River Preserve	Purchase and Conversion to Conservation Lands	Completed	3
Lee County	LC-10	Prairie Pines Preserve	Purchase and Conversion to Conservation Lands	Completed	3
Lee County	LC-11	Telegraph Creek Preserve	Conservation Purchase	Completed	0[1]
Lee County	LC-12	West Marsh Preserve	Purchase and Conversion to Conservation Lands	Completed	3
Lee County	LC-13	Yellow Fever Creek Preserve	Conservation Purchase	Completed	0[1]
Lee County	LC-15	Education Efforts	FYN, landscaping ordinance, irrigation ordinance, fertilizer ordinance, pamphlets, PSAs, website, illicit discharge program	Completed	20,445
Lee County	LC-16	Street Sweeping	345.9 lane miles swept annually	Completed	196
Lee County	LC-17	NFM Powell Creek Extension/Lost Lane Levee	Conveyance improvements to increase residence time, rehydrate offsite wetlands on adjacent properties and accommodate offsite flows	Future	2,976
Lee County	LC-18	Whiskey Creek Weir Reconstruction	Retention lake weir repairs to restore originally intended design and operation	Completed	3,364
Lee County	LC-19	Caloosahatchee Creeks	Hydrologic Restoration	Completed	4,251
Lee County	LC-20	Powell Creek Filter Marsh	Created wetland areas, boardwalks, and trails and a stabilized crossing of Powell Creek.	Future	1,693
Lee County	LC-21	Nalle Grade Stormwater Park	Dry Retention Pond	Future	300
Lee County	LC-22	Deep Lagoon Hydraulic Restoration	Hydrologic restoration and enhancement, water conservation, wildlife habitat enhancement, and flood protection for surrounding area	Completed	3,097
Lee County	LC-23	Popash Creek Restoration	Hydrologic restoration to a more natural flow regime by increasing water storage on the property and improving both on and off site flows	Completed	6,596
Lee County	LC-23	Billy's Creek Wetland	Billy Creek Filter Marsh Park	Completed	2,684
Lee County	-	-	**Total Projects Reduction**	-	**45,708**

CHARLOTTE COUNTY

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ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	STATUS	TN REDUCTION (LBS/YR)
Charlotte County	CH-1	Education Efforts	Fertilizer ordinance, pamphlets,	Completed	52
Charlotte County	**-**	**-**	**Total Projects Reduction**	**-**	**52**

FDOT

- = Empty cell/no data

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	STATUS	TN REDUCTION (LBS/YR)
FDOT	FDOT-1	Existing Stormwater Dry Ponds	Dry Detention	Completed	55
FDOT	FDOT-2	Discontinuing Fertilization	No longer fertilizing rights-of-way within watershed	Completed	1,941
FDOT	FDOT-3	Education Efforts	Pamphlets, PSAs, illicit discharge program	Completed	232
FDOT	FDOT-4	Street Sweeping	1,341.4 pavement miles swept annually	Completed	471
FDOT	FDOT-5	Ditch Blocked Swales	Swales w/ Ditch Blocks	Completed	826
FDOT	FDOT-6	Swales w/o Ditch Blocks	Swales w/o Blocks	Completed	4,949
FDOT	FDOT-7	Existing Stormwater Wet Ponds	Wet Detention	Completed	2,646
FDOT	FDOT-8	SR 78 Project	Wet Detention	Completed	264
FDOT	**-**	**-**	**Total Projects Reduction**	**-**	**11,384**

Appendix F: Glossary of Terms

303(d) List: The list of Florida's waterbodies that do not meet or are not expected to meet applicable water quality standards with technology-based controls alone.

305(b) Report: Section 305(b) of the federal Clean Water Act requires states to report biennially to the EPA on the quality of the waters in the state.

Allocation Technical Advisory Committee (ATAC): The Watershed Restoration Act of 1999 required FDEP to form a Technical Advisory Committee to address issues relating to the allocation of load reductions among point source and nonpoint source contributors. The ATAC was therefore formed in order to develop recommendations for a report to the legislature on the process for allocating TMDLs.

Background: The condition of waters in the absence of human-induced alterations.

Baffle box: An underground stormwater management device that uses barriers (or baffles) to slow the flow of untreated stormwater, allowing particulates to settle out in the box before the stormwater is released into the environment.

Baseline period: A period of time used as a basis for later comparison.

Baseline loading: The quantity of pollutants in a waterbody, used as a basis for later comparison.

Basin Management Action Plan (BMAP): The document that describes how a specific TMDL will be implemented; the plan describes the specific load and wasteload allocations as well as the stakeholder efforts that will be undertaken to achieve an adopted TMDL.

Basin Status Report: For the Pensacola Basin, this document was published in 2004 by FDEP. The report documents the water quality issues, list of water segments under consideration for a TMDL and data needs in the basin.

Best Available Technology (BAT) Economically Achievable: As defined by 40 CFR, §125.3, outlines technology-based treatment requirements in permits.

Best Management Practices (BMPs): Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

Coliforms: Bacteria that live in the intestines (including the colon) of humans and other animals, used as a measure of the presence of feces in water or soil.

Clean Water Act (CWA): The Clean Water Act is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants to waters of the United States.

Continuous deflective separation (CDS) Unit: A patented stormwater management device that uses the available energy of the storm flow to create a vortex to cause a separation of solids from fluids. Pollutants are captured inside the separation chamber, while the water passes out through the separation screen.

Designated use: Uses specified in water quality standards for each waterbody or segment (such as drinking water, swimmable, fishable).

Detention Pond: A stormwater system that delays the downstream progress of stormwater runoff in a controlled manner, typically by using temporary storage areas and a metered outlet device.

Domestic Wastewater: Wastewater derived principally from dwellings, business buildings, institutions and the like; sanitary wastewater; sewage.

Dry Season: The dry part of the year when rainfall is low; the dry season is defined as November through May.

Effluent: Wastewater that flows into a receiving stream by way of a domestic or industrial discharge point.

Environmental Protection Agency (EPA): The agency was created in December 1970 to address the nation's urgent environmental problems and to protect the public health. The majority of FDEP's regulatory programs has counterparts at the EPA or is delegated from the EPA.

Event mean concentration: The flow-weighted mean concentration of an urban runoff pollutant measured during a storm event.

Exfiltration: Loss of water from a drainage system as the result of percolation or absorption into the surrounding soil.

External loading: Pollutants originating from outside a waterbody that contribute to the pollutant load of the waterbody.

Flocculent: A liquid that contains loosely aggregated, suspended particles.

Florida Department of Environmental Protection (FDEP): FDEP is Florida's principal environmental and natural resources agency. The Florida Department of Natural Resources and the Florida Department of Environmental Regulation were merged together to create FDEP effective July 1, 1993.

Ground Water or Groundwater: Water below the land surface in the zone of saturation where water is at or above atmospheric pressure.

Impairment: The condition of a waterbody that does not achieve water quality standards (designated use) due to pollutants or an unknown cause.

Load Allocations (LA): The portions of a receiving water's loading capacity that are allocated to one of its existing or future nonpoint sources of pollution.

Load Capacity: The greatest amount of loading that a waterbody can receive without violating water quality standards.

Loading: The total quantity of pollutants in stormwater runoff that contributes to the water quality impairment.

Margin of safety (MOS): An explicit or implicit assumption used in the calculation of a TMDL, which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. An explicit MOS is typically a percentage of the assimilative capacity or some other specific amount of pollutant loading (e.g., the loading from an out-of-state source). Most FDEP-adopted TMDLs include an implicit MOS based on the fact that the predictive model runs incorporate a variety of conservative assumptions (they examine worst-case ambient flow conditions, worst-case temperature, and assume that all permitted point sources discharge at their maximum permittable amount).

National Pollutant Discharge Elimination System (NPDES): The permitting process by which technology based and water quality–based controls are implemented.

Nonpoint Source (NPS): Diffuse runoff without a single point of origin that flows over the surface of the ground by stormwater and is then introduced to surface or ground water. NPS includes atmospheric deposition and runoff or leaching from agricultural lands, urban areas, unvegetated lands, OSTDS, and construction sites.

Nonpoint Source Pollution: Nonpoint source pollution is created by the flushing of pollutants from the landscape by rainfall and the resulting stormwater runoff, or by the leaching of pollutants through the soils into the ground water.

Organic Matter: Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

Outfall: The place where a sewer, drain, or stream discharges.

Particulate: A minute separate particle, as of a granular substance or powder.

Pollutant Load Reduction Goals (PLRGs): PLRGs are defined as the estimated numeric reductions in pollutant loadings needed to preserve or restore designated uses of receiving waterbodies and maintain water quality consistent with applicable state water quality standards. PLRGs are developed by the water management districts.

Point Source: An identifiable and confined discharge point for one or more water pollutants, such as a pipe, channel, vessel, or ditch.

Pollutant: Generally any substance, such as a chemical or waste product, introduced into the environment that adversely affects the usefulness of a resource.

Pollution: An undesirable change in the physical, chemical, or biological characteristics of air, water, soil, or food that can adversely affect the health, survival, or activities of humans or other living organisms.

Removal efficiency: A description of how much of a given substance (metals, sediment, etc.) has been extracted from another substance.

Retention Pond: A stormwater management structure whose primary purpose is to permanently store a given volume of stormwater runoff, releasing it by infiltration and /or evaporation.

Reuse: The deliberate application of reclaimed water for a beneficial purpose. Criteria used to classify projects as "reuse" or "effluent disposal" are contained in Subsection 62-610.810, F.A.C.

Runoff curve: A calculated number representing the percentage of rainfall that becomes runoff for a given area.

Quality Assurance (QA): An integrated system of management activities involving planning, implementation, documentation, assessment, reporting, and quality improvement to ensure that a process, product, or service meets defined standards of quality.

Quality Control (QC): The overall system of technical activities that measures the attributes and performance of a process, product, or service against defined standards to verify that they meet the established data quality objectives.

Septic Tank: A watertight receptacle constructed to promote the separation of solid and liquid components of wastewater, to provide the limited digestion of organic matter, to store solids, and to allow clarified liquid to discharge for further treatment and disposal in a soil absorption system.

STORET: The EPA's STOrage and RETrieval database, used nationally for water quality data storage.

Stormwater: Water that results from a rainfall event.

Stormwater runoff: The portion of rainfall that hits the ground and is not evaporated, percolated, or transpired into vegetation, but rather flows over the ground surface seeking a receiving water body.

Submersed: Growing or remaining under water.

Surface Water: Water on the surface of the earth, whether contained in bounds created naturally or artificially or diffused. Water from natural springs is classified as surface water when it exits the spring onto the earth's surface.

Total Maximum Daily Load (TMDL): The sum of the individual wasteload allocations for point sources and the load allocations for nonpoint sources and natural background. Prior to determining individual wasteload allocations and load allocations, the maximum amount of a pollutant that a waterbody or waterbody segment can assimilate from all sources while still maintaining its designated use must first be calculated. TMDLs are based on the relationship between pollutants and instream water quality conditions.

Wasteload Allocations (WLAs): Pollutant loads allotted to existing and future point sources, such as discharges from industry and sewage facilities.

Wastewater: The combination of liquid and pollutants from residences, commercial buildings, industrial plants, and institutions, together with any ground water, surface runoff, or leachate that may be present.

Waterbody Identification (WBID) Numbers: WBIDs are numbers assigned to hydrologically based drainage areas in a river basin.

Water column: The water within a waterbody between the surface and sediments.

Water Quality Index: Determines the quality of Florida's streams, blackwaters, and springs. Categories include water clarity, dissolved oxygen, oxygen-demanding substances, nutrients, bacteria, and macroinvertebrate diversity.

Water Quality Standards (WQSs): (1) Standards that comprise the designated most beneficial uses (classification of water), the numeric and narrative criteria applied to the specific water use or classification, the Florida Anti-degradation Policy, and the moderating provisions contained in Rules 62-302 and 62-4, F.A.C. (2) State-adopted and EPA-approved ambient standards for waterbodies. The standards prescribe the use of the waterbody (such as drinking, fishing and swimming, and shellfish harvesting) and establish the water quality criteria that must be met to protect designated uses.

Watershed: Topographic area that contributes or may contribute runoff to specific surface waters or an area of recharge.

Watershed management approach: The process of addressing water quality concerns within their natural boundaries, rather than political or regulatory boundaries. The process draws together all the participants and stakeholders in each basin to decide what problems affect the water quality in the basin, which are most important, and how they will be addressed.

Wet Season: The rainy part of the year; the wet season is defined as June through October.

Appendix G: Bibliography of Key References and Websites

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STORMWATER AND WATER QUALITY PROTECTION WEBSITES

TABLE G-1: STORMWATER AND WATER QUALITY PROTECTION WEBSITES

- = Empty cell/no data

ENTITY/PROGRAM	URL
Local and Regional Sites	-
-	-
-	-
-	-
-	-
State Sites	-
General Portal for Florida	http://www.myflorida.com
FDEP	http://www.dep.state.fl.us/
Watershed Management	http://www.dep.state.fl.us/water/watersheds/index.htm
TMDL Program	http://www.dep.state.fl.us/water/tmdl/index.htm
BMPs, public information	http://www.dep.state.fl.us/water/nonpoint/pubs.htm
NPDES Stormwater Program	http://www.dep.state.fl.us/water/stormwater/npdes/index.htm
NPS funding assistance	http://www.dep.state.fl.us/water/nonpoint/319h.htm
Surface Water Quality Standards	http://www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf
Identification of Impaired Surface Waters Rule	http://www.dep.state.fl.us/legal/Rules/shared/62-303/62-303.pdf
Caloosahatchee Water Quality Assessment Report	http://www.dep.state.fl.us/water/basin411/caloosa/assessment.htm
STORET Program	http://www.dep.state.fl.us/water/storet/index.htm
2008 Integrated Report	http://www.dep.state.fl.us/water/docs/2008_Integrated_Report.pdf
Criteria for Surface Water Quality Classifications	http://www.dep.state.fl.us/water/wqssp/classes.htm
FDOH	http://www.doh.state.fl.us
Standards for OSTDS	http://tlhdwf2.dep.state.fl.us/basin411/caloosa/assessment/G3AS-CaloosaLowResMerge.pdf
National Sites	-
Center for Watershed Protection	http://www.cwp.org/
EPA Office of Water	http://www.epa.gov/water
EPA Region 4 TMDLs (southeast United States)	http://www.epa.gov/region4/tmdl/florida
EPA SSO Fact Sheet	http://www.epa.gov/npdes/sso/control/
EPA STORET Program	http://www.epa.gov/storet/