

2015 PROGRESS REPORT

for the Caloosahatchee Estuary Basin Management Action Plan

prepared by the
Division of Environmental Assessment and Restoration
Water Quality Restoration Program
Florida Department of Environmental Protection
Tallahassee, Florida 32399

with participation from the
Caloosahatchee Estuary Stakeholders

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ACKNOWLEDGMENTS

This 2015 Progress Report for the Caloosahatchee Estuary Basin Management Action Plan was prepared as part of a statewide watershed management approach to restore and protect Florida's water quality. It was prepared by the Florida Department of Environmental Protection with participation from the Caloosahatchee Estuary stakeholders.



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LIST OF ACRONYMS AND ABBREVIATIONS

ArcNLET	ARC Nitrogen Loading Estimation Tool
BMAP	Basin Management Action Plan
BMP	Best Management Practice
CDD	Community Development District
cfs	Cubic Feet Per Second
CHNEP	Charlotte Harbor National Estuary Program
CRE	Caloosahatchee River Estuary
DEP	Florida Department of Environmental Protection
DON	Dissolved Organic Nitrogen
ECWCD	East County Water Control District
LA-MSID	Lehigh Acres Municipal Services Improvement District
FDACS	Florida Department of Agriculture and Consumer Services
FDOT	Florida Department of Transportation
FYN	Florida Yards and Neighborhoods (Program)
lbs/yr	Pounds Per Year
MS4	Municipal Separate Storm Sewer System
NNC	Numeric Nutrient Criteria
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
OAWP	FDACS Office of Agricultural Water Policy
PSA	Public Service Announcement
SCCF	Sanibel-Captiva Conservation Foundation
SFWMD	South Florida Water Management District
STORET	STorage and RETrieval (Database)
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
EPA	United States Environmental Protection Agency
WOW	Wings Over Water (Festival)

SUMMARY

Total Maximum Daily Load (TMDL)

The Florida Department of Environmental Protection (DEP) identified the Caloosahatchee Estuary as impaired by nutrients (chlorophyll-*a*). In December 2009, DEP adopted the [Caloosahatchee Estuary TMDL](#) (the TMDL document appendices are found [here](#)) for total nitrogen (TN), which is linked to high chlorophyll-*a* concentrations in the Caloosahatchee River and Estuary downstream of the Franklin Lock and Dam.

The [Caloosahatchee Estuary Basin Management Action Plan](#) (BMAP) was adopted in November 2012 to implement the TN TMDL in the watershed. This is the third annual Progress Report for the Caloosahatchee Estuary BMAP, and it describes the activities that occurred during the reporting period from December 1, 2014, through November 30, 2015.

Summary of Load Reductions

During the reporting period, in addition to the ongoing projects and programs, the City of Cape Coral completed a septic-to-sewer project and the City of Fort Myers completed the Ford Street Preserve project, resulting in a reduction of 7,293 pounds per year (lbs/yr) of TN. In addition, the reductions from agricultural best management practice (BMP) implementation during the reporting period are 16,696 lbs/yr of TN. The reductions described here are in addition to those projects given credit before BMAP adoption and in previous annual reports. Therefore, the total reductions to date are 196,181 lbs/yr of TN, or 50% of the reductions needed to meet the portion of the TMDL allocated to the Caloosahatchee Estuary Basin. **Figure ES-1** shows progress towards the TN TMDL load reductions.

Water Quality and Biological Monitoring

Local entities (Cape Coral, Fort Myers, and Lee County) continued water quality monitoring consistent with the BMAP. The South Florida Water Management District (SFWMD) continued monitoring 10 stations in the BMAP monitoring plan, and DEP continued monitoring at 15 stations. In addition, the SFWMD conducted biological sampling for oysters and seagrass, and the DEP South District continued quarterly sampling for seagrass.

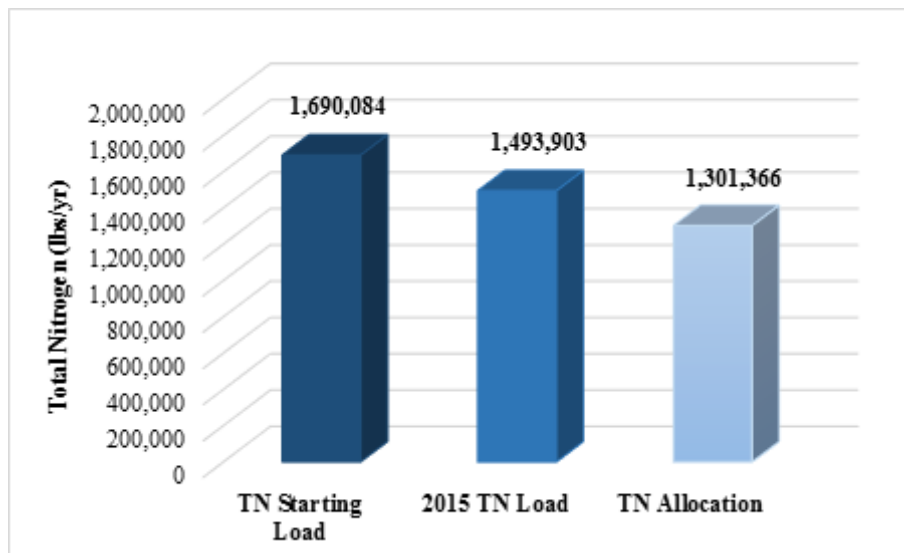


Figure ES-1: Progress towards the Caloosahatchee TN TMDL through November 30, 2015

Section 1: INTRODUCTION

1.1 Purpose of the Report

This is the third annual Progress Report for the Caloosahatchee Estuary Basin Management Action Plan (BMAP). **Section 2** describes the activities that occurred during the period from December 1, 2014, through November 30, 2015. **Section 3** describes the water quality and biological monitoring that occurred during the reporting period.

1.2 Total Maximum Daily Load (TMDL) for the Caloosahatchee Estuary Basin

The Florida Department of Environmental Protection (DEP) identified the Caloosahatchee Estuary (see **Figure 1**) as impaired by nutrients (chlorophyll-*a*). In December 2009, DEP adopted the [Caloosahatchee Estuary TMDL](#) (the appendices for the TMDL document can be found [here](#)) for total nitrogen (TN), which is linked to high chlorophyll-*a* concentrations in the Caloosahatchee River and Estuary downstream of the Franklin Lock and Dam.

1.3 Responsible Parties and Key Stakeholders

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

- Agriculture.
- Charlotte County.
- City of Cape Coral.
- City of Fort Myers.
- Lehigh Acres Municipal Services Improvement District (LA-MSID).
- Florida Department of Transportation (FDOT) District 1.
- Lee County.
- Lucaya Community Development District (CDD).

In addition to these entities, the Florida Department of Agriculture and Consumer Services (FDACS), DEP, and the South Florida Water Management District (SFWMD) are essential to the implementation of this BMAP.

During BMAP development, it was determined that assigning detailed allocations is the best approach for achieving the TMDL reductions.

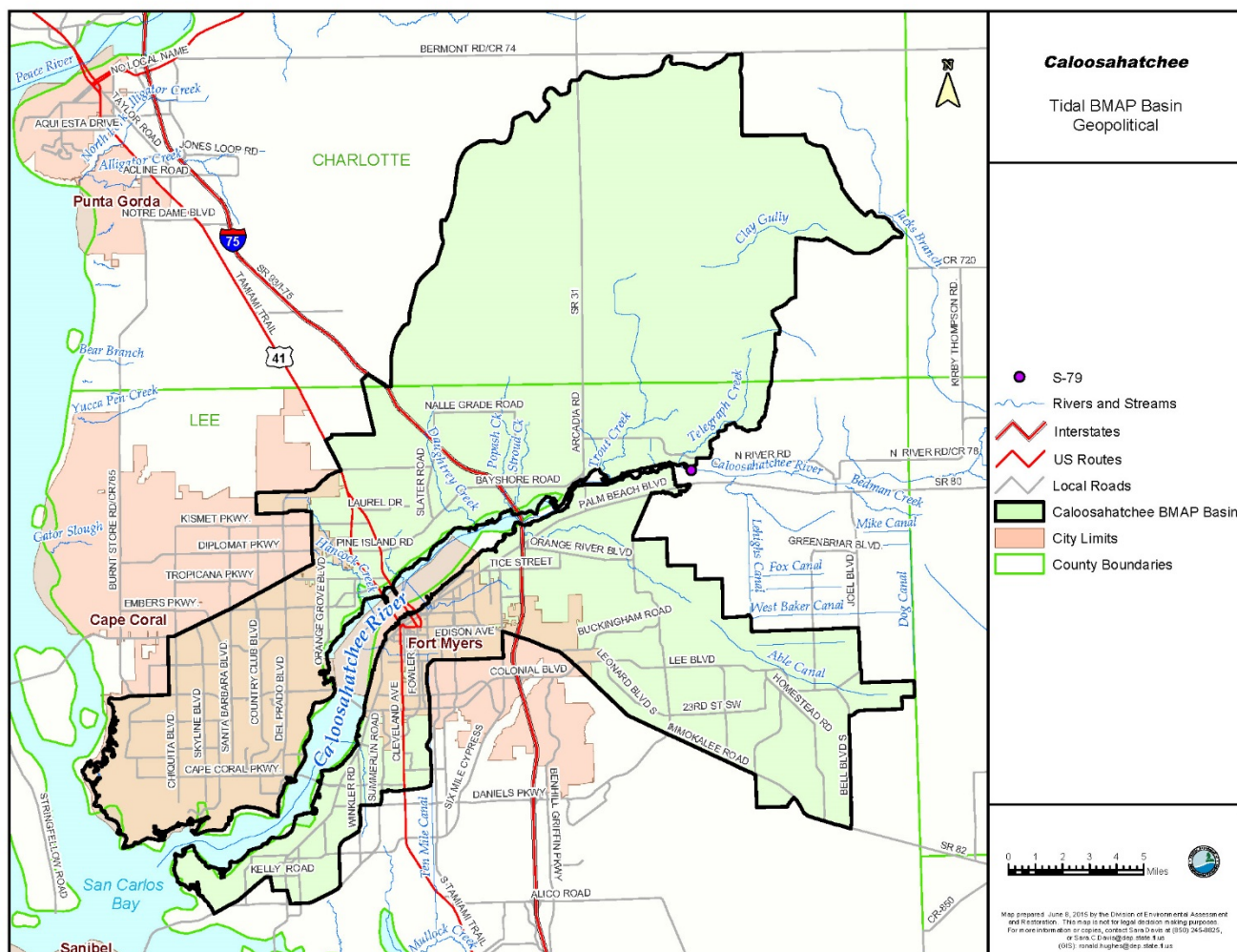


Figure 1: Caloosahatchee Estuary Basin

Section 2. ACTIVITIES DURING THE REPORTING YEAR

Section 2.1 and **Section 2.2** describe the accomplishments over the past year. New projects added to the individual project tables are described below, as are individual projects completed during the reporting period. Ongoing efforts such as street sweeping, ordinances, and public education efforts are not specifically described below but must continue each year for the project credit to remain effective.

Appendix A contains the individual project tables.

2.1 Activities by Entity

2.1.1 Cape Coral

The city completed a phase-out program to eliminate certain septic tank systems in the "Southwest 6/7" area and connected them to city sewer service (CC-15). This completed project has been added to the city's project table, but the nitrogen reductions have not been quantified using the ARC Nitrogen Loading Estimation Tool (ArcNLET) model.

2.1.2 Fort Myers

The Ford Street Preserve (FM-9) was completed on November 12, 2015. The preserve is a 5.81-acre created marsh providing water quality treatment for an 811-acre urban area. The project will reduce TN by 7,293 lbs/yr. The Ford Street Preserve was partially funded by a Section 319 grant (#G0345) and the Land and Water Conservation Fund (#12-00580). Fort Myers has now completed the projects in the Phase 1 BMAP project list and will investigate other alternatives and projects to continue reducing the TN load discharging from the city.

2.1.3 Lehigh Acres Municipal Services Improvement District (LA-MSID)

On June 10, 2015, the East County Water Control District (ECWCD) became LA-MSID. References in the BMAP document to the ECWCD now apply to LA-MSID.

LA-MSID conducted the fourth annual Wings Over Water (WOW) Festival on Friday, February 27, and Saturday, February 28, 2015, at Harns Marsh; more than 25 community partners participated. New this year were stations from Home Depot, Healthy Harvest, and Hickory Hammock Native Tree Farm. Over 400 people attended the event.

LA-MSID distributed approximately 2,500 brochures, bookmarks, and magnets throughout the reporting period, educating the public on stormwater pollution and water conservation. LA-MSID has designed

and printed pocket-sized educational tools covering fertilizers, conservation, and the proper disposal of pet waste and household waste. Approximately 2,000 cards have been passed out to date.

Joining in the Great American Cleanup Effort, LA-MSID staff partnered with the Sheriff's Office and Lehigh Acres Community Initiative by focusing on a canal cleanout effort in the Leonard area. For the last five years, LA-MSID has increased its [public outreach](#) and education efforts and secured grants and sponsorships for a majority of the outreach efforts.

2.1.4 Lee County

Lee County continued its street sweeping program during the reporting period, collecting 367 tons of material and removing 413 lbs/yr TN. Nalle Grade Stormwater Park (LC-21) is in Phase II, design and permitting. Lee County's consultant developed 6 conceptual designs for the Nalle Grade Stormwater Park in Phase I. Engineering staff have reviewed and selected one of the concepts (#6) based on the nutrient load reduction and cost-benefit analyses. The future load removal for Concept #6 is 2,485 lbs/yr TN and 357 lbs/yr total phosphorus (TP).

Lee County expanded the "Fertilize Smart" campaign entitled "Don't Feed the Monster" in 2015. This campaign includes an [updated website](#), a [social media site](#), brochure materials, and a [public service announcement \(PSA\) video featuring "The Slime Monster."](#) Lee County funded the placement of 197 Slime Monster spots on local television stations and placed billboards in four locations in Lee County.

Lee County performs proactive inspections to ensure compliance with its fertilizer ordinance. During the reporting period, 30 inspections were conducted, with 3 warning citations issued and 14 citations with fines, for a total of 17 violations. Lee County also carries out proactive inspections to identify and eliminate sources of illicit discharges, illicit connections, and dumping into the county's municipal separate storm sewer system (MS4).

Lee County also conducted vegetation harvesting during the reporting period. **Table 1** lists the total amounts of vegetation harvested in 2015.

Table 1: Lee County 2015 vegetation harvesting quantities

Project	Amount Harvested (cubic yards)
Powell Creek Extension	29
Powell Creek Filter Marsh	76
Popash Creek Preserve Filter Marsh	34
Prairie Pines Preserve	30
Yellow Fever Creek Preserve	3

2.1.5 SFWMD

While the SFWMD is not the lead agency on specific projects identified in the BMAP, it was involved in numerous restoration activities in the Caloosahatchee River Watershed that moved forward during the reporting period. **Section 4.1** lists agency highlights for advancements made in key district-led projects in the Caloosahatchee River Watershed during the reporting period, and further information on this past year's progress is reported in the [2016 South Florida Environmental Report \(SFER\)](#) (Volume I, Chapter 10).

2.1.6 Agriculture

In the SFWMD region, FDACS currently has seven field staff who work with producers on best management practice (BMP) enrollment and implementation. Some of the FDACS activities include initial enrollment, follow-up to provide technical assistance, BMP implementation assurance visits, the management of water quality- and water supply-related projects and contracts, and coordination with the SFWMD on agriculture-related permitting questions. Staff also participate in the development of the various BMAPs in the region.

FDACS updates its enrollment database quarterly. These quarters do not necessarily align with the reporting periods for the various BMAPs. For example, this annual Progress Report covers the reporting period from December 1, 2014, through November 30, 2015. However, the enrollment reflected is through September 30, 2015 (**Figure 2**). As of September 30, 2015, FDACS had enrolled 69,091.5 acres in BMPs (**Table 2**) based on the entire parcel acreage (**Figure 3**).

The acreage enrolled under the cow/calf BMP manual exceeds the total acreage identified as pasture in the 2004 SFWMD land use coverage. This exceedance is due to the inclusion of the entire Babcock Ranch property parcel, which includes nonagricultural as well as agricultural areas. DEP will work with FDACS to identify which lands on the Babcock Ranch property are in production and will update the estimated load reductions associated with BMP implementation in the next Progress Report. In the next BMAP iteration, the acreages assigned to various land uses will be adjusted to account for the agricultural activities on this property.

Applicable agricultural operations for BMP enrollment include citrus, cropland, improved pasture, and tree crops. According to 2004 land use data, these comprise 30,049 acres within the BMAP boundary. When looking at the portion of the enrolled acreage associated with these agricultural land uses, a total

of 18,480 acres was enrolled as of September 2015. The BMPs implemented on this acreage result in reductions of 45,786 lbs/yr of TN (**Table 3**).

Not all of the acreage listed as agriculture in **Table 2** is included in enrollment calculations, because the NOIs only document the estimated total number of acres on which applicable BMPs are implemented, not the land use acreage mapped as agriculture. Land use data can contain nonproduction acres (such as buildings, parking lots, and fallow acres) that will not be used in BMAP reduction calculations. There also may be acreage that is not appropriate for enrollment in the FDACS Office of Agricultural Water Policy (OAWP) BMPs, such as lands not in commercial production. **Table 3** summarizes the land use acreage mapped as agriculture where an NOI is on file with FDACS, the estimated TN reductions associated with those enrolled acres, and both the Phase I and overall enrollment progress in the BMAP basin.

2.2 Summary of Accomplishments

Table 4 summarizes the projects completed during the third annual BMAP reporting period. In addition, the reductions from agricultural BMP implementation were updated based on agricultural land uses in the 2004 SFWMD coverage and FDACS enrollment through September 2015. The new reductions associated with enrollments since the last annual Progress Report are 16,696 lbs/yr of TN. The Ford Street Preserve project resulted in a reduction of 7,293 lbs/yr of TN. These reductions are in addition to those projects given credit before BMAP adoption and in previous annual reports. Therefore, the total reductions to date are 196,181 lbs/yr of TN, or 50% of the reductions needed to meet the portion of the TMDL allocated to the Caloosahatchee Estuary Basin.

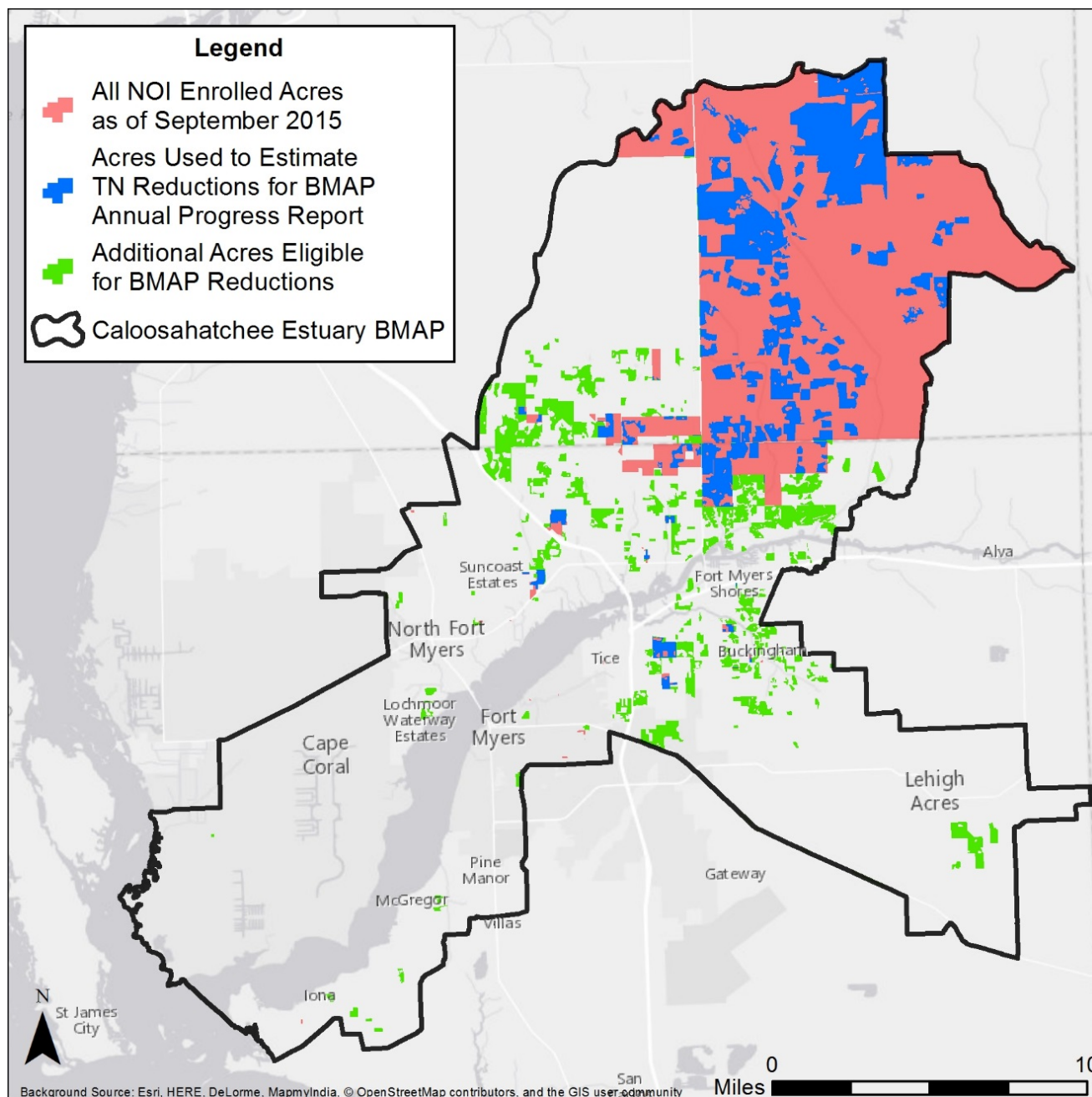


Figure 2: FDACS BMP Program enrollment progress as of September 30, 2015

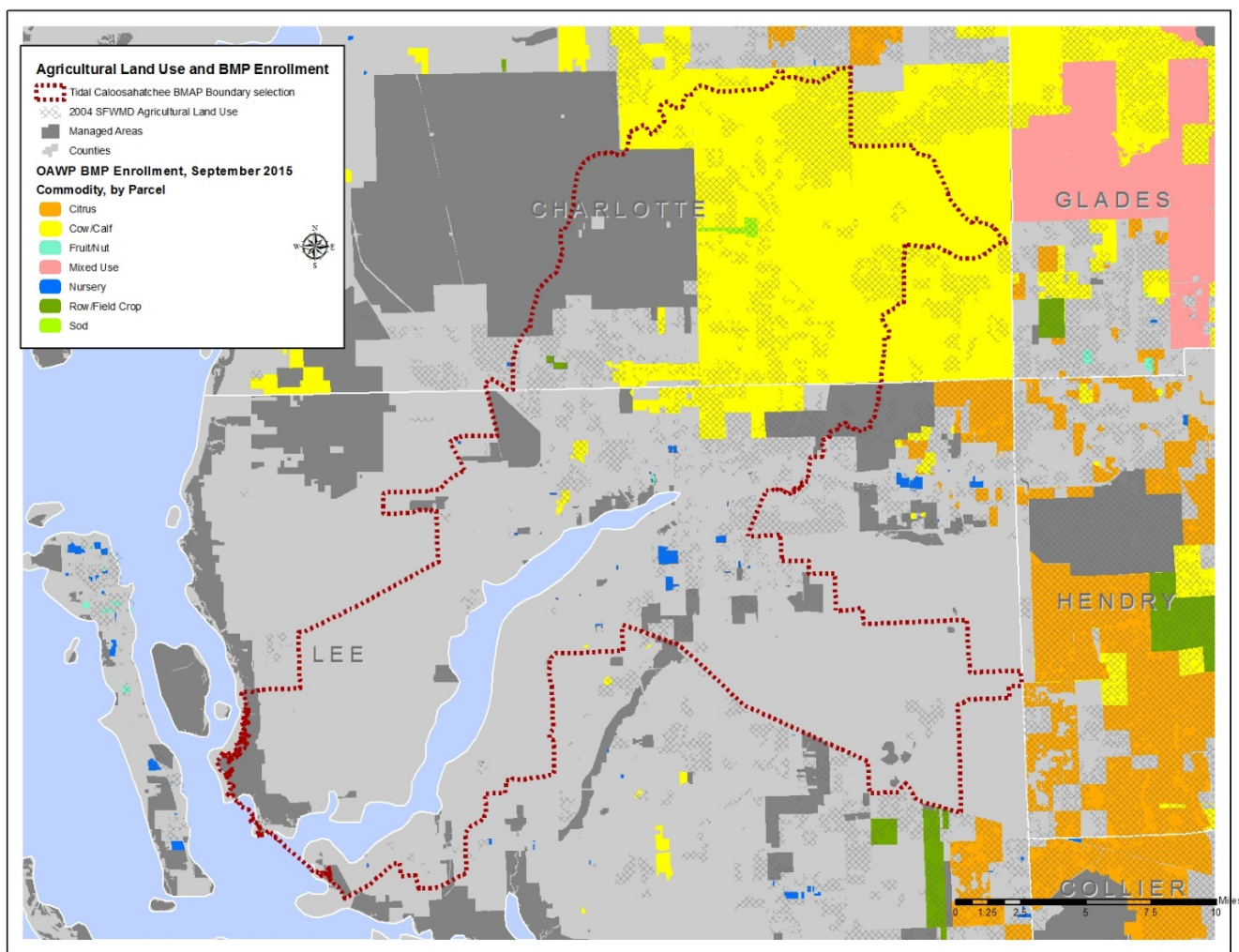


Figure 3: FDACS BMP Program enrollment by commodity as of September 2015

Table 2: Agricultural acreage and BMP enrollment for the Caloosahatchee Estuary Basin
¹ FDACS staff-adjusted acreage for the purposes of enrollment is based on a review of more recent aerial imagery in the basin and local staff observations.

² FDACS staff have observed no active dairy operations in the BMAP area, and this was confirmed by the FDACS Division of Animal Industry.

³ Acreage enrolled as part of the Babcock Ranch cow/calf operation was not classified as agricultural land use in the 2004 land use coverage.

Note: Figures do not include forestry or aquaculture.

N/A = Not applicable.

2004 SFWMD Land Use	2004 Acres ³	FDACS-Adjusted Acres for Enrollment ¹	Related FDACS BMP Programs	Acreage Enrolled	Related NOIs
Pasture (2100, 2110, 2120, 2130)	29,890.2	28,981.2	Cow/Calf, Vegetable and Agronomic Crops (hay)	68,262.6 ³	11
Row/Field/Mixed Crops	6,081.9	6,041.3	Vegetable/Agronomic Crops	120.0	1
Sod	N/A	N/A	Sod	453.6	1
Fallow Cropland	1,499.3	N/A	N/A	N/A	N/A
Horse Farm	24.3	24.3	Equine	N/A	N/A
Citrus	817.7	359.1	Statewide Citrus	19.1	1
Abandoned Groves	0.0	N/A	No Enrollment Needed	N/A	N/A
Fruit Orchards/Other Groves	154.1	154.1	Specialty Fruit and Nut	23.61	1
Tree Nurseries	230.3	230.3	Nursery, Specialty Fruit and Nut	0.0	0
Ornamentals	285.1	285.1	Container Nursery	212.6	24
Specialty Farms	67.2	67.2	Conservation Plan Rule	0.0	0
Dairies ²	37.9	37.9	Conservation Plan Rule	0.0	0
Total	39,088.0	36,181		69,091.5	39

Table 3: Summary of agricultural enrollment

Category	Acres
Total Agricultural Acres in BMAP	30,049
Enrolled Acres Used for TN Reduction Estimates	18,480
Estimated TN Reduction (lbs/yr)	45,785
BMAP Phase I FDACS Enrollment Goal (50% of FDACS-adjusted acres)	18,091
BMAP Phase I Remaining Acres To Enroll	0
Total Remaining Acres in BMAP Basin To Enroll	11,569

Table 4: Summary of projects completed in the reporting period (December 1, 2014–November 30, 2015)

N/A = Not applicable

- = No data/reductions not quantified

Entity	Project Number	Project Name	TN Reduction (lbs/yr)
Cape Coral	CC-15	Septic to Sewer in Southwest 6/7	-
Fort Myers	FM-9	Ford Street Preserve	7,293
Agriculture	N/A	Agricultural BMPs – New Reductions	16,696
Total			23,989

Figure 4 shows the progress towards the TN TMDL load reductions. The first bar shows the starting load for urban and agricultural stormwater runoff. The second bar shows the current estimated loading based on those projects shown as completed in the BMAP, those completed as part of the [2013](#) and [2014](#) Progress Reports, and those listed above. The third bar shows the total allocation for stormwater runoff to meet the TMDL.

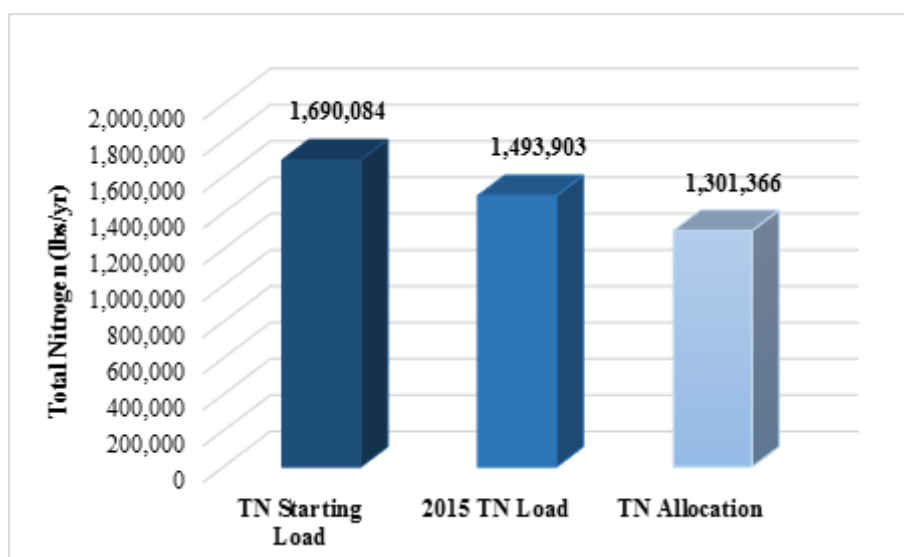


Figure 4: Progress towards the Caloosahatchee TN TMDL through November 30, 2015

Section 3: WATER QUALITY AND BIOLOGICAL MONITORING

The Caloosahatchee Estuary BMAP monitoring plan was designed to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track water quality trends. The information gathered through the monitoring plan will measure progress toward achieving the TMDL and provide a better understanding of watershed loading. The BMAP monitoring plan consists of ambient water quality sampling and biological monitoring. A few highlights of the BMAP monitoring efforts are described below.

3.1 Water Quality Monitoring

Cape Coral continued water quality monitoring in the basin and has been uploading the data to the Florida Storage and Retrieval (STORET) database. Fort Myers continued water quality monitoring in the basin. However, the results are not yet uploaded to STORET, and Fort Myers is working with a subcontractor to get the data into STORET as soon as possible. Lee County has increased water quality sampling efforts in the Caloosahatchee Estuary Basin to further pinpoint areas of nutrient loading to the Caloosahatchee. Additional samples were collected for the tributaries with the highest percentage of exceedances of the numeric nutrient criteria (NNC) in the past five years. The results from Lee County's monitoring have been uploaded to STORET.

The SFWMD continued monitoring at 10 stations in the BMAP area, and the monitoring data for the reporting period were provided to DEP for uploading into STORET. Further information on this monitoring and associated data results are also reported in the district's [2016 SFER](#) (Volume I, Chapter 10). The DEP South District has also continued water quality monitoring at 15 stations in the basin.

Appendix B provides the corrected list of stations in the BMAP monitoring network for easy reference.

In addition, Lee County, Fort Myers, Cape Coral, LA-MSID, Lucaya CDD, and FDOT District 1 are regulated under the National Pollutant Discharge Elimination System (NPDES) Phase I MS4 program. The Lee County Environmental Lab performs ambient water quality monitoring to support the Lee County Division of Natural Resources Surface Water Master Plan and for NPDES MS4 permit and BMAP compliance. These data are available for the Lee County NPDES co-permittees to use in their respective annual reports. Charlotte County is regulated under a Phase II MS4 permit.

3.2 Biological Monitoring

As summarized in **Table 5**, the SFWMD continued its biological sampling for oysters and seagrass over the past year. Seagrass monitoring focused on the period between March and September, and two sites were also monitored in December. Oysters at all four sites were monitored monthly. The DEP South District continues to carry out seagrass monitoring in the basin at the stations listed in **Table 6**.

Table 5: SFWMD biological monitoring

¹ Twenty randomly generated points in the upper CRE. Points are generated monthly depending on the previous month's results.

² Three-meter x three-meter quadrant divided into nine square-meter quadrants.

Project	Station Name	Sampling Frequency
Estuary Patch Scale Seagrass Monitoring	Upper CRE1	March, May, July, and September – 20 Quadzilla ^{1,2}
Estuary Patch Scale Seagrass Monitoring	CRE_2	March, April, May, June, July, August, September, and December – 30 Quads
Estuary Patch Scale Seagrass Monitoring	CRE_4	March, May, July, and September – 30 Quads
Estuary Patch Scale Seagrass Monitoring	CRE_5	March, May, July, and September – 30 Quads
Estuary Patch Scale Seagrass Monitoring	CRE_6B	March, May, July, and September – 30 Quads
Estuary Patch Scale Seagrass Monitoring	CRE_7	March, May, July, and September – 30 Quads
Estuary Patch Scale Seagrass Monitoring	CRE_8	March, April, May, June, July, August, September, and December – 30 Quads
Oyster Monitoring	Pepper Tree Pointe	Monthly: Recruitment, growth, predation, disease, reproductive condition
Oyster Monitoring	Iona Cove	Monthly: Recruitment, growth, predation, disease, reproductive condition. Twice yearly: Density, size
Oyster Monitoring	Bird Island	Monthly: Recruitment, growth, predation, disease, reproductive condition. Twice yearly: Density, size
Oyster Monitoring	Kitchel Key	Monthly; Recruitment, growth, predation, disease, reproductive condition. Twice yearly: Density, size

Table 6: DEP South District biological monitoring

Project	Station Name	Sampling Frequency
Seagrass Monitoring	CR02	Quarterly
Seagrass Monitoring	CR04	Quarterly
Seagrass Monitoring	CR05	Quarterly
Seagrass Monitoring	SC03	Quarterly
Seagrass Monitoring	MP04	Quarterly
Seagrass Monitoring	MP05	Quarterly

Section 4: ACTIVITIES UPSTREAM OF THE ESTUARY BMAP

An effort is under way to develop a watershed model for the entire Caloosahatchee Watershed and Estuary. Model results are expected to be available by March 2017, and may be used to refine existing TMDLs or develop new TMDLs. DEP is currently planning to expand the existing BMAP to encompass the Caloosahatchee Watershed, and this section includes some efforts and activities located in the anticipated expanded BMAP area.

4.1 SFWMD

While the SFWMD is not the lead agency on any specific projects identified in the BMAP, it was involved numerous restoration activities in the Caloosahatchee River Watershed and one in-estuary project that moved forward during the reporting period. Regional projects with both water storage and water quality benefits also progressed. The following lists agency highlights for advancements made in key District-led projects in the Caloosahatchee River Watershed during the reporting period (further information on this past year's progress is also reported in the 2016 *SFER* (Volume I, Chapter 10).

4.1.1 Caloosahatchee River (C-43) West Basin Storage Reservoir Project

The purpose of this project is to aid in capturing regulatory releases from Lake Okeechobee and to collect and store runoff from the basin that is currently discharged to the river. Water will be released when needed during the dry season to help provide essential flows that will result in a more stable salinity regime. In August 2015, the SFWMD issued the first of four construction packages for Phase 1, including the preloading and demolition work, authorizing the start of early construction on this massive storage reservoir project.

4.1.2 C-43 Water Quality Treatment and Testing Facility Project

The SFWMD and Lee County are partners in the development and implementation of this project (**Figure 5**). The project goals are to demonstrate and implement cost-effective, wetland-based strategies for reducing pollutant loadings to the Caloosahatchee River and its downstream estuarine ecosystems, particularly the recalcitrant fraction of dissolved organic nitrogen (DON) that is more difficult to remove than other forms ordinarily found in fertilizers. Phase I, initiated in 2015, includes bioassays and mesocosms. Bioassays are being performed to determine the fraction of biologically available DON in the Caloosahatchee River. These results will inform the mesocosm design. Mesocosms will be employed to assess potential surface water nitrogen removal rates using different plant communities and

hydrologic loading rates. The design of Mesocosm I was completed in 2015, and construction commenced in March 2016.



Figure 5: C-43 Canal water quality treatment and testing facility project location

4.1.3 Lake Hicpochee Hydrologic Enhancement – North Project (Phase 1)

The objectives of this project are to provide shallow-water storage, rehydrate a portion of the lake bed to promote habitat restoration, and increase capacity for ancillary water quality enhancements. The project includes a shallow storage feature and a spreader canal to deliver excess stormwater runoff from the C-19 Canal to the northern portion of Lake Hicpochee as needed. The final engineering design has been completed, and the final regulatory authorizations for Phase 1 of this project are anticipated in 2016.

4.1.4 Tape Grass Restoration Pilot Study

Tape grass (*Vallisneria americana*) beds in the upper Caloosahatchee Estuary serve as a key indicator of estuarine health. The beds provide critical shallow-water habitat for fish, shellfish, and other estuarine organisms and provide a number of water quality benefits. Research has demonstrated that herbivory (grazing by turtles and other organisms) prevents the grass beds from becoming reestablished. As has been found in other rivers and estuaries, protecting tape grass from grazing using exclosure cages allows plants to grow. The three-year pilot study tests the efficacy of using exclosure cages to establish founder populations that can serve as a seed source for re-establishing tape grass beds and ultimately achieving sustainable populations.

4.2 Lee County

4.2.1 Fichter's Creek Restoration Project

Fichter's Creek is located in northeast Lee County and southern Charlotte County. The watershed extends over an area of 4,577 acres, much of which is located within the Bob Janes Preserve, formerly the Babcock Ranch, to the north and terminates at the Caloosahatchee River in Caloosahatchee Regional Park (**Figure 6**). During a dredging project for the Caloosahatchee River, fill was placed on what is now Caloosahatchee Regional Park, and a ditch was constructed to divert runoff from the creek to the Caloosahatchee River.

The Lee County Division of Natural Resources and Community Engineering Services, Inc. are undertaking the Fichter's Creek Restoration Project. A goal of this project is to restore the appropriate hydroperiod and water quality in Fichter's Creek to maintain a functioning ecosystem. Additional benefits include alleviating the flooding risk for neighboring properties in the vicinity of Fichter's Creek. A 31-acre dry prairie is targeted to hold a 3.2-acre lake and 3 dry detention areas, totaling 7 acres associated with this project. According to Lee County, the Fichter's Creek restoration will reduce TN loading by 1,453 lbs/yr.

4.2.2 Spanish Creek at Daniels Preserve Restoration Project

Spanish Creek Restoration at Daniels Preserve is a 243-acre parcel purchased through the Conservation 20/20 Program in 2005 (**Figure 7**). The preserve is located in Alva in northeast Lee County, approximately 1 mile north of the Caloosahatchee River. The project is expected to increase the wetland hydroperiod in Daniels Preserve, providing increased sheet flow attenuation. This will improve water quality by increasing the residence time of surface waters in wetlands, as well as improving groundwater recharge in the area. According to Lee County, the project will reduce TN by 112 lbs/yr.

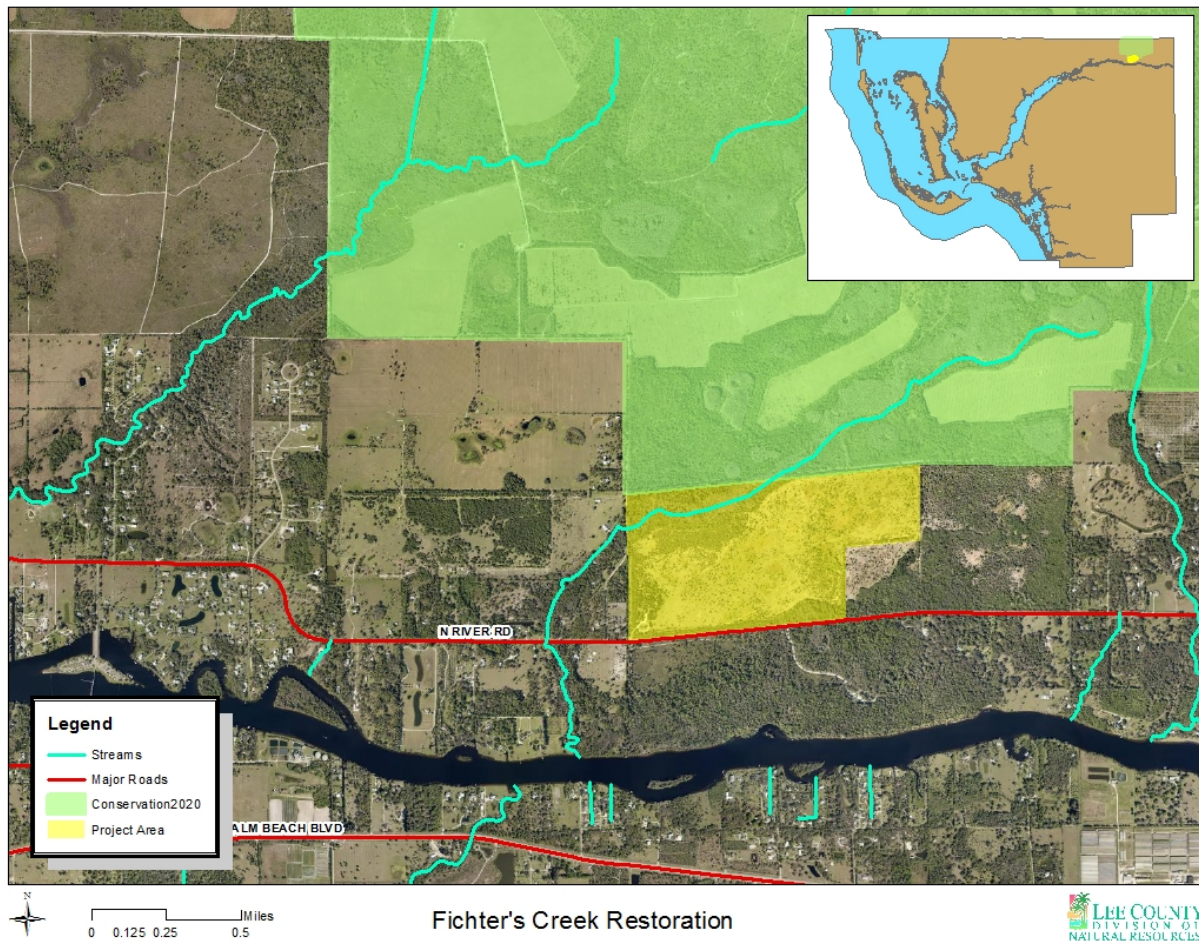
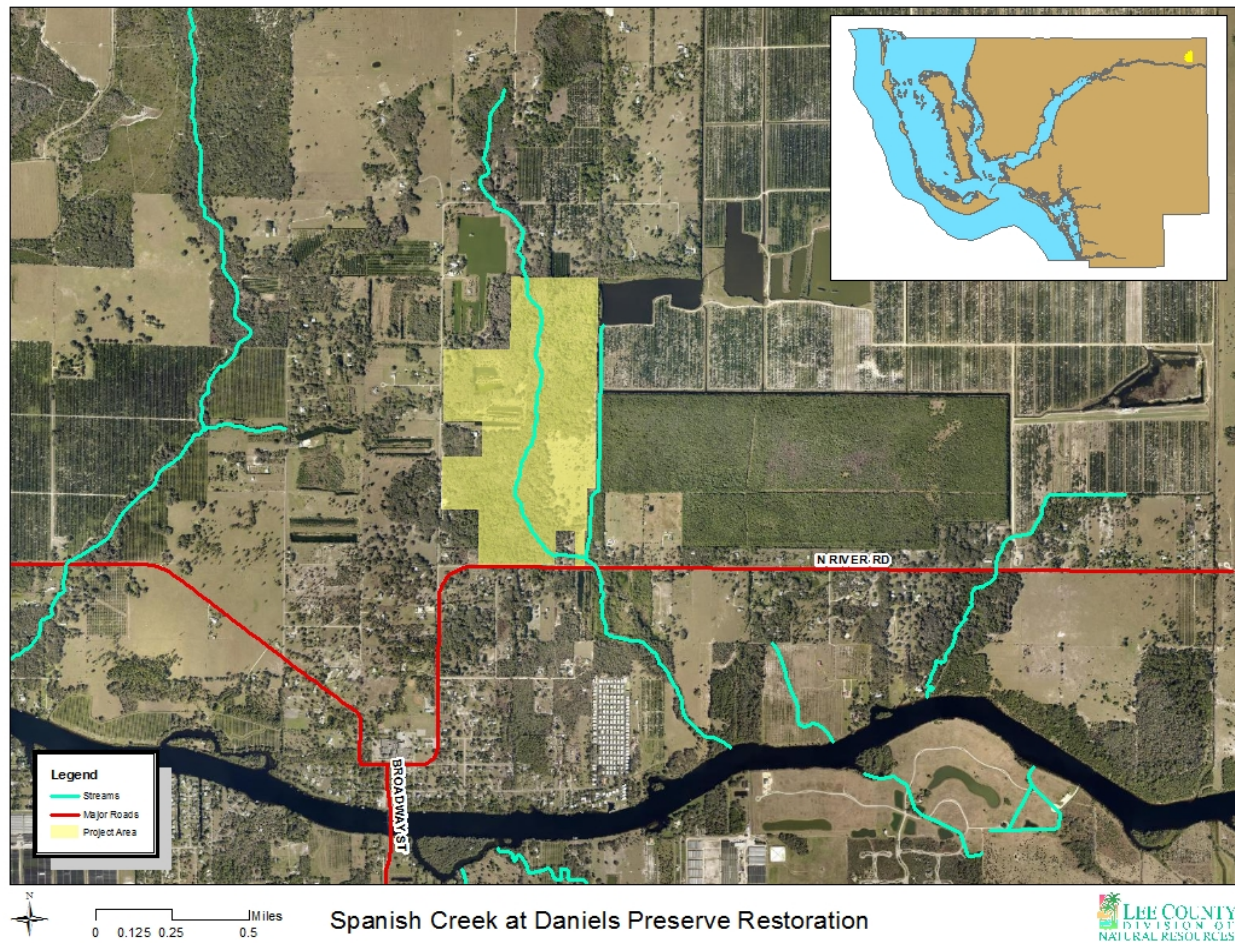


Figure 6: Fichter's Creek restoration project location



APPENDICES

APPENDIX A: BMAP PROJECTS

The BMAP project tables in this appendix show the implementation status of the BMAP projects as of November 30, 2015. The tables list (in lbs/yr) the nutrient reduction attributable to each individual project. These projects were submitted to provide reasonable assurance to DEP that each entity has a plan on how to meet its allocation. However, the 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 period.

Table A-1: Charlotte County projects

N/A = Not applicable

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
CH-1	Education Efforts	Fertilizer ordinance, pamphlets	Education Efforts	Ongoing	N/A	52

Total Project Reduction = 52 lbs/yr

Total TN Reduction Required = 943 lbs/yr

Table A-2: City of Cape Coral projects

¹ Projects were listed but had unproven credit.

- = No data/project reduction unknown.

N/A = Not applicable

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
CC-1	Education Efforts	Florida Yards and Neighborhoods (FYN), landscaping ordinance, irrigation ordinance, fertilizer ordinance, pet waste ordinance, pamphlets, PSAs, website, illicit discharge program	Education Efforts	Ongoing	N/A	15,429
CC-2	SE-1 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality improvement in roadside swales		Completed		0 ¹
CC-3	SW-1 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality improvement in roadside swales		Completed		0 ¹
CC-4	SW-2 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality improvement in roadside swales		Completed		0 ¹
CC-5	SW-3 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality improvement in roadside swales		Completed		0 ¹
CC-6	SW-4 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality improvement in roadside swales		Completed		0 ¹
CC-7	SW-5 Swale/ Inlet Replacement	Installed raised inlets to provide additional water quality improvement in roadside swales		Completed		0 ¹

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
CC-8	SE Pipe Replacement	SE pipe replacement		Completed		0 ¹
CC-9	Unit 23-SE 8th Street Drainage	Unit 23-SE 8th Street drainage		Completed		0 ¹
CC-10	Freshwater Canal Detention	Regulation of freshwater canals through existing control structures		Completed		4,769
CC-11	Freshwater Canal Irrigation	Pump stormwater stored in canals into irrigation supply network	Reclaimed Water	Completed		11,507
CC-12	Weir #6 Elevation/Basin 12	Installed riser on weir in freshwater canal system that provides additional retention volume in canals		Completed		7,597
CC-13	Weir #1 Elevation/Basin 15	Installed riser on weir in freshwater canal system that provides additional retention volume in canals		Completed		8,184
CC-14	Street Sweeping	Street sweeping of downtown area, alleys, and commercial roads	Street Sweeping	Ongoing	N/A	676
CC-15	Septic to Sewer Phase Out Project	Phase out septic tanks in Southwest 6/7 area	Septic to Sewer Conversion	Completed		-

Total Project Reduction = 48, 162 lbs/yr

Total TN Reduction Required = 103,414 lbs/yr

Table A-3: City of Fort Myers projects

N/A = Not applicable

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
FM-1	Manuels Branch Watershed Imp.	Exfiltration trenches	Exfiltration Trench	Completed	124.60	836
FM-2	Education Efforts	FYN, fertilizer ordinance, pamphlets, PSAs, website, illicit discharge program	Education Efforts	Ongoing	N/A	2,101
FM-3	Utility and Streetscape Improvements	Installation of Stormceptors™	Stormceptor	Completed	117.90	40
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	642.70	1,078
FM-5	Manuels Branch Control Structures	Series of two weirs constructed along Manuel's Branch between Royal Palm Avenue and Grand Avenue. These act as detention structures to increase storage and attenuation in canal.		Completed	437.90	2,202
FM-6	Billy's Creek Wetland	Billy Creek Filter Marsh Park	Treatment Wetlands	Completed	1,631.60	4,025
FM-7	Brookhill Utility Drainage Improvement	Installation of Stormceptors™	Stormceptor	Completed		11
FM-8	Street Sweeping	Four zones swept at varying frequencies based on pollutant accumulation	Street Sweeping	Ongoing	N/A	2,582
FM-9	Ford Street Preserve	Constructed wetland treatment system to remove pollutants from Ford Street Canal, which serves 811 acres of highly urbanized watershed	Treatment Wetlands	Completed		7,293
FM-10	Riverfront Development Phase 1	Wet detention	Wet Detention Pond	Completed		90
FM-11	Carrell Canal Water Quality Retrofit	2 detention areas, 5 filter marshes, and golf course renovation	Treatment Train	Completed		1,275

Total Project Reduction = 21,533 lbs/yr

Total TN Reduction Required = 40,924 lbs/yr

Table A-4: LA-MSID projects

N/A = Not applicable

Note: On June 10, 2015, the ECWCD became LA-MSID. Projects in the BMAP document beginning with "EC-" now apply to LA-MSID.

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
EC-1	Education/Fertilizer	Education	Education Efforts	Ongoing	N/A	1,646
EC-2	Freshwater Canal Detention	Regulation of freshwater canals through existing control structures		Completed	32,982.00	7,940
EC-3	Weir Elevation Improvements	Replacement of weir structures at increased control elevations to provide additional attenuation		Completed	32,982.00	7,543
EC-4	Harn's Marsh Phases I & II	Replacement of weir structures and redirection of flows into filter marsh		Completed	462.00	4,682
EC-5	Jim Flemming Eco-Park	Wetland rehydration and treatment	Hydraulic Restoration	Completed		0
EC-6	Mirror Lake Phase I	Detention pond	Detention Pond	Completed		1,357

Total Project Reduction = 23,168 lbs/yr

Total TN Reduction Required = 37,736 lbs/yr

Table A-5: FDOT projects

N/A = Not applicable

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
FDOT-1	Existing Stormwater Dry Ponds	Dry detention	Dry Detention Pond	Completed		55
FDOT-2	Discontinuing Fertilization	No longer fertilizing rights-of-way in watershed	Fertilizer Elimination	Completed	465.00	1,941
FDOT-3	Education Efforts	Pamphlets, PSAs, illicit discharge program	Education Efforts	Ongoing	N/A	232
FDOT-4	Street Sweeping	2,992 pavement miles swept annually	Street Sweeping	Ongoing	N/A	944
FDOT-5	Ditch Blocked Swales	Swales with ditch blocks		Completed		826
FDOT-6	Swales w/o Ditch Blocks	Swales without ditch blocks		Completed		4,949
FDOT-7	Existing Stormwater Wet Ponds	Wet detention	Wet Detention Pond	Completed		2,646
FDOT-8	SR 78 Project	Wet detention	Wet Detention Pond	Completed	79.50	264

Total Project Reduction = 11,857 lbs/yr

Total TN Reduction Required = 9,119 lbs/yr

Table A-6: Lucaya CDD projects

N/A = Not applicable

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
LU-1	Education/Fertilizer	Education	Education Efforts	Completed	N/A	0

Total Project Reduction = 0 lbs/yr

Total TN Reduction Required = 132 lbs/yr

Table A-7: Lee County projects

N/A = Not applicable

TBD = To be determined

¹ Project was listed but had unproven credit.

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
LC-1	Yellow Fever Creek Preserve	Purchase and conversion to conservation lands		Completed	215.0	32
LC-2	Billy's Creek Preserve	Purchase and conversion to conservation lands		Completed	50.7	17
LC-3	Six Mile Cypress Preserve	Purchase and conversion to conservation lands		Completed	1,219.0	13
LC-4	Bob Jane's Preserve	Conservation purchase	Conservation	Completed	1,978.9	0 ¹
LC-5	Buckingham Trails Preserve	Purchase and conversion to conservation lands		Completed	575.5	13
LC-6	Caloosahatchee Cks Preserve	Purchase and conversion to conservation lands		Completed	911.3	15
LC-7	Deep Lagoon Preserve	Purchase and conversion to conservation lands		Completed	117.0	3
LC-8	Hickory Swamp Preserve	Purchase and conversion to conservation lands		Completed	67.2	3
LC-9	Orange River Preserve	Purchase and conversion to conservation lands		Completed	59.1	3
LC-10	Prairie Pines Preserve	Purchase and conversion to conservation lands		Completed	330.9	3
LC-11	Telegraph Creek Preserve	Conservation purchase	Conservation	Completed	1,715.1	0 ¹
LC-12	West Marsh Preserve	Purchase and conversion to conservation lands		Completed	218.1	3
LC-13	Yellow Fever Creek Preserve	Conservation purchase	Conservation	Completed	117.8	0 ¹
LC-15	Education Efforts	FYN, landscaping ordinance, irrigation ordinance, fertilizer ordinance, pamphlets, PSAs, website, illicit discharge program	Education Efforts	Ongoing	N/A	20,445
LC-16	Street Sweeping	367 tons of material collected	Street Sweeping	Ongoing	N/A	413

Project Number	Project Name	Description	Project Type	Project Status	Acres Treated	TN Reduction (lbs/yr)
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	Hydraulic Restoration	Completed	397.1	2,976
LC-18	Whiskey Creek Weir Reconstruction	Retention lake weir repairs to restore originally intended design and operation		Completed	549.6	3,364
LC-19	Caloosahatchee Creeks	Hydrologic restoration	Hydraulic Restoration	Completed	6,567.4	4,251
LC-20	Powell Creek Filter Marsh	Created wetland areas, boardwalks, and trails and stabilized crossing of Powell Creek.	Treatment Wetlands	Completed	1,169.6	1,693
LC-21	Nalle Grade Stormwater Park	Dry retention pond	Dry Retention Pond	Future	659.6	300
LC-22	Deep Lagoon Hydraulic Restoration	Hydrologic restoration and enhancement, water conservation, wildlife habitat enhancement, and flood protection for surrounding area	Hydraulic Restoration	Completed	1,022.1	3,097
LC-23	Popash Creek Restoration	Hydrologic restoration to more natural flow regime by increasing water storage on property and improving both onsite and offsite flows	Hydraulic Restoration	Completed	3,517.0	6,596
LC-24	Billy's Creek Wetland	Billy Creek Filter Marsh Park	Filter Marsh	Completed		2,684
LC-25	Caloosahatchee Creek Preserve Restoration	Hydrologic restoration	Hydraulic Restoration	Future		TBD
LC-26	Yellow Fever Creek –Gator Slough Transfer Facility	Return historical flow from Gator Slough canal system to Yellow Fever Creek	Hydraulic Restoration	Future		TBD

Total Project Reduction = 45,624 lbs/yr

Total TN Reduction Required = 140,853 lbs/yr

Table A-8: FDACS NOI enrollment reduction estimates as of September 2015

2004 SFWMD Land Use	Acreage	TN Load Delivered (lbs/yr)	TN Reduction Estimate	TN Reduction (lbs/yr)
Citrus	142	2,909	10%	291
Cropland/improved pasture/tree crops	18,338	181,978	25%	45,494
Total	18, 480	184,887		45,785

Total TN Reduction Required = 55,597 lbs/yr

APPENDIX B: REVISED MONITORING NETWORK

The monitoring stations listed in this appendix 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 must not affect the ability of the monitoring network to fulfill the objectives noted below.
- **Tier 2:** Stations that are currently sampled either in the BMAP basin or in a tributary contributing to the overall load. These stations will help in understanding the total load in the watershed, and DEP supports the continued monitoring.
- **Tier 3:** Nonstakeholder sampling stations. Data from these stations are extremely useful, and DEP supports continued monitoring.
- **Tier 4:** State of Florida (DEP/SFWMD) sampling stations.

Table B-1: Revised monitoring network

*Data from stations that are currently listed as NPDES outfall stations will not be included in any ambient monitoring analysis.

** Discontinued April 1, 2013

Agency	Tier	NPDES Outfall*	River or Watershed Station	Site Name
City of Cape Coral	2		Watershed	210
City of Cape Coral	2		River	242
City of Cape Coral	2		Watershed	243
City of Cape Coral	2		Watershed	262
City of Cape Coral	2		Watershed	275
City of Cape Coral	2		Watershed	280
City of Cape Coral	2		Watershed	290
City of Cape Coral	2		Watershed	295
City of Cape Coral	1		Watershed	300
City of Cape Coral	2		Watershed	310
City of Cape Coral	2		Watershed	315
City of Cape Coral	1		River	350
City of Cape Coral	2		Watershed	355
City of Cape Coral	2		Watershed	390
City of Cape Coral	1		Watershed	400

Agency	Tier	NPDES Outfall*	River or Watershed Station	Site Name
City of Cape Coral	2		Watershed	430
City of Cape Coral	1		Watershed	470
City of Cape Coral	2		Watershed	510
City of Cape Coral	1		Watershed	540
City of Cape Coral	2		Watershed	550
City of Cape Coral	1		Watershed	590
City of Cape Coral	1		Watershed	600
City of Ft. Myers	2		Watershed	BCP1-10
City of Ft. Myers	2		Watershed	BCP4-10
City of Ft. Myers	2		Watershed	CFMBILLY3
City of Ft. Myers	2		Watershed	CFMBILLY6
City of Ft. Myers	2		Watershed	CFMCARRELL
City of Ft. Myers	1		Watershed	CFMMANUEL
City of Ft. Myers	1		Watershed	CFMWINKLER
DEP	4		River	28020110
DEP	4		River	28020111
DEP	4		River	CALUSA0005FTM
DEP	4		River	CALUSA0006FTM
DEP	4		River	CALUSA0007FTM
DEP	4		River	CALUSA0008FTM
DEP	4		River	CALUSA0009FTM
DEP	4		River	CALUSA0010FTM
DEP	4		River	CALUSA0011FTM
DEP	4		River	CALUSA0012FTM
DEP	4		River	CALUSA0013FTM
DEP	4		River	CALUSA0014FTM
DEP	4		Watershed	CALUSA0023FTM (former 28020109)
DEP	4		Watershed	CALUSA0024FTM
DEP	4		Watershed	CALUSA0025FTM
Lee County	2		Watershed	16-18GR
Lee County	1		Watershed	16-3GR
Lee County	1		Watershed	18-6GR
Lee County	2		Watershed	20-29GR
Lee County	1		Watershed	20-9GR
Lee County	2		Watershed	20A-11GR
Lee County	2		Watershed	20A-19GR
Lee County	2		Watershed	21-7GR
Lee County	2		Watershed	22-18GR
Lee County	2		Watershed	22-7GR
Lee County	2		Watershed	23-27GR
Lee County	1		Watershed	23-5GR

Agency	Tier	NPDES Outfall*	River or Watershed Station	Site Name
Lee County	2		Watershed	24-19GR
Lee County	1		Watershed	24-7GR
Lee County	2		Watershed	25-GR20
Lee County	2		Watershed	26-GR20
Lee County	1		Watershed	27-6GR
Lee County	1		Watershed	27O-GR20
Lee County	1		Watershed	28-5GR
Lee County	1		Watershed	29-8GR
Lee County	2		Watershed	40-18GR
Lee County	2		Watershed	40-32GR
Lee County	2		Watershed	BILLGR20
Lee County	2	Yes	Watershed	BILLGR60
Lee County	1		Watershed	DEEPGR10
Lee County	1		Watershed	DEEPGR50
Lee County	2		Watershed	DEEPGR90
Lee County	2		Watershed	GATOR91
Lee County	1		River	PI-01
Lee County	1		River	PI-02
Lee County	2		River	PI-13
Lee County	1		River	PI-14
Lee County	1		Watershed	POWLGR20
Lee County	1	Yes	Watershed	POWLGR51
Lee County	2		Watershed	POWLGR81
Lee County	1	Yes	Watershed	WHISGR10
Lee County	2	Yes	Watershed	WHISGR50
Lee County	2	Yes	Watershed	YFC-CI
Sanibel-Captiva Conservation Foundation (SCCF)	3		River	RECON-Fort Myers
SCCF	3		River	RECON-Gulf of Mexico
SCCF	3		River	RECON-Shell Point
SCCF	3		River	RECON-Tarpon Bay
SFWMD	4		River	CES03
SFWMD	4		River	CES04
SFWMD	4		River	CES05
SFWMD	4		River	CES06
SFWMD	4		River	CES07
SFWMD	4		River	CES08
SFWMD	4		River	CES09
SFWMD	4		River	CES11
SFWMD	4		River	ROOK471 (former Point Ybel)
SFWMD	4		River	S79
U.S. Geological Survey (USGS)	3		Watershed	Billy's Creek**

Agency	Tier	NPDES Outfall*	River or Watershed Station	Site Name
USGS	3		River	Caloosahatchee River at Marker #52**
USGS	3		River	Caloosahatchee River at Punta Blanca**
USGS	3		River	Caloosahatchee River at Shell Point**
USGS	3		Watershed	Hancock Creek**
USGS	3		River	McIntyre Creek at Sanibel Island
USGS	3		Watershed	Orange River**
USGS	3		Watershed	Popash Creek**
USGS	3		Watershed	Telegraph Creek**
USGS	3		Watershed	Whiskey Creek