

2013 PROGRESS REPORT

for the Caloosahatchee Estuary Basin Management Action Plan

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

in cooperation with the
Caloosahatchee Estuary Stakeholders

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ACKNOWLEDGMENTS

This 2013 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 in cooperation with the Caloosahatchee Estuary stakeholders.



For additional information on the watershed management approach in the Caloosahatchee Estuary Basin, contact:

Kimberleigh Dinkins, Basin Coordinator
Florida Department of Environmental Protection
Watershed Restoration Program, Watershed Planning and Coordination Section
2600 Blair Stone Road, Mail Station 3565
Tallahassee, FL 32399-2400
Email: Kimberleigh.Dinkins@dep.state.fl.us
Phone: (850) 245–8255

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LIST OF ACRONYMS AND ABBREVIATIONS

BMAP	Basin Management Action Plan
BMP	Best Management Practice
CDD	Community Development District
Department	Florida Department of Environmental Protection
ECWCD	East County Water Control 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
NPDES	National Pollutant Discharge Elimination System
PSA	Public Service Announcement
SFWMD	South Florida Water Management District
STORET	STOrage and RETrieval (Database)
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
WBID	Waterbody Identification

SUMMARY

TOTAL MAXIMUM DAILY LOADS

The Caloosahatchee River extends from Lake Okeechobee, through a series of locks to San Carlos Bay. It has both fresh and marine segments. The marine segment, referred to as the Caloosahatchee Estuary or Tidal Caloosahatchee, extends from Franklin Lock (S-79) to Shell Point. The Caloosahatchee Estuary Basin receives freshwater input from S-79 and from various tributaries and canal systems that discharge directly to the estuary below S-79. The basin encompasses portions of Lee County and Charlotte County and areas within the cities of Cape Coral and Fort Myers.

The Florida Department of Environmental Protection identified the Caloosahatchee Estuary to be impaired by nutrients (chlorophyll-*a*). In December 2009, the Department adopted the Caloosahatchee Estuary TMDL for total nitrogen (TN), which has been linked to high chlorophyll-*a* concentrations.

The Caloosahatchee Estuary Basin Management Action Plan was adopted in November 2012 to implement the TN TMDL within the watershed. This Progress Report is the first annual progress report for the Caloosahatchee Estuary BMAP, and it describes the activities that occurred during the reporting period from December 1, 2012, through November 30, 2013.

SUMMARY OF LOAD REDUCTIONS

During the reporting period, the city of Fort Myers completed two projects, East County Water Control District (ECWCD) completed one project, and Lee County completed two projects. These projects resulted in an estimated reduction of 6,127 pounds per year (lbs/yr) of TN. These reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 140,465 lbs/yr of TN. The progress towards the TN TMDL load reductions is shown in **Figure ES-1**.

WATER QUALITY AND BIOLOGICAL MONITORING

The city of Cape Coral, city of Fort Myers, Lee County, South Florida Water Management District (SFWMD), and Department's South District continued water quality monitoring consistent with the BMAP monitoring plan. In addition, SFWMD continued its biological sampling for oysters and seagrass, and the Department's South District continued its quarterly sampling for seagrass. A detailed water quality evaluation will be conducted no later than after four years of BMAP implementation to determine water quality improvements in the basin from actions included in the first BMAP iteration.

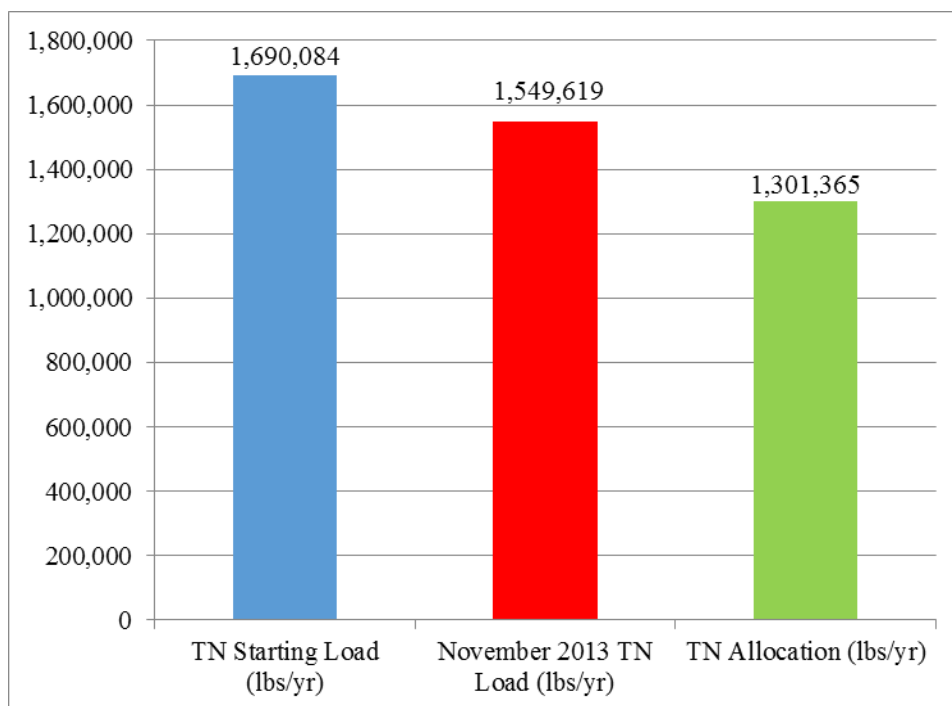


FIGURE ES-1: PROGRESS TOWARDS THE CALOOSAHATCHEE TN TMDL THROUGH NOVEMBER 30, 2013

Section 1: INTRODUCTION

1.1 PURPOSE OF THE REPORT

This is the first annual progress report for the Caloosahatchee Estuary Basin Management Action Plan. **Section 2** describes the activities that occurred during the period from December 1, 2012, through November 30, 2013. **Section 3** describes the water quality and biological monitoring that occurred during the reporting period.

1.2 TOTAL MAXIMUM DAILY LOADS FOR THE CALOOSAHATCHEE ESTUARY BASIN

The Caloosahatchee River extends from Lake Okeechobee, through a series of locks to San Carlos Bay. It has both fresh and marine segments. The freshwater segment extends from Lake Okeechobee to the Franklin Lock (S-79). The marine segment, referred to as the Caloosahatchee Estuary or Tidal Caloosahatchee, extends from 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 Basin receives freshwater input from S-79 and from various tributaries and canal systems that discharge directly to the estuary below S-79. The basin encompasses portions of Lee County and Charlotte County and areas within the cities of Cape Coral and Fort Myers (see **Figure 1**). Approximately 75% of the Tidal Caloosahatchee watershed is located in Lee County, with the remaining 25% in Charlotte County.

The Florida Department of Environmental Protection identified the Caloosahatchee Estuary as impaired by nutrients (chlorophyll-*a*). In December 2009, the Department adopted the Caloosahatchee Estuary TMDL for total nitrogen (TN), which has been linked to high chlorophyll-*a* concentrations in the Caloosahatchee River and Estuary downstream of the Franklin Lock and Dam. The Caloosahatchee Estuary BMAP includes the three segments with waterbody identification (WBID) numbers that make up the tidal Caloosahatchee River: WBID 3240A, WBID 3240B, and WBID 3240C.

Table 1 lists the TMDL and pollutant load allocations adopted by rule for the watershed (based on updates to the loading to the watershed).

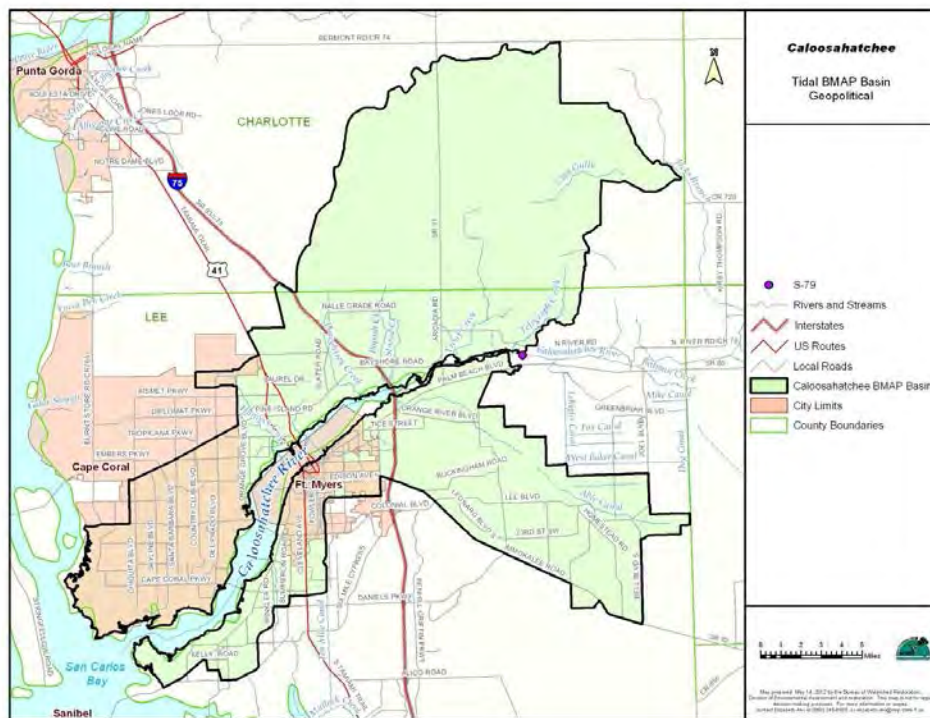


FIGURE 1: CALOOSAHATCHEE ESTUARY BASIN

TABLE 1: CALOOSAHATCHEE ESTUARY TMDLS

¹ Domestic wastewater treatment plant 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	WASTELOAD ALLOCATION FOR WASTEWATER (POUNDS/YEAR [LBS/YR])	CURRENT DOMESTIC WASTEWATER LOADING (LBS/YR) ¹	WASTELOAD ALLOCATION FOR NPDES STORMWATER (% REDUCTION)	LOAD ALLOCATION (% 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

1.3 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.*
- *East County Water Control District (ECWCD).*
- *Florida Department of Transportation (FDOT) District 1.*
- *Lee County.*
- *Lucaya Community Development District (CDD).*

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

1.4 BMAP ALLOCATIONS

The stakeholders determined that assigning detailed allocations was the best approach for achieving the TMDL reductions. The TMDL did not include detailed allocations for the wastewater treatment facilities in the basin; therefore, the BMAP only assigned detailed allocations for the stormwater sources in the Tidal Caloosahatchee Basin. Scenarios that were simulated during TMDL development (existing conditions, TMDL, and background) 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 flow from Lake Okeechobee at the target nutrient levels established by the Lake Okeechobee phosphorus TMDL. The TMDL run simulated the condition in the estuary where light attenuation in the target area (San Carlos Bay) was at a level consistent with maintaining healthy seagrass growth at a depth of 2.2

meters. A comparison of the existing condition with the TMDL and background conditions, as well as the results of previous research in the estuary, demonstrated a required 23% TN load reduction. This meant reducing the TN load by 388,719 lbs/yr, and this load reduction was allocated based on a stakeholder's percentage of the developed load.

The load reductions allocated to each stakeholder were based on the percentage of the current developed lands shown in **Table 2**. 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 but rather are an initial application of the allocation process.

TABLE 2: INITIAL ALLOWABLE LOAD DETERMINATION

ENTITY	ALLOWABLE LOAD BY PERCENT NONBACKGROUND (LBS/YR)	BACKGROUND + ALLOWABLE NONBACKGROUND LOAD (LBS/YR)	LOAD REDUCTION (LBS/YR)
Agriculture	21,224	230,557	55,597
Charlotte County	360	232,047	943
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
FDOT	3,481	14,815	9,119
Lee County	53,770	359,770	140,853
Lucaya CDD	51	671	132
Total	148,391	1,301,365	388,719

Section 2: ACTIVITIES DURING THE REPORTING YEAR

The accomplishments over the past year are described in **Section 2.1** through **Section Error! Reference source not found.** The individual project tables are included in **Appendix A**, and photographs of project implementation efforts are included in **Section 2.1** and **Appendix B**.

2.1 ACTIVITIES BY ENTITY

2.1.1 CHARLOTTE COUNTY

Charlotte County continued its education and outreach efforts (Project CH-1) during the reporting period.

2.1.2 CITY OF CAPE CORAL

The city of Cape Coral has made 14 presentations on the Florida Yards and Neighborhoods (FYN) Program and illicit discharge awareness, reaching approximately 302 people with these talks (see **Figure 2**). The city's website had 2,405 hits specifically related to FYN and fertilizer information (Project CC-1). The funding for the education and outreach efforts comes from the city's stormwater utility, and funding for the FYN Program is continuing despite budget cuts in other areas.



FIGURE 2: CITY OF CAPE CORAL FYN CLASS AT ROTARY PARK ON JULY 26, 2013

2.1.3 CITY OF FORT MYERS

The city of Fort Myers has continued work on the Ford Street Filter Marsh (Project FM-9). Phases 1 and 2 of the project are completed, including vegetation removal and pedestrian access permitting, respectively. Phase 3 of the project, filter marsh design, is ongoing (see **Figure 3**). For the Riverfront Development Phase 1 project (FM-10), the Downtown Detention Basin infrastructure is completed and the planting in the pond is ongoing (see **Figure 4**). The initial indications for this project are that the Downtown Detention Basin will emulate a retention system verses a detention system. Thus, minimal if any discharge (other than through percolation and evaporation) from the contributing basins will be discharged via surface water into the Caloosahatchee River during the dry season. In addition, the city installed nutrient removal baffle boxes (see **Figure 5**), instead of Stormceptors™, as part of the Brookhill Utility Drainage Improvements (Project FM-7).



FIGURE 3: CITY OF FORT MYERS FORD STREET FILTER MARSH CONSTRUCTION



FIGURE 4: CITY OF FORT MYERS DOWNTOWN DETENTION BASIN



FIGURE 5: CITY OF FORT MYERS BROOKHILL NUTRIENT BAFFLE BOXES

2.1.4 ECWCD

ECWCD completed the Mirror Lakes Phase 1 project (EC-6) in August 2012. This project consisted of a pump station designed to remove excess stormwater from the canal system and rehydrate a 346-acre natural wetland (see **Figure 6**). To date, ECWCD has pumped 235,054,512 gallons, or 715 acre-feet, of stormwater out of the canal system that would have eventually made its way to the Caloosahatchee River. This project was funded by ECWCD and a SFWMD grant.



FIGURE 6: ECWCD MIRROR LAKES PHASE 1

ECWCD has continued its education and outreach efforts in the basin (Project EC-1). Funding for the public education events came from local businesses and environmental organizations. ECWCD distributed approximately 2,500 brochures, bookmarks, and magnets educating the public on stormwater pollution and water conservation. The second annual Wings Over Water Festival was held on April 5 and 6, 2013, at Harns Marsh to help the public discover the beauty of southwest Florida's water, land, and wildlife (see **Figure 7**). The two-day festival celebrates southwest Florida's natural resources and includes presentations from experts and an array of exhibits by local organizations.



FIGURE 7: ECWCD WINGS OVER WATER FESTIVAL

The third graders at Tortuga Preserve Elementary School finished studying the water cycle and participated in ECWCD's lesson on water quality, water conservation, and pollution prevention. Students were then asked to share what they learned through an art project. The artwork was submitted in the Rain Barrel Design contest. The first phase allowed for one drawing to be selected from each classroom as the best overall, based on the designs that best promoted pollution prevention and water conservation, and showed the students as stewards of the environment. Creativity, messaging, and artistic quality were also considered. The second phase of the competition called for the students to work together and paint the selected image on a rain barrel (see **Figure 8**). These barrels were then judged based on creativity and message. The elementary school will use the rain barrels as part of a garden project.

On April 20, 2013, community members and organizations participated in a Great American Cleanup event at Greenbriar Preserve in Lehigh Acres (see **Figure 9**). The Greenbriar Preserve/Swamp is a natural land feature that provides great water quality enhancements and ground water recharge for a significant part of the Hickey Creek Basin. The removal of trash and debris from this cleanup will enhance water quality in both surface and ground water.



FIGURE 8: ECWCD RAIN BARREL PROJECT



FIGURE 9: ECWCD GREAT AMERICAN CLEANUP EVENT AT GREENBRIAR PRESERVE

2.1.5 FDOT DISTRICT 1

FDOT District 1 continues to distribute stormwater education information and implement Illicit Discharge Detection and Elimination Training (Project FDOT-3). Street sweeping activities continue to be performed consistent with executed contracts (Project FDOT-4). In addition, FDOT has several widening projects in various stages of construction that provide TN reduction above net improvement, including the following:

- *411038-1, Interstate 75 from south of Lockett Road to south of State Road 80.*
- *411042-1, Interstate 75 at State Road 80 interchange.*
- *413066-1, Interstate 75 from State Road 80 to south of State Road 78.*
- *413041-2, Interstate 75 from south of State Road 78 to Charlotte County Line.*

2.1.6 LEE COUNTY

Lee County completed the construction of the 18-acre Powell Creek Filter Marsh in September 2012 (Project LC-20). This project was a partnership between SFWMD, the Department, and Lee County to improve water quality as part of a Conservation 2020 natural preserve area, which also provides habitat for wildlife in an urban setting (see **Figure 10**). SFWMD contributed \$300,000 for design and permitting, the Department contributed \$440,000 for construction, and Lee County matched with \$1,238,000. Existing wetlands on the preserve were enhanced and incorporated into the design with newly created wetlands to create alternating shallow and deep wetlands, allowing sediment to settle and plants to absorb nutrients that would otherwise be carried into the Caloosahatchee River. In fiscal year 2012/2013, the Lee County Division of Natural Resources removed 80 cubic yards of vegetation as part of the maintenance harvesting plan at a cost of \$20,060.

The construction of the 125-foot-wide by 1.9-mile-long conveyance for the Powell Creek Extension includes a key ditch designed to meander about the centerline flanked by shallow littoral zones (Project LC-17). These areas have been planted with shallow-water emergent aquatic plants to facilitate increased residence time and nutrient uptake. The new weirs capture sediment and slow velocities.



FIGURE 10: LEE COUNTY POWELL CREEK PRESERVE

The Lost Lane Levee component of the project is located north of the Powell Creek Extension adjacent to the Prairie Pines Preserve. Lost Lane Levee consists of a 1.32-acre borrow ditch excavated to provide fill to reinforce the levee, which was then ditch plugged with backfill within the linear borrow area adjacent to the levee, creating wetlands between the plugs. Riser structures were installed on three culverts to mimic the stage/outflow of the natural system from the levied area, which connects under the Del Prado Extension/Mellow Road roadway to the Powell Creek Extension wetland/key ditch. The construction of the project was completed in August 2009. SFWMD contributed \$132,298 for design and permitting, and Lee County matched \$3,250,917 for construction. In fiscal year 2012/2013, the Lee County Division of Natural Resources removed 15 cubic yards of vegetation from the project area at a cost of \$12,450.

The Powell Creek Extension project site has been the subject of repeated vandalism. Structural components and gates were stolen, and some areas of the water course sustained damage from all-terrain vehicles crossing the channel. Lee County partnered with the sheriff's office to stem those activities.

The Nalle Grade Stormwater Park will be located at 8350 Nalle Grade Road in North Fort Myers (Project LC-21). This project is designed to provide water quality benefits, enhance flood protection, improve wildlife habitat, and create recreational opportunities for the community (see **Figure 11**). The

Bayshore Creek watershed is roughly three square miles in size and receives drainage from a 12-square-mile contributing watershed that originates in Charlotte County. Bayshore Creek drainage interacts with the Popash Creek watershed depending on water levels and rainfall. The Lee County Division of Natural Resources is currently working on design and permitting of the Nalle Grade Stormwater Park. This project was one of the recommendations of the North Fort Myers Surface Water Management Plan developed in 2010. The process includes the following:

— *Review and analyze existing and new data:*

- o The project consultant, Hole Montes, is currently collecting topographic and boundary survey data.
- o The consultant will review existing basin boundary maps for adequacy and accuracy and analyze previous flood events to identify issues of concern.
- o The consultant will review existing water quality data to identify pollutants of concern and opportunities to improve water quality.

— *Develop preliminary conceptual design alternatives and project descriptions:*

- o Water quality treatment is the main focus of the project.
- o Design features may include wetland preservation, protection of wildlife, recreation, and water conservation.
- o Continue to look for opportunities to enhance flood protection.

— *Develop detailed design plans for public presentation.*

— *Complete permits for construction plans and specifications necessary implement project.*

The county has also continued its educational efforts (Project LC-15), which include the resolution of 19 illicit discharge complaints; 2,511 National Pollutant Discharge Elimination System (NPDES) website hits (countywide); 49 proactive illicit discharge inspections; 154 people in four classes for illicit discharge training (countywide); 151 new landscape companies registered with Lee County (countywide); 3,799 people reached through 64 public outreach presentations (countywide); 300 people in 12 classes for Green Industries-Best Management Practice (BMP) training (countywide); and 4,142 people in 148 classes for FYN Program training (countywide). The county also implemented its

fertilizer ordinance; the compliance and enforcement activities for this ordinance are summarized in **Table 3**.



FIGURE 11: LEE COUNTY POPASH CREEK PRESERVE

TABLE 3: LEE COUNTY FERTILIZER ORDINANCE COMPLIANCE AND ENFORCEMENT ACTIVITIES

COMPLIANCE ACTIVITY	NUMBER OF INSPECTIONS
Compliant with Ordinance	14
Verbal Warning of Noncompliance	1
Written Warning of Noncompliance	10
Written Citation of Noncompliance	8
Total Inspections from 12/2012 to 11/2013	33

The Lee County Division of Natural Resources has partnered with the Charlotte Harbor National Estuary Program, Lee County Hyacinth Control District, private businesses, and private homeowners to conduct neighborhood stormwater pond educational activities, including the installation of BMPs. The Lee County Division of Natural Resources is currently working with the Lee County Hyacinth Control District PondWatch Program to analyze stormwater pond data and use that information to develop BMPs to improve water quality in two neighborhood ponds in the Caloosahatchee Estuary Basin. Both ponds are more than 20 years old and have chronic algae bloom problems. Lee County has approved

funding for \$100,000 to start the first pond retrofit project, with assistance from the homeowners who will maintain water quality sampling of their pond in the future and eventually take over the maintenance of aerators and vegetated floating mats that the county will provide for this two-year pilot project. In addition, Lee County has continued its street sweeping in the basin. A total of 346 lane miles were swept, removing 118 tons of sediment (Project LC-16).

2.1.7 AGRICULTURE

To date, FDACS has enrolled a total of 66,003 acres of agricultural lands in BMPs (**Summary of Accomplishments**

The projects completed during the first annual BMAP reporting period are summarized in **Table 5**. These projects resulted in an estimated reduction of 6,127 lbs/yr of TN. The reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 140,465 lbs/yr of TN.

The progress towards the TN TMDL load reductions is shown in **Figure 12**. The first bar shows the starting load for urban and agricultural stormwater runoff. The second bar shows the current estimated loading with the implementation of projects. The third bar shows the total allocation for stormwater runoff to meet the TMDL.

Table 4). The acreage enrolled under the cow/calf BMP manual exceeds the total acreage identified as pasture in the 2004 SFWMD land use database. This is because other land uses on the Babcock Ranch property involve the use of agricultural BMPs. An analysis of more recent land use shows that there are 19,649 acres of combined agriculture and 8,923 acres of rangeland on the enrolled Babcock Ranch property. The additional acreage is primarily accounted for by forested areas and wetlands, which together total 33,897 acres. Both land uses are legitimately included on the Notice of Intent (NOI) to implement BMPs, as the forested areas are occasionally grazed, and there are BMPs in the FDACS cow/calf BMP manual applicable to wetlands protection. In the next BMAP iteration, the land use assignments to different sources will be adjusted to account for the uses on this property.

2.2 SUMMARY OF ACCOMPLISHMENTS

The projects completed during the first annual BMAP reporting period are summarized in **Table 5**. These projects resulted in an estimated reduction of 6,127 lbs/yr of TN. The reductions are in addition to those projects given credit before BMAP adoption. Therefore, the total reductions to date are 140,465 lbs/yr of TN.

The progress towards the TN TMDL load reductions is shown in **Figure 12**. The first bar shows the starting load for urban and agricultural stormwater runoff. The second bar shows the current estimated loading with the implementation of projects. The third bar shows the total allocation for stormwater runoff to meet the TMDL.

TABLE 4: AGRICULTURAL ACREAGE, BMP ENROLLMENT, AND FUTURE ENROLLMENT GOALS FOR THE 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 have observed no active dairy operations in the BMAP area, and this was confirmed by 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.

Notes: Figures do not include forestry or aquaculture.

N/A = Not applicable

2004 SFWMD LAND USE	2004 ACRES	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, Future (Hay)	65,196.3 ³	6
Row/Field/Mixed Crops	6,081.9	6,041.3	Vegetable/Agronomic Crops	120.0	1
Sod	N/A	N/A	N/A	453.6	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	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	0.0	0
Tree Nurseries	230.3	230.3	Future Nursery, Specialty Fruit and Nut	0.0	0
Ornamentals	285.1	285.1	Container Nursery	214.0	23
Specialty Farms	67.2	67.2	Conservation Plan Rule	0.0	0
Dairies ²	37.9	37.9	Conservation Plan Rule	0.0	0
Totals	39,088.0	36,180.5	N/A	66,003.0	32
Five-Year Enrollment Goal (50%)	N/A	18,090.3	N/A	N/A	N/A
Acreage Enrolled (as of December 31, 2011)	N/A	66,003.0	N/A	N/A	N/A

TABLE 5: SUMMARY OF PROJECTS COMPLETED IN THE REPORTING PERIOD (DECEMBER 1, 2012–NOVEMBER 30, 2013)

ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)
City of Fort Myers	FM-7	Brookhill Utility Drainage Improvement	11
City of Fort Myers	FM-10	Riverfront Development Phase 1	90
ECWCD	EC-6	Mirror Lake Phase I	1,357
Lee County	LC-17	NFM Powell Creek Extension/Lost Lane Levee	2,976
Lee County	LC-20	Powell Creek Filter Marsh	1,693
Total	N/A	Total Reductions in Reporting Period	6,127

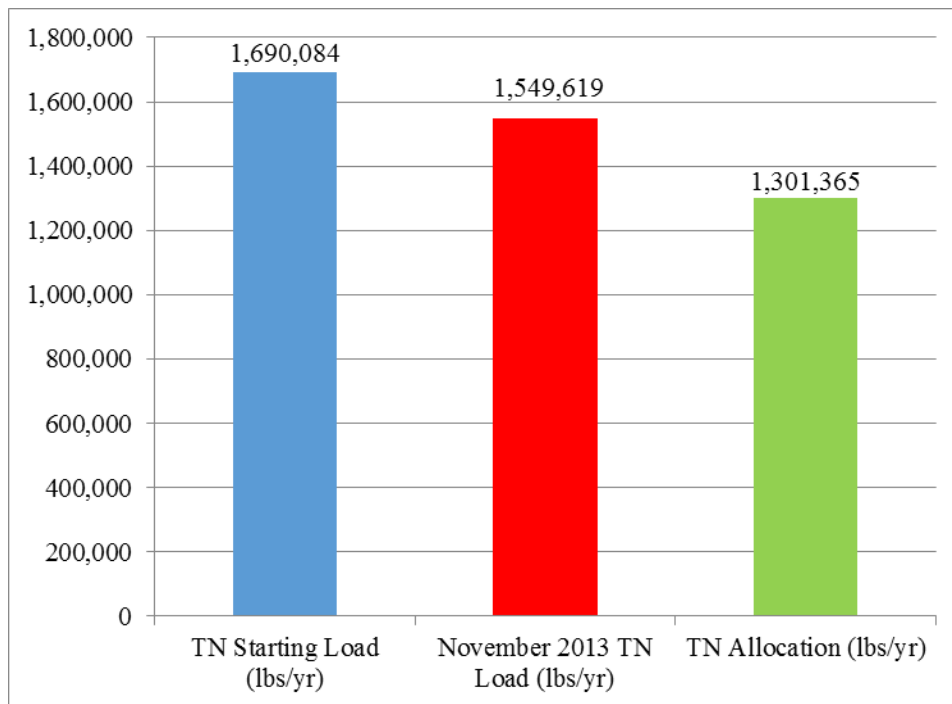


FIGURE 12: PROGRESS TOWARDS THE CALOOSAHATCHEE TN TMDL THROUGH NOVEMBER 30, 2013

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 the watershed loading. The BMAP monitoring plan consists of ambient water quality sampling and biological monitoring. A detailed water quality evaluation will be conducted no later than Year 4 of BMAP implementation to determine water quality improvements in the basin from actions included in the first BMAP iteration. All responsible stakeholders participated in the monitoring plan in the first year of BMAP implementation.

A few highlights of the monitoring efforts are as follows:

- *The city of Cape Coral continued its water quality monitoring in the basin and has been uploading the data to the state's STOrage and RETrieval (STORET) database.*
- *The city of Fort Myers continued its water quality monitoring in the basin, and the results are included in **Appendix C**.*
- *Lee County continued its water quality monitoring in the basin, and the data have been uploaded to STORET.*
- *SFWMD continued its biological sampling for oysters and seagrass. The frequency of sampling for these parameters is monthly except for oyster density, which is collected twice a year. For the seagrass monitoring, Station CRE_6 was dropped in April 2012 and replaced with CRE_6B. SFWMD also continued its monthly water quality sampling. Station CES01 should be removed from the BMAP monitoring plan because SFWMD stopped sampling this station in September 2009. This station is located near Station S79, which is still sampled monthly. Station Point Ybel, R8 should be shown in the monitoring plan as ROOK471.*
- *The Department's South District continues to conduct bimonthly seagrass monitoring in the basin. The South District also continued its water quality monitoring in the basin. Station 28020109 was removed from the network in January 2011 and replaced with Station CALUSA0023FTM.*

APPENDIX A: BMAP PROJECTS

The BMAP project tables below show the implementation status of the BMAP projects as of November 30, 2013. The tables provide information on the nutrient reduction attributed to each individual project in lbs/yr. These projects were submitted to provide reasonable assurance to the Department that each entity has a plan on how to meet its 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 time frame.

TABLE A-1: CHARLOTTE COUNTY PROJECTS

N/A = Not applicable

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

TABLE A-2: CITY OF CAPE CORAL PROJECTS

N/A = Not applicable

¹ Projects were listed but had unproved credit.

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	STATUS	TN REDUCTION (LBS/YR)
Cape Coral	CC-1	Education Efforts	FYN, landscaping ordinance, irrigation ordinance, fertilizer ordinance, pet waste ordinance, pamphlets, public service announcements (PSAs), website, illicit discharge program	Ongoing	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 8 th Street Drainage	Unit 23-SE 8 th 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 that 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 that provides additional retention volume in canals	Completed	8,184
Cape Coral	N/A	N/A	Total Projects Reduction	N/A	47,484

TABLE A-3: CITY OF FORT MYERS PROJECTS

N/A = Not applicable

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

TABLE A-4: ECWCD PROJECTS

N/A = Not applicable

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	STATUS	TN REDUCTION (LBS/YR)
ECWCD	EC-1	Education/Fertilizer	N/A	Ongoing	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 increased control elevations to provide additional attenuation	Completed	7,543
ECWCD	EC-4	Harn's Marsh Phases I & II	Replacement of weir structures and redirection 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	N/A	N/A	Total Projects Reduction	N/A	23,169

TABLE A-5: FDOT PROJECTS

N/A = Not applicable

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	Ongoing	232
FDOT	FDOT-4	Street Sweeping	1,341.4 pavement miles swept annually	Ongoing	471
FDOT	FDOT-5	Ditch Blocked Swales	Swales with ditch blocks	Completed	826
FDOT	FDOT-6	Swales w/o Ditch Blocks	Swales without 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	N/A	N/A	Total Projects Reduction	N/A	11,384

TABLE A-6: LUCAYA CDD PROJECTS

N/A = Not applicable

ENTITY	PROJECT NUMBER	PROJECT NAME	PROJECT DETAIL	STATUS	TN REDUCTION (LBS/YR)
Lucaya CDD	LU-1	Education/Fertilizer	Education/fertilizer	Completed	0
Lucaya CDD	N/A	N/A	Total Projects Reduction	N/A	0

TABLE A-7: LEE COUNTY PROJECTS

N/A = Not applicable

* Not Calculated

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*
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*
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*
Lee County	LC-15	Education Efforts	FYN, landscaping ordinance, irrigation ordinance, fertilizer ordinance, pamphlets, PSAs, website, illicit discharge program	Ongoing	20,445
Lee County	LC-16	Street Sweeping	345.9 lane miles swept annually	Ongoing	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	Completed	2,976
Lee County	LC-18	Whiskey Creek Weir Reconstruction	Retention lake weir repairs to restore original intent of 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 stabilized crossing of Powell Creek	Completed	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 more natural flow regime by increasing water storage on property and improving both on- and offsite flows	Completed	6,596
Lee County	LC-23	Billy's Creek Wetland	Billy Creek filter marsh park	Completed	2,684
Lee County	N/A	N/A	Total Projects Reduction	N/A	45,708

APPENDIX B: ADDITIONAL PROJECT PICTURES

CITY OF FORT MYERS



FIGURE B-1: CITY OF FORT MYERS DOWNTOWN DETENTION BASIN



FIGURE B-2: CITY OF FORT MYERS DOWNTOWN DETENTION BASIN



FIGURE B-3: CITY OF FORT MYERS DOWNTOWN DETENTION BASIN



FIGURE B-4: CITY OF FORT MYERS FORD STREET FILTER MARSH CONSTRUCTION



FIGURE B-5: CITY OF FORT MYERS FORD STREET FILTER MARSH CONSTRUCTION



FIGURE B-6: CITY OF FORT MYERS FORD STREET FILTER MARSH CONSTRUCTION

ECWCD



FIGURE B-7: ECWCD MIRROR LAKE PHASE I



FIGURE B-8: ECWCD RAIN BARREL PROJECT



FIGURE B-9: ECWCD WINGS OVER WATER



FIGURE B-10: ECWCD WINGS OVER WATER

LEE COUNTY



FIGURE B-11: LEE COUNTY POPASH CREEK PRESERVE



FIGURE B-12: LEE COUNTY POPASH CREEK PRESERVE

APPENDIX C: WATER QUALITY MONITORING DATA

Table C-1 summarizes the water quality data collected by the city of Fort Myers during the reporting period.

TABLE C-1: CITY OF FORT MYERS WATER QUALITY DATA

Mg/L = Milligrams per liter
 µmhos/cm = Micromhos per centimeter
 °C.= Degrees Celsius

STATION	DATE	DISSOLVED OXYGEN (MG/L)	NITRATE/ NITRITE (MG/L)	PH	SPECIFIC CONDUCTANCE (µMHOS/CM)	TEMPERATURE (°C)	TOTAL KJELDAHL NITROGEN (MG/L)	TOTAL PHOSPHORUS (MG/L)	TOTAL SUSPENDED SOLIDS (MG/L)
BCP1-10	12/12/12	7.05	0.21	6.85	375	22.6	1.06	0.295	11.1
BCP4-10	12/12/12	4.24	0.01	7.23	678	23.0	1.05	0.739	2.6
CFMBILLY3	12/12/12	6.82	0.01	7.70	786	24.0	1.20	0.134	2.2
CFMBILLY6	12/12/12	5.93	0.10	7.82	365	23.9	0.64	0.152	17.0
CFMMANUEL	12/12/12	7.23	0.15	7.60	283	23.9	0.40	0.095	1.9
CFMCARRELL	12/12/12	4.30	0.01	7.45	591	23.5	0.80	0.093	1.1
CFMWINKLER	12/12/12	5.21	0.01	7.72	365	24.1	0.35	0.071	0.6
BCP1-10	01/09/13	50.2	0.15	6.68	867	22.7	1.04	0.350	2.2
BCP4-10	01/09/13	60.9	0.01	6.54	783	21.8	0.99	0.640	1.4
CFMBILLY3	01/09/13	124.0	0.02	6.64	789	24.4	1.14	0.130	0.9
CFMBILLY6	01/09/13	150.0	0.12	6.89	827	24.6	0.75	0.160	1.8
CFMMANUEL	01/09/13	148.0	0.18	6.70	880	24.0	0.66	0.100	0.6
CFMCARRELL	01/09/13	100.0	0.02	6.55	755	22.1	0.80	0.060	0.6
CFMWINKLER	01/09/13	112.0	0.04	6.61	753	23.6	0.47	0.060	0.6
BCP1-10	02/13/13	1.82	0.02	7.30	783	23.6	0.94	0.220	5.4
BCP4-10	02/13/13	1.46	0.01	7.19	656	22.1	1.12	0.400	3.6
CFMBILLY3	02/13/13	2.80	0.01	7.45	880	25.4	1.15	0.070	2.2
CFMBILLY6	02/13/13	1.95	0.03	7.32	847	24.5	0.89	0.160	7.2
CFMMANUEL	02/13/13	5.25	0.16	7.06	1,010	25.0	0.69	0.130	2.2
CFMCARRELL	02/13/13	5.24	0.01	7.48	697	23.8	1.09	0.060	1.5
CFMWINKLER	02/13/13	1.43	0.34	7.05	892	26.4	1.03	0.210	2.6
BCP1-10	03/13/13	7.05	0.01	6.72	971	17.8	0.95	0.177	3.2

STATION	DATE	DISSOLVED OXYGEN (MG/L)	NITRATE/ NITRITE (MG/L)	pH	SPECIFIC CONDUCTANCE (µMHOS/CM)	TEMPERATURE (°C)	TOTAL KJELDAHL NITROGEN (MG/L)	TOTAL PHOSPHORUS (MG/L)	TOTAL SUSPENDED SOLIDS (MG/L)
BCP4-10	03/13/13	4.17	0.01	7.09	853	16.0	1.05	0.431	4.3
CFMBILLY3	03/13/13	6.78	0.01	7.31	1,140	18.2	1.11	0.169	1.0
CFMBILLY6	03/13/13	5.99	0.02	7.31	1,080	17.2	0.68	0.141	4.2
CFMMANUEL	03/13/13	6.50	0.15	7.18	1,280	19.0	0.57	0.188	0.7
CFMCARRELL	03/13/13	6.86	0.01	7.17	821	18.2	0.79	0.050	0.6
CFMWINKLER	03/13/13	4.68	0.01	7.11	1,050	19.8	0.53	0.044	1.5
BCP1-10	04/10/13	8.34	0.01	7.21	605	23.4	1.17	0.255	4.3
BCP4-10	04/10/13	4.62	0.01	7.14	688	22.5	1.45	0.366	3.4
CFMBILLY3	04/10/13	8.88	0.01	7.47	894	24.7	1.25	0.063	2.2
CFMBILLY6	04/10/13	7.11	0.02	7.09	902	23.4	0.84	0.160	4.9
CFMMANUEL	04/10/13	7.56	0.10	7.08	888	23.7	0.73	0.543	1.3
CFMCARRELL	04/10/13	8.66	0.01	7.04	580	23.8	0.80	0.012	0.9
CFMWINKLER	04/10/13	6.88	0.01	6.74	650	24.2	0.64	0.020	1.1
BCP1-10	05/08/13	10.5	0.01	7.44	677	24.6	0.84	0.234	3.6
BCP4-10	05/08/13	9.88	0.01	7.05	706	21.7	1.11	0.227	0.8
CFMBILLY3	05/08/13	8.89	0.01	7.69	811	25.9	1.01	0.061	1.6
CFMBILLY6	05/08/13	11.1	0.05	7.42	919	24.6	0.73	0.130	1.3
CFMMANUEL	05/08/13	8.72	0.11	7.34	920	23.8	0.72	0.143	0.6
CFMCARRELL	05/08/13	10.3	0.01	7.25	713	24.1	1.07	0.094	2.8
CFMWINKLER	05/08/13	9.07	0.01	7.31	953	25.0	0.64	0.069	1.1
BCP1-10	06/12/13	9.73	0.01	6.74	405	26.1	0.97	0.282	4.3
BCP4-10	06/12/13	9.11	0.01	5.88	448	26.4	1.21	0.319	3.6
CFMBILLY3	06/12/13	9.39	0.01	6.59	530	27.9	0.84	0.064	3.0
CFMBILLY6	06/12/13	9.57	0.10	6.70	249	26.3	0.57	0.105	2.0

STATION	DATE	DISSOLVED OXYGEN (MG/L)	NITRATE/ NITRITE (MG/L)	pH	SPECIFIC CONDUCTANCE (µMHOS/CM)	TEMPERATURE (°C)	TOTAL KJELDAHL NITROGEN (MG/L)	TOTAL PHOSPHORUS (MG/L)	TOTAL SUSPENDED SOLIDS (MG/L)
CFMMANUEL	06/12/13	9.64	0.09	6.65	302	26.1	0.43	0.086	0.9
CFMCARRELL	06/12/13	8.92	0.11	6.72	149	26.1	0.52	0.092	3.4
CFMWINKLER	06/12/13	9.10	0.08	6.54	186	27.5	0.37	0.071	1.9
BCP1-10	07/10/13	2.09	0.19	7.16	644	27.2	1.12	0.297	2.1
BCP4-10	07/10/13	2.40	0.01	7.10	599	28.7	0.90	0.345	0.7
CFMBILLY3	07/10/13	2.42	0.01	7.27	628	28.1	0.77	0.099	1.2
CFMBILLY6	07/10/13	3.57	0.15	7.29	682	28.1	0.84	0.148	1.8
CFMMANUEL	07/10/13	4.94	0.15	7.29	654	26.9	0.61	0.117	0.6
CFMCARRELL	07/10/13	3.44	0.11	7.21	687	28.4	0.78	0.102	1.7
CFMWINKLER	07/10/13	4.75	0.04	7.41	796	29.1	0.60	0.073	3.6
BCP1-10	08/14/13	2.42	0.12	6.36	496	28.7	1.10	0.169	2.4
BCP4-10	08/14/13	1.00	0.09	6.72	444	29.6	0.83	0.236	1.7
CFMBILLY3	08/14/13	3.21	0.01	7.05	606	31.5	0.81	0.090	2.8
CFMBILLY6	08/14/13	2.65	0.08	7.18	425	29.5	0.78	0.124	2.4
CFMMANUEL	08/14/13	2.70	0.12	7.17	466	28.9	0.64	0.088	1.6
CFMCARRELL	08/14/13	2.27	0.08	7.23	328	29.9	0.77	0.125	5.2
CFMWINKLER	08/14/13	2.81	0.08	7.20	382	29.6	0.45	0.068	1.4
BCP1-10	09/11/13	2.85	0.21	7.44	503	28.2	1.03	0.181	3.7
BCP4-10	09/11/13	1.52	0.14	7.29	422	28.8	0.93	0.218	1.4
CFMBILLY3	09/11/13	3.53	0.02	7.54	532	29.4	1.05	0.086	3.5
CFMBILLY6	09/11/13	2.67	0.20	7.45	588	28.4	0.77	0.136	2.3
CFMMANUEL	09/11/13	3.66	0.23	7.47	568	28.3	0.70	0.125	2.0
CFMCARRELL	09/11/13	3.55	0.07	7.40	576	28.7	0.80	0.104	2.7
CFMWINKLER	09/11/13	2.19	0.09	7.12	553	29.1	0.57	0.078	1.9

STATION	DATE	DISSOLVED OXYGEN (MG/L)	NITRATE/ NITRITE (MG/L)	pH	SPECIFIC CONDUCTANCE (µMHOS/CM)	TEMPERATURE (°C)	TOTAL KJELDAHL NITROGEN (MG/L)	TOTAL PHOSPHORUS (MG/L)	TOTAL SUSPENDED SOLIDS (MG/L)
BCP1-10	10/09/13	3.45	0.25	7.39	496	26.5	0.92	0.177	2.0
BCP4-10	10/09/13	1.32	0.07	7.19	433	27.3	0.99	0.239	2.7
CFMBILLY3	10/09/13	2.39	0.03	7.35	538	28.3	1.05	0.058	4.3
CFMBILLY6	10/09/13	3.42	0.18	7.36	578	28.4	0.80	0.146	2.1
CFMMANUEL	10/09/13	3.30	0.22	7.35	544	28.2	0.67	0.133	1.9
CFMCARRELL	10/09/13	3.03	0.18	7.35	558	28.4	0.96	0.075	2.4
CFMWINKLER	10/09/13	2.44	0.08	7.39	649	28.8	0.51	0.053	1.0