2015 ANNUAL PROGRESS REPORT

for the Lake Harney, Lake Monroe, St. Johns River, and Smith Canal Basin Management Action Plan

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

in cooperation with the
Lakes Harney and Monroe and Middle St. Johns River Basin Technical Stakeholders

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ACKNOWLEDGMENTS

This 2015 Lakes Harney and Monroe and Middle St. Johns River BMAP Progress Report 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 Lakes Harney and Monroe and Middle St. Johns River stakeholders.

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LIST OF ACRONYMS AND ABBREVIATIONS

BMAP	Basin Management Action Plan
BMP	Best Management Practice
DEP	Florida Department of Environmental Protection
FDACS	Florida Department of Agriculture and Consumer Services
FDOT	Florida Department of Transportation
FWC	Florida Fish and Wildlife Conservation Commission
FYN	Florida Yards and Neighborhood (Program)
GI	Green Industries
HSPF	Hydrologic Simulation Program – FORTRAN (model)
lbs/yr	Pounds Per Year
LVI	Lake Vegetation Index
MS4	Municipal Separate Storm Sewer System
MSJR	Middle St. Johns River
NPDES	National Pollutant Discharge Elimination System
PSA	Public Service Announcement
RSF	Regional Stormwater Facility
SAV	Submerged Aquatic Vegetation
SCLMP	Seminole County Lake Management Program
SERV	Seminole Education, Restoration and Volunteer Program
SJRWMD	St. Johns River Water Management District
SR	State Road
STORET	STOrage and RETrieval (Database)
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
WBID	Waterbody Identification

SUMMARY

TOTAL MAXIMUM DAILY LOADS (TMDLS)

The Lakes Harney and Monroe and Middle St. Johns River (MSJR) Basin includes the main stem segments of the MSJR located between the inlet of Lake Harney and the confluence of the St. Johns River with the Wekiva River. These river segments receive discharges from the Upper St. Johns River and from several major tributaries, including the Econlockhatchee River, Deep Creek, and Lake Jesup. The Smith Canal watershed is located in the southern portion of the Lakes Harney and Monroe and MSJR Basin and drains an area of ten square miles.

The Florida Department of Environmental Protection (DEP) identified the Lakes Harney and Monroe and MSJR Basin to be impaired by nutrients and low dissolved oxygen, and, in December 2009, adopted TMDLs for Total Phosphorus (TP) and Total Nitrogen (TN) for the lakes and river segments. The Smith Canal TMDL was adopted by the department in September 2009 for TP. An important consideration for the restoration of the Lakes Harney and Monroe and MSJR Basin is that the majority of the loading to the impaired waterbodies comes from sources outside the watershed. Therefore, reductions from the upstream sources must occur before water quality standards can be met in the impaired waterbodies.

The Lakes Harney and Monroe and MSJR Basin Management Action Plan (BMAP) was adopted in August 2012 to implement the TP and TN TMDLs within the watershed. This 2015 Progress Report is the third annual progress report for the Lakes Harney and Monroe and MSJR BMAP, and it describes the activities that occurred during the reporting period from September 1, 2014 through August 31, 2015.

MAJOR ACCOMPLISHMENTS

Nutrient reductions associated with project implementation efforts that occurred during the reporting period total 8,252 lbs/yr of TN and 1,538.6 lbs/yr of TP. These reductions are in addition to those projects given credit at BMAP adoption; therefore, the total project reductions to date are 81,286.6 lbs/yr of TN and 18,376.8 lbs/yr of TP. The first BMAP iteration addresses 50% of the allocated reductions, and the required reductions for this iteration are 43,828.2 lbs/yr of TN and 8,854.9 lbs/yr of TP. Therefore, the reductions that have occurred to date are greater than the reductions required for the first BMAP iteration. These reductions are 92.7% of the TN required TMDL reductions, and exceed the required TP reductions (111.6%) to meet the TMDL. These notably high percentages are a result of

several stakeholders implementing projects that have resulted in more reductions than were required of them, and therefore, more than 100% of the required TP reductions have been achieved. However, there are still stakeholders in the basin that need to implement further projects in order to achieve their required reductions and meet their allocations. The progress towards the total TMDL load reductions for TN and TP are shown in **Figure ES- 1** and **Figure ES- 2**, respectively.

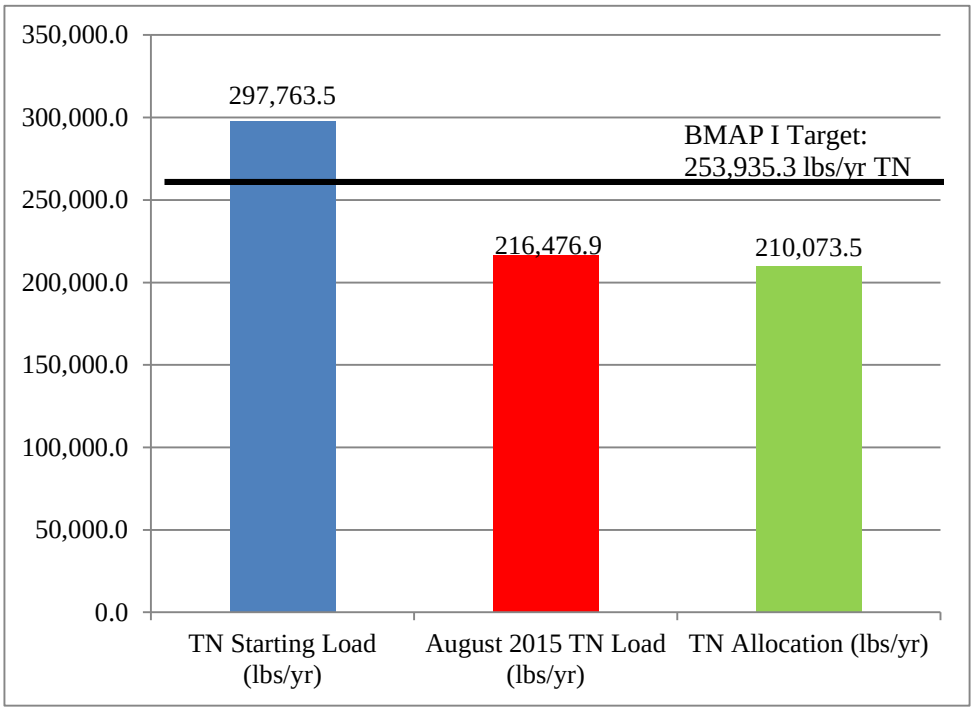

Figure ES-1: Progress Towards the Lakes Harney and Monroe and MSJR TN TMDL Through August 31, 2015

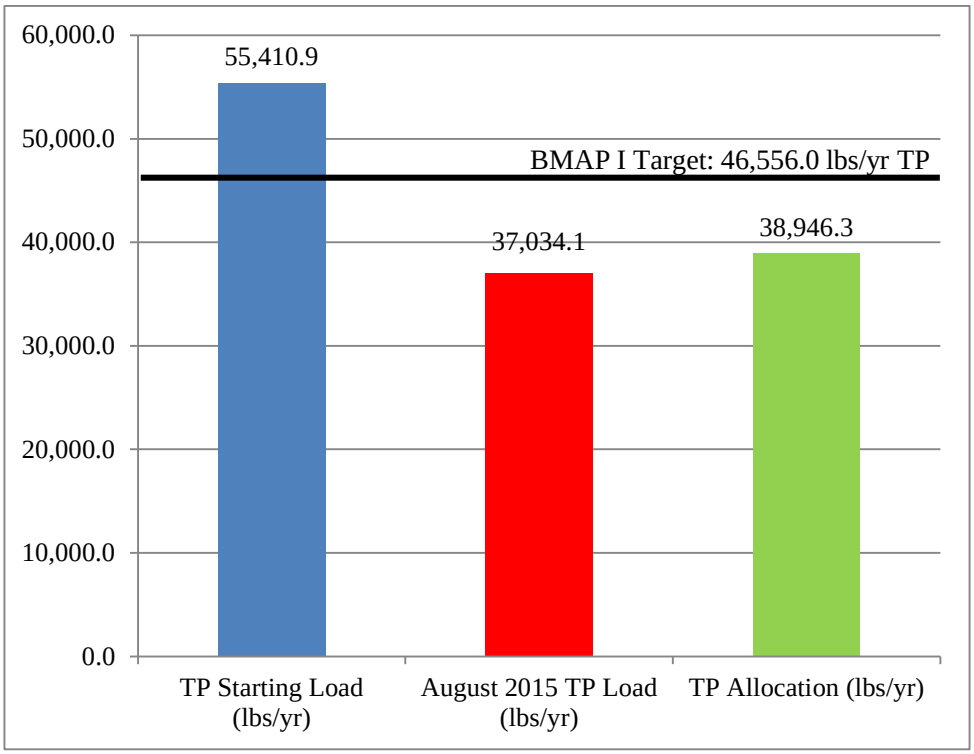

Figure ES-2: Progress Towards the Lakes Harney and Monroe and MSJR TP TMDL Through August 31, 2015

WATER QUALITY AND BIOLOGICAL MONITORING

The City of Deltona continued its monthly water quality monitoring at three stations in the basin. Seminole County continued biological and ambient water quality monitoring as identified in the BMAP. Volusia County continued its monthly sampling at six of the stations included in the BMAP. The St. Johns River Water Management District (SJRWMD) continued to sample its ten ambient water quality stations that are part of the BMAP monitoring plan. SJRWMD also continued its phytoplankton sampling at three stations in the basin. 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.

Section 1: INTRODUCTION

1.1 PURPOSE OF THE REPORT

This is the third annual progress report for the Lakes Harney and Monroe and Middle St. Johns River (MSJR) Basin Management Action Plan (BMAP). **Section 2** describes the activities that occurred during the period from September 1, 2014 through August 31, 2015. **Section 3** describes the water quality and biological monitoring that occurred during the reporting period.

1.2 TOTAL MAXIMUM DAILY LOADS FOR THE LAKES HARNEY AND MONROE AND MSJR BASIN

The Lakes Harney and Monroe and MSJR Basin includes the impaired main stem segments of the MSJR located between the inlet of Lake Harney and the confluence of the St. Johns River with the Wekiva River. These river segments receive discharges from the Upper St. Johns River and from several major tributaries, including the Econlockhatchee River, Deep Creek, and Lake Jesup. Two major lakes, Lake Monroe and Lake Harney, are also impaired segments of the MSJR main stem. The basin encompasses portions of Seminole County and Volusia County and areas within the cities of DeBary, DeLand, Deltona, Lake Helen, Lake Mary, Orange City, and Sanford.

Smith Canal is located in northwest Seminole County and drains an area of 10 square miles. Smith Canal is 6 miles in length and flows northwest until it enters the St. Johns River 1.4 miles upstream of the outlet to Lake Monroe. The Smith Canal watershed includes portions of Seminole County, Lake Mary, and Sanford.

Figure 1 shows the Lakes Harney and Monroe and MSJR watershed and the local governments in this area.

The Total Maximum Daily Loads (TMDLs) for the Lakes Harney and Monroe and MSJR Basin were adopted by DEP in December 2009, and the TMDL for Smith Canal was adopted in September 2009. For assessment purposes, DEP divided the Lakes Harney and Monroe and MSJR Basin into water assessment polygons with unique waterbody identification (WBID) numbers for each watershed or segment.

An important consideration for the restoration of the Lakes Harney and Monroe and MSJR Basin is that the majority of the loading to the impaired waterbodies comes from sources outside the watershed. Approximately 96.4% of the total nitrogen (TN) loading and 95% of the total phosphorus (TP) loading

enters the impaired waterbodies from the Upper St. Johns River, Econlockhatchee River, and Lake Jesup Basins. Therefore, implementing projects in the watershed alone will not achieve the TMDLs; reductions from the upstream sources must occur before water quality standards can be met in the impaired WBIDs.

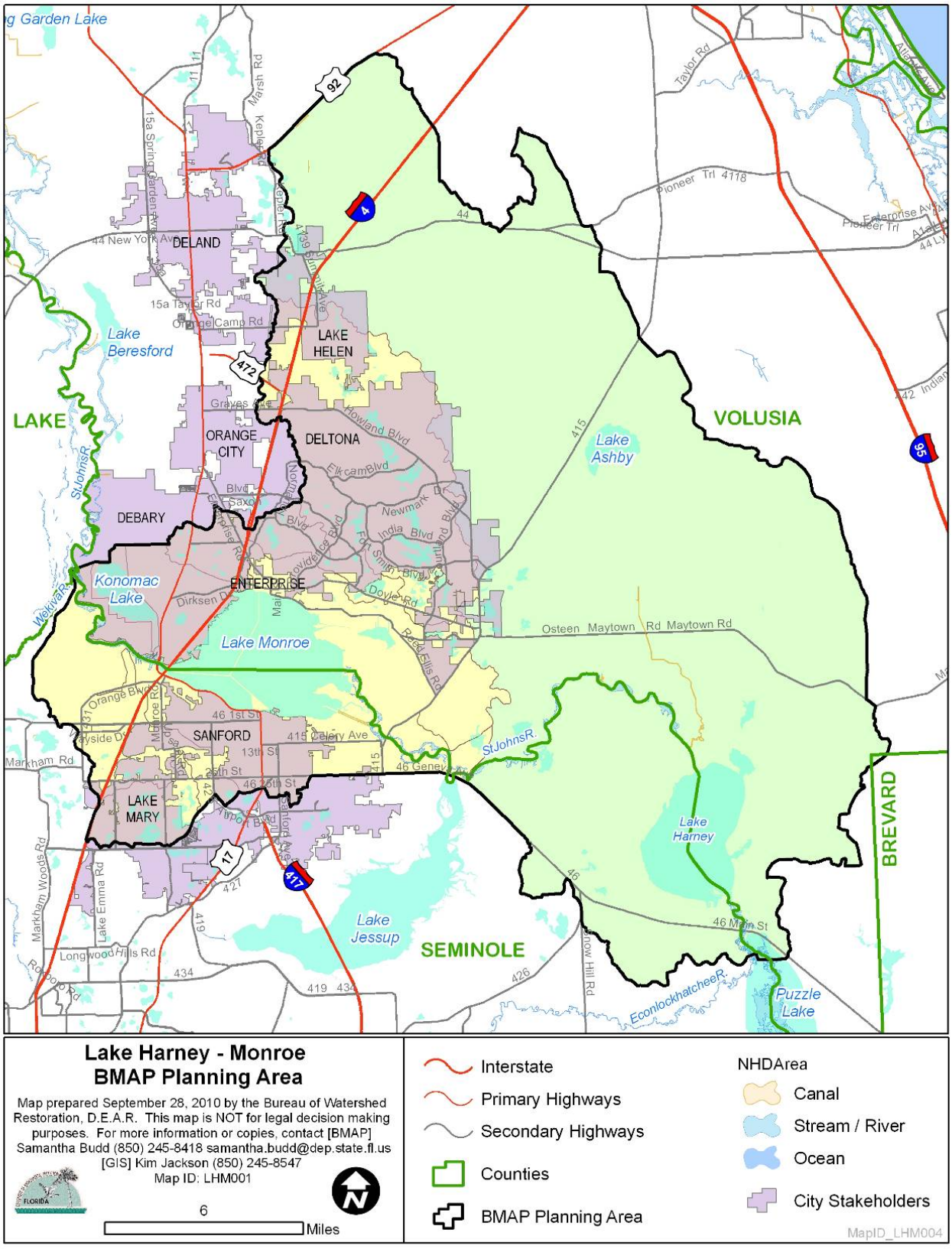

Figure 1: Lakes Harney and Monroe and MSJR Basin

Section 2: ACTIVITIES DURING THE REPORTING YEAR

The accomplishments over the past year are described in **Section 2.1** through **Section 2.2**, and the individual project tables are included in **Appendix A**.

2.1 ACTIVITIES BY ENTITY

2.1.1 City of DeLand

The City of DeLand maintained and distributed educational materials about the impacts of stormwater discharges and the steps the public can take to reduce pollutants (project DL-1). The city maintained electronic versions of the main brochures (*A Citizen's Guide to Stormwater Ponds and Stormwater Facts*) on the city website. The city samples and monitors National Pollutant Discharge Elimination System (NPDES) outfalls on a regular basis.

2.1.2 City of Deltona

The city conducted training for the Florida Storwmater, Erosion, and Sedimentation Control Inspector Training for 36 individuals. The City of Deltona, in conjunction with DEP and the University of Florida, offered a Green Industries (GI)-Best Management Practices (BMP) training to 13 individuals. This training helps ensure that commercial applicators, municipal employees, and anyone taking the course is aware of the proper application of fertilizers, herbicides, and some pesticides, as well as the nine principles of Florida Friendly Landscaping. The city continued catch basin cleanouts throughout the city (project DEL-6). The number and amount of debris removed is relatively consistent throughout the year. Debris removed is tracked and reported in the city's Municipal Separate Storm Sewer System (MS4) Stormwater Management Program Annual Report. The Leland Dr. retention pond project (project DEL-7), which will result a retention area to provide for stormwater storage and nutrient removal, is under construction and is anticipated to be completed by March 2016. During the reporting period, the city completed the force main and RIB Site Phase I part of the Tivoli/Wheeling Forcemain to Rapid Infiltration Basin (RIB)/Stormwater Retention Ponds project (project DEL-8). The force main is used to reroute untreated stormwater from Tivoli/Wheeling pump station into two stormwater ponds at the 122 acre RIB site where it infiltrates rather than being sent to Clearwater Lake, a surface waterbody, as previous pumping accomplished.

2.1.3 City of Lake Helen

The City of Lake Helen continued to enforce the adopted irrigation ordinance and pet waste ordinance, and continued to provide informational pamphlets to the public (project LH-1). A "*Stormwater*

Pollution Prevention Factsheet for Commercial Properties" is posted to the city's website. The city's illicit discharge program consists of routine monitoring of inlets/catch basins/retention ponds by public works department personnel, construction site inspection by city inspection staff, and enforcement of the illicit discharge provisions of the stormwater pollution prevention ordinance.

2.1.4 City of Lake Mary

The City of Lake Mary continued its street sweeping on public roads (project LM-2), and its education and outreach efforts (project LM-1) in the basin.

2.1.5 City of Orange City

The City of Orange City continues to post information regarding NPDES activities, Environmental Resource Permits, and nonpoint source pollution on its webpage. Also included on the webpage are links to other websites with stormwater information and information for children. Handouts are provided for new customers at the utility's customer service counter (project OC-1). Students from local elementary schools participated in Orange City's Earth Day celebrations (April 22, 2015) by picking up trash at local parks including Mill Lake Park which contains a stormwater retention area. The city posted the "Pointless Personal Pollution" pamphlet at kiosks at City Parks and Senior Center.

2.1.6 City of Sanford

The City of Sanford continued its street sweeping (project S-1), public education (project S-3), and catch basin clean out projects in the basin.

2.1.7 Florida Department of Transportation (FDOT) District 5

FDOT continued to implement its education programs (project FDOT-32). Construction activities for State Road (SR) 415 are ongoing and funding has been secured for projects identified on SR 44. These projects will provide treatment for the expanded roadway, as well as the existing roadway where no treatment previously existed. Sweeping activities in Volusia County occurred as scheduled and totals are reported in **Table A-15** (project FDOT-33).

2.1.8 Seminole County

Seminole County continued its education efforts (project SC-6) through the Florida Yards and Neighborhoods (FYN) and Seminole Education, Restoration and Volunteer (SERV) program classes, events and outreach, as well as the continued airing of proper use of fertilizer public service announcements (PSAs) on the local CBS affiliate and Seminole Government TV. In addition, street sweeping continued throughout the county (project SC-5).

Seminole County continued biological and ambient water quality monitoring as identified in the BMAP (see **Section 3.4**). Copies of the Lake Assessment Report for both lakes will be available to the public from Seminole County or DEP.

2.1.9 Turnpike Authority

The Turnpike Authority continued its street sweeping in the basin (project T-1, **Table A-19**).

2.1.10 Volusia County

Volusia County continued its public education and outreach efforts (project VC-1) and street sweeping (project VC-2) in the basin.

2.1.11 Agriculture

The Florida Department of Agriculture and Consumer Services (FDACS), through field staff and contracted staff with the East Central Florida Resource Conservation and Development Council, meet with landowners to enroll them in the FDACS BMP Program. The FDACS staff person or contractor goes over the applicable BMP manual for their property. At the completion of the meeting, the landowner signs a Notice of Intent (NOI) to agree to implement applicable BMPs on their enrolled *(i.e.,* enrolled in the FDACS BMP Program) properties. FDACS updates its enrollment database on a quarterly basis, and these quarters do not necessarily align with the reporting periods for the various BMAP reporting periods. For example, this annual Progress Report covers the reporting period from September 1, 2014 through August 31, 2015; however, the enrollment reflected is through June 30, 2015. This enrollment has an estimated reduction of 8,252 lbs/yr of TN and 1,538.6 lbs/yr of TP for the reporting period, and 16,045.90 lbs/yr of TN and 3,023.70 lbs/yr of TP to date. As of June 30, 2015, FDACS had enrolled 7,463.1 acres in BMPs (**Table 1**) based on the entire parcel acreage. Between June 30, 2015 and September 30, 2015, FDACS enrolled an additional 1,988.6 acres in the equine and cow/calf programs. This enrollment is not factored into the reductions listed above.

Thirty-two producers in the Lakes Harney and Monroe Basin have now submitted NOIs to implement FDACS-adopted BMPs. These producers are enrolled in the citrus, cow/calf, nursery, row crop, and sod BMP programs. Enrollment figures as of June 30, 2015 are contained in **Table 1** and depicted in **Figure 2**.

Not all of the acreage listed as agriculture in **Table 1** is included in enrollment figures, because the NOIs document only the estimated total number of acres on which applicable BMPs are implemented, not the entire 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 counted on the NOIs submitted to FDACS. There also may be acreage that is not appropriate for enrollment in FDACS BMPs, such as lands not in commercial production (defined as operations conducted as a business). Only enrolled lands that fall within the mapped agricultural land uses are included in the BMAP figures.

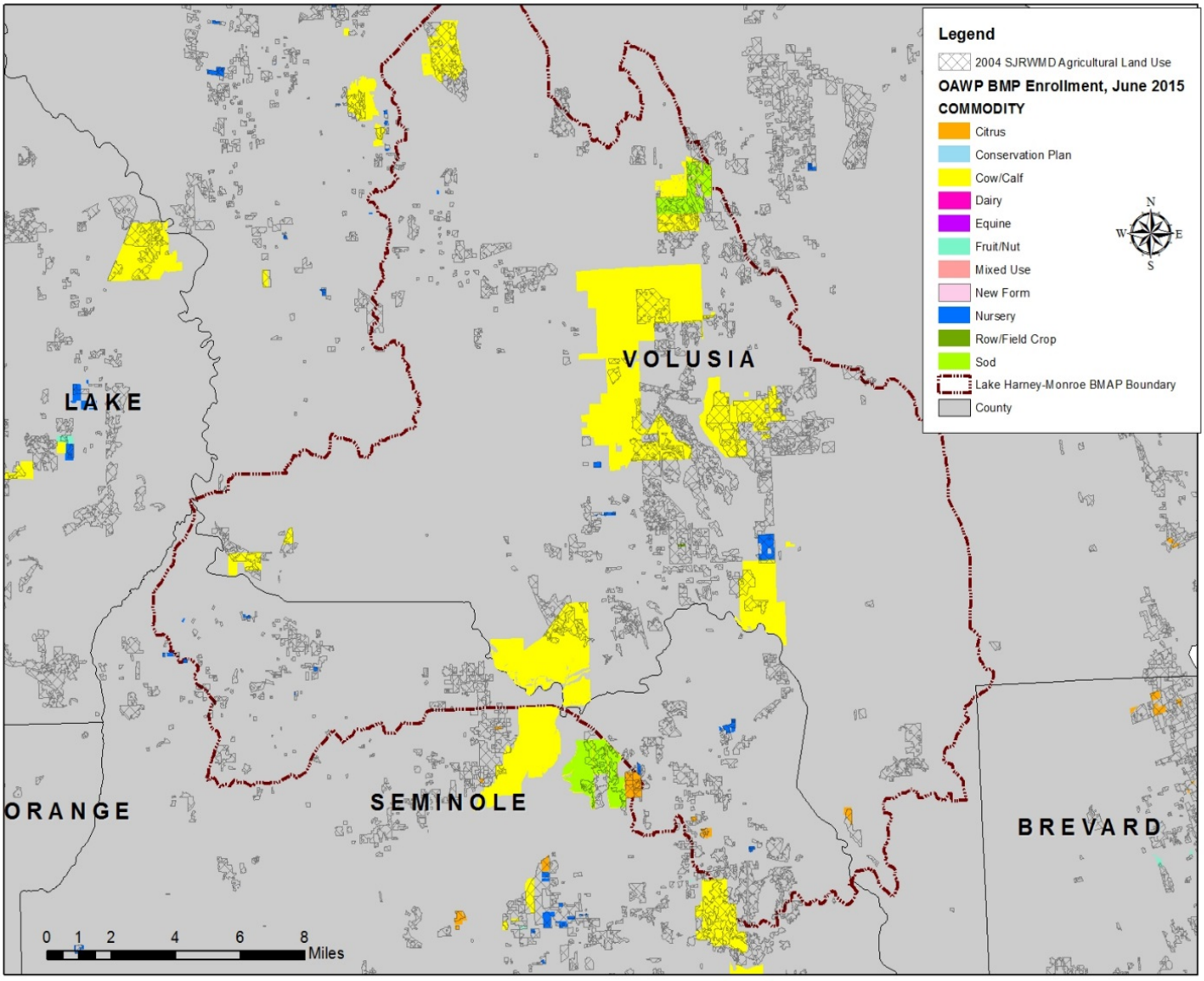

Figure 2: Agricultural Operations Enrolled in FDACS BMP Programs in the Harney-Monroe BMAP Area as of June 30, 2015

Table 1: Agricultural Acreage, BMP Enrollment, and Future Enrollment Goals for the Lakes Harney and Monroe and MSJR 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] Most of these horse farms likely are not commercial agriculture, and will be addressed through FDEP-developed BMPs.
[3] FDACS staff has observed no active poultry operations in the BMAP area, but will be confirming this supposition.
[4] Actual acreage enrolled will be less than targeted because some agricultural lands will not be in production.
[5]The FDACS Division of Aquaculture currently has eight aquaculture facilities in the BMAP boundary, and they encompass roughly 8 acres. These facilities have a current Aquaculture Certificate of Registration and comply with Aquaculture BMPs pursuant to Rule 5L-3, F.A.C.

2004 SJRWMD Land Use	2004 Acres	FDACS-Adjusted Acres[1]	Related FDACS BMP Programs	Acreage Enrolled as of June 30, 2015	Related Notices of Intent
Pasture	15,901.1	15,901.1	Cow/Calf; Hay; Statewide Sod	6,099.5	13
Row/Field/Mixed Crops	2,862.8	825.6	Vegetable/Agronomic Crops	1,190.6	1
Fallow Cropland	1.7	1.7	No enrollment needed	N/A	N/A
Horse Farm[2]	174.1	174.1	Equine	3.4	N/A
Citrus	450.1	450.1	Citrus	89.5	5
Abandoned Citrus	633.9	0.0	No enrollment needed	N/A	N/A
Tree Crops	13.3	13.3	Specialty Fruit and Nut	0.0	N/A
Tree Nurseries	76.5	76.5	Nursery; Specialty Fruit/Nut	0.0	N/A
Ornamentals	243.0	243.0	Container Nursery	57.2	11
Shade Ferns	0.6	0.6	Nursery	N/A	N/A
Hammock Ferns	2.4	2.4	Nursery	N/A	N/A
Specialty Farms	2.2	2.2	Conservation Plan Rule	0.0	N/A
Cattle Feeding	11.3	11.3	Conservation Plan Rule	0.0	N/A
Poultry Feeding[3]	80.9	80.9	Conservation Plan Rule	12.8	N/A
Other Open Lands – Rural	0.1	0.0	No enrollment needed	N/A	N/A
***Aquaculture*[5]**	*12.5*	*12.5*	*FDACS Aquaculture Division*	*10.1*	*8*
Total	**20,466.6**	**17,795.3**		**7,463.1**	**30**

5-Year Enrollment Goal (90%)[4] 16,015.8 FDACS-Adjusted Acres
Acreage Enrolled 7,463.1 FDACS-Adjusted Acres
Remaining Acres To Enroll[4] 8,552.7 FDACS-Adjusted Acres

2.1.12 SJRWMD

The District recently completed a TP reduction planning project in the Deep Creek Planning Unit. Twenty potential locations for treatment projects were identified, with fourteen available for Deep Creek remediation and six for Deep Creek Diversion Canal treatment. Modeling was completed to determine potential TP reductions and to optimize a smaller network of projects to meet some overall reduction goals while minimizing capital and cost per pound removed. In the next fiscal year (October 2015 – September 2016), the District will conduct additional storm event sampling to further refine the final recommended treatment areas. The District will also meet with FDACS staff to begin identifying some additional BMPs that will assist with nutrient reductions.

2.2 SUMMARY OF ACCOMPLISHMENTS

The projects completed during the third annual BMAP reporting period are summarized in **Table 2**. Nutrient reductions associated with project implementation efforts that occurred during the reporting period total 8,252 lbs/yr of TN and 1,538.6 lbs/yr of TP. These reductions are in addition to those projects given credit atBMAP adoption. Therefore, the total project reductions to date are 81,286.6 lbs/yr of TN and 18,376.8 lbs/yr of TP, which are greater than the required reductions in the first BMAP iteration of 43,828.2 lbs/yr of TN and 8,854.9 lbs/yr of TP. Therefore, the reductions that have occurred to date are greater than the reductions required for the first BMAP iteration. These reductions are 92.7% of the TN required TMDL reductions, and exceed the required TP reductions (111.6%) to meet the TMDL. These notably high percentages are a result of several stakeholders implementing projects that have resulted in more reductions than were required of them, and therefore, more than 100% of the required TP reductions have been achieved. However, there are still stakeholders in the basin that need to implement further projects in order to achieve their required reductions and meet their allocations.

The progress towards the total TMDL load reductions for TN and TP are shown in **Figure 3** and **Figure 4**, respectively. The first bar in these figures shows the starting load for urban and agricultural stormwater runoff. The second bar shows the current estimated loading with the implementation of projects and the removal of non-contributing areas. The third bar shows the total allocation for stormwater runoff to meet the TMDLs. The line shows the target for the first BMAP iteration.

Table 2: Summary of Projects Completed in the Reporting Period (September 1, 2014 Through August 31, 2015)

N/A = Not available

Entity	Project Number	Project Name	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
City of Deltona	DEL-8	Tivoli/Wheeling Forcemain to Rapid Infiltration Basin Stormwater Retention Ponds.	N/A	N/A
Agriculture	N/A	Agricultural BMP Enrollment – Reporting Period	8,252	1,538.6
Total		**Total Reductions in Reporting Period**	**8,252**	**1,538.6**

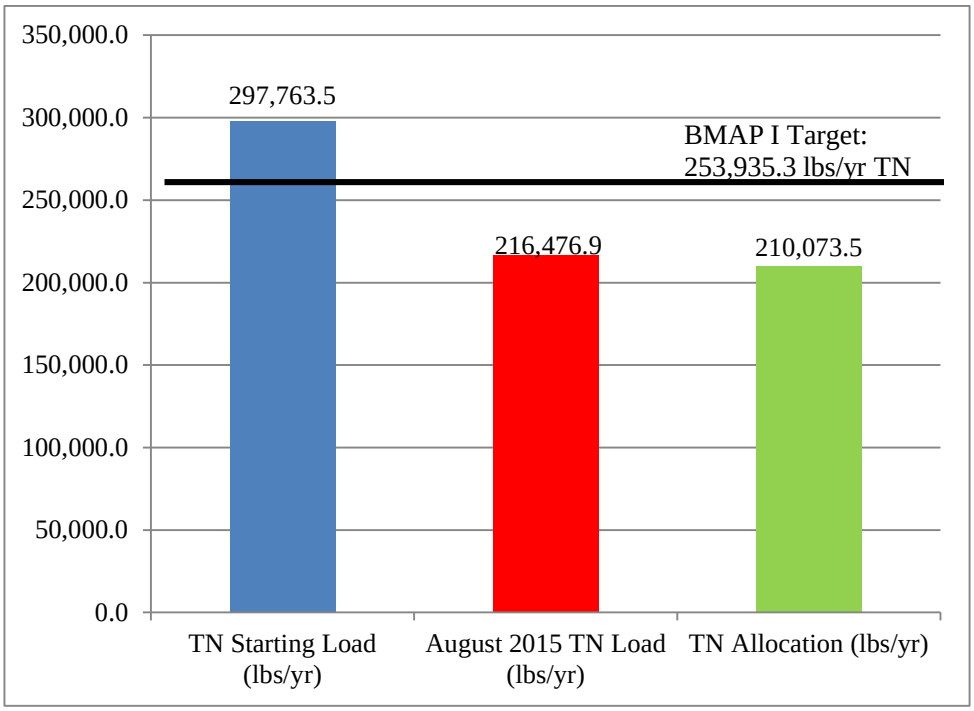

Figure 3: Progress Towards the Lakes Harney and Monroe and MSJR TN TMDL Through August 31, 2015

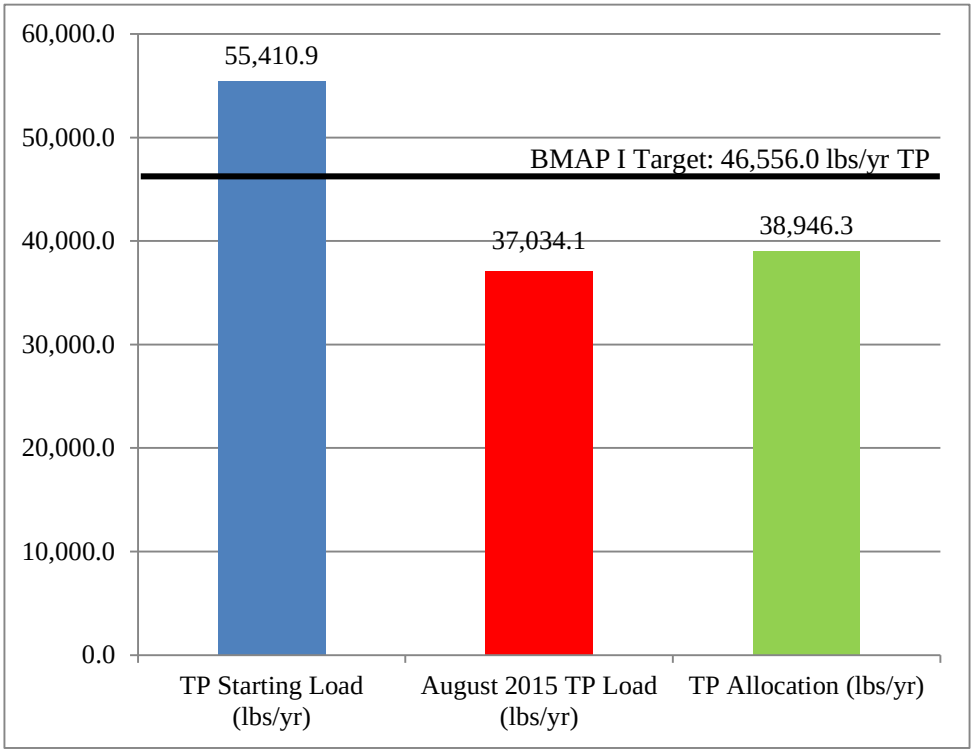

Figure 4: Progress Towards the Lakes Harney and Monroe and MSJR TP TMDL Through August 31, 2015

2.3 STREET SWEEPING

Since the adoption of the BMAP, the methodology for calculating nutrient load reductions using the FSA assessment tool has been modified. Street sweeping reductions in the first two years of BMAP implementation were reported based on the old methodology. However, as of this third reporting period, all stakeholders with a street sweeping program were required to calculate street sweeping reductions based on the updated methodology, which is consistent with the requirements included in the MS4 permits.

Section 3: WATER QUALITY AND BIOLOGICAL MONITORING

The Lakes Harney and Monroe and MSJR 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 TMDLs and provide a better understanding of the watershed loading. The BMAP monitoring plan consists of ambient water quality sampling and biological and vegetation monitoring. A detailed water quality evaluation will be conducted after the fourth year 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 third year of BMAP implementation. A few highlights of the monitoring efforts are described below.

3.1 SJRWMD

This summary covers the mainstem of the St. Johns River (SJR) and includes Lakes Harney and Monroe and river between the two lakes. This section of the river has a nutrient TMDL (Gao 2009) that was completed prior to the current numeric nutrient criteria (NNC). Brief summaries of three of the primary Middle Basin (MSJRB) tributaries – Econlockhatchee, Deep Creek and Lake Jesup – are included for perspective on nutrient loads (**Figure 5**). The Wekiva River, the second largest TP load to the SJR, is not included because outflow into the SJR is not currently directly monitored. One upstream site is also included to demonstrate Upper Basin inputs – the Upper Basin (USJRB) at US Hwy 50 – the closest District sampling site to the boundary between the USJRB and the MSJRB.

Although an extensive set of water quality parameters are analyzed monthly or bimonthly at each site, this summary focuses on analytes critical to nutrient TMDLs: TPT (total fraction of Total Phosphorus), Total Nitrogen (TN), Chlorophyll *a* (Chl-a), Dissolved Oxygen (DO) and Cyanobacteria where available. TN is calculated using the sum of Total Kjeldahl Nitrogen (TKN) and NOx.

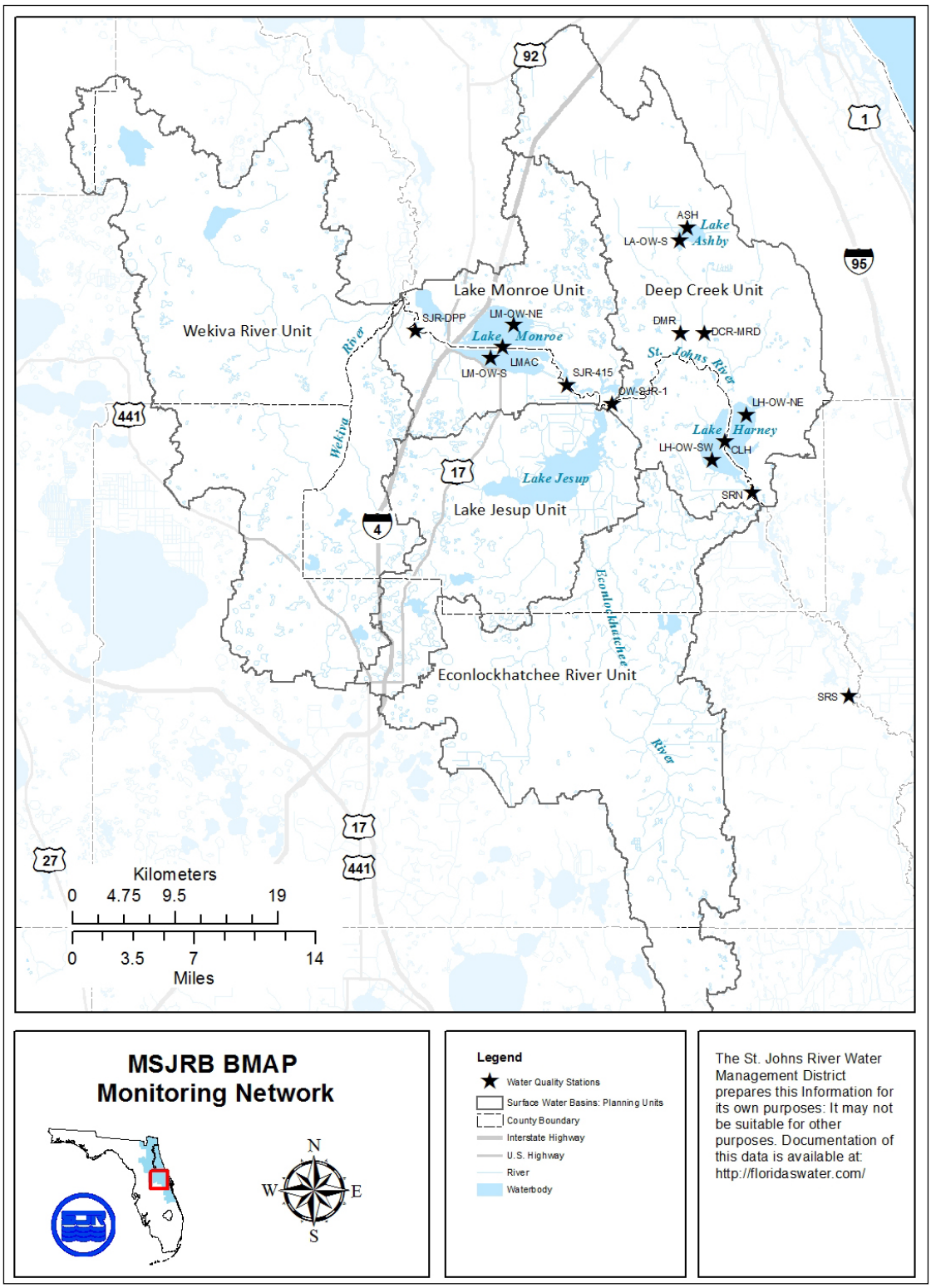

Figure 5. Water Quality Sampling Sites Used To Complete the Evaluation in this Report

3.1.1 Mainstem Water Quality

In previous reports and analyses, a traditional mean (or average) has been used to present annual concentrations calculated from monthly ambient sampling. The DEP NNC use geomeans to determine impairment; geomeans are always less than or equal to averages. Consequently both geomeans and averages are presented here for comparison in **Table 3** and **Table 4,** respectively.

Both TP and Chl-a concentrations were similar from the USJRB to just upstream of Lake Jesup (SRS through OW-SJR-1) **Figure 6** shows that the annual average TP concentrations (not geomeans) in the upper half of the MSJRB were not statistically different but were significantly different downstream of the outfall from Lake Jesup. None of these concentrations were above the NNC for streams in the Peninsula or for lakes with high color and an annual geomean Chl-a below 20. **Figure 7** shows that the annual average TN concentrations (not geomeans) in the upper half of the MSJRB were not statistically different but were significantly different after the outfall from Lake Jesup. Both TP and Chl-a were significantly higher downstream of the outflow from Lake Jesup and through Lake Monroe. Although TP and Chl-a were not statistically different between Monroe and the site just downstream (SJR-DPP), a downward trend was evident. TN concentrations were similar throughout the basin (**Figure 8**). TP, Chl-a and TN concentrations throughout the mainstem overtime demonstrated the strong influence of the SJR on water quality. There was no significant change in nutrient concentrations at any site except Monroe which exhibited a slightly lower TP concentration between 2004 and 2014 ($p<0.001$).

Table 3. Summary of the geometric mean for key water quality parameters along the mainstem of the St. Johns River in the Middle Basin for the time period covering 2004 through 2014. Arrow indicates upstream input (SRS) and downstream flow out of Monroe (SJR-DPP). Yellow highlights indicate means that exceeded the new numeric criteria for streams/lakes.

Parameter	SRS	SRN	Harney	OW-SJR-1	SJR-415	Monroe	SJR-DPP
TPT, mg/L	0.085	0.090	0.080	0.079	0.094	0.095	0.089
TNT, mg/L	1.70	1.45	1.40	1.4	1.67	1.6	1.48
TKNT, mg/L	1.80	1.36	1.33	1.35	1.60	1.54	1.38
Chl-a, mg/m3	5.9	2.9	4.2	3.3	11.1	11.9	9.5
DO, mg/L	3.96	5.29	7.14	6.11	5.62	6.93	7.09
TSS, mg/L	7.5	4.3	2.1	1.4	7.1	6.6	3.7
Color, PCU	184	170	146	146	136	130	116
Water Depth, ft	3.07	2.00	2.29	1.93	3.71	2.48	4.09

Table 4. Summary of *Averages* for same Parameters Presented in Table 4. These Values are the More Typical Averages Reported in Past Reports Rather than the Geometric Mean Now Used in the New Numeric Nutrient Criteria.

Parameter	SRS	SRN	Harney	OW-SJR-1	SJR-415	Monroe	SJR-DPP
TPT, mg/L	0.095	0.098	0.088	0.088	0.103	0.102	0.095
TNT, mg/L	1.87	1.50	1.45	1.5	1.73	1.7	1.51
TKNT, mg/L	1.84	1.40	1.37	1.39	1.66	1.58	1.41
Chl-a, mg/m3	9.74	4.26	10.35	8.07	20.44	21.53	16.88
DO, mg/L	5.18	5.88	7.39	6.52	6.19	7.31	7.31
TSS, mg/L	8.96	6.56	5.06	5.28	10.79	11.35	7.67
Color, PCU	206	198	174	178	166	158	145
Water Depth, ft	3.24	2.18	2.39	2.02	3.86	2.53	4.19

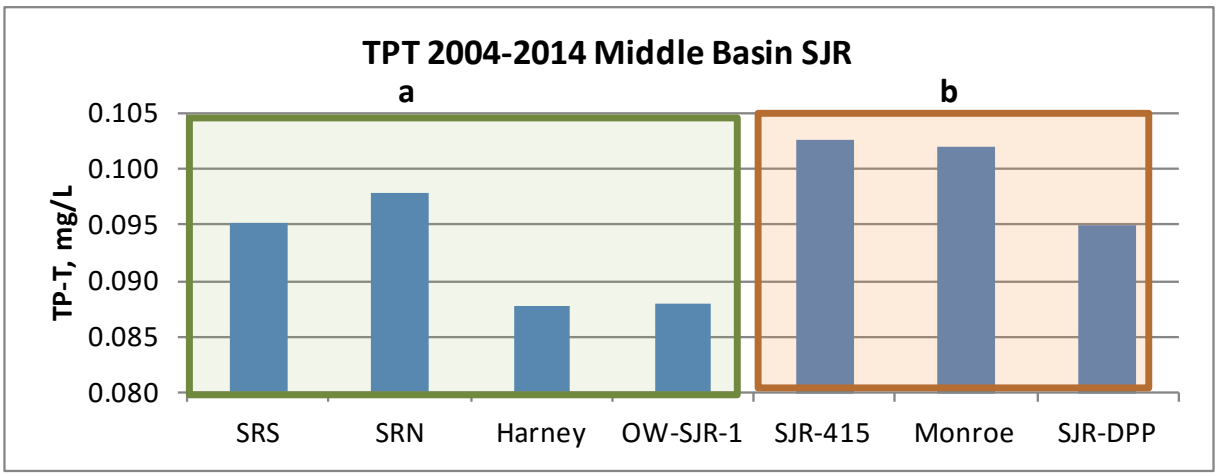

Figure 6. Annual Average TP Concentrations in the Upper Half of the MSJRB (2004-2014)

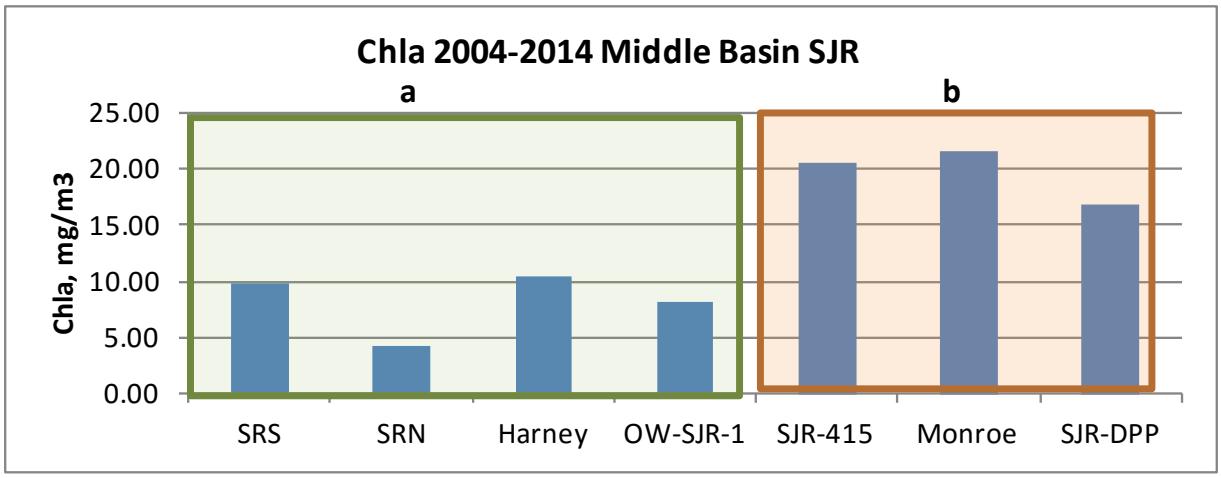

Figure 7. Annual Average TN Concentrations in the Upper Half of the MSJRB (2004-2014)

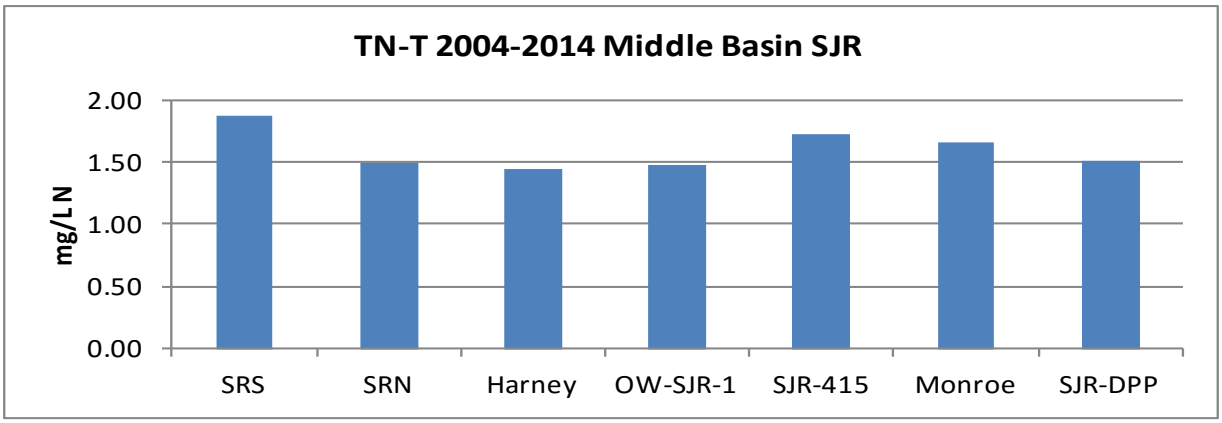

Figure 8. TN Concentrations throughout the Middle Basin and its USJRB Input (2004-2014)

There were four primary divisions of phytoplankton present in the MSJRB: Cyanobacteria, Bacillariophyta, Chlorophyta and Cryptophyta. The abundance of all but Cyanobacteria were similar throughout the MSJRB and for the period of record represented (2004-2014). Cyanobacteria exhibited a significant and large increase in abundance beginning in 2011 through 2014 from downstream Harney. Harney's Cyanobacteria abundance dropped the following year, but the remainder of the MSJRB mainstem maintained high abundance. As with TP and Chl-a, Lake Jesup (outfall just upstream of SJR-415) appeared to be a driving force in the phytoplankton dynamics, although the effect also appeared to reach a short distance upstream as well (sample site OW-SJR-1). Stage and discharge also play an important role in the proliferation of these populations, but because the profiles were significantly different at each location, examination of other more localized effects is warranted.

3.1.2 Tributary Water Quality

The Econlockhatchee River (sample site ECH) enters the SJR just upstream of Lake Harney (outfall between sample sites SRS and SRN). Lake Ashby is the primary input to Deep Creek (DCR-MRD) which enters the SJR just downstream of Lake Harney. Deep Creek Diversion Canal (DMR) drains the western part of the Deep Creek planning unit and enters the SJR downstream of Deep Creek and upstream of Lake Jesup.

The Econlockhatchee entered the SJR at about the same TP concentrations found at SRS and SRN, but a significantly lower TN concentration (**Table 5** and **Table 6**). Deep Creek drained into the SJR at a significantly higher TP concentration but a significantly lower TN concentration. Deep Creek Diversion had a similar TP concentration and higher TN than the mainstem SJR. Lake Jesup (discussed in a separate summary) had a significantly higher TP concentration than the SJR but lower than Deep Creek. Jesup's TN concentration was three times higher than SJR.

Table 5. Average water quality concentrations from 2004-2014 using monthly ambient data

Parameter	ECH	Ashby	DCR-MRD	DMR
TPT, mg/L	0.099	0.102	0.186	0.081
TNT, mg/L	0.89	0.95	1.13	1.3
TKNT, mg/L	0.74		1.04	1.23
Chl-a, mg/m3		6.10		

Table 6. Geomean nutrient concentrations from 2004-2014 using monthly ambient data

Parameter	ECH	Ashby	DCR-MRD	DMR
TPT, mg/L	0.095	0.093	0.137	0.068
TNT, mg/L	0.87	0.92	1.08	1.1
TKNT, mg/L	0.72		1.00	1.10
Chl-a, mg/m3		3.43		

The Deep Creek system includes drainage from Lake Ashby into Lake Ashby Canal which drains into Deep Creek (sampling site DCR-MRD) and directly into the SJR (**Figure 5**). Deep Creek also receives drainage from the entire eastern basin in the Deep Creek planning unit with the exception of a small portion draining directly into Lake Harney. Deep Creek Diversion Canal (sampling site DMR) is the third primary component of the system, draining the western portion of the Deep Creek Planning Unit and entering the SJR downstream of Deep Creek.

Lake Ashby TP dynamics influenced Deep Creek levels most of the time with higher storm events contributing to spikes in concentration with occasional spikes observed from Deep Creek spikes due to inputs from the agricultural area to the east during high storm events. The Deep Creek Diversion Canal on the other hand, was independent of the Ashby-Deep Creek dynamics and, while increasing the overall TP load in the SJR, the Diversion Canal did not change the TP concentration in the SJR (**Figure 9**).

Lake Ashby TP concentration was significantly lower between two periods of analysis – prior to the TMDL (2004 – 2009) and after (2009-2014). TP concentration dropped from 0.117 mg/L P to 0.087 mg/L P. Both discharge and TP concentrations were significantly lower in Deep Creek. Discharge was 59% lower (68 cfs 1/2004 – 6/2009 vs 28 cfs 7/2009 – 12/2014) and TP was 37% lower (0.221 mg/L P vs 0.140). The source of this TP reduction is currently not known. Deep Creek Diversion also exhibited significantly lower discharge (55 cfs vs 24) but TP concentrations were unchanged between the two time periods.

Lake Ashby also influenced TN dynamics in Deep Creek (**Figure 10**), but no change in TN concentration was evident in Ashby or Deep Creek. Deep Creek Diversion had a higher TN concentration than Deep Creek but no significant change was exhibited over the time period examined. A few spikes from surrounding agricultural land use during extreme storm events were observed. The Deep Creek Diversion Canal TN concentration was higher than Deep Creek and higher than the SJR at the point of outfall.

Lake Ashby has been an anomaly among shallow sub-tropical lakes due to high TP concentrations and low Chl-a and phytoplankton abundance. It continues to maintain a healthy population of submerged aquatic vegetation (SAV). While this situation was also exhibited during the 2004 – 2014 time period, both phytoplankton populations and Chl-a levels have significantly increased (**Figure 11** and **Figure 12**). Similar to trends throughout the Middle Basin, Cyanobacteria has become the dominant species in recent years. The District will continue to monitor this lake for phytoplankton changes.

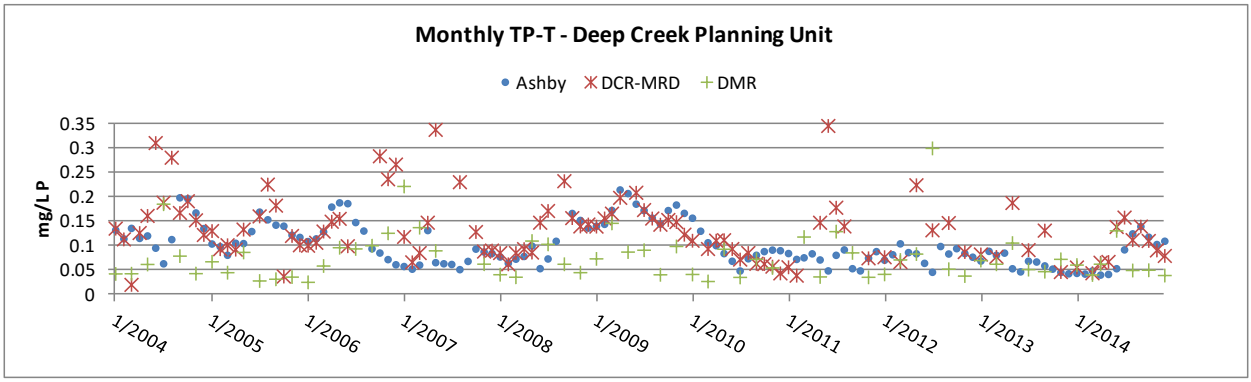

Figure 8. Time Series for Three Waterbodies in the Deep Creek Planning Unit from 2004-2014

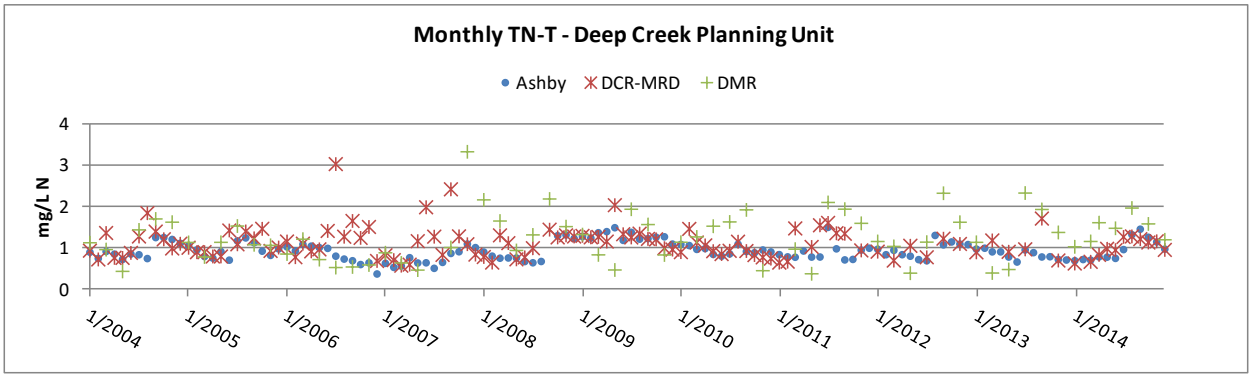

Figure 90. Time Series of Nitrogen in the Deep Creek System from 2004-2014

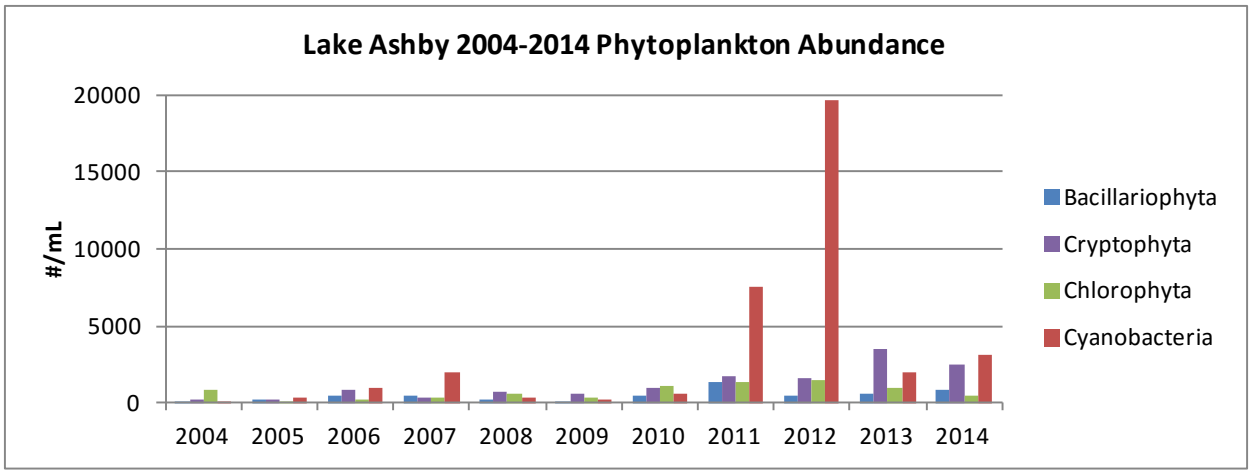

Figure 10. Lake Ashby Phytoplankton Abundance From 2004-2014

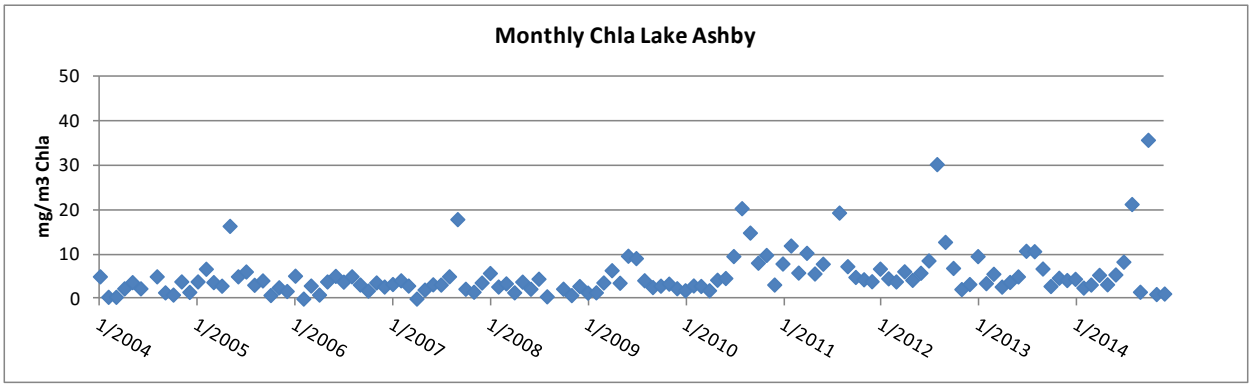

Figure 11. Time Series of Chl-a in Lake Ashby from 2004-2014

3.2 SEMINOLE COUNTY BIOLOGICAL MONITORING

Seminole County continued biological and ambient water quality monitoring as identified in the BMAP. All water chemistry data are uploaded to STORET via the Seminole Watershed Atlas. Biological data have also been included. A Stream Condition Index was conducted in Smith Canal downstream of the County's Lockhart-Smith RSF on May 19, 2015. The results of the SCI were an exceptional metric score, indicating a diverse macroinvertebrate assemblage. Conventional macroinvertebrate assessments of both Lakes Harney and Monroe were conducted in 2015 with the resulting Shannon Weaver Index (SWI) calculated. Surface Water Quality Standards (62.302) for biological health states that the Shannon Weaver Index (SWI) shall not be reduced to less than 75% of background level. Seminole County has two stations in both Lakes Harney and Monroe where an Ekman dredge is dropped 3 times to obtain a composite sample. The resulting average SWI in both lakes in 2015 was between 2.0 and 3.0 which was consistent with previous year's scores. Four vegetation surveys were conducted in Lake Monroe and Lake Harney by Seminole County staff during the reporting period. The survey findings are summarized below. The next vegetative monitoring will be conducted in October 2015.

3.2.1 Lake Monroe Surveys

On December 3, 2014, Seminole County Lake Management Program (SCLMP) biologists conducted a survey of the aquatic plants in Lake Monroe. Hydrilla was sparse to a depth of 4 feet and had decreased in most areas of the lake since the previous inspection. Much of the hydrilla found inshore showed signs of depredation from waterfowl. A large amount of water hyacinth was found lake-wide. The invasive creeping primrose willow was found scattered between Stone Island and the eastern river mouth. Also, a high amount of water flow was observed in the lake.

Native SAV observed during the inspection included the following: eelgrass to a depth of 5 feet, coontail to a depth of two feet, and bladderwort to a depth of one foot. Eelgrass was the dominant SAV present in the lake. Invasive emergent species observed during the inspection included the following: alligatorweed, paragrass, wild taro, torpedo grass, water hyacinth, water lettuce, Chinese tallow, and Brazilian pepper tree. Native emergent vegetation observed during the inspection included buttonbush, flat sedge, pennywort, yellow cow lily, yellow water lily, phragmites, knotgrass, American cupscale-grass, Carolina willow, bulrush, three- square bulrush, fireflag, and cattail. The Secchi depth reading was 2.7 feet in 5.2 feet of water. The water elevation at the time of inspection was 3.15 feet below sea level.

On March 25, 2015, SCLMP and Florida Fish and Wildlife Conservation Commission (FWC) biologists surveyed the aquatic plants in Lake Monroe. Hydrilla was found to be sparse and intermixed with eelgrass to a depth of 4.5 feet lake-wide. This was a reduction from the previous inspection. Invasive emergent species observed during the inspection included the following: alligator weed, paragrass, wild taro, torpedo grass, water lettuce, water spangle, Chinese tallow, and Brazilian pepper tree. Water hyacinth decreased since the previous inspection, but water lettuce increased. Native SAV observed during the inspection included eelgrass to a depth of 3 feet and bladderwort to a depth of 1 foot. Eelgrass was again the dominant SAV.

Native emergent vegetation observed during the inspection included the following: buttonbush, water hemlock, flat sedge, pennywort, primrose willow, hempvine, yellow cow lily, yellow water lily, Egyptian paspalidium, phragmites, knotweed, American cupscale-grass, Carolina willow, bulrush, three-square bulrush, fireflag, and cattail. The invasive apple snail eggs increased around the perimeter of the lake. These pink clutches can be seen at the base of bulrush. Secchi reading was 3.7 feet in 5 feet of water. The water elevation at the time of inspection was 0.79 feet below sea level.

On June 3, 2015, SCLMP biologists surveyed the aquatic plants in Lake Monroe. In previous inspections, hydrilla was observed in the southeast and east coves of Lake Monroe. Since then, there was a significant reduction of this invasive species, especially along the east side of the lake. On the west side of the lake, hydrilla was scattered sparsely by the Interstate 4 Bridge. A small amount of the invasive parrot feather was also present. Invasive emergent species observed during the inspection included the following: alligator weed, paragrass, wild taro, torpedo grass, water lettuce, water spangle, Chinese tallow, and Brazilian pepper tree. The biomass of water hyacinth decreased since the previous inspection, but water lettuce increased. Native SAV observed during the inspection included eelgrass to a depth of 3 feet and bladderwort to a depth of 1 foot. Eelgrass was the dominant SAV.

Native emergent vegetation observed during the inspection included buttonbush, water hemlock, flat sedge, pennywort, primrose willow, hempvine, yellow cow lily, yellow water lily, Egyptian paspalidium, phragmites, knotweed, American cupscale-grass, Carolina willow, bulrush, three-square bulrush, fireflag, and cattail. Apple snail eggs increased around the perimeter of the lake. These pink clutches can be seen at the base of bulrush as seen in**.**A cyanobacteria bloom was present by Wayside Park.The Secchi depth reading was 2.5 feet in 3.9 feet of water. The water elevation at the time of inspection was 1.09 feet below sea level.

3.2.2 Lake Harney Surveys

On December 4, 2014, SCLMP biologists surveyed the aquatic plants in Lake Harney. Lake elevation was high at the time of inspection. SAV included the following: eelgrass to six feet, roadgrass to two feet, bladderwort to two feet, and hydrilla to six feet. Eelgrass was the dominant SAV but had decreased since the previous inspection. Hydrilla was sparse and intermixed with the eelgrass at a depth of six feet of water. Bladderwort was found only in the canals along the east side of the lake.

Emergent aquatic plants that were found during the inspection included soft stem bulrush, knot grass, maidencane, penny-wort, pickerel weed, sand cordgrass (*Spartina bakeri*), smartweed and bulrush. Invasive emergent plants found included alligatorweed, torpedo grass, cattails and common reed. Other invasive exotics included Brazilian pepper (*Schinus terebinthifolius*), water hyacinth (*Eichornia crassipes*), and water lettuce (*Pistia stratiotes*). Secchi depth reading was 3.9 feet in 6.8 feet of water. Water elevation at the time of inspection was 7.0 feet above sea level at the USGS monitoring station.

On March 26, 2015, SCLMP personnel surveyed the aquatic plants in Lake Harney. SAV included the following: eelgrass to 3.5 feet, roadgrass to one foot, bladderwort to two feet, and hydrilla to six feet.

Eelgrass was the dominant SAV but had decreased since the previous inspection. Hydrilla was found sparse and intermixed within the eelgrass six feet of water. Bladderwort was found only in the canals along the east side of the lake. Emergent aquatic plants that were found included the following: soft stem bulrush, knot grass, maidencane, penny-wort, pickerel weed, sand cordgrass (*Spartina bakeri*), smartweed and bulrush. Invasive emergent plants found included alligatorweed, torpedo grass, cattails and common reed. Other invasive exotics included Brazilian pepper (*Schinus terebinthifolius*), water hyacinth (*Eichornia crassipes*).and water lettuce (*Pistia stratiotes*). The Secchi depth reading was 2.6 feet in 6.8 feet of water. Water elevation at the time of inspection was 2.4 feet at the USGS monitoring station.

On June 3, 2015, SCLMP biologists surveyed the aquatic plants in Lake Harney. SAV included the following: eelgrass to two feet, roadgrass to two feet, bladderwort to three feet, coontail to three feet, and hydrilla to two feet. A reduction in eelgrass around the perimeter of the lake was observed. A reduction in hydrilla was also observed with only a few sprigs found around the lake. Bladderwort and coontail were found only in the northeast cove.

Emergent aquatic plants that were found included soft stem bulrush, knot grass, maidencane, penny-wort, pickerel weed, sand cordgrass (*Spartina bakeri*), smartweed, and bulrush. The observed invasive emergent plants included: alligatorweed, cattails, and common reed. Other invasive exotics included creeping primrose, Brazilian pepper (*Schinus terebinthifolius*), water hyacinth (*Eichornia crassipes*), and water lettuce (*Pistia stratiotes*). Water lettuce and water hyacinth were found to be greatly reduced due to recent herbicide treatments. Creeping primrose was also found greatly reduced due to recent treatments. Secchi depth reading was 1.9 feet in 5.3 feet of water. Water elevation at the time of inspection was 1.1 feet at the United States Geological Survey (USGS) monitoring station

APPENDIX A: BMAP PROJECTS

The BMAP project tables below show the implementation status of the BMAP projects as of August 31, 2015. 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 DEP that each entity 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.

Table A-1: City of DeBary Projects

N/A = Not applicable

*Noncontributing basins are defined in Section 1.4 (Assumptions and Considerations Regarding TMDL Implementation) in the Lakes Harney and Monroe and MSJR BMAP.

Entity	Project Number	Project Name	Project Detail	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
DeBary	DB-1	Noncontributing Basin*	Noncontributing basin, not included in the TMDL model	N/A	6,522.5	1,036.8
DeBary	DB-2	Noncontributing Basin*	Noncontributing basin, not included in the TMDL model	N/A	7,039.2	1,170.2

Table A-2: City of DeBary Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	13,561.7	2,207.0
Total BMAP 1 Required Reduction	1,880.2	86.4
Credit for Future BMAPs	11,681.5	2,120.6

Table A-3: City of DeLand Projects

Entity	Project Number	Project Name	Project Detail	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
DeLand	DL-1	Education Efforts	FYN Program, irrigation ordinance, fertilizer ordinance, pamphlets, website, illicit discharge program	Ongoing	9.1	0.7

Table A-4: City of DeLand Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	9.1	0.7
Total BMAP 1 Required Reduction	0.0	0.0
Credit for Future BMAPs	9.1	0.7

Table A-5: City of Deltona Projects

N/A = Not applicable

Entity	Project Number	Project Name	Project Type	Treatment Acres	Project Cost	Annual O&M	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Deltona	DEL-1	McGarity Kirkhill Regional Treatment Facility	Wet detention pond	277.2	$1,500,000	$50,000	Completed	344.6	91.8
Deltona	DEL-2	DRA GC-5	Retention BMPs	10.5	$120,000	$6,000	Completed	25.5	4.3
Deltona	DEL-3	Swales	Swales	2,368.7	$2,000,000	$100,000	Completed	4,820.2	728.6
Deltona	DEL-4	Lake Gleason Control Structure	Wet detention pond	581.6	$150,000	$3,000	Completed	672.0	188.4
Deltona	DEL-5	Education Efforts	Education	N/A	Unknown	Unknown	Ongoing	1,270.0	206.4
Deltona	DEL-6	Catch Basin Maintenance	Catch basin cleanout	N/A	Unknown	Unknown	Ongoing	19.1	10.4
Deltona	DEL-7	Leland Dr. Retention Pond	Retention Pond	8	$756,300 Villages Construction		March 16, 2016	N/A	N/A
Deltona	DEL-8	Tivoli/Wheeling Forcemain to Rapid Infiltration Basin Stormwater Retention Ponds	Rapid Infiltration Basin	8	$578,200 Tivoli Wheeling Pump Station $645,416.78 Tivoli Wheeling Stormwater Forcemain $1,177,239.39 RIB Site Phase I –		Pump Station Completed 3/2013 Forcemain Completed 11/2014 RIB Site Completed 02/2015	N/A	N/A

Table A-6: City of Deltona Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	7,151.3	1,229.9
Total BMAP 1 Required Reduction	3,608.7	388.3
Credit for Future BMAPs	3,542.6	814.6

Table A-7: City of Lake Helen Projects

Entity	Project Number	Project Name	Project Detail	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Lake Helen	LH-1	Education Efforts	Irrigation ordinance, pet waste ordinance, pamphlets, website, stormwater pollution prevent factsheet	Ongoing	30.8	4.5

Table A-8: City of Lake Helen Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	30.8	4.5
Total BMAP 1 Required Reduction	0.0	0.0
Credit for Future BMAPs	30.8	4.5

Table A-9: City of Lake Mary Projects

Entity	Project Number	Project Name	Project Detail	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Lake Mary	LM-1	Education Efforts	FYN, landscape ordinance, irrigation ordinance, pet waste ordinance, PSAs, pamphlets, website, illicit discharge program	Ongoing	361.5	52.2
Lake Mary	LM-2	Street Sweeping	Sweeping of 53.58 curb miles per year	Ongoing	9.6	6.4

Table A-10: City of Lake Mary Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	371.1	58.6
Total BMAP 1 Required Reduction	0.0	0.0
Credit for Future BMAPs	371.1	58.6

Table A-11: City of Orange City Projects

Entity	Project Number	Project Name	Project Detail	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Orange City	OC-1	Education Efforts	Irrigation ordinance, pamphlets, website, illicit discharge program	Ongoing	1.3	0.2

Table A-12: City of Orange City Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	1.3	0.2
Total BMAP 1 Required Reduction	0.0	0.0
Credit for Future BMAPs	1.3	0.2

Table A-13: City of Sanford Projects

N/A = Not applicable

Entity	Project Number	Project Name	Project Type	Project Detail	Treatment Acres	Project Cost	End Date	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Sanford	S-1	Cloud Branch Phase I	Wet detention pond	Drainage/water quality improvements	187.0	$3,491,375	05/2007	Completed	647.3	173.9
Sanford	S-2	Cloud Branch Phase II	Wet detention pond	Drainage/water quality improvements	379.7	$3,072,693	05/2007	Completed	1,390.1	405.6
Sanford	S-3	Street Sweeping	Street sweeping	Street sweeping throughout the city	N/A	Unknown	Ongoing	Ongoing	8,866.5	3,993.3
Sanford	S-4	Education Efforts	Education	FYN, landscaping ordinance, irrigation ordinance, PSAs, pamphlets, website, illicit discharge program	N/A	Unknown	Ongoing	Ongoing	2,069.9	324.5
Sanford	S-5	Sanford Avenue	Baffle box	Baffle box on Sanford Avenue	Unknown	Unknown	2014	Completed	5.5	0.7
Sanford	S-6	Mill Creek	Wet detention pond	Drainage/water quality improvements	412.1	Unknown	2004	Completed	1,465.6	433.8
Sanford	S-7	Baffle Boxes (Not included in the model)	Baffle box	Baffle box on 2nd Street	200.1	Unknown	1997	Completed	9.0	6.7

Table A-14: City of Sanford Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	14,453.9	5,338.5
Total BMAP 1 Required Reduction	10,360.0	1,339.6
Credit for Future BMAPs	4,093.9	3,998.9

Table A-15: FDOT Projects

N/A = Not applicable
*Noncontributing areas are defined in Section 1.4 (Assumptions and Considerations Regarding TMDL Implementation) in the Lakes Harney and Monroe and MSJR BMAP.

Entity	Project Number	Project Name	Project Type	Treatment Acres	Start Date	End Date	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
FDOT	FDOT-1	79070-3547-02 (Pond 2)	Wet detention pond	21.6	N/A	6/2007	Completed	19.7	2.2
FDOT	FDOT-2	79070-3547-03 (Pond 3)	Wet detention pond	24.9	N/A	6/2007	Completed	11.7	0.6
FDOT	FDOT-3	79070-3547-04 (Pond 4)	Wet detention pond	35.2	N/A	6/2007	Completed	15.8	0.8
FDOT	FDOT-4	79070-3547-06 (Pond 6)	Wet detention pond	18.8	N/A	6/2007	Completed	13.6	0.7
FDOT	FDOT-5	79070-3546-03 (Pond 9)	Wet detention pond	13.4	N/A	6/2007	Completed	13.3	8.6
FDOT	FDOT-6	79070-3546-02 (Pond 8)	Wet detention pond	44.3	N/A	6/2007	Completed	25.4	6.2
FDOT	FDOT-7	79070-3547-05 (Pond 5)	Wet detention pond	33.1	N/A	6/2007	Completed	25.2	2.7
FDOT	FDOT-8	79070-3546-01 (Pond 7)	Wet detention pond	26.9	N/A	6/2007	Completed	19.9	1.4
FDOT	FDOT-9	79070-3546-04 (Pond 10)	Wet detention pond	3.6	N/A	6/2007	Completed	3.8	2.7
FDOT	FDOT-10	79110-xxx3-08 (Pond 4)	Wet detention pond	8.4	N/A	10/2008	Completed	8.2	1.6
FDOT	FDOT-11	79110-xxx3-09 (Pond 5)	Wet detention pond	22.6	N/A	10/2008	Completed	27.2	6.2
FDOT	FDOT-12	79110-xxx3-10 (Pond 6)	Wet detention pond	10.7	N/A	10/2008	Completed	13.6	2.8
FDOT	FDOT-13	79110-xxx3-11 (Pond 7)	Wet detention pond	30.0	N/A	10/2008	Completed	38.3	7.7
FDOT	FDOT-14	79110-xxx4-01 & 02 (Pond 1 & 1A)	Wet detention pond	35.6	N/A	Unknown	Completed	54.4	11.0
FDOT	FDOT-15	79110-xxx4-03 & 04 (Pond 2 & 2A)	Wet detention pond	38.7	N/A	Unknown	Completed	65.3	13.3
FDOT	FDOT-16	79110-xxx4-05 (Pond 14)	Wet detention pond	24.5	N/A	Unknown	Completed	43.8	8.0
FDOT	FDOT-17	SR 415 - missing from model	Swales	133.9	N/A	Unknown	Completed	90.1	28.3
FDOT	FDOT-18	SR 44 - missing from model	Swales	43.5	N/A	Unknown	Completed	34.1	10.5
FDOT	FDOT-19	SR 46 - missing from model	Swales	48.2	N/A	Unknown	Completed	32.8	7.4
FDOT	FDOT-20	77160-3404-02 (Pond 1-NW)	Retention BMPs	25.5	N/A	05/2004	Completed	94.2	13.4

Entity	Project Number	Project Name	Project Type	Treatment Acres	Start Date	End Date	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
FDOT	FDOT-21	77160-3404-06 (Pond 4-11)	Wet detention pond	38.5	N/A	05/2004	Completed	102.5	24.4
FDOT	FDOT-22	77160-3404-05 (Pond 4-1)	Wet detention pond	32.4	N/A	05/2004	Completed	44.9	12.4
FDOT	FDOT-23	77160-3404-07 (Pond 5)	Wet detention pond	30.5	N/A	05/2004	Completed	47.4	8.6
FDOT	FDOT-24	77160-3436	Swales	56.5	N/A	Unknown	Completed	147.5	19.8
FDOT	FDOT-25	77160-3439-01 (Pond 1)	Wet detention pond	20.3	N/A	00/2006	Completed	7.4	0.7
FDOT	FDOT-26	79110-3404-04 & 05 (Pond QQ3 & QQ-5)	Wet detention pond	47.6	N/A	10/2004	Completed	56.4	11.7
FDOT	FDOT-27	79110-3404-06 (RR-3)	Wet detention pond	53.1	N/A	10/2004	Completed	68.1	16.9
FDOT	FDOT-28	79110-3404-07 (Pond SS-2)	Wet detention pond	87.5	N/A	02/2006	Completed	91.9	26.3
FDOT	FDOT-29	Roadside Swale	Swales	35.0	N/A	10/2004	Completed	93.8	13.5
FDOT	FDOT-30	Roadside swale	Swales	13.3	N/A	02/2006	Completed	39.5	5.7
FDOT	FDOT-31	SR 415 - missing from model	Swales	65.1	N/A	Unknown	Completed	39.1	8.5
FDOT	FDOT-32	Education Efforts	Education	N/A	N/A	Ongoing	Ongoing	101.1	13.3
FDOT	FDOT-33	Street Sweeping	Street sweeping	N/A	N/A	Ongoing	Ongoing	410	263
FDOT	FDOT-34	Noncontributing Area in DeBary	Noncontributing area*	39.2	N/A	N/A	N/A	194.9	27.9
FDOT	FDOT-35	Noncontributing Area in Volusia County	Noncontributing area*	22.7	N/A	N/A	N/A	117.6	19.0
FDOT	FDOT-36	SR 415 – Pond A	Wet detention pond	4.3	2012	2015	Construction	6.8	1.5
FDOT	FDOT-37	SR 415 – Pond B	Wet detention pond	8.5	2012	2015	Construction	7.9	0.8
FDOT	FDOT-38	SR 415 – Exfiltration Trench	Retention BMPs	22.0	2012	2015	Construction	11.6	0.4
FDOT	FDOT-39	SR 415 – Pond H	Wet detention pond	9.9	2012	2015	Construction	10.2	2.4
FDOT	FDOT-40	SR 46 – Pond 1	Wet detention pond	18.0	2012	Unknown	Funded for 2018	25.8	6.3
FDOT	FDOT-41	SR 46 – Pond 2	Wet detention pond	11.6	2012	Unknown	Funded for 2018	18.8	5.4

Table A-16: FDOT Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	2,293.6	624.6
Total BMAP 1 Required Reduction	1,231.8	0.0
Credit for Future BMAPs	1,061.80	624.6

Table A-17: Seminole County Projects

N/A = Not applicable

Entity	Project Number	Project Name	Project Type	Project Detail	Treatment Acres	Project Cost	Annual O&M	End Date	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Seminole County	SC-1	Club II Regional Stormwater Facility (RSF)	Wet detention pond	RSF to collect and treat stormwater runoff	422.7	$2,334,682	$20,095	02/2007	Completed	1,333.3	395.6
Seminole County	SC-2	Midway RSF	Wet detention pond	RSF to collect and treat stormwater runoff	121.8	$2,163,151	$26,662	01/2009	Completed	408.4	118.4
Seminole County	SC-3	Elder Creek RSF	Wet detention pond	RSF to collect and treat stormwater runoff	229.7	$3,884,496	$19,251	11/2007	Completed	519.2	134.4
Seminole County	SC-4	Lockhart-Smith RSF	Wet detention pond	RSF to collect and treat stormwater runoff	2,757.0	$3,504,755	Unknown	01/2007	Completed	3,201.1	840.1
Seminole County	SC-5	Street Sweeping	Street sweeping	Street sweeping throughout the county	N/A	Unknown	Unknown	Ongoing	Ongoing	300.0	135.1
Seminole County	SC-6	Education Efforts	Education	FYN, landscaping ordinance, irrigation ordinance, pet waste ordinance, PSAs, pamphlets, website, illicit discharge program	N/A	Unknown	Unknown	Ongoing	Ongoing	1,875.8	282.3

Table A-18: Seminole County Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	7,637.8	1,905.9
Total BMAP 1 Required Reduction	3,973.6	155.5
Credit for Future BMAPs	3,664.2	1,750.4

Table A-19: Turnpike Authority Projects

Entity	Project Number	Project Name	Project Detail	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Turnpike Authority	T-1	Street Sweeping	Sweep 120 lane miles per year	Ongoing	21.6	14.4

Table A-20: Turnpike Authority Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	21.6	14.4
Total BMAP 1 Required Reduction	0.0	0.0
Credit for Future BMAPs	21.6	14.4

Table A-21: Volusia County Projects

N/A = Not applicable

*Noncontributing basins are defined in Section 1.4 (Assumptions and Considerations Regarding TMDL Implementation) in the Lakes Harney and Monroe and MSJR BMAP.

Entity	Project Number	Project Name	Project Type	Treatment Acres	Project Cost	End Date	Status	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Volusia County	VC-1	Education and Outreach	Education	N/A	Unknown	Ongoing	Ongoing	1,391.9	201.0
Volusia County	VC-2	Street Sweeping	Street sweeping	N/A	Unknown	Ongoing	Ongoing	1,482.7	667.8
Volusia County	VC-3	Lemon Bluff Road	Swales	1.8	$145,000	2011	Completed	6.6	1.1
Volusia County	VC-4	Lemon Bluff Boat Ramp	Swales	0.2	$55,550	02/2011	Completed	0.7	0.1
Volusia County	VC-5	DeBary Avenue – Doyle Road Expansion	Wet detention pond	123.3	Unknown	Unknown	Completed	41.0	10.3
Volusia County	VC-6	Lake Winnemissett Noncontributing Basin	Noncontributing basin*	1003.3	N/A	N/A	N/A	657.9	93.8

Table A-22: Volusia County Summary of Reductions

Category	TN Reduction (lbs/yr)	TP Reduction (lbs/yr)
Total Projects Reduction	3,580.8	974.1
Total BMAP 1 Required Reduction	1,632.9	0.0
Credit for Future BMAPs	1,947.9	974.1