

Final

***2016 Progress Report for the Upper
Wakulla River and Wakulla Springs
Basin Management Action Plan***

**Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection**

July 2017

**2600 Blair Stone Road
Tallahassee, FL 32399**



Acknowledgments

This *2016 Progress Report for the Upper Wakulla River and Wakulla Springs Basin Management Action Plan* was prepared as part of a statewide watershed management approach to restore and protect Florida's water quality. It was prepared by the Florida Department of Environmental Protection with information from the following Upper Wakulla River and Wakulla Springs Basin stakeholders:

Upper Wakulla River and Wakulla Springs Basin Participants

- Agricultural Producers
 - Leon County
 - Wakulla County
 - City of Tallahassee
- Florida Department of Transportation District 3
 - Gadsden County
 - Jefferson County
 - City of Gretna
 - City of Midway
 - City of Quincy
 - Town of Havana
- Federal Correctional Institution, Tallahassee
- Florida Agricultural and Mechanical University
 - Tallahassee Community College
 - Talquin Electric Cooperative
- Florida Department of Agriculture and Consumer Services
- Florida Department of Environmental Protection, including Wakulla Springs State Park
 - Florida Department of Health
 - Leon County Health Department
- Northwest Florida Water Management District
 - Wakulla County Health Department
 - 1000 Friends of Florida
 - Citizens
- Florida Department of Economic Opportunity
 - Friends of Wakulla Springs
 - Wakulla Springs Alliance

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List of Acronyms and Abbreviations

µg/L	Micrograms Per Liter
AGM	Annual Geometric Mean
AWT	Advanced Wastewater Treatment
BMAP	Basin Management Action Plan
BMP	Best Management Practice
CDD	Central Drainage Ditch
C of C	Coefficient of Conservatism
CR	County Road
DEP	Florida Department of Environmental Protection
DO	Dissolved Oxygen
EPA	U.S. Environmental Protection Agency
F.A.C.	Florida Administrative Code
FAMU	Florida Agricultural and Mechanical University
FCI	Florida Correctional Institute
FDACS	Florida Department of Agriculture and Consumer Services
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
FLEPPC	Florida Exotic Plant Pest Council
F.S.	Florida Statutes
FSU	Florida State University
FYN	Florida Yards and Neighborhoods
GIS	Geographic Information System
I	Interstate
IA	Implementation Assistance
kg	Kilogram
kg/yr	Kilograms Per Year
LVS	Linear Vegetation Survey
MFLs	Minimum Flows and Levels
mg/L	Milligrams Per Liter
mm	Millimeter
MS4	Municipal Separate Storm Sewer System
NNC	Numeric Nutrient Criteria
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NSILT	Nitrogen Source Inventory Loading Tool
NWFWMD	Northwest Florida Water Management District
O&M	Operations and Maintenance
OAWP	Office of Agricultural Water Policy
OSTDS	Onsite Sewage Treatment and Disposal System
PFA	Priority Focus Area
PSA	Public Service Announcement

PSPZ	Primary Spring Protection Zone
RPS	Rapid Periphyton Survey
SCI	Stream Condition Index
SESF	Southeast Spray Field
SOP	Standard Operating Procedure
TCC	Tallahassee Community College
TEC	Talquin Electric Cooperative
TIF	Tax Increment Financing
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
WBID	Waterbody Identification
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

Section 1: Project Updates

1.1 Purpose of the Report

The Florida Department of Environmental Protection (DEP) determined that the Upper Wakulla River segment with waterbody identification (WBID) number 1006 was impaired by nitrates using data from January 1, 2000, through June 30, 2007. To address nitrate impacts to the aquatic biological community in this impaired water, DEP adopted a total maximum daily load (TMDL) in 2009. TMDLs and pollutant load allocations adopted by rule for the watershed can be found at the DEP final TMDL webpage.

The BMAP represents the joint efforts of multiple stakeholders to prepare strategies for water quality restoration for the Upper Wakulla River and Wakulla Springs to work towards achieving the adopted TMDL. A nitrogen source inventory and loading tool (NSILT) was developed in support of the BMAP decision-making process. The NSILT is intended to assist stakeholders and DEP in identifying locations where future projects will have the greatest impact in reducing nitrogen loads.

This is the first annual progress report for the Upper Wakulla River and Wakulla Springs BMAP. **Section 1** describes the major accomplishments during the reporting period from November 1, 2015, to October 31, 2016. **Section 2** provides a compliance overview. **Section 3** describes the results of the water quality assessment during the reporting period, and **Section 4** includes a summary of efforts. Individual project tables are included in **Appendix A** and **Appendix B**. The stakeholders continued their public education and outreach efforts, maintenance programs, structural projects, and water quality monitoring during the reporting period.

1.2 Agriculture

1.2.1 Agriculture Best Management Practices (BMPs)

Agricultural BMPs may or may not be implemented on all acres reported because the notices of intent (NOIs) may include nonproduction acres, such as buildings, parking lots, and fallow acres. Furthermore, this enrollment figure includes NOIs on lands not classified as agriculture. However, the land use coverage used for this BMAP (2009) may not accurately reflect agricultural land uses in the basin today. To estimate the actual agricultural acreage in the Wakulla River and Springs Priority Focus Areas (PFAs) covered by the Florida Department of Agriculture and Consumer Services (FDACS) BMPs, FDACS used the 2009 Northwest Florida Water Management District (NFWFMD) agricultural land use data.

1.2.1.1 Inside the PFAs

As of September 30, 2016, 1,465.49 acres of the Wakulla River and Springs PFAs were covered by 12 agricultural BMP NOIs issued by FDACS Office of Agricultural Water Policy (OAWP) (**Figure 1**). Based on these land uses, 708.24 agricultural acres are enrolled in the FDACS BMP Program. This figure equates to 12.2 % enrollment of the agricultural acreage based on the 2009

NFWMD land use in the Wakulla River and Springs PFAs covered by the FDACS BMP Program. **Table 1** lists the BMPs and the acreage covered by NOIs.

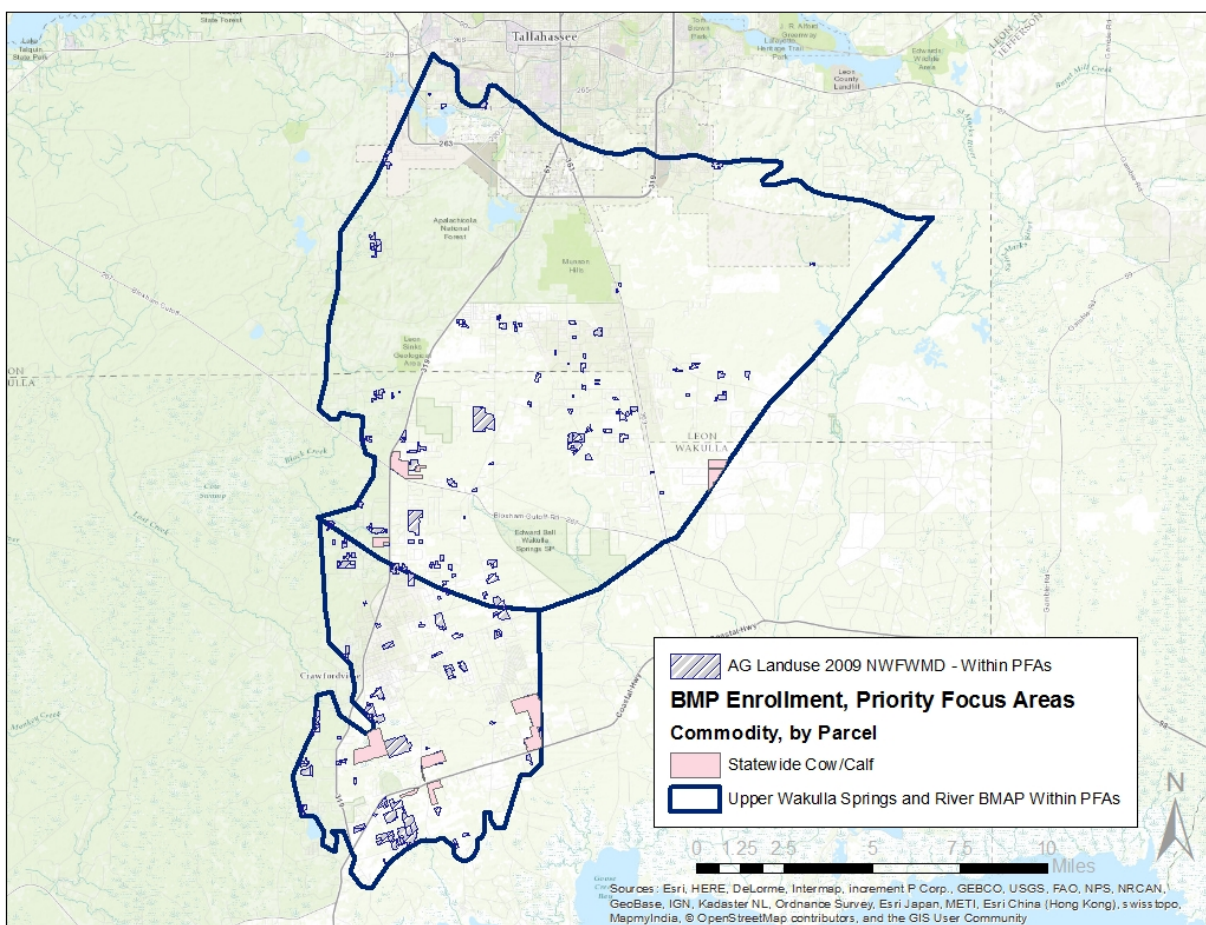


Figure 1: Agricultural lands enrolled in BMPs in the Wakulla PFAs, September 30, 2016

Table 1: Agricultural acreage and BMP enrollment in the PFAs of the Upper Wakulla River and Springs Basin as of September 30, 2016

N/A = Not applicable

2009 NFWMD Land Use	Acres	Related FDACS BMP Programs	Enrolled Acres	Related NOIs
Pasture and Rangeland	3,761.48	Cow/Calf	1,465.49	5
Row Crops	33.65	Vegetable/Agronomic Crops	0	
Field Crops	254.80	Vegetable/Agronomic Crops	0	
Hay Fields	1,162.58	Vegetable/Agronomic Crops Revision (Future)	0	
Other Groves	19.24	Specialty Fruit and Nut	0	
Nurseries and Vineyards	18.11	Future Nursery, Specialty Fruit and Nut	0	
Ornamentals	14.78	Container Nursery	0	
Horse Farms	37.29	Equine	0	
Aquaculture	1.52	N/A	0	
Other Open Lands	33.12	N/A	0	
Fallow Cropland	472.61	N/A	0	
Total	5,809.18		1,465.49	5

1.2.1.2 Outside the PFAs

As of September 30, 2016, 35,514.68 acres of the Wakulla River and Springs area outside the PFAs were covered by 57 agricultural BMP NOIs issued by FDACS OAWP (**Figure 2**). Based on these land uses, there are 9,075.85 agricultural acres enrolled in the FDACS BMP Program. This figure equates to 15.5 % enrollment of the agricultural acreage based on the 2009 NFWMD land use coverage in the Wakulla River and Springs PFAs covered by the FDACS BMP Program. **Table 2** lists the BMPs and the acreage covered by NOIs.

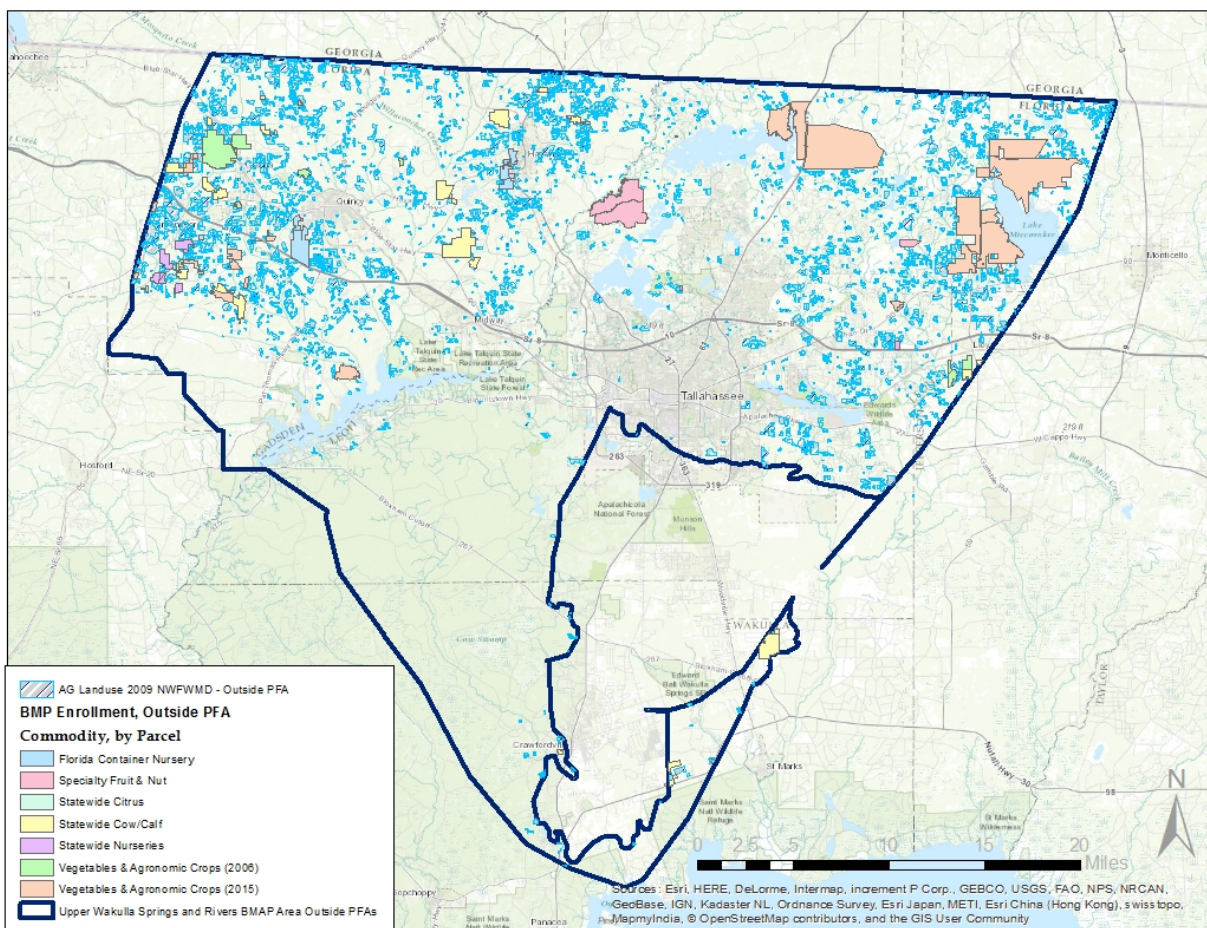


Figure 2: Agricultural lands enrolled in BMPs outside the PFAs, September 30, 2016

Table 2: Agricultural acreage and BMP enrollment outside the PFAs of the Upper Wakulla River and Springs Basin as of September 30, 2016

N/A = Not applicable

2009 NFWMD Land Use	Acres	Related FDACS BMP Programs	Enrolled Acres	Related NOIs
Pasture and Rangeland	26,893.79	Cow/Calf	5,398.14	19
Row/Field/Mixed Crops	11,775.01	Vegetable/Agronomic Crops and Citrus	23,206	23
Hay Fields	13,927.11			
Fallow Cropland	821.28			
Horse Farms	1,298.19	Equine	0	
Other Groves	476.50	Specialty Fruit and Nut	3,196.10	3
Nurseries and Vineyards	258.08			
Ornamentals	1,629.78	Nursery	3,714.44	12
Sod Farms	1,260.56	Statewide Sod	0	
Specialty Farms	48.67	Conservation Plan Rule	0	
Cattle Feeding	55.15	Conservation Plan Rule	0	
Poultry Feeding	23.58	Conservation Plan Rule	0	
Aquaculture	10.20	N/A		
Other Open Lands	62.41	N/A		
Total	58,540.31		35,514.68	57

1.2.2 FDACS BMP Manuals

In 2015, FDACS OAWP adopted a revised vegetable and agronomic crop manual that includes specific nutrient and irrigation management BMPs for plastic mulch, bare ground, sugar cane, hay/silage, and greenhouse production systems. In early 2016, FDACS adopted a dairy manual that targets dairies without DEP-issued National Pollutant Discharge Elimination System (NPDES) permits. In June 2016, a poultry manual was adopted. To date, FDACS has BMP manuals, available on its website, for cow/calf, citrus, vegetable and agronomic crops, nurseries, equine, sod, dairy, poultry, and specialty fruit and nut operations.

1.2.3 FDACS OAWP Implementation Assurance (IA) Program

FDACS OAWP formally established its IA Program in 2005. The program to date has included two key components—mail-out surveys and site visits. Additional emphasis was given to IA in Chapter 2016-1, Laws of Florida. Among its provisions, this law requires the enhancement and formalization of OAWP IA policies and procedures through rulemaking. Rulemaking was initiated prior to January 1, 2017. Once rulemaking is completed, FDACS will implement the enhanced IA Program and, as prescribed by the legislation, will report on site visits in more detail and conduct annual surveys.

The enhanced IA Program, as a component of the FDACS BMP Program, will be designed to achieve the following:

- Provide accurate and timely information on the status of BMP enrollments.

- Provide accurate and timely information on the extent of BMP implementation.
- Provide the information from which reports on BMP enrollment and implementation can be developed for BMAP stakeholders and for the annual report required by Section 403.0675, Florida Statutes (F.S.).
- Inform educational, research, and technical assistance efforts targeted to strengthen BMP implementation and effectiveness.
- Guide the review and potential revision of BMP manuals.

During the reporting period (November 1, 2015–October 31, 2016), FDACS field staff conducted four implementation assurance visits in the Wakulla BMAP area.

1.2.4 FDACS Cost-share and Outreach

During the reporting period, FDACS started 2 new cost-share projects in the Wakulla Springs BMAP area at a total cost of \$16,706.25. These projects are crop tools that will reduce the application of herbicides and fertilizer; reduce herbicide, pesticide, and nutrient leaching into groundwater or runoff into adjacent surface waters, including wetlands; and decrease soil compaction, which will improve soil percolation and reduce runoff.

The following educational outreach events were completed during the reporting period: Lake Tallavana TMDL Meeting (January 2016); Envirothon at Torreya State Park (March 2016); Gadsden County Cattlemen's Association (May 2016); Wakulla Springs Alliance Meeting (May 2016); Tri-State Climate Workshop (August 2016); Leon Agricultural Producers Workshops (August 2016); and Gadsden Agricultural Producers Workshop (September 2016). Attendees at these events learned about the FDACS BMP Program and cost-share opportunities.

1.3 Activities by Entity

1.3.1 DEP

DEP continues to update permits as needed to incorporate new requirements for facilities in the PFA.

1.3.2 City of Tallahassee

During the reporting period, the City of Tallahassee completed an interlocal agreement with Leon County to provide sewer service to the Woodside Heights Subdivision. The city also distributed the Wakulla nitrate video through the local television station, WCOT, and through social media. The city applied for several grant awards and secured federal Section 319(h) grant funding for septic-to-sewer outreach. It also secured a related septic-to-sewer connection grant from 2016 legislative funds for 130 connections in PFA1.

1.3.3 Leon County

Leon County initiated design for the construction of central sewer in the Woodside Heights Subdivision using Springs Restoration Grant Funds. The county also worked with the NFWFMD to scope the Passive Onsite Sewage Nitrogen Reduction Pilot Project. Additional areas in PFA1 were prioritized for septic-to-sewer projects, and funding requests were submitted to the NFWFMD for Springs Restoration Grant funds.

1.3.4 Wakulla County

During the reporting period, Wakulla County began construction on the Otter Creek Wastewater Treatment Plant (WWTP) upgrades to expand capacity at the plant. The county also secured funds and intends to begin construction this summer on the Magnolia Gardens Central Sewer Installation Project for an estimated 270 properties.

1.3.5 Talquin Electric Cooperative (TEC)

TEC completed the Oyster Bay WWTP Abandonment Project (TEC-01) and the Gadsden East WWTP Project (TEC-2). TEC-2 included constructing a treatment wetland by retrofitting three existing rapid infiltration basins and building additional treatment cells.

Section 2: Compliance

Table 3 lists the number of projects that each entity committed to in the 2015 BMAP and the status of those projects. Nitrogen reductions from completed projects through 2016 total 609,484 kg/yr.

Table 3: Summary of completed projects identified in the 2015 BMAP by entity

Entity	Projects Listed in 2015 BMAP	Completed	Cancelled	Under Way
DEP	1	1	0	0
Florida Department of Transportation (FDOT) District 3	4	3	0	1
Wakulla Springs State Park	5	5	0	0
City of Tallahassee	13	12	0	1
Leon County	33	24	0	9
Wakulla County	22	17	0	5
City of Gretna	1	1	0	0
City of Quincy	3	3	0	0
Florida Agricultural and Mechanical University (FAMU)	1	1	0	0
Florida Correctional Institute (FCI)	2	2	0	0
Florida State University (FSU)	2	2	0	0
Gadsden County	4	4	0	0
TEC	4	4	0	0
Tallahassee Community College (TCC)	1	1	0	0
Town of Havana	1	1	0	0
Total	97	81	0	16

Section 3: Water Quality Assessment

3.1 Water Quality and Biological Community Trends

3.1.1 Water Quality Trends

The Upper Wakulla River was found to be impaired based on failing Stream Condition Index (SCI) scores from February 2000 to May 2007. The poor biological community scores reflect the finding that sensitive taxa were affected by the smothering of substrate by hydrilla, occasional low dissolved oxygen (DO), and slightly elevated conductivity. The water quality data collected during this time indicated that ammonia levels (mostly below detection) and phosphorus levels (averaging 0.03 milligrams per liter [mg/L]) generally represented excellent conditions, while nitrate concentrations were elevated from anthropogenic sources. Therefore, the Upper Wakulla River was found to be impaired for nitrates, as evidenced by an aquatic biological community impacted by excessive hydrilla growth and algal mats (DEP 2012).

The highest nitrate concentration is found at the spring vent, and the nitrate concentration decreases as the water moves downriver (Figure 3). When comparing the data from the verified period (2000–07) (the yellow shaded area in the figure) with more recent data (2008–16), nitrate concentrations at the vent are declining. In the groundwater caves and tunnels that feed Wakulla Spring, nitrate concentrations were higher in the B-, C-, and D-Tunnels than in the Main Tunnel, indicating that other sources of flow to the springs are diluting the concentrations observed at the spring vent (Figure 4).

Data from the K-Tunnel (see **Figure 5**) indicate lower nitrate levels; this tunnel may be diluting flows from the other tunnels. The B-, C-, and D -Tunnels continue to show mean nitrate + nitrite concentrations above the target concentration of 0.35 mg/L, and are the major contributors (**Figure 4**), with the highest mean nitrate concentration in the B-Tunnel. These tunnels bring contributing flows from the Southeast Spray Field (SESF) and Ames Sink to the Upper Wakulla River and Wakulla Springs. However, there are declining trends in nitrate concentrations in the B-, C-, and D-Tunnels. The K-Tunnel nitrate concentrations reached levels below the target concentration of 0.35 mg/L in 2014 and early 2015 (see **Figure 5**). **Figure 6** shows the contributing area to Wakulla Springs in Florida.

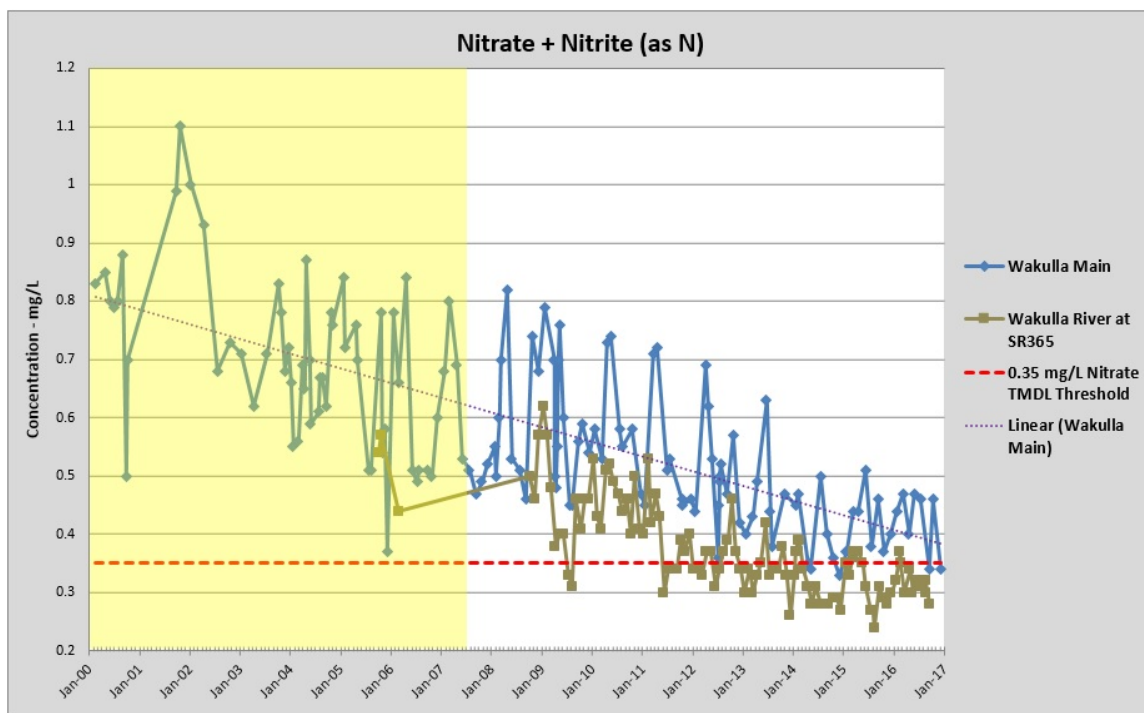


Figure 3: Nitrate-nitrite water quality trends in the Wakulla River and Wakulla Spring vent

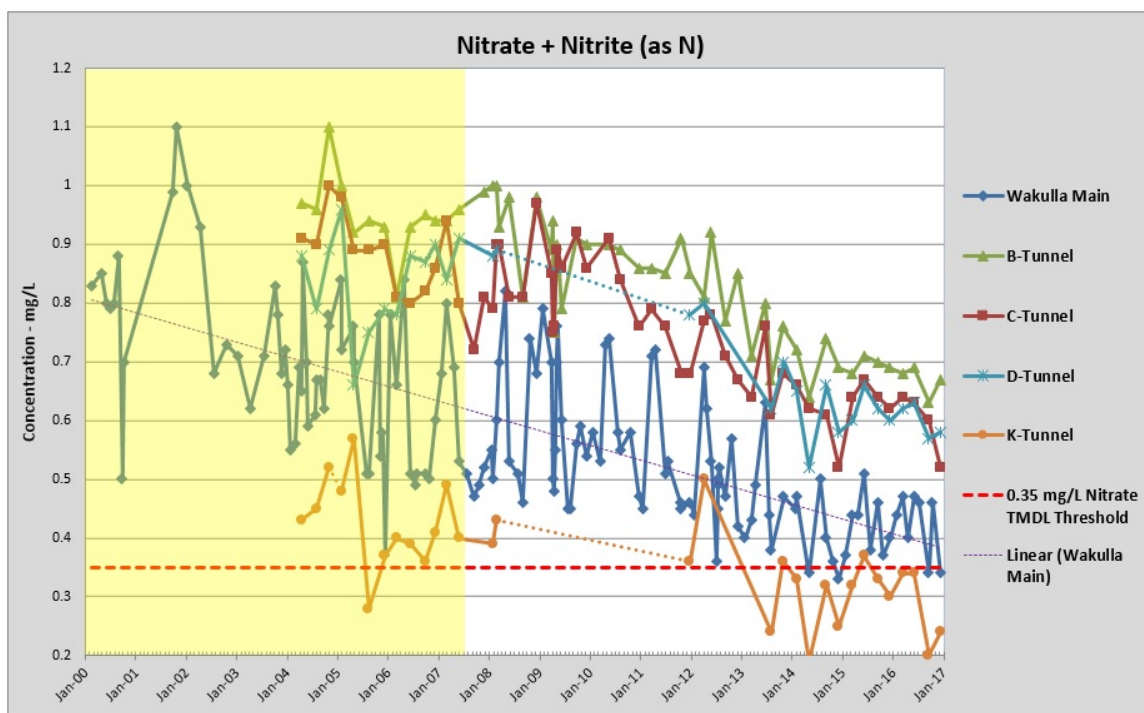


Figure 4: Nitrate-nitrite water quality trends in the Wakulla Springs tunnels

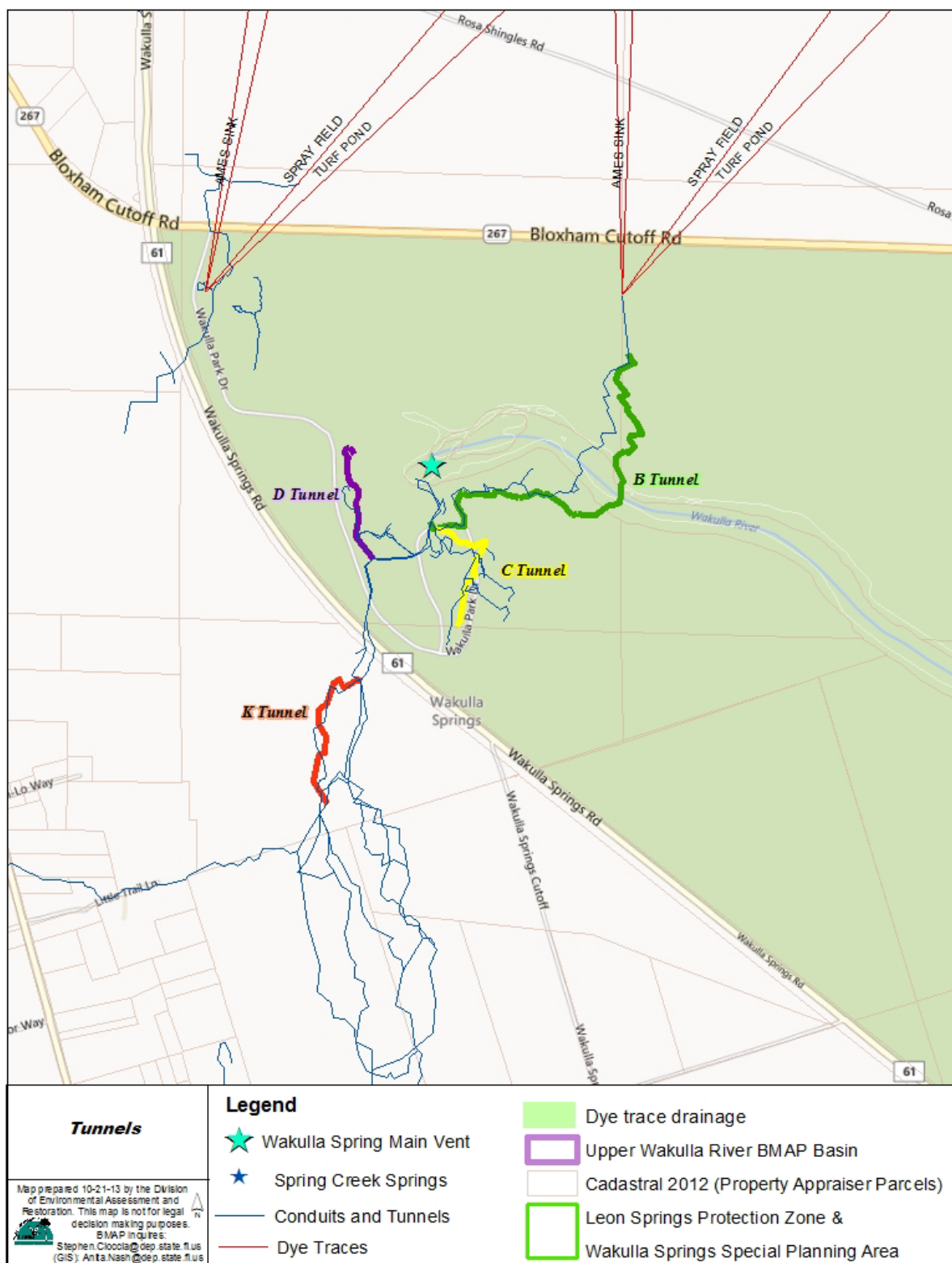


Figure 5: Locations of the main Wakulla Springs tunnels

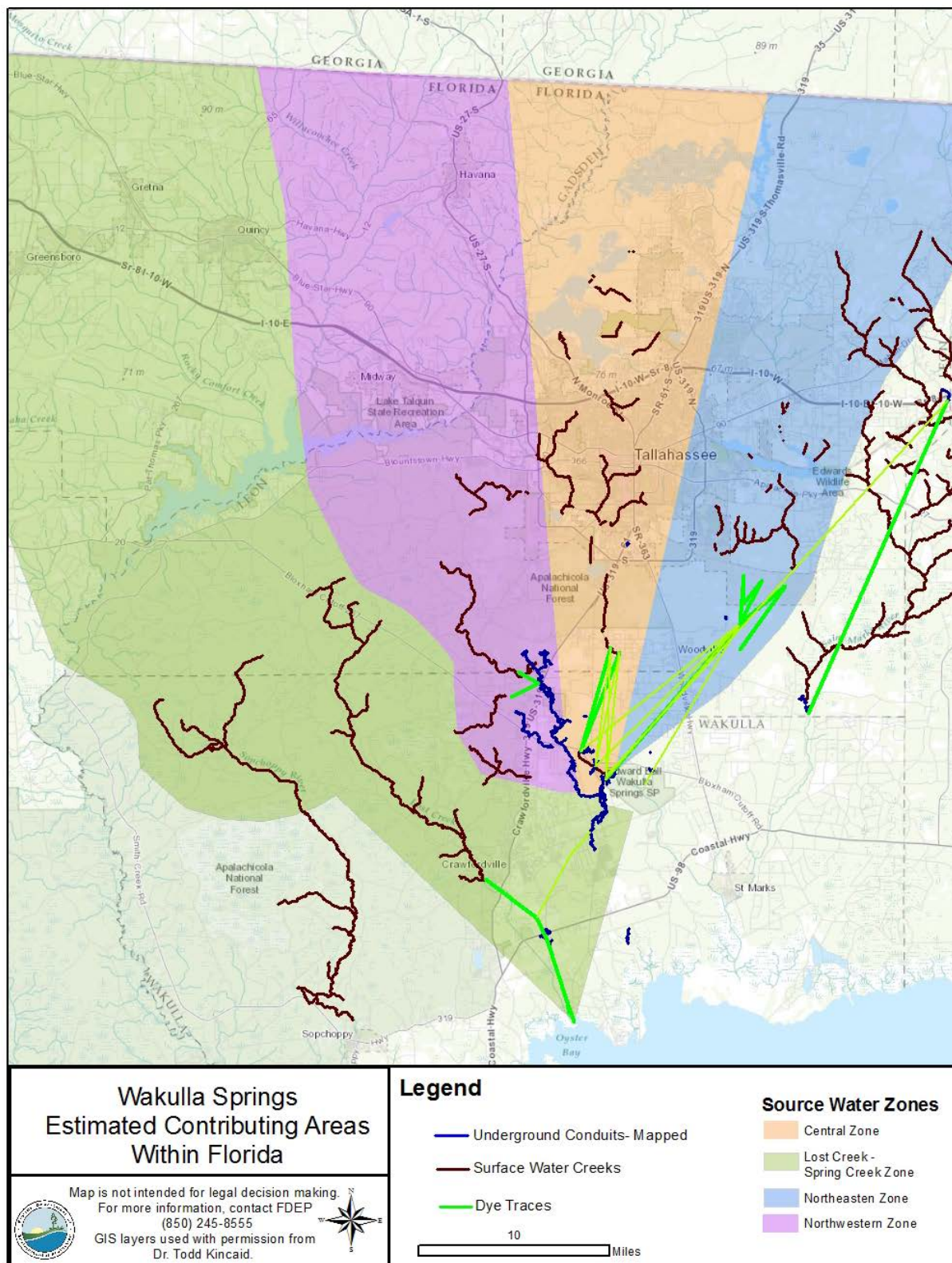


Figure 6: Estimated contributing areas to Wakulla Springs

3.1.2 Biological Community Trends

Beginning in October 2013, DEP, in collaboration with the NFWFMD, collected quarterly water chemistry and biological samples at 2 locations in the Wakulla River to monitor and measure the effects of current and future reductions in nutrients on the river's biological communities (**Figure 7**). The upstream station is located at the Boat Tram inside Wakulla Springs State Park, approximately 0.5 mile downstream from the spring boil (**Figure 7**). The second station is approximately 3.0 miles downstream of the spring boil and just outside the state park boundary at County Road (CR) 365. This report summarizes biological data collected between October 2013 and October 2016 at these 2 locations and is being provided for informational purposes to interested DEP staff and stakeholders.

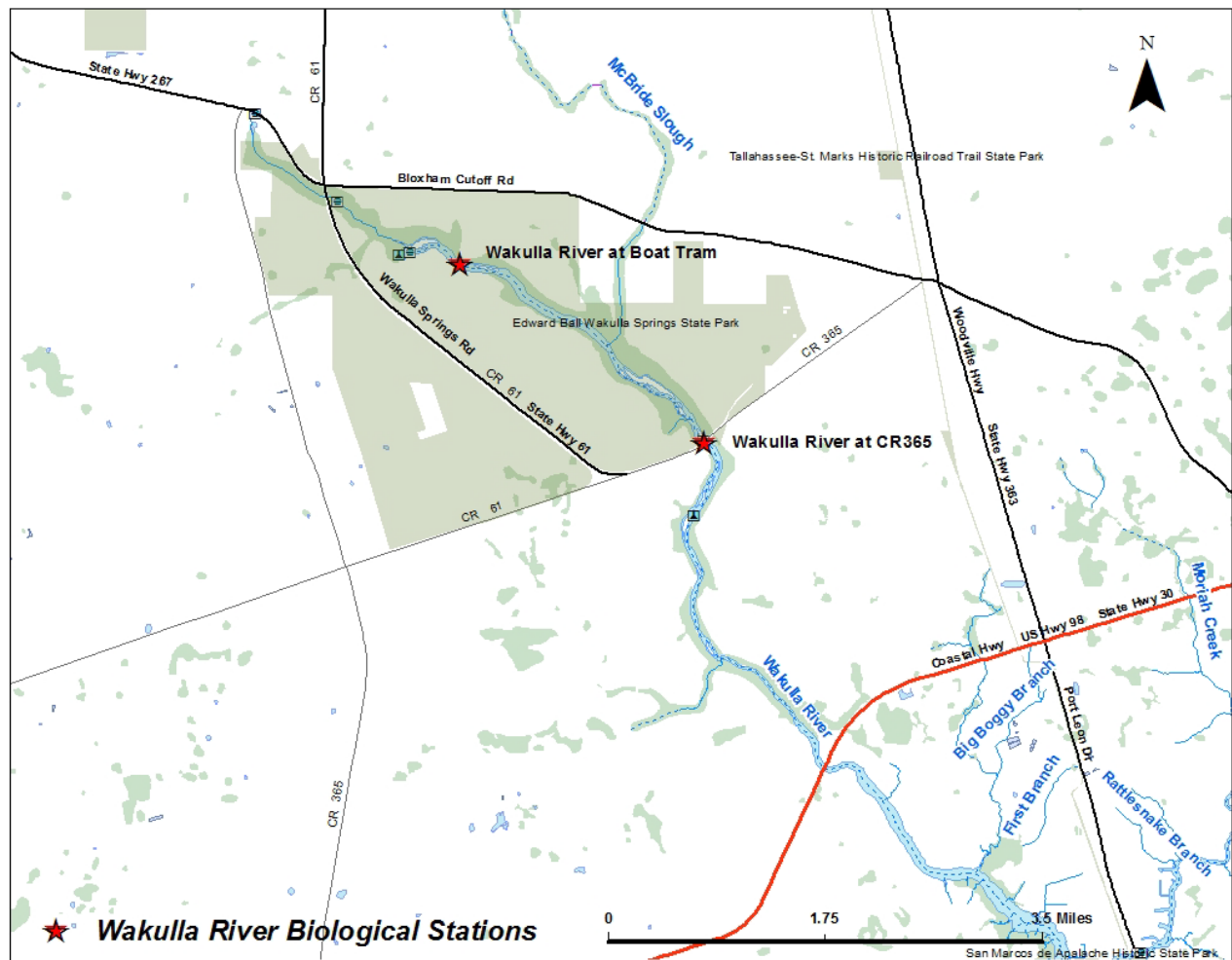


Figure 7: Wakulla River biological monitoring stations

SCI

The SCI is a biological assessment procedure that measures the degree to which flowing fresh waters support a healthy, well-balanced biological community, as indicated by the number and diversity of benthic macroinvertebrates. A balanced faunal community is achieved if the average score of at least 2 temporally independent SCIs is 40 or higher, with neither of the 2 most recent SCI scores less than 35.

When the SCI bioregions were initially developed in 1992, relatively few data were available for some of the bioregions, particularly the eastern portion of the Panhandle region. DEP has subsequently collected thousands of new SCI measurements throughout the state. In addition, better geographic information system (GIS) tools are now available that allow more accurate spatial resolution.

In 2012, DEP undertook a reanalysis of the SCI regions to better define the macroinvertebrate communities across the state. The reanalysis of the SCI regionalization indicated that the Panhandle bioregion should be divided into the Panhandle West and Big Bend bioregions because they have significantly different taxa at reference sites (**Figure 8**). During the SCI reevaluation, the bioregion boundaries were also redrawn to be consistent with watershed boundaries. The original bioregion boundaries bisected watersheds, meaning that the biological expectation in some streams changed upstream or downstream of an imaginary line across the stream.

Greater detail on the reanalysis of the SCI bioregions and the results of that evaluation are provided in Appendix B of the Technical Support Document (DEP-SAS-001/13). As part of the reassessment, the SCI equations were also updated and SCI scores were recalculated. The original listing of the Wakulla River was based on earlier versions of the SCI. This report uses the revised regions and equations for what is now referred to as the SCI-2012 (**Figure 8**).

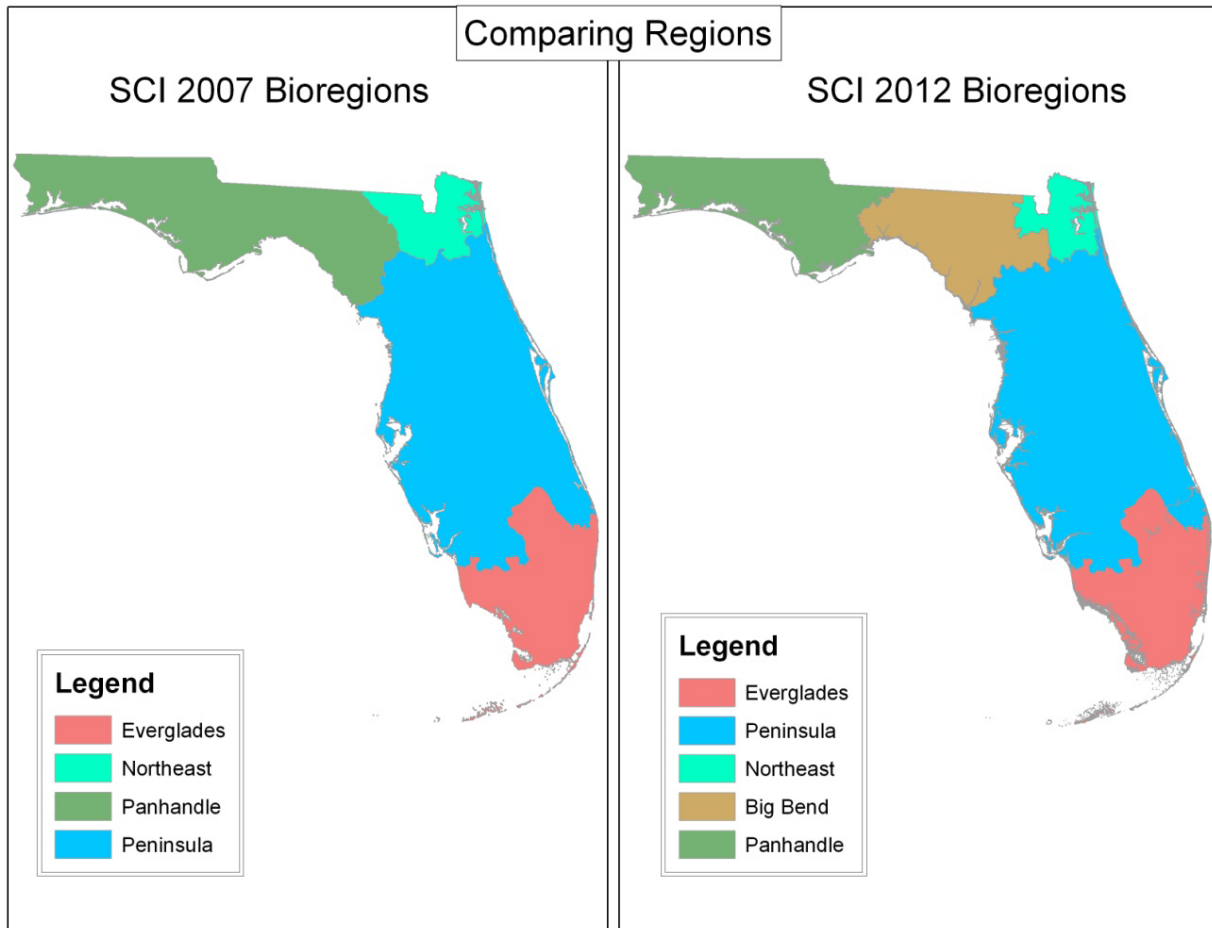


Figure 8: Comparison of the SCI 2007 bioregions with the new 2012 bioregions

Figure 9 shows the SCI results collected from the biological monitoring stations from October 2013 to October 2016. The average of the last 13 samples at the upstream Boat Tram site is 36 (up from 34 points reported in the 2015 summary), and the average of the 2 most recent samples is 41 (up 9 points from 32). The sample collected on August 17, 2016 (33), was below the single sample impairment threshold of 35 (red dotted line in the figure).

The average SCI score for the most recent 12 samples at the CR 365 site is 45 (compared with 47 in the 2015 summary), and the average of the 2 most recent samples is 44 (compared with 55 in 2015). A sample was not collected during the third quarter of 2016 at the CR 365 site because of inclement weather. Thus, when these sampling events are taken together, the overall average SCI score for the Wakulla River remains unchanged at 40 points (green dotted line in the figure), from 2013 through 2015 and from 2013 through 2016.

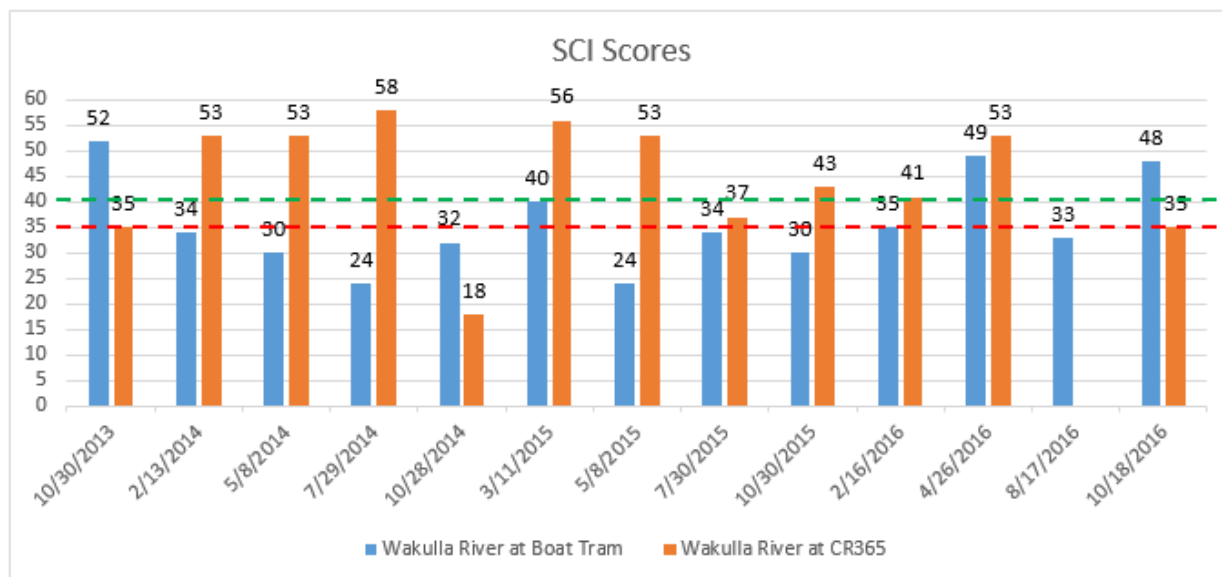


Figure 9: SCI results for two sites on the Wakulla River, October 30, 2013–October 18, 2016

Floral Measures

DEP derived the floral thresholds that are used as part of the streams nutrient standard using a distribution of a population of minimally disturbed benchmark streams sampled by DEP as part of numeric nutrient criteria (NNC) development. The thresholds summarized in **Table 4** can be used when developing evidence supporting a DEP conclusion about the balance of the floral community in streams. If all floral measures are achieved, a stream meets the floral component of a healthy, well-balanced aquatic system, because it is within the range of conditions for minimally disturbed benchmark streams. However, if any one of these floral measures indicates an imbalance, then the stream does not attain the NNC (Rule 62-302.531, Florida Administrative Code [F.A.C.]).

Table 4: Floral measures summary

Floral Metric	Evidentiary Threshold of No Imbalances
Linear Vegetation Survey (LVS) Coefficient of Conservatism (C of C)	Site average ≥ 2.5
LVS Florida Exotic Plant Pest Council (FLEPPC)	Site average $< 25\%$
Rapid Periphyton Survey (RPS)	$< 25\%$ Rank 4-6 coverage 20 to 25 % Rank 4-6 coverage, Evaluate algal autecological data
Chlorophyll <i>a</i>	< 20 micrograms per liter ($\mu\text{g/L}$); 3.2 to 20 $\mu\text{g/L}$ = site specific
Algal Community Composition (Autecology)	No adverse shifts in dominant taxa

LVS

The LVS is a rapid assessment tool for evaluating the ecological condition of streams based on vascular plants, conducted per DEP Standard Operating Procedure (SOP) FS 7320. DEP evaluated LVS data from reference streams and found that if a site's average C of C score is greater than or equal to 2.5 and the frequency of occurrence of FLEPPC exotic taxa is less than 25 % of the total plant occurrences, then the plant community composition may be part of the reference site distribution and does not represent an imbalance of flora.

The 2.5 threshold for the C of C score was based on the 10th percentile of the distribution of LVS data from U.S. Environmental Protection Agency (EPA) reference streams. The 25 % threshold for exotic plant occurrences is based on the 80th percentile of the EPA reference streams that had vascular plants. Additional details on DEP established the thresholds related to the biological measures can be found in the April 2013 DEP report, *Implementation of Florida's Numeric Nutrient Standards*.

Because of the inherent variability in aquatic plant communities, 2 temporally independent assessments are required (at least 3 months apart). All samples from October 30, 2013, through August 17, 2016, met the evidentiary thresholds, as seen in **Figure 10** and **Figure 11** and **Table 5**. The LVS results from the third quarter (October) 2016 sampling were not available as of this update. In **Figure 10** the dashed line shows the evidentiary threshold for balanced flora of ≥ 2.5 . In **Figure 11** the dashed line shows the evidentiary threshold for balanced flora of ≤ 25 %.

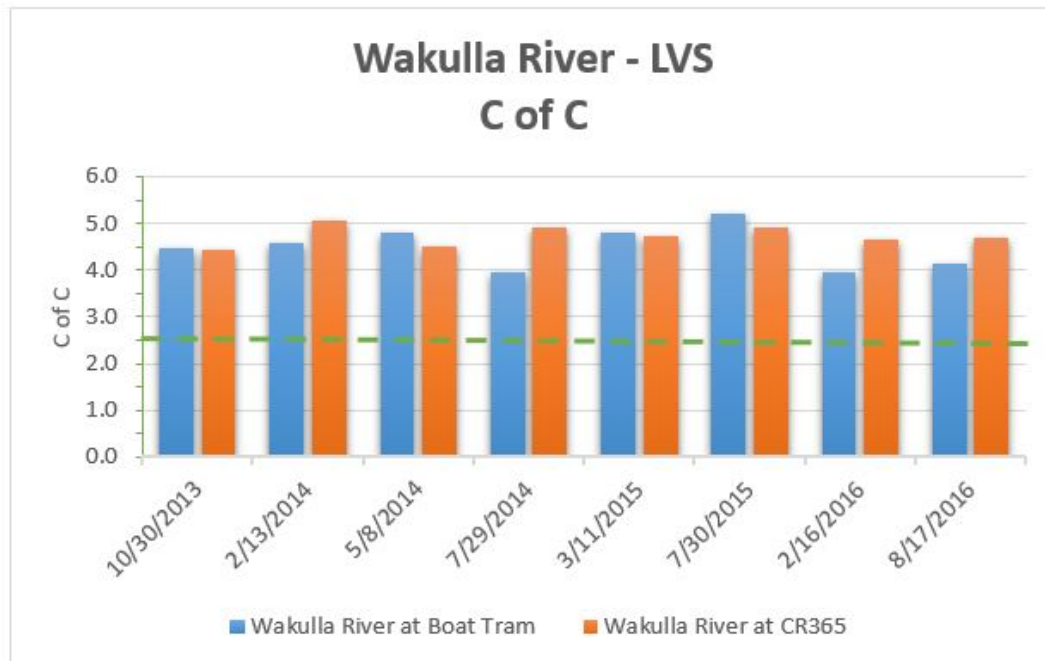


Figure 10: C of C metric for samples collected from October 30, 2013, to August 17, 2016

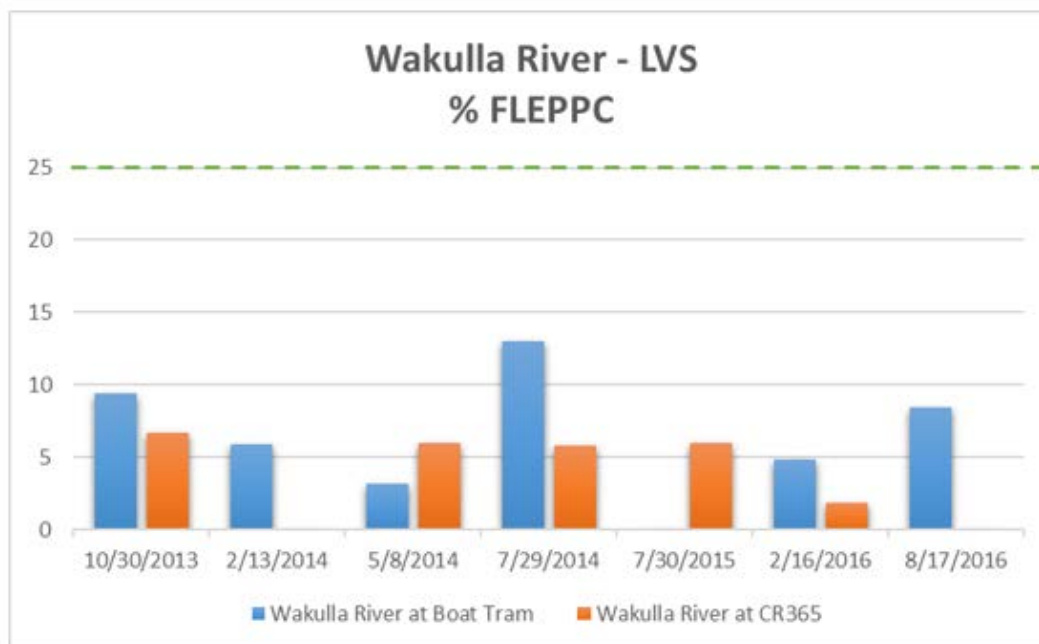


Figure 11: Percent FLEPPC metric for samples collected from October 30, 2013, to August 17, 2016

The average of the 2 most recent samples for C of C for the Wakulla River at Boat Tram and CR 365 were 4.0 and 4.7, respectively. Both exceeded the minimum threshold. Similarly, the percent FLEPPC taxa was less than the 25 % maximum threshold at both locations, 8 % and 0 %, respectively.

Table 5: Individual LVS results for two stations on the Wakulla River, October 30, 2013– August 17, 2016

Date Sampled	Wakulla River at Boat Tram Average C of C	Wakulla River at Boat Tram % FLEPPC	Wakulla River at CR 365 Average C of C	Wakulla River at CR 365 % FLEPPC
10/30/2013	4.5	9	4.4	7
2/13/2014	4.6	6	5.1	0
5/8/2014	4.8	3	4.5	6
7/29/2014	4.0	13	4.9	6
3/11/2015	4.8	0	4.7	0
7/30/2015	5.2	0	4.9	6
2/16/2016	3.95	5	4.7	5
8/17/2016	4.13	8	1.9	0

RPS

The RPS is used to quantify the extent and abundance of attached algae, and is conducted per DEP SOP FS 7230. DEP compares RPS results from a stream with the RPS results compiled from the population of minimally disturbed and healthy sites sampled by DEP as part of NNC development. RPS Ranks 4 through 6 coverage (Ranks 4 through 6 represent algae mat lengths of > 6 millimeters [mm]) at these streams ranged from 0 % to 66 %, with a mean value of 6 % and a 90th percentile value of 25 %. Therefore, if a stream exhibits a percent coverage for RPS Ranks 4 through 6 of 25 % or less in both samples, the RPS results indicate evidence of no imbalance of flora. If a stream segment exceeds an RPS Ranks 4 to 6 coverage of > 25 % during 2 consecutive, temporally independent samplings (at least 3 months apart), DEP considers this as evidence that the NNC is not achieved.

The results of the RPS samples collected between October 30, 2013, and August 17, 2016, at the 2 locations in the Wakulla River indicate an imbalance in the floral community (**Figure 12**). Although there appears to be some temporal variability at the CR 365 location, the average ranks greatly exceeded the 25 % maximum threshold in all samples at both locations. The averages of the samples from October 2013 to August 2016 at the Boat Tram site and the CR 365 site were 68 and 49, respectively. Station means for the 2 most recent sampling events were slightly below these longer-term averages at 61 % and 46 % at the Boat Tram and CR 265 sites, respectively. In **Figure 12** the dashed line shows the evidentiary threshold for balanced flora, < 25 % 6 mm or greater.

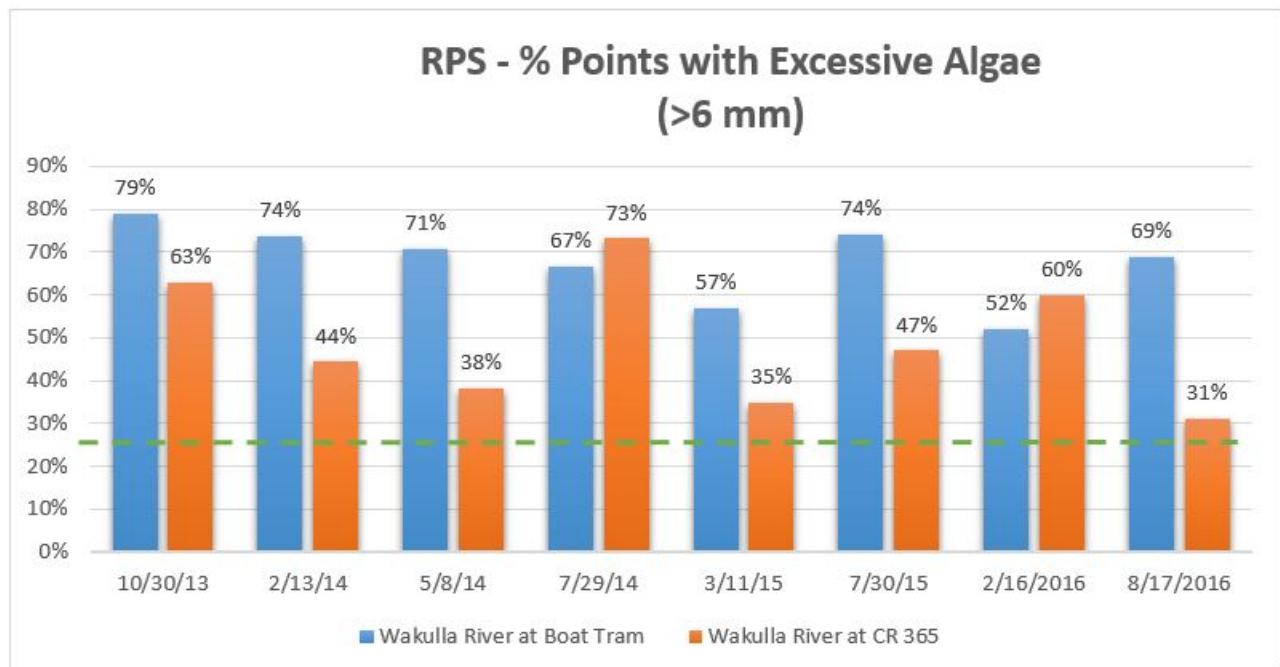


Figure 12: Percent abundance of RPS Ranks 4 through 6 (> 6 mm) at 2 locations in the Wakulla River, October 30, 2013–August 17, 2016

Chlorophyll *a*

A wide range of stream chlorophyll *a* values is considered "healthy" because of a variety of site-specific factors, such as system morphology and water residence time. If a stream exhibits annual geometric mean (AGM) chlorophyll *a* concentrations below the 90th percentile values (3.2 to 3.5 micrograms per liter [$\mu\text{g/L}$]) observed at minimally disturbed and healthy sites, that chlorophyll *a* concentration shows no imbalance of flora. The chlorophyll *a* concentrations measured in this analysis represent individual samples and not AGMs. However, these values suggest no imbalance in the floral communities (**Table 6**).

Table 6: Chlorophyll *a* values in the Wakulla River at two sampling locations, October 30, 2013–August 17, 2016

I = Substance measured between the method detection limit and the practical quantitation limit.

NA = Not available at the time of reporting.

U = Indicates that the compound was analyzed for but not detected.

Date Sampled	Chlorophyll <i>a</i> , Corrected for Pheophytin Wakulla River at Boat Tram	Chlorophyll <i>a</i> , Corrected for Pheophytin Wakulla River at CR 365
10/30/2013	1.1 I	0.55 U
2/13/2014	0.56 I	0.88 I
5/8/2014	0.55 I	0.55 U
7/29/2014	1.8	1.4 I
10/29/2014	0.55 I	0.97 I
3/11/2015	0.55 I	0.71 I
7/30/2015	0.92 I	0.9 I
2/16/2016	0.55 U	0.55 U
8/17/2016	NA	2.1

Section 4: Summary

The first year of BMAP implementation has been successful. The total BMAP project reductions to the land surface, including those shown as completed in the BMAP and the projects completed during the first year of implementation, are 611,014 kg/yr. Stakeholders identified nine new projects in the basin. In addition, water quality monitoring indicates that nitrate concentrations at the vent are declining. The overall average SCI score for the Wakulla River remains unchanged at 40, from 2013 through 2015 and 2013 through 2016. All samples from October 30, 2013, through August 17, 2016, met the evidentiary thresholds for the LVS. The results of the RPS samples collected from October 30, 2013, to August 17, 2016, at 2 locations in the Wakulla River indicate an imbalance in the floral community. Chlorophyll *a* concentrations suggest no imbalance in the floral communities.

Appendices

Appendix A: Stakeholder Projects Inside the PFAs

Table A-1. DEP management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual Operations & Maintenance (O&M)	Partners	Start Date
FDEP-1	TN Requirements for WWTFs in PFA1	Update permits, as needed, to incorporate new requirements for WWTFs.	Permit updates	Ongoing	0	0	\$ -	\$ -		

Table A-2. FDOT District 3 management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
FDOT-1	Fertilizer Cessation	Eliminated fertilizer use for ongoing turf maintenance in the entire basin, including areas outside the PFAs.	Residential Fertilizer	Completed	4,640	0	\$ -	\$ -		
FDOT-2	Street Sweeping	Contract for street sweeping of FDOT curb and gutter roads in the urbanized areas of Leon County and City of Tallahassee.	Stormwater	Ongoing	285	0	\$ -	\$ -		
FDOT-3	Innovative Nitrogen Removal Technologies	Investigating the use of innovative nitrogen removal technologies as part of the present work program in the PFAs.	Stormwater	Planned	0	0	\$ -	\$ -		
FDOT-4	Avoidance of Mapped Karst Caves	Avoid constructing ponds directly over mapped karst caves by providing a 300-foot buffer.	Protection measure	Ongoing	0	0	\$ -	\$ -		

Table A-3. Wakulla Springs State Park management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
WP-1	Learning in Florida's Environment	Annual environmental education program.	Public education and outreach	Ongoing	0	0	\$ -	\$ -		
WP-2	Project Learning Tree	Annual environmental education program.	Public education and outreach	Ongoing	0	0	\$ -	\$ -		
WP-3	Green Guide Class	Annual environmental education program.	Public education and outreach	Ongoing	0	0	\$ -	\$ -		
WP-4	Wakulla Wildlife Festival	Annual environmental education program.	Public education and outreach	Ongoing	0	0	\$ -	\$ -		

Table A-4. City of Tallahassee management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
COT-1	WWTF Upgrade to Advanced Wastewater Treatment (AWT)	Upgrade to AWT to reduce the nitrogen concentration by 75 % at the spray field near Tram Road and improve the quality of reuse.	Wastewater	Completed	214,939	0	\$227,000,000	\$ -		2008
COT-2	Biosolids Application Elimination	Eliminated biosolids disposal in the springshed.	Wastewater	Completed	169,347	0	\$ -	\$ -		2001
COT-3	Assessment and Rehabilitation of the Sewer Collection System	Project consists of an assessment and rehabilitation of the sewer collection system.	Wastewater	Ongoing	0	0	\$10,000,000	\$ -		2011

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
COT-4	Fertilizer Use Ordinance (08-072AA)	Households that applied fertilizer (2007 vs. 2012) decreased 49 %; level of nitrogen applied per household decreased 27 %.	Regulation or ordinance	Ongoing	129	0	\$ -	\$ -		2009
COT-5	Public Education for Stormwater, Fertilizer, and Pet Waste	Public education using various media resources to promote behavioral changes for individuals and businesses to conserve water and reduce or eliminate pollution impacts to surface water and groundwater.	Public education and outreach	Ongoing	47	0	\$1,700,000	\$ -		2006
COT-6	Spray Field Fertilizer Application	Eliminated fertilizer application on the spray field (in the springshed).	Farm fertilizer	Completed	61,500	0	\$ -	\$ -		2007
COT-7	Pet Waste Ordinance (Number 10-0-15AA)	34 % of dog owners began picking up after their pets.	Regulation or ordinance	Ongoing	29	0	\$ -	\$ -		06/2008
COT-8	Stormwater Improvement Projects	Conveyance improvements.	Stormwater	Completed	14	0	\$990,000	\$ -		2004
COT-9	Primary Spring Protection Zone (PSPZ) Ordinance (Number 08-0-68AA)	Identifies the PSPZ where development has to meet more stringent requirements.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		04/2009
COT-10	Comprehensive Plan Provisions (Conservation Element Policy 4.2.5)	Reduced allowed development in the urban fringe inside the PSPZ.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2009

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
COT-11/LC-29	Alternatives to Sewer Solutions Study	Study and develop preferred options for management alternatives to traditional Onsite Sewage Treatment and Disposal System (OSTDS) in unincorporated areas of Leon County, including PSPZ; identify preferred options for responsible management entities, including recommendations for financing and management structure for identified preferred options; identify other issues related to sewage treatment and disposal system financing.	OSTDS	Planned	0	0	\$ -	\$ -		2018
COT-14	Public Education- Wakulla Springs Nitrate Video	Five-minute video educates homeowners on the local groundwater system and explains the need to address septic systems to restore Wakulla Springs. Shared via social media and WCOT television.	Public education	Completed	0	0	\$27,000	\$ -	City of Tallahassee	
COT-15	Septic Connection to Existing Sewer in the Wakulla BMAP Area	Facilitate the connection of approximately 130 properties currently on OSTDS to existing central sewer in the Wakulla BMAP PFA1.	Septic tank phase out	Started	2,526	2,526	\$637,000 (Grant), \$1,950,000 (Match)	\$ -	DEP– Legislative Projects Grant/ City of Tallahassee	Early 2017

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
COT-16	OSTDS Reduction Outreach Initiative – Outreach for the City of Tallahassee's Connect Septic to Sewer Project	From 2017 to 2019 the City of Tallahassee will produce and distribute educational public service announcements (PSAs), billboards, and other media, to encourage city residents who are on septic systems in the PFA1 to connect to existing central sewer.	Public education	Started	0	0	\$100,000 (Grant), \$70,000 (Match)	\$ -	DEP-FY2015-319/City of Tallahassee	Early 2017
COT-17	2017-2020 Development and Implementation of Education Plan	Develop and implement a plan to educate residents about septic to sewer and impact on Wakulla Springs – including PSAs.	Public education	Envisioned, but not funded	0	0	\$25,000 (Grant), \$25,000 (Match)	\$ -	DEP FY2017–2020	Early 2017
COT-18	Interlocal Agreement for the Provision of Sewer Service to Woodside Heights Subdivision	Interlocal agreement to provide sewer service to the Woodside Heights subdivision.	Septic tank phase out	Planned and funded	0	0	\$ -	\$ -	City of Tallahassee /Leon County	

Table A-5. Leon County management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
LC-1	Sewering in PSPZ	The county identified this project both in its adopted sewer master plan and the water and sewer interlocal agreement with the city as a targeted area for sewer. Funds for the project are available through the county's share of the Blueprint Water Quality Funding supported by the local infrastructure sales tax, subject to annual budget and appropriation.	OSTDS	Ongoing (Woodside Heights)	0	0	\$24,500,000	\$ -	NWFWMD	2020
LC-2	Septic Tank Inventory	Preparation of a GIS inventory of all the septic systems in Leon County.	OSTDS	Completed	0	0	\$50,000	\$ -		2013
LC-3	Septic Tank Repairs	Proposed revision to the septic tank ordinance to require repairs to have a minimum 24-inch separation between the drainfield and seasonal high water table.	Regulation or ordinance	Completed	0	0	Staff Time	\$ -		2015

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
LC-4	Septic Tank Nitrogen Removal Requirements	Pending the results of Florida Department of Health (FDOH) evaluation of passive systems as referenced in Section 38165(4)(x), F.S., the county will (1) review the results of this Florida study of nitrogen reducing, performance-based OSTDS, including passive systems; (2) identify passive systems regulated under Section 38165, F.S., that are approved by Florida for permitting and appropriate for use in Leon County; (3) evaluate factors such as cost and operational feasibility of such passive systems; and (4) develop a proposed amendment to the code of laws requiring the use of appropriate systems for new construction in the PSPZ.	OSTDS	Ongoing	0	0	Staff Time	\$ -	NWFWMD	2015
LC-5	Septic Tank Education	Add educational kiosks at the Woodville Community Center to explain how septic systems work.	Public education and outreach	Proposed	22	0	\$2,500	\$ -		2015
LC-6	Enacted Comprehensive Fertilizer Ordinance (Number 09-34)	Requires commercial applicators to follow a set of BMPs for the application of fertilizers.	Regulation or ordinance	Completed	12	0	Staff Time	\$ -		2009
LC-7	Fertilizer Ordinance Modification	Consider modifying the fertilizer ordinance to reduce nitrogen application rates below the Cody Scarp, if allowable by Florida law.	Regulation or ordinance	Proposed	0	0	Staff Time	\$ -		2014

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
LC-8	Education and Outreach	Outreach through Florida Yards and Neighborhoods (FYN), illicit discharge program, pamphlets, presentations, workshops, and special events.	Public education and outreach	Ongoing	25	0	Staff Time	\$ -		-
LC-9	Enacted Pet Waste Ordinance (Number 11-21)	Education program to promote the cleanup of pet waste as a contributor to surface water pollution.	Public education and outreach	Completed	16	0	Staff Time	\$ -		
LC-10	Land Development Regulations	Adopted new minimum countywide environmental regulations that exceed state stormwater standards.	Regulation or ordinance	Completed	0	0	Staff Time	\$ -		2011
LC-11	Comprehensive Plan Provisions (Conservation Element Policy 4.2.5)	Reduced allowable development in the urban fringe from up to 1 unit per acre to 1 unit per 3 acres. Transfer of density with no net increase in dwelling units as allowed on the future land use map is permitted.	Regulation or ordinance	Completed	0	0	Staff Time	\$ -		01/2008
LC-12	Lake Munson Erosion and Flood Protection Upgrades	Removed 15-acre nutrient sediment dam in 2002, stabilized Munson Slough to reduce erosion, and repaired the dam to stabilize the lake hydroperiod.	Stormwater	Completed	157,068	0	\$7,200,000	\$ -		1996
LC-13	Low Impact Development	Develop low impact development incentives to reduce nitrogen loading to surface water and groundwater.	Stormwater	Completed	0	0	Staff Time	\$ -		2013
LC-14	Street Sweeping	Contract for 821 miles of street sweeping annually; collects 124.75 tons/yr.	Stormwater	Ongoing	51	0	\$ -	\$75,000		

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
LC-15	FYN Program	Participation in the FYN Program through the Cooperative Extension Service.	Stormwater	Ongoing	74	0	\$ -	\$55,000		
LC-16	Irrigation Ordinance	Irrigation ordinance.	Regulation or ordinance	Ongoing	12	0	\$ -	\$ -		
LC-17	Landscaping Ordinance	Landscaping ordinance.	Regulation or ordinance	Ongoing	12	0	\$ -	\$ -		
LC-18	Aquifer Vulnerability Assessment	Study to determine the areas with the most direct connections to Wakulla Springs.	Study	Completed	0	0	\$73,000	\$ -		2006
LC-19	Lombardo Report	In conjunction with the City of Tallahassee and Wakulla County, compiled previous studies identifying nitrogen loading to Wakulla Springs, and identified treatment and management options, where central sewer is not available, to reduce nitrate loading to Wakulla Springs from septic systems located in Leon and Wakulla Counties.	Study	Completed	0	0	\$60,000	\$ -		04/2010
LC-20	Water Quality Sampling	Sampled 73 sites in 13 lakes, 27 streams, and 2 rivers.	Study	Ongoing	0	0	\$250,000	\$ -		
LC-21	Preparation of Annual Water Quality Report	Preparation and publishing of an annual water quality report to document the health of natural systems and use it to prioritize water quality project needs.	Study	Ongoing	0	0	\$ -	\$15,000		

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
LC-22	Woodville Recharge Aquifer Protection Study	EPA grant to study the 60-square-mile Woodville Recharge Basin for flooding, water quality, and aquifer protection.	Study	Completed	0	0	\$300,000	\$ -		2005
LC-23	Annual Wakulla Springs Status Report	Commitment to develop an annual status report on Wakulla Springs for the Board of County Commissioners.	Study	Ongoing	0	0	Staff Time	\$ -		01/2014
LC-24	Established PSPZ (Number 09-12)	Enacted to establish a defined area for enforcement for additional water quality protection in this zone.	Regulation or ordinance	Completed	0	0	Staff Time	\$ -		2006
LC-25	Eight Mile Pond	Acquisition of 132 acres immediately upstream of Ames Sink to preserve/protect the sink.	Land acquisition	Completed	0	0	Staff Time	\$ -		2009
LC-26	Aquifer Wellhead Protection Ordinance (Number 07-20)	Includes Aquifer Protection Program.	Regulation or ordinance	Completed	0	0	Staff Time	\$ -		
LC-27	Litter Control Program	Maintain 2,316 miles of right-of-way, collecting 78.4 tons of waste.	Other Source Control	Ongoing	0	0	Staff Time	\$ -		
LC-28	Adopt-A-Road Program	Maintain 112 miles of right-of-way, collecting 2.11 tons of trash.	Other Source Control	Ongoing	0	0	Volunteers	\$ -		
LC-29	Harbinwood Estates Ponds	Constructed 2 stormwater retrofit ponds and planted/stabilized 1,200 linear feet of channel.	Stormwater	Completed	108	0	\$2,980,000	\$ -		

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
LC-29/COT-11	Alternatives to Sewer Solutions Study	Study and develop preferred options for management alternatives to traditional OSTDS in unincorporated areas of Leon County, including PSPZ; identify preferred options for responsible management entities, including recommendations for financing and management structure for identified preferred options; identify other issues related to sewage treatment and disposal system financing.	OSTDS	Planned	0	0		\$ -		2018

Table A-6. Wakulla County management strategies

* Project location has not been verified in the PFA.

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
WC-1	Comprehensive Plan Infrastructure Policy 1.3.6	Requires AWT for any WWTF or spray field located in the Wakulla Springs Special Planning Area.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2006
WC-2	Otter Creek WWTP Upgrade and Capacity Expansion	Proposed upgrades and expansion to include contributing systems in PFA2 to the WWTF for improved treatment.	Wastewater	Funded and under construction	0	0	\$12,000,000	\$ -		2015

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
WC-3	Public Education on OSTDS	Provide citizens and officials with the best available information for decision making regarding the use of OSTDS and decentralized wastewater systems to reduce nutrients in groundwater to the springs.	Public education and outreach	Completed	0	0	\$ -	\$ -		2007
WC-4	Comprehensive Plan Infrastructure Policy 1.3.7	Requires nitrogen-reducing septic systems on parcels smaller than 5 acres in the Wakulla Springs Special Planning Area; within 150 feet of surface water, swallet, or other karst feature, or within 300 feet of a 1st or 2nd magnitude spring; and on all parcels less than 0.229 acres in size.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2012
WC-5	Magnolia Gardens Central Sewer Installation – Phase I	Planned central sewer installation for Magnolia Gardens Phase I.	OSTDS	Funded and construction anticipated summer 2017	0	0	\$4,300,000	\$ -		
WC-6	Wakulla Gardens Central Sewer Installation – Phase I	Planned central sewer installation for Wakulla Gardens Phase I. There are potentially 90 existing septic system connections projected. Conceptual planning for Phases II and III is ongoing.	OSTDS	Funded and construction anticipated summer 2017	0	0	\$4,300,000	\$ -		
WC-7	Greiner's Addition Central Sewer Installation	Planned central sewer installation for the Greiner's Addition neighborhood.	OSTDS	Not yet funded	0	0	\$ -	\$ -		

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
WC-8	Wakulla County WWTF - Plantation River Estates	Wakulla County will assume ownership and management of the River Plantation Estates WWTP sewer system and WWTF. Project includes removal and replacement of the existing facility.	Wastewater	Ongoing	0	0	\$4,900,000	\$ -		
WC-9	Wakulla Springs Watershed	Inspection and repair of old, damaged, and failing systems in the Wakulla Springs watershed area.	OSTDS	Advanced planning, seeking funding	0	0	\$1,380,300	\$ -		10/15/2012
WC-10	Crawfordville Tax Increment Financing (TIF) District	TIF District for Crawfordville area to fund improvements, including basic infrastructure.	OSTDS	Ongoing	0	0	\$ -	\$ -		11/5/2012
WC-11	Fertilizer Use Ordinance 2010-1	Adopts model ordinance on Florida-friendly fertilizer use on urban landscapes.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2/4/2010
WC-12	Fertilizer Management Education	Education and outreach to the public about fertilizer management.	Public education and outreach	Proposed	0	0	\$ -	\$ -		2014
WC-13	Comprehensive Plan Future Land Use Policies 1.2.10, 1.2.10.3, Special Area Plans	Establishes special area plans for the Bloxham Special Area Plan, Special Area Plan #2, and Spring Creek Highway Special Area Plan in the Wakulla Springs Basin. Requires nitrate loading analyses for development. Establish standards for stormwater, karst feature protections, landscaping, and open space.	Regulation or ordinance	Ongoing	22	0	\$ -	\$ -		2004
WC-14	Wakulla County Aquifer Vulnerability Assessment	Modeling effort to identify the most vulnerable areas in the county.	Study	Completed	Part of WC-11	0	\$ -	\$ -		2007

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
WC-15	Comprehensive Plan Future Land Use Polity 1.2.9.1 – Northeast Wakulla Sustainable Community	Establishes standards for 606 acres in the Wakulla Springs Basin. Requires no net increase in nutrients or phosphorus loading to groundwater. Sustainable community standards established for stormwater, groundwater, open space, and BMPs. Requires AWT standards for sanitary sewer service to the site.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2003
WC-16	Ordinance 2006-58 (Multiple Objectives and Policies in Comprehensive Plan Conservation and Future Land Use Elements)	Add karst buffers; require a nitrate loading study for proposed development greater than 1 acre; incorporate FYN practices and landscaping standards that promote native vegetation for new subdivisions; reduce nitrates from public facilities; and address stormwater, water conservation, wastewater facilities, treated wastewater reuse, and natural water flows.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2006
WC-17	Comprehensive Plan Conservation Objective 12.0	Develop solutions to restore the health of Wakulla Springs by reducing pollutants in groundwater, and implementing policies for the Wakulla Springs Special Planning Area.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2010

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
WC-18	Comprehensive Plan Conservation Objective 12.1	Establishes a transfer of development rights policy to encourage development in Crawfordville with connection to sewer service; "no net increase in dwelling units" allowed by the future land use map in the Wakulla Springs Special Planning Area; fertilizer restrictions based on the FYN Program.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2010
WC-19	Comprehensive Plan Conservation Objective 12.2	County will consider expanding the Wakulla Springs Special Planning Area based on geologic vulnerability.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		2010
WC-20	Comprehensive Plan Infrastructure Objective 2.5	Protect the functions of groundwater recharge areas, springs, and springsheds.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		1995
WC-21	Groundwater Extraction Ordinance	Ask the NFWFMD to establish minimum flows and levels (MFLs) for Wakulla Springs and ask the NFWFMD to deny permits to transport water from the Wakulla Springs Springshed and the Ochlocknee and St. Marks Rivers.	Protection measure	Ongoing	0	0	\$ -	\$ -		
WC-22	Litter Regulations. Code of Ordinances Section 27.049	Prohibits litter and dumping along roadways and waterways, and establishes penalties.	Other source control	Ongoing	0	0	\$ -	\$ -		1992
WC-23*	Nitrogen Reduction – Wakulla Gardens Phase I	Planned central sewer installation for Wakulla Gardens Phase I. Estimated 326 properties.	Septic tank phase out	Planned and funded	0	0	\$4.3 million	\$ -	NFWFMD	Design and permitting in process

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Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
WC-24*	Nitrogen Reduction – Magnolia Gardens Phase II	Planned central sewer installation for Magnolia Gardens Phase II. Estimated 120 properties.	Septic tank phase out	Planned and funded	0	0	\$1.5 million	\$ -	NWFWMD	Design and permitting in process
WC-25*	Nitrogen Reduction – Wakulla Gardens Phase I	Planned central sewer installation for Wakulla Gardens Phase I. Estimated 2,500 +/- properties.	Septic tank phase out	Envisioned, but not funded	0	0	\$ -	\$ -	NWFWMD	
WC-26*	WINCO WWTP Purchase	Nitrogen reduction – northeast Wakulla County.	Septic tank phase out	Envisioned, but not funded	0	0	\$ -	\$ -	NWFWMD	

Appendix B: Stakeholder Projects Outside the PFAs

Table B-1. City of Gretna management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
CG-1	No Fertilizer Use	Fertilizer is not applied on any city-owned property.	Residential fertilizer	Ongoing	0	0	\$ -	\$ -		

Table B-2. City of Quincy management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
CQ-1	City of Quincy WWTF	AWT at the WWTF.	WWTF	Completed	0	0	\$ -	\$ -		
CQ-2	Land Development Code – Watershed Conservation Measures	Ordinance that requires minimum stormwater treatment levels and use of BMPs including slow-release fertilizers.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		
CQ-3	Street Sweeping	Sweeping the streets in the south side of the city one week and the north side the next week.	Stormwater	Ongoing	0	0	\$ -	\$ -		

Table B-3. FAMU management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
FAMU-1	NPDES Municipal Separate Storm Sewer (MS4) Permit	NPDES MS4 permit.	Stormwater	Ongoing	0	0	\$ -	\$ -		

Table B-4. FCI management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
FCI-1	NPDES MS4 Permit	Stormwater system inspection and maintenance.	Stormwater	Ongoing	0	0	\$ -	\$ -		
FCI-2	No Fertilizer Use	Fertilizer is not applied on facility grounds.	Fertilizer	Ongoing	0	0	\$ -	\$ -		

Table B-5. FSU management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
FSU-1	Fertilizer Rule in University Master Plan	Fertilizer rule in the University Master Plan.	Fertilizer	Ongoing	0	0	\$ -	\$ -		2008
FSU-2	NPDES MS4 Permit	NPDES MS4 permit.	Stormwater	Ongoing	0	0	\$ -	\$ -		

Table B-6. Gadsden County management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
GC-1	Comprehensive Plan Policy 4.5.1 and 5.2.11	Comprehensive Plan Policy 4.5.1 and 5.2.11 in the Infrastructure and Conservation Element.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		
GC-2	Comprehensive Plan Policy 5.2.4 and 5.2.11	Comprehensive Plan Policy 5.2.4 and 5.2.11 in the Conservation Element.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		
GC-3	Comprehensive Plan Infrastructure Element	Comprehensive Plan Infrastructure Element.	Regulation or ordinance	Ongoing	0	0	\$ -	\$ -		
GC-4	Section 3.4 Special Drainage Basins	Section 3.4 Special Drainage Basins – Water Quality (Pollution Abatement) in the Stormwater Policies and Procedures Manual.	Stormwater	Ongoing	0	0	\$ -	\$ -		

Table B-7. TEC management strategies

TBD = To be determined.

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
TEC-1	Oyster Bay WWTP Abandonment	Oyster Bay WWTP abandonment.	Wastewater	Completed	TBD	0	\$750,000	\$ -		
TEC-2	Gadsden East WWTP	Gadsden East WWTP (construct a treatment wetland by retrofitting 3 existing rapid infiltration basins and building additional treatment cells).	Wastewater	Completed	TBD	0	\$200,000	\$ -		
TEC-3	Highway 267 Sewer	Highway 267 sewer.	Wastewater	Completed	1	0	\$400,000	\$ -		
TEC-4	Beech Ridge Trail Sewer	Beech Ridge Trail sewer.	Wastewater	Completed	1	0	\$40,000	\$ -		

Table B-8. TCC management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
TCC-1	Fertilizer Cessation	Fertilizer cessation.	Residential fertilizer	Ongoing	1	0	\$ -	\$ -		12/2012

Table B-9. Town of Havana management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
TH-1	Street Sweeping	Street sweeping.	Stormwater	Ongoing	1	0	\$ -	\$ -		

Table B-10. Leon County management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
LC-30	Fuller Road Regional Facility	Constructed 10-acre stormwater retrofit facility at Interstate (I)-10 and US 27.	Stormwater	Completed	208	0	\$800,000	\$ -		
LC-31	Fred George Basin Acquisition	Acquisition of 166 acres, including Fred George Sink, for preservation/protection of the sink.	Land acquisition	Completed	0	0	\$2,600,000	\$ -		
LC-32	Fred George Basin Wetland Rehydration	Wetland rehydration through grade restoration and construction of trash racks at the inflow points are planned to improve water quality prior to runoff entering the Fred George Sink.	Protection measure	Planned	0	0	\$1,000,000	\$ -		

Table B-11. City of Tallahassee management strategies

Project Number	Project Name	Project Description	Project Type	Status	TN Reduction (kg/yr)	TP Reduction (kg/yr)	Cost	Cost Annual O&M	Partners	Start Date
COT-12	Stormwater Treatment Projects	81 stormwater projects citywide (outside PFA1) were completed since 2004. Examples include Lower Central Drainage Ditch (CDD), Frenchtown Pond, Emory Court, and Weems Pond projects.	Stormwater	Ongoing	0	0	\$82,303,740	\$ -		
COT-13	Street Sweeping	Citywide street sweeping annually collects an estimated 2,000 tons of material and 2,000 pounds (942 kg) of TN are removed	Stormwater	Ongoing	942	0	\$1,500,000	\$ -		

Appendix C: References

Florida Department of Environmental Protection. 2012. *Nutrient (biology) TMDL for the Upper Wakulla River (WBID 1006)*. TMDL report. Tallahassee, FL: Division of Water Resource Management, Bureau of Watershed Management.