Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River Basin Management Action Plan

Division of Environmental Assessment and Restoration
Water Quality Restoration Program
Florida Department of Environmental Protection

with participation from the
Silver and Rainbow Stakeholders

June 2018

2600 Blair Stone Rd.
Tallahassee, FL 32399
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Acknowledgments

The Florida Department of Environmental Protection adopted the Basin Management Action Plan by Secretarial Order as part of its statewide watershed management approach to restore and protect Florida's water quality. The plan was developed in coordination with stakeholders, identified below, with participation from affected local, regional, and state governmental interests; elected officials and citizens; and private interests.

Florida Department of Environmental Protection
Noah Valenstein, Secretary

Table A-1. Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River stakeholders

Type of Entity	Name
Responsible Stakeholders	Agricultural Producers Marion County Alachua County Lake County Sumter County Levy County Putnam County City of Ocala City of Dunnellon City of Belleview The Villages On Top of the World Town of McIntosh City of Williston Town of Bronson City of Micanopy City of Hawthorne Town of Lady Lake City of Fruitland Park
Responsible Agencies	Florida Department of Agriculture and Consumer Services Florida Department of Environmental Protection, including Silver Springs State Park and Rainbow Springs State Park, Oklawaha River Aquatic Preserve, and Rainbow Springs Aquatic Preserve Florida Department of Health Florida Department of Health in Marion County Florida Department of Health in Alachua County Florida Department of Health in Levy County Florida Department of Transportation District 2 Florida Department of Transportation District 5 St. Johns River Water Management District Southwest Florida Water Management District City of Ocala

Type of Entity	Name
	City of Dunnellon City of Williston Town of Bronson
OSTDS Advisory Committee	Marion County Florida Department of Health in Marion County Florida Department of Health in Alachua County Florida Department of Health in Levy County City of Ocala City of Belleview City of Dunnellon Florida Onsite Wastewater Association Florida Homebuilders Association Bay Laurel Center CDD Oklawaha Valley Audubon Rainbow River Conservation Coalition
Other Interested Stakeholders	Citizens/Homeowners Florida Department of Economic Opportunity Florida Farm Bureau Federation Marion County Farm Bureau Sierra Club Rainbow River Conservation Coalition Oklawaha Valley Audubon Weyerhaeuser University of Florida Institute of Food and Agricultural Sciences Extension

See **Appendix A** for links to important sources referenced in this document. For additional information on total maximum daily loads and nutrient management strategies for the Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River Basin Management Action Plan, contact:

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Table of Contents

List of Figures

List of Tables

List of Acronyms and Abbreviations

ac	Acre
AWT	Advanced Wastewater Treatment
ATU	Aerobic Treatment Unit
BAF	Biochemical Attenuation Factor
BMAP	Basin Management Action Plan
BMPs	Best Management Practices
BOD	Biochemical Oxygen Demand
CASTNET	Clean Air Status and Trends Network
cfs	Cubic Feet Per Second
CMAQ	Community Multiscale Air Quality
CRF	Controlled-Release Fertilizer
CRISPS	Collaborative Research Initiative on Sustainability and Protection of Springs
DEP	Florida Department of Environmental Protection
DMR	Discharge Monthly Report
DO	Dissolved Oxygen
DRA	Drainage Retention Area
ERP	Environmental Resource Permit
F.A.C.	Florida Administrative Code
F.A.R.	Florida Administrative Register
FARMS	Facilitating Agricultural Resource Management Systems
FCT	Florida Communities Trust
FDACS	Florida Department of Agriculture and Consumer Services
FDOH	Florida Department of Health
FF	Farm Fertilizer
FFL `	Florida-Friendly Landscaping
FGS	Florida Geological Survey
FLUCCS	Florida Land Use Cover and Forms Classification System
FOWA	Florida Onsite Wastewater Association
F.S.	Florida Statutes
FSAID	Florida Statewide Agricultural Irrigation Database
FY	Fiscal Year
FYN	Florida Yards and Neighborhoods
GIS	Geographic Information System
gpd	Gallons Per Day
GPS	Global Positioning System
HA	Habitat Assessment
IA	Implementation Assurance
IV	Implementation Verification
in/yr	Inches Per Year
lb	Pound

lb-N/yr	Pounds of Nitrogen Per Year
LID	Low-Impact Development
LSSA	Little Sumter Service Area
LVS	Linear Vegetation Survey
LW	Livestock Waste
MFL	Minimum Flow and Level
mgd	Million Gallons Per Day
mg/L	Milligrams Per Liter
MIL	Mobile Irrigation Lab
N	Nitrogen
NA	Not Applicable
NADP	National Atmospheric Deposition Program
NELAC	National Environmental Accreditation Conference
NELAP	National Environmental Accreditation Program
NNC	Numeric Nutrient Criteria
NOI	Notice of Intent
NPDES	National Pollutant Discharge and Elimination System
NSF	NSF International (formerly National Sanitation Foundation)
NSILT	Nitrogen Source Inventory Loading Tool
NSU	North Sumter Utilities
NTN	National Trends Network
NWFWMD	Northwest Florida Water Management District
OAWP	Office of Agricultural Water Policy (FDACS)
OFS	Outstanding Florida Spring
OFW	Outstanding Florida Water
OSTDS	Onsite Sewage Treatment and Disposal System
PAR	Photosynthetically Active Radiation
PBTS	Performance-Based Treatment System
PFA	Priority Focus Area
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
RIB	Rapid Infiltration Basin
RPS	Rapid Periphyton Survey
SAV	Submerged Aquatic Vegetation
SBIO	Statewide Biological Database (DEP)
SCI	Stream Condition Index
SOP	Standard Operating Procedure
SRWMD	Suwannee River Water Management District
SSS	Silver Springs Shores
STF	Sports Turfgrass Fertilizer
STORET	Florida Storage and Retrieval System (Database)
SWFWMD	Southwest Florida Water Management District
SWIM	Surface Water Improvement and Management

TDEP	Total Atmospheric Deposition Model
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TOC	Total Organic Carbon
TP	Total Phosphorus
TSS	Total Suspended Solids
UFA	Upper Floridan aquifer
UF–IFAS	University of Florida/Institute of Food and Agricultural Sciences
USDA	U.S. Department of Agriculture
USGS	U.S. Geological Survey
UTF	Urban Turfgrass Fertilizer
VCSA	Villages Center Service Area
WAFR	Wastewater Facility Regulation (Database)
WBID	Waterbody Identification (Number)
WIN	Florida Watershed Information Network Database
WMD	Water Management District
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant
yr	Year

Executive Summary

The Silver Springs, Silver Springs Group, and Upper Silver River and the Rainbow Spring Group and Rainbow Spring Group Run Basin Management Action Plans (BMAPs) were adopted in 2015. This document replaces the two plans and addresses the requirements of the 2017 Florida Springs and Aquifer Protection Act (Chapter 373, Part VIII, Section 1.1, Florida Statutes [F.S.]),) for these two Outstanding Florida Springs (OFS): Silver Springs and Rainbow Spring Group.

The decision to merge the two adopted BMAPs was based on the following considerations:

- The two spring systems have a zone of interaction that influences the movement and direction of groundwater flow. There is no clear delineation between the two systems' groundwater contributing areas (**Section 1.4.2**).

- Management policies implemented to address pollutant sources are largely the same for both spring systems. Two plans are not needed to implement most of these policies.

- Marion County has the largest land area within both BMAP areas—60 % of Silver Springs and 65 % of the Rainbow Spring Group. The City of Ocala spans both BMAP areas. Upgrades to Ocala Utilities wastewater treatment facilities (WWTFs) allow the transfer of wastewater between portions of Ocala east and west of Interstate 75 (I-75). A single BMAP provides greater consistency in local jurisdiction planning and policy making.

- Two distinct BMAP areas are maintained for the calculation of loadings and identification of sources. They are separated by I-75, because the interstate separates the area overseen by the St. Johns River Water Management District (SJRWMD) from that of the Southwest Florida Water Management District (SWFWMD). One BMAP provides an opportunity for increased coordination and consistency in the programs and policies implemented by the two water management districts (WMDs).

Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP Areas

The Florida Springs and Aquifer Protection Act provides for the protection and restoration of OFS, which comprise 24 first magnitude springs, 6 additional named springs, and their associated spring runs. The Florida Department of Environmental Protection (DEP) has assessed water quality in each OFS and determined that 24 of the 30 OFS are impaired for the nitrate form of nitrogen. Silver Springs and the Rainbow Spring Group are impaired first magnitude OFS.

Both BMAP areas share a north-south boundary along I-75 (**Figure ES-1a**). The Silver Springs and Upper Silver River BMAP area (989 square miles [mi^2]) includes Silver Springs, Silver Springs Group, and the Upper Silver River along with the groundwater contributing area for the springs. The waterbodies delineated as Silver Springs and Silver Springs Group are collectively referred to as Silver Springs in this document and together include at least 30 named springs that contribute flow to the Upper Silver River.

The Silver Springs and Upper Silver River BMAP area is located mostly in central Marion County, with portions extending into Alachua and Putnam Counties, and encompasses all or portions of several municipalities in Marion, Alachua, Sumter, and Lake Counties, including the City of Ocala, City of Belleview, City of Hawthorne, Town of McIntosh, City of Fruitland Park, Town of Lady Lake, City of Wildwood, and The Villages Community Development Districts (CDDs). The Ocala National Forest is located along the eastern border of the BMAP area.

The Rainbow Spring Group and Rainbow River BMAP area (679 mi^2) includes Rainbow Springs Group, Rainbow Springs Group Run, and the Rainbow River along with the groundwater contributing area for the springs. The waterbody delineated as Rainbow Spring Group contains at least 11 named springs, and Rainbow Springs Group Run (Upper Rainbow River) receives additional spring discharges, including those from two major springs. Together they are referred to as Rainbow Spring Group and Rainbow River in this document.

The Rainbow Spring Group and Rainbow River BMAP area is located mostly in western Marion County, with portions extending into Levy County (**Figure ES-1b**). Major urban centers include western Ocala, Dunnellon, Williston, Bronson, and Bay Laurel Center CDD (On Top of the World).

Priority Focus Areas (PFAs)

Each BMAP area has a delineated PFA. These PFAs represent the areas in the basin where the aquifer is most vulnerable to inputs and where there are the most connections between groundwater and Silver Springs and Rainbow Spring Group. The PFA areas are based on Marion County's identified Primary Protection Zones and supported by local ordinance. Consistency in the enactment of policy was a factor in DEP's consideration when basing PFA boundaries on the existing county ordinance.

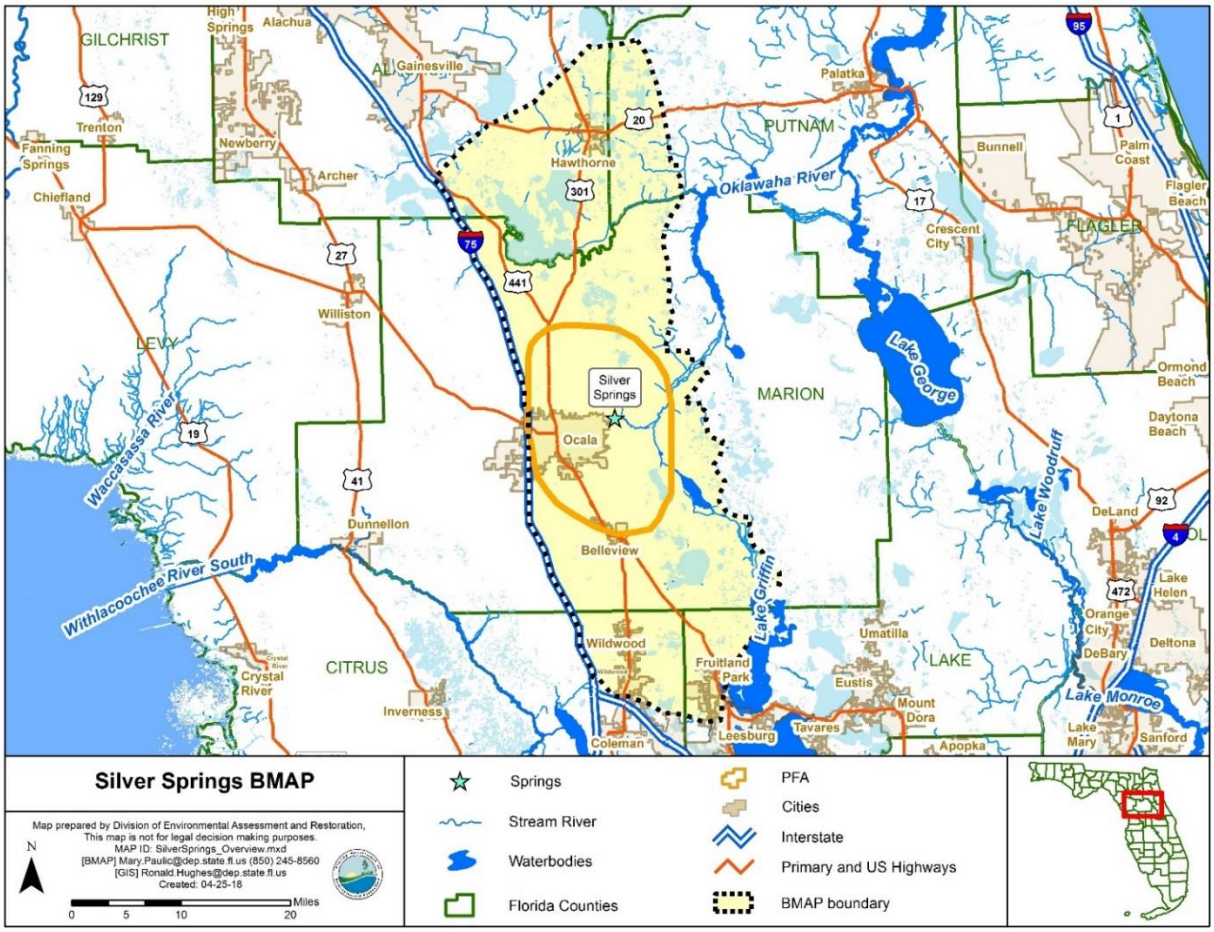

Figure ES-1a. Silver Springs and Upper Silver River BMAP area and PFA boundaries

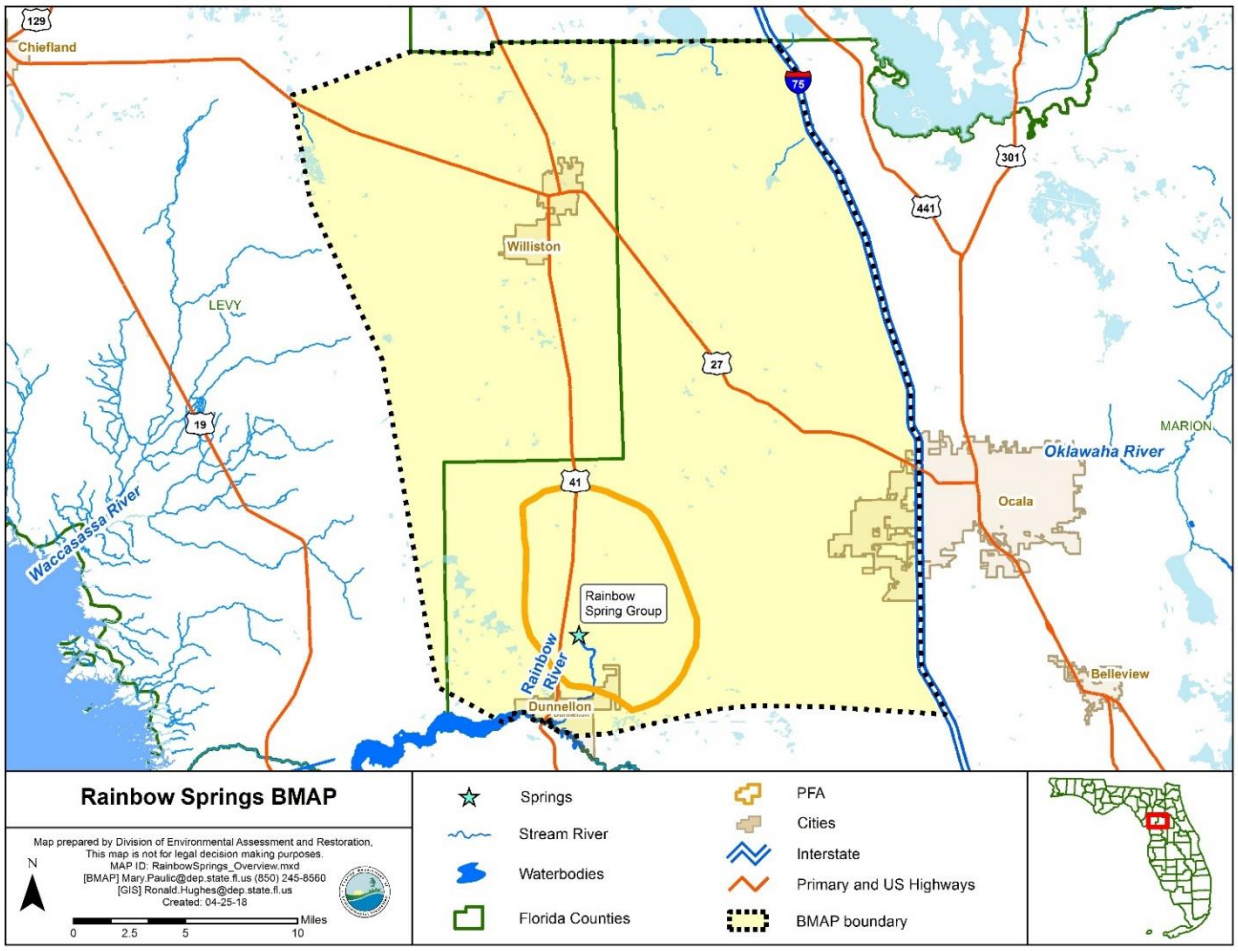

Figure ES-2b. Rainbow Spring Group and Rainbow River BMAP area and PFA boundaries

Nitrogen Source Identification, Required Reductions, and Options to Achieve Reductions

At least 30 named springs comprising Silver Springs and Silver Springs Group are the main source of water to the Upper Silver River, which along with the springs was identified as impaired because of a biological imbalance caused by excessive concentrations of nitrate in the water. In 2012, a total maximum daily load (TMDL) for nitrate was developed as a water quality restoration target for Silver Springs and the Upper Silver River. The TMDLs established a long-term monthly average nitrate target of 0.35 milligrams per liter (mg/L).

The springs associated with Rainbow Spring Group and the next segment of the Rainbow River, called Rainbow Spring Group Run, are the primary source of water for the Rainbow River. They were identified as impaired because of a biological imbalance caused by excessive

concentrations of nitrate in the water. In 2013, a TMDL for nitrate was developed as a water quality restoration target; it established a long-term monthly average nitrate target of 0.35 mg/L.

The DEP analysis of loading sources was conducted using the Nitrogen Source Inventory Loading Tool (NSILT) for each spring system. For the Silver Springs and Upper Silver River BMAP area, onsite sewage treatment and disposal systems (OSTDS, or septic systems; the terms are used interchangeably throughout this document) represent 29 % of the estimated nitrogen loading to groundwater. Stormwater loading to groundwater comes from urban turf fertilizer (UTF), sports turf fertilizer (STF), and drainage wells, and overall represents 22 % of the loading. The combined agricultural categories of livestock waste (LW) and farm fertilizer (FF) represent 36 %, and atmospheric deposition represents 10 % of the loading to groundwater.

For the Rainbow Spring Group and Rainbow River BMAP area, the NSILT analysis found OSTDS represented 20 % of the loading to groundwater, while UTF and STF combined represented 13 % of the loading to groundwater. The combined agricultural categories of LW and FF represented 54 % and atmospheric deposition 11 % of the loading to groundwater.

For the Silver Springs and the Upper Silver River BMAP area, the total load reduction required to meet the TMDL at all spring vents is 930,135 pounds of nitrogen per year (lb-N/yr). To measure progress towards achieving the necessary load reduction, DEP is establishing the following milestones:

- Initial reduction of 279,041 lb-N/yr (30 %) within 5 years.
- An additional 372,054 lb-N/yr (40 %) within 10 years.
- The remaining 279,040 lb-N/yr (30 %) within 15 years.
- For a total of 930,135 lb-N/yr within 20 years.

The policies and submitted projects included for the Silver Springs and Upper Silver River BMAP area are estimated to achieve a reduction of 499,475 to 691,719 lb-N/yr to groundwater. While reductions to groundwater will benefit the springs, it is uncertain to know with precision how those reductions will impact the necessary reductions at the spring. DEP will continue to monitor the spring systems to evaluate those reductions as projects are implemented against the required load reductions. The BMAP is designed to achieve 70 % of the load reductions needed for the spring vents within 10 years of adoption and 100 % within 15 years.

For the Rainbow Spring Group and Rainbow River BMAP area, the total load reduction required to meet the TMDL at all spring vents is 1,783,607 lb-N/yr. To measure progress towards achieving the necessary load reduction, DEP is establishing the following milestones:

- Initial reduction of 535,082 lb-N/yr (30 %) within 5 years.
- An additional 713,443, lb-N/yr (40 %) within 10 years.

- The remaining 535,082 lb-N/yr (30 %) within 15 years.
- For a total of 1,783,607 lb-N/yr within 20 years.

The total loading calculated for the Rainbow Spring Group and Rainbow River BMAP area is substantially larger than what was estimated using the NSILT methodologies. There are several possible explanations for this difference, as follows:

- Legacy loads already in groundwater have moved through the system to be discharged at the springs.
- Rainbow Spring Group is discharging water that may be originating in DEP's defined Silver Springs and Upper Silver River BMAP area.
- There is an unidentified source(s) of loading not accounted for in the NSILT analysis.
- Hydrogeological changes have occurred that move water more quickly to the springs potentially reducing the attenuation of sources.

The policies and submitted projects included for the Rainbow Spring Group and Rainbow River BMAP area will achieve a reduction of 340,689 to 508,644 lb-N/yr to groundwater. While reductions to groundwater will benefit the springs, it is uncertain to know with precision how those reductions will impact the necessary reductions at the springs. DEP will continue to monitor the springs to evaluate those reductions as projects are implemented against the required load reductions. The BMAP is designed to achieve 70 % of the load reductions needed for the spring vents within 10 years of adoption and 100 % within 15 years.

DEP will evaluate progress towards the milestones for both Silver Springs and Rainbow Spring Group and will report to the Governor and Florida Legislature on both BMAP areas. The agency will adjust management strategies to ensure the target concentrations are achieved, including periodic water quality evaluations and estimation of loading from the spring vents. This may include additional policy implementation or adjustment and development of better or new BMPs that better address nitrogen sources or expanding the area to which the OSTDS remediation policies apply. Any such change, however, would be incorporated into an updated BMAP through a formal adoption process.

Current policies and submitted projects for both BMAP areas provide less than the required reductions. Additional strategies and actions could be identified through modeling and data analysis tools that can identify groundwater locations with consistently high nitrate concentrations (“hot spots”) and assist in determining reasons for the high concentration of nitrate. These areas may need prioritization for policy implementation, additional policy implementation or adjustment, or simply the remediation of identified sources. An additional

source identification effort described in **Section 1.6.4** is a potentially collaborative effort between DEP, state agencies, local governments, and the water management districts.

For the list projects to improve water quality, see **Appendix B**. Included are owner-implemented best management practices (BMPs) for FF, LW, and STF; WWTF upgrades; projects to reduce UTF application; and OSTDS conversions to sewer.

Successful BMAP implementation requires commitment, dedicated state funding, and follow-up. Stakeholders have expressed their intention to carry out the plan, monitor its effects, and continue to coordinate within and across jurisdictions to achieve nutrient reduction goals. As the TMDLs must be achieved within 20 years, DEP, WMDs, Florida Department of Health (FDOH), and Florida Department of Agriculture and Consumer Services (FDACS) will implement management action strategies using the annual Legacy Florida appropriation from the Legislature of at least $50 million to reduce nitrogen in impaired OFS. DEP, working with the coordinating agencies, will continue to invest existing funds and explore other opportunities and potential funding sources for springs restoration efforts.

Restoration Approaches

Load reduction to the aquifer is needed to achieve the load reductions requirements at the spring vents. To ensure that load reductions are achieved at the spring vents, the following restorations actions are being established. These actions are designed to reduce the amount of nutrients to the aquifer, which will reduce the load at the spring vents and ultimately achieve the necessary reductions. Monitoring of the spring discharges during implementation will be implemented to monitor progress.

- **New OSTDS** – Upon BMAP adoption, the OSTDS remediation plan prohibits new systems on lots of less than 1 acre within the PFAs, unless the system includes the enhanced treatment of nitrogen as defined by the OSTDS remediation plan, or unless the OSTDS permit applicant demonstrates that sewer connections will be available within 5 years. Local governments and utilities are expected to develop master wastewater treatment feasibility analyses within 5 years to identify specific areas to be sewered or have enhanced nitrogen reducing OSTDS within 20 years of BMAP adoption. The OSTDS remediation plan is incorporated as **Appendix D**.

- **Existing OSTDS** – Upon completion of the master wastewater treatment feasibility analyses, FDOH rulemaking, and funding program for homeowners included in the OSTDS remediation plan, but no later than 5 years after BMAP adoption, modification or repair permits issued by the FDOH for all OSTDS within the BMAP boundary on all lots will require the enhanced treatment of nitrogen, unless sewer connections will be available through a BMAP-listed project. All OSTDS subject to the policy must include the enhanced treatment of nitrogen no later than 20 years after BMAP adoption.

- **WWTFs** − All new facilities within the PFA with a permitted discharge of 0.1 mgd (million gallons per day) or greater must meet an effluent standard for nitrogen of 3 mg/L for all disposal methods. The effluent standards listed in **Table ES-1** were adopted with the 2015 BMAP and continue to apply to all existing WWTFs and new DEP-permitted discharges less than 0.1 mgd in the PFAs. The effluent standards listed in **Table ES-2** and adopted with the 2015 BMAPs will continue to apply to all new and existing WWTFs outside the PFAs in both BMAP areas.

Table ES-1. WWTF effluent standards for existing DEP-permitted discharges and new DEP-permitted discharges less than 0.1 mgd within the PFAs

mgd= million gallons per day

Designed Average Daily Flow (mgd)	TN Concentration Limits for Rapid-Rate Land Application (RRLA) Effluent Disposal System (mg/L)	TN Concentration Limits for Slow-Rate Land Application Effluent Disposal System (mg/L)	TN Concentration Limits for Public Access Reuse Effluent Disposal System (mg/L)
Greater than or equal to 0.5	3	3	10
Less than 0.5 and greater than or equal to 0.01	3	6	10
Less than 0.01	10	10	10

Table ES-2. WWTF effluent standards outside the PFAs

mgd = million gallons per day

Designed Average Daily Flow (mgd)	TN Concentration Limits for Rapid Rate Land Application and Slow-Rate Land Application (mg/L)	Public Access Reuse Effluent Disposal System (mg/l)
Greater than or equal to 0.01	6	10
Less than 0.01	10	10

- **UTF** – UTF sources can receive up to 6 % credit for the DEP-approved suite of public education and source control ordinances. Entities have the option to collect and provide monitoring data to quantify reduction credits for additional measures.

- **STF –** STF sources include golf courses and other sporting facilities. Golf courses can receive up to 10 % credit for implementing the golf course BMP manual. Other sports fields can receive up to 6 % credit for managing their fertilizer applications to minimize transport to groundwater.

- **FF** – All FF sources are required to implement BMPs or perform monitoring to demonstrate compliance with the TMDL. A 15 % reduction to groundwater is estimated for owner-implemented BMPs. Additional credits could be achieved through better documentation of reductions achieved through BMP implementation or the implementation of additional agricultural projects or practices, such as precision irrigation, soil moisture probes, controlled-release fertilizer, and cover crops.

- **LW** – All LW sources are required to implement BMPs or perform monitoring. A 10 % reduction to groundwater is estimated for owner-implemented BMPs. Additional credits could be achieved through better documentation of the reductions achieved through BMP implementation.

- Currently identified additional agricultural practices are more focused on irrigated acreage and practices that are more applicable to row crops. The largest agricultural activities in both BMAP areas are horse and cattle farms. Identification and refinement of additional practices specific to cattle and horse farms, particularly for improved management of manure, is planned during the first 5 years of the BMAP.

Section 1: Background

The Silver Springs, Silver Springs Group, and Upper Silver River and Rainbow Springs Group and Rainbow Springs Group Run Basin Management Action Plans (BMAPs) were adopted in 2015 (**Figure 1**). This document replaces the two plans and addresses the requirements of the Florida Springs and Aquifer Protection Act (**Section 1.1**) for both Outstanding Florida Springs (OFS): Silver Springs and Rainbow Spring Group. These waters were determined to be nutrient impaired because of excessive algal growth caused by elevated levels of nitrate from groundwater.

The decision to merge the two adopted BMAPs was based on the following considerations:

- The two spring systems have a zone of interaction that influences the movement and direction of groundwater flow. There is no clear delineation between the two systems' groundwater contributing areas (**Section 1.4.2**).

- Management policies implemented to address pollutant sources are largely the same for both spring systems. Two plans are not needed to implement most of these policies.

- Marion County has the largest land area within both BMAP areas: 60 % of Silver Springs and 65 % of Rainbow Springs. The City of Ocala spans both BMAP areas. Upgrades to Ocala Utilities wastewater treatment facilities (WWTFs) allow the transfer of wastewater between portions of Ocala east and west of Interstate 75 (I-75). One BMAP provides for greater consistency in local jurisdiction planning and policy making.

- Two distinct BMAP areas are maintained for the calculation of loadings and identification of sources. They are separated by I-75, because the interstate separates the area overseen by the St. Johns River Water Management District (SJRWMD) from that of the Southwest Florida Water Management District (SWFWMD). One BMAP provides an opportunity for increased coordination and consistency in programs and policies implemented by the two water management districts (WMDs).

1.1 Legislation

The Florida Springs and Aquifer Protection Act (Chapter 373, Part VIII, Florida Statutes [F.S.]) provides for the protection and restoration of OFS, which comprise 24 first magnitude springs, 6 additional named springs, and their associated spring runs. The Florida Department of Environmental Protection (DEP) has assessed water quality in each OFS and determined that 24 of the 30 OFS are impaired for the nitrate form of nitrogen. Silver Springs and Rainbow Spring Group are impaired first magnitude OFS. The development of the basin management action plan (BMAP) to meet the new requirements of the act was initiated in 2016.

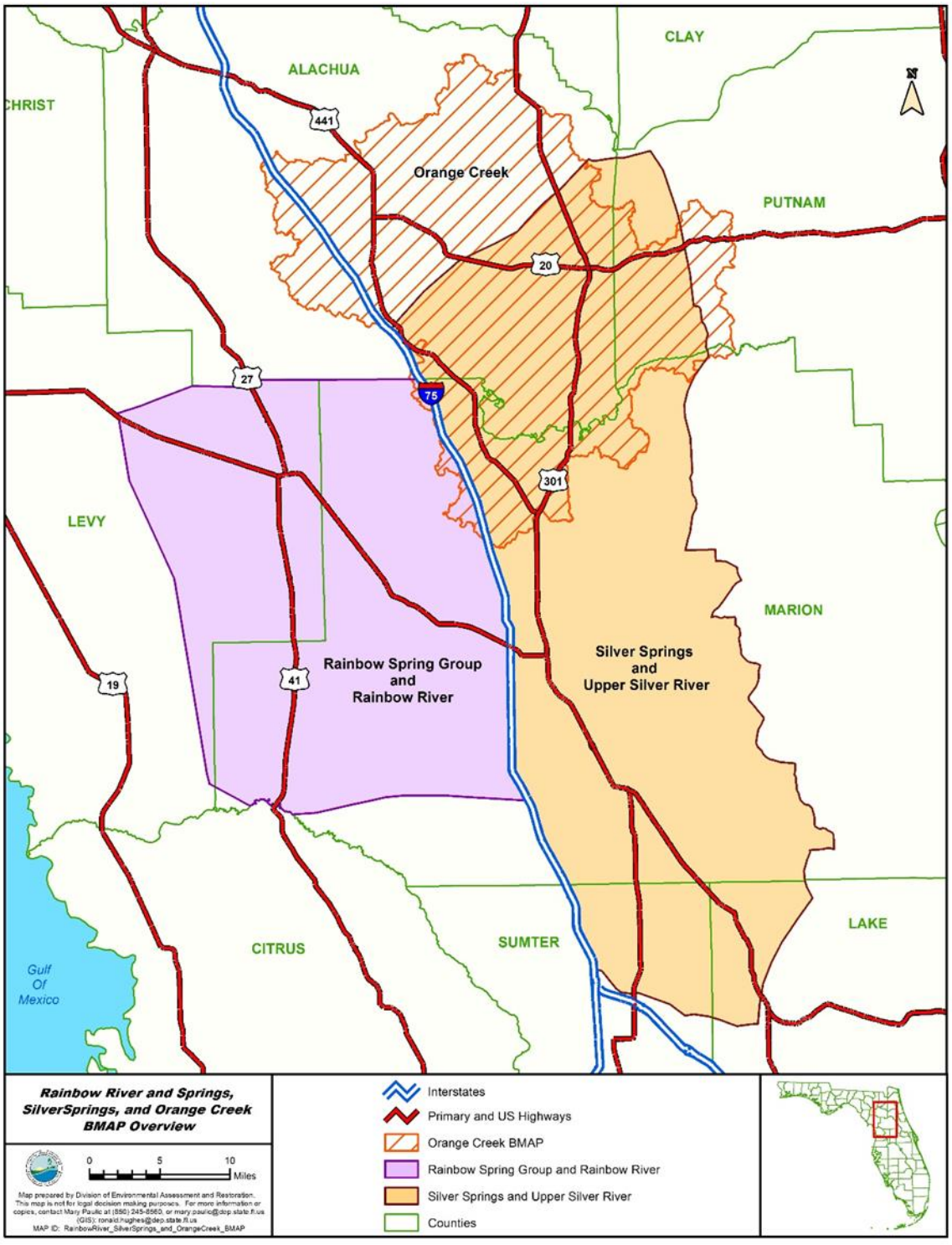

Figure 1. Location of Silver Springs and Upper Silver River BMAP area and Rainbow Spring Group and Rainbow River BMAP area

1.2 Water Quality Standards and Total Maximum Daily Loads (TMDLs)

A TMDL represents the maximum amount of a given pollutant that a waterbody can assimilate and still meet water quality criteria. Upper Silver River, Silver Springs Group, Silver Springs, Rainbow Springs Group, and Rainbow Springs Group Run are Class III waterbodies with a designated use of recreation, propagation, and the maintenance of a healthy, well-balanced population of fish and wildlife. They are also designated as Outstanding Florida Waters (OFWs).

These waters are impaired by nitrate nitrogen, which in excess is demonstrated to adversely affect flora or fauna through excessive algal growth, which results in ecological imbalances in springs and rivers and can produce human health problems, foul beaches, inhibit navigation, and reduce the aesthetic value of resources.

DEP adopted a nutrient TMDL for Upper Silver River, Silver Springs Group, and Silver Springs in November 2012 (Chapter 62-304, Florida Administrative Code [F.A.C.]), and for the Rainbow Spring Group and Rainbow Spring Group Run in 2013 (**Table 1).** The TMDLs established the target of a long-term monthly average of 0.35 milligrams per liter (mg/L) of nitrate to be protective of the aquatic flora and fauna (Hicks and Holland 2012, Holland and Hicks 2013). The period of record for water quality data evaluated for the TMDL was January 1, 2000, through December 30, 2011, for Silver Spring waterbodies, and January 1, 2000, through December 30, 2010, for Rainbow Spring waterbodies.

Table 1. Restoration targets for TMDLs

Waterbody	Waterbody Identification Number (WBID)	Parameter	TMDL mg/L
Silver Springs	2772A	Nitrate as monthly average	0.35
Silver Springs Group	2772C	Nitrate as monthly average	0.35
Upper Silver River	2772E	Nitrate as monthly average	0.35
Rainbow Springs Group	1320A	Nitrate as monthly average	0.35
Rainbow Springs Group Run	1320B	Nitrate as monthly average	0.35

1.3 BMAP Requirements

Section 403.067(7), F.S., provides DEP the statutory authority for the BMAP Program. A BMAP is a comprehensive set of strategies to achieve the required pollutant load reductions. In addition to specifying BMAP statutory authority, the Florida Springs and Aquifer Protection Act (Part VIII of Chapter 373, F.S.) describes additional requirements for the 30 OFS.

1.4 BMAP Area

The Silver Springs and Upper Silver River BMAP area and the Rainbow Spring Group and Rainbow River BMAP area share a north-south boundary along I-75 (**Figure 1**). The northern portion of the Silver Springs and Upper Silver River BMAP area overlaps with the Orange Creek Basin. Water quality issues in the large lakes, Orange Creek, and connecting streams located in

the northern portion of the Silver Springs and Upper Silver River BMAP area are addressed by the Orange Creek BMAP. Lake Weir is located within the Silver Springs and Upper Silver River BMAP area, but this BMAP does not address the lake's water quality issues.

The Silver Springs and Upper Silver River BMAP area (989 square miles [mi^2]) includes Silver Springs, Silver Springs Group, and the Silver River, along with the groundwater contributing area for the springs. The waterbodies delineated as Silver Springs and Silver Springs Group are collectively referred to as Silver Springs in this document. The BMAP area is located mostly in central Marion County, with portions extending into Alachua, Putnam, Sumter, and Lake Counties, and encompasses all or portions of several municipalities including the City of Ocala, City of Belleview, City of Hawthorne, Town of McIntosh, City of Fruitland Park, Town of Lady Lake, City of Wildwood, and the Villages Community Development Districts (CDDs) (**Figure 2a**). **Table 2** lists the size and percentage of the BMAP area by county. The Ocala National Forest is located along the eastern border of the BMAP area.

Silver Springs is actually a group of springs, with as many as 30 named springs and numerous other unnamed groundwater discharges. WBID 2772A is the head spring, also referred to as Mammoth Springs, and the largest of the group. Water discharged from this spring appears to originate from two distinct locations: Mammoth East and Mammoth West. WBID 2772C consists of a short section of the Silver River called Silver Springs Group, ending a short distance downstream from the confluence with Half Mile Creek, containing numerous other springs contributing flow to the Silver River. Half Mile Creek is the only significant surface tributary to the impaired segments of Silver River. WBID 2772E is a 1.7-mile section of the Upper Silver River starting below the confluence of the Silver River with Half Mile Creek. Silver Springs and the Silver River are located in Silver Springs State Park.

The Rainbow Spring Group and Rainbow River BMAP area (679 mi^2) includes Rainbow Springs Group, Rainbow Springs Group Run, and the Rainbow River, along with the groundwater contributing area for the springs. The waterbodies delineated as Rainbow Springs Group and Rainbow Springs Group Run are collectively referred to as Rainbow Spring Group and Rainbow River in this document. The BMAP area is located mostly in western Marion County, with portions extending into Levy County (**Figure 2b** and **Table 2**). Major urban centers include western Ocala, Dunnellon, Williston, Bronson, and the On Top of the World CDD.

Rainbow Springs Group (WBID 1320A) encompasses 11 named springs within the Head Springs area, defined as the first 1.5 miles of the Rainbow River (SWFWMD 2011). It is located in Rainbow River State Park. Rainbow Spring Group Run (WBID 1320B), the next segment of the Rainbow River, includes additional named springs and inputs from Indian Creek and its springs. Most of the land surrounding Rainbow Springs Run is in private ownership and developed with residential housing. There are no significant surface tributaries to the remaining segments of the Rainbow River. Consequently, the surface watershed of the Rainbow Springs and River system is very limited.

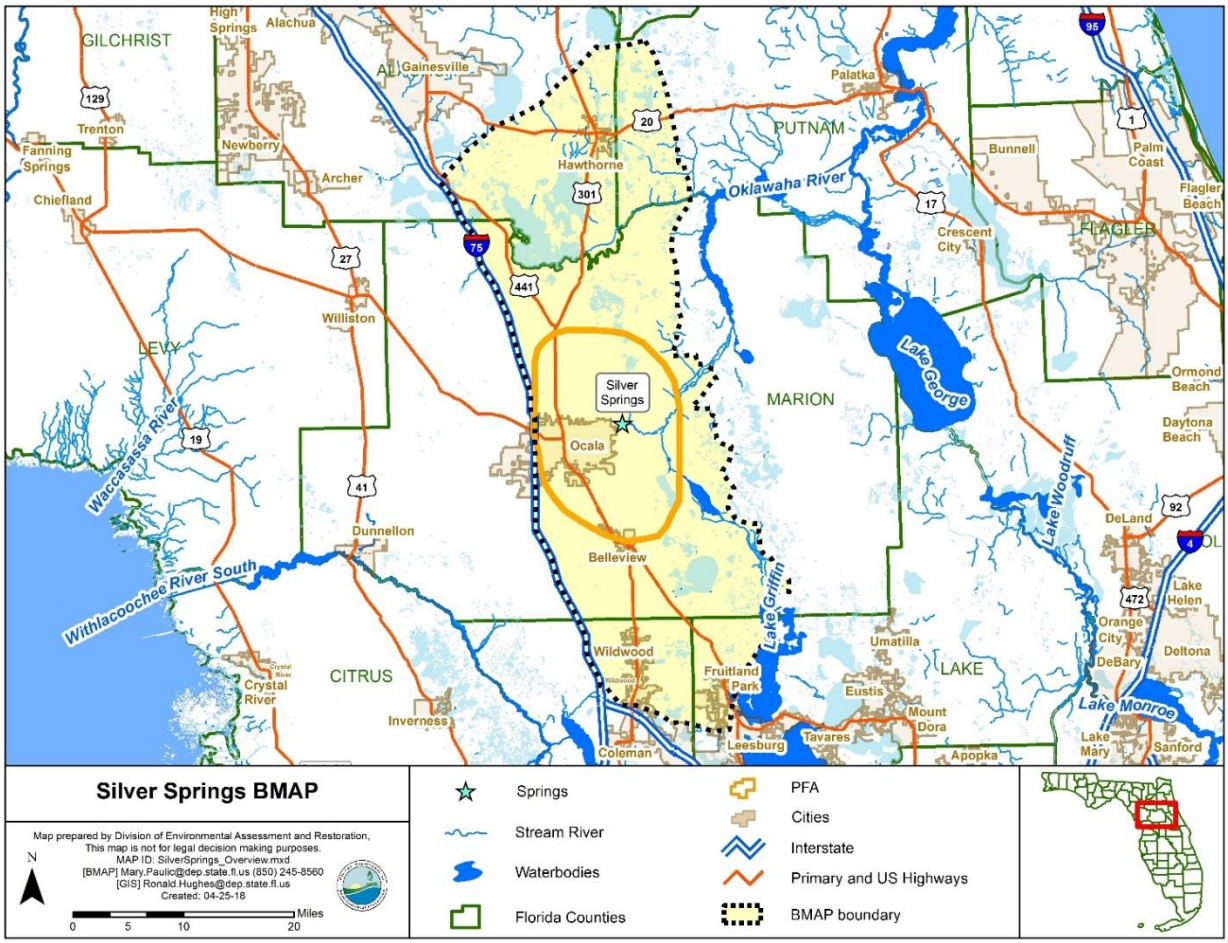

Figure 2a. Silver Springs and Upper Silver River BMAP area and priority focus area (PFA) boundary

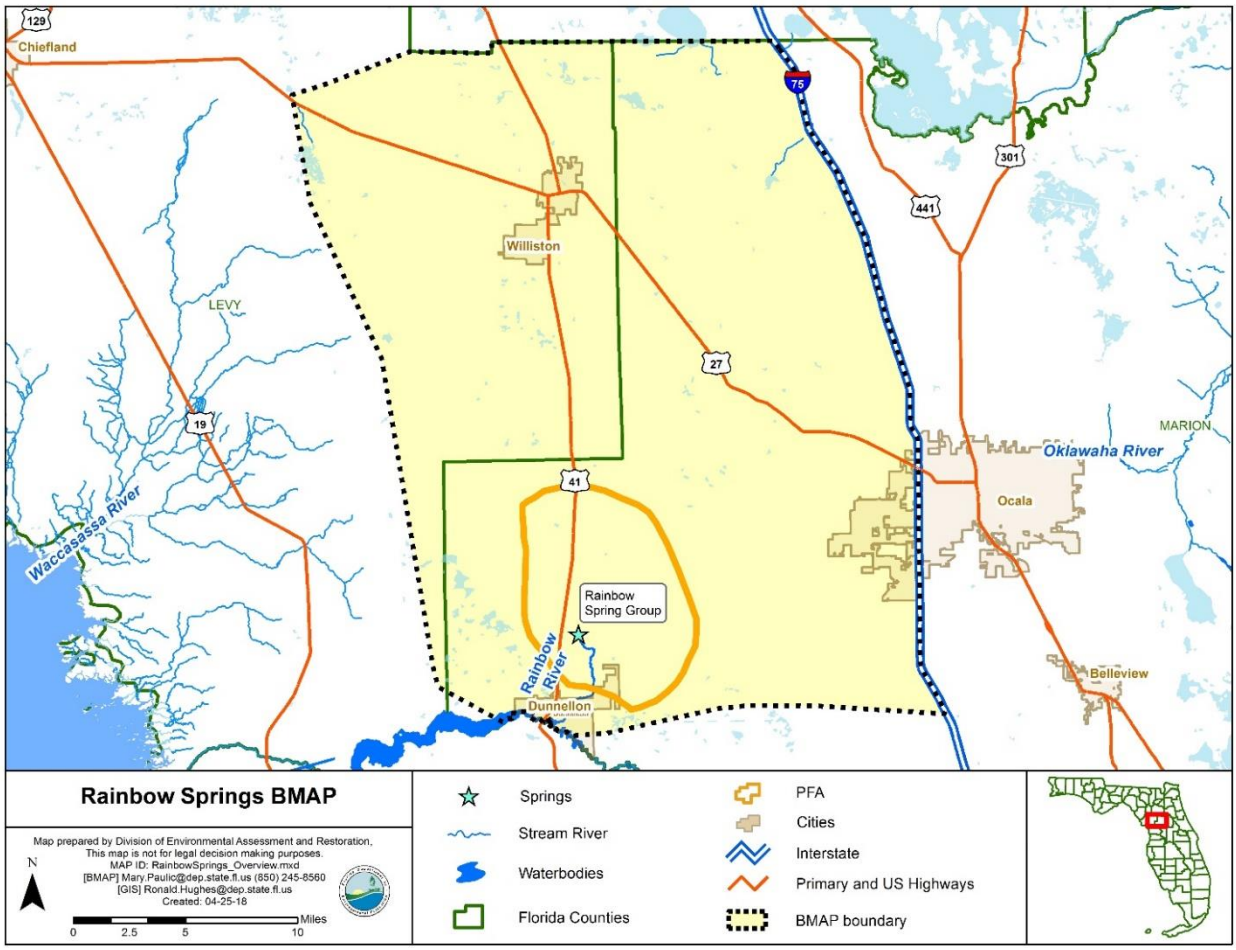

Figure 2b. Rainbow Spring Group and Rainbow River BMAP area and PFA boundary

Table 2. BMAP area by county

County	Silver Spring BMAP Area (mi^2)	Silver Spring BMAP Area % of Total Area	Rainbow Spring BMAP Area (mi^2)	Rainbow Spring BMAP Area % of Total Area
Marion	594	60.0	442	65
Alachua	194	19.6		
Putnam	76	7.7		
Sumter	75	7.6		
Lake	50	5.1		
Levy			237	35
Total	**989**	**100**	**679**	**100**

1.4.1 Silver Springs State Park

Silver Springs State Park was created on October 1, 2013, with the inclusion of 266 acres of the former Silver Springs Attraction–Nature's Theme Park into Silver River State Park. With the inclusion of this acreage into the park, all three impaired waterbodies—Upper Silver River, Silver Springs Group, and Silver Springs—are located in a state conservation area. In addition, the entire length of the Silver River is now contained within the park's boundary.

The park provides environmental benefits to both the Silver River and Silver Springs and local protection of the Upper Floridan Aquifer (UFA). Refurbishment and restoration activities completed in the park will add to that benefit. State parks are typically managed to minimize stormwater and wastewater impacts to natural resources. The Silver Springs State Park Acquisition and Restoration Council Draft Unit Management Plan Amendment outlines a 10-year plan of restoration and improvements in the park (DEP 2014). These efforts include projects to correct hydrology, reduce water consumption, reduce stormwater runoff, restore native vegetation, remove older buildings to increase the amount of pervious area, and improve the treatment and collection of wastewater.

Animals were removed from the attraction, including from Ross Island prior to its inclusion in the state park. As a result, the pumping of water from animal areas into the Fort King Waterway ceased, removing a direct nutrient discharge to the Silver River. The Fort King Waterway receives untreated stormwater runoff via a secondary ditch that drains the parking areas as well as floodplain areas. The construction of one water retention area adjacent to the Fort King Waterway to capture and treat stormwater runoff was completed in August 2014, and park management plans call for ditches to be blocked or filled. Paved parking areas are under evaluation for partial removal. The pumping of large volumes of water around the attraction property to irrigate lawns and landscaping as well as hydrate some areas has ceased. A portion of the irrigation water came from the Silver River.

The rehabilitation or replacement of the attraction area's wastewater collection system and four lift stations is completed. Silver Springs Attraction was connected to central sewer, but parts of the wastewater collection system were old and needed rehabilitation or replacement. Almost all

the facilities associated with Silver River State Park are now connected to central sewer. The sewering project included the installation of a force main on Sharps Ferry Road and a lift station. The lift station was installed to accommodate potential future connections to areas outside the park that are currently using onsite sewage treatment and disposal systems (OSTDS).

1.4.2 Hydrogeology

Groundwater flow in both BMAP areas originates from the karstic UFA. A surficial aquifer may overlie portions of the UFA, and in some places a confining unit may be present. The UFA is recharged from rainfall collected across the karst terrain.

Geology and hydrogeology influence the characteristics of Silver Springs and help explain many of the observed groundwater quality issues. Moving westward approximately from Silver Springs to the BMAP boundary, the Ocala Group, the geological formation containing the limestone rocks of the UFA, is close to the land surface and typically under unconfined or water table aquifer conditions. The proximity of the UFA to the land surface continues west across the Rainbow Spring Group and Rainbow River BMAP area.

Overburden is thicker to the east of Silver Springs moving towards the Ocklawaha River. As a result, the Floridan Aquifer lies deeper under the land surface. East of Silver Springs, the Ocala Group may be overlain by the Hawthorn Group, a phosphate-rich clay layer, which can act as an intermediate confining unit and may contain an intermediate aquifer. The UFA typically is confined where the Hawthorn Group is present. As a confining layer, the Hawthorn Group may retard the downward movement of water to the UFA.

Several conclusions were drawn from modeling results and dye tracer tests completed for Silver Springs (Boniol 2013, McGurk 2012). The movement of groundwater to the springs is a mix of conduit flow and matrix flow. However, comparing modeled results with dye tracer results, it was concluded that most of the groundwater movement in the two-year capture zone (closest to the spring) is probably by conduit flow. Conduit flow moves groundwater more quickly toward the spring than matrix flow; thus, distance from the spring is not a completely reliable indicator of the potential effect of a nitrate source on the spring's nitrate concentration.

Both Alachua and Marion Counties have prepared detailed aquifer vulnerability maps using local information (Marion County Aquifer Vulnerability Assessment [MCAVA] and Alachua County Aquifer Vulnerability Assessment). In Alachua County, the portion of the Silver Springs and Upper Silver River BMAP area, including Orange Lake, is classified as moderately vulnerable, while east of Orange Lake is classified as low vulnerability. In Marion County, the Silver Springs and Upper Silver River BMAP area west of Silver Springs and the western half of Lake Weir are a mix of the two highest vulnerability classes: most vulnerable and more vulnerable. East of Silver Springs is classified as less vulnerable to the south and vulnerable to the north of the springs. The Florida Aquifer Vulnerability Assessment (Arthur et al. 2005) is less detailed than MCAVA, but classifies the parts of Sumter County and Lake County in the BMAP area as more vulnerable.

The Rainbow Spring Group and Rainbow River BMAP area is classified by Marion County's MCAVA as either most vulnerable or more vulnerable. The most vulnerable area is in southwestern Marion County. The Florida Aquifer Vulnerability Assessment (Arthur et al. 2005) classifies the part of Levy County in the BMAP area as more vulnerable.

1.4.3 BMAP Boundary Delineation

The established BMAP boundaries reflect both the approximate extent of the 1,000-year groundwater capture area as modeled by SJRWMD and SWFWMD and potentiometric springshed delineations, but they are referenced to roads wherever possible to provide a readily recognizable boundary tied to a permanent feature on the land surface. Springshed delineations are estimated based on the UFA's potentiometric surface, which can vary significantly from year to year because of climatic conditions such as rainfall and seasonality, and the density of measuring wells. For these reasons, the BMAP areas do not coincide with any particular year's potentiometric surface, although variations in potentiometric surface were considered in its development.

The groundwater divide between Silver Springs and Rainbow Spring Group is not well defined, and therefore the western boundary of the Silver Springs and Upper Silver River BMAP area coincides with the eastern extent of the Rainbow Spring Group and Rainbow River BMAP area at I-75 in Marion County to ensure that the entire contributing areas are covered by an easily definable BMAP, while avoiding duplication of effort. I-75 is also the boundary separating the SJRWMD from the SWFWMD.

Different authors have defined the extent of the Silver Springs Springshed farther west of I-75 (Phelps 2004) or farther north to include Lake Santa Fe or farther south almost to Lake Harris (Boniol 2013). A part of the contributing area for the Rainbow Spring Group Springshed delineated by SWFWMD extends across the Silver Springs contributing area into Alachua County, and does not completely coincide with I-75 along its southeastern boundary (SWFWMD 2015, Jones 1996).

1.5 PFAs

In compliance with the Florida Springs and Aquifer Protection Act, this BMAP delineates PFAs for the Silver Springs and Upper Silver River BMAP area and Rainbow Spring Group and Rainbow River BMAP area. PFAs are defined as the areas of a basin where the Floridan Aquifer is generally most vulnerable to pollutant inputs and where there is a known connectivity between groundwater pathways and an OFS. The PFAs provide a guide for focusing restoration strategies where science suggests these efforts will most benefit the springs.

The PFAs are incorporated by reference into this BMAP. The PFAs delineated for Silver Springs and Rainbow Spring Group are based on Marion County's identified Primary Protection Zones and supported by local ordinance. Consistency in the enactment of policy was a factor in DEP's consideration of basing PFA boundaries on existing county ordinance.

Marion County's Spring Protection Resolution (05-R-106) was passed in 2005, and the county's Comprehensive Plan, Future Land Use Element, Objective 7.4, establishes the Springs Protection Overlay and identifies the extent of the primary and secondary zones, as well as design and development standards. Subsequent updates to the county Land Development Code incorporated these development standards. **Appendix C** includes additional documentation.

1.5.1 Description

The PFAs delineate the estimated modeled 10-year travel time to each spring system. Dye trace studies performed in the Silver Springs and Upper Silver River BMAP area confirm the movement of water to Silver Springs and Silver River in reasonably short times. The vulnerability of both PFAs is largely supported through the MCAVA.

Following BMAP adoption, DEP will ensure that the geographic information system (GIS) files associated with the PFA boundaries are available to the public on the DEP Map Direct webpage.

1.5.2 Additional Requirements

In accordance with Section 373.811, F.S., the following activities are prohibited in the PFAs:

- New domestic wastewater disposal facilities, including rapid infiltration basins (RIBs), with permitted capacities of 100,000 gallons per day (gpd) or more, except for those facilities that meet an advanced wastewater treatment (AWT) standard of no more than 3 mg/L total nitrogen (TN) on an annual permitted basis.

- New OSTDS on lots of less than one acre inside the PFAs unless additional nitrogen treatment is provided, as specified in the OSTDS remediation plan (see **Appendix D** for details).

- New facilities for the disposal of hazardous waste.

- The land application of Class A or Class B domestic wastewater biosolids not in accordance with a DEP-approved nutrient management plan establishing the rate at which all biosolids, soil amendments, and sources of nutrients at the land application site can be applied to the land for crop production, while minimizing the amount of pollutants and nutrients discharged to groundwater or waters of the state.

- New agricultural operations that do not implement best management practices (BMPs), measures necessary to achieve pollution reduction levels established by DEP, or groundwater monitoring plans approved by a WMD or DEP.

1.5.2.1 Biosolids and Septage Application Practices

In the PFAs, the aquifer contributing to the spring is highly vulnerable to contamination by nitrogen sources, and soils have a high to moderate tendency to leach applied nitrogen. DEP

previously documented elevated nitrate concentrations in groundwater beneath septage application zones in spring areas. To assure that nitrogen losses to groundwater are minimized from the permitted application of biosolids and septage in the PFAs, the following requirements apply to newly permitted application sites and existing application sites upon permit renewal.

All permitted biosolids application sites that are agricultural operations must be enrolled in the Florida Department of Agriculture and Consumer Services (FDACS) BMP Program or be located in an agricultural operation enrolled in the FDACS BMP Program for the applicable crop type. Implementation of applicable BMPs will be verified by FDACS in accordance with Chapter 5M-1, Florida Administrative Code (F.A.C.). Permitted biosolids application sites that are new agricultural operations must also comply with Subsection 373.811(5), F.S. Biosolids application sites must be certified as viable agricultural operations by an acknowledged agricultural professional such as an agricultural consultant or agricultural extension agent. Effective nutrient management practices must be ongoing at the application zones in the permit. Plant uptake and harvesting are vital components of the nutrient management plan to remove nitrogen and prevent it from leaching to groundwater. If DEP determines that the site is not a viable agricultural site implementing a nutrient management plan, corrective action will be required.

Groundwater monitoring for nitrate is required for all biosolids and septage land application sites in the PFAs to assure compliance with nutrient management objectives in this BMAP. However, groundwater monitoring is not required if the site nutrient management plan limits biosolids application rates of TN with no adjustment for available nitrogen normally allowed by Subsections 62-640.500(5) and (6), F.A.C. (e.g., for a recommended fertilizer rate of 160 pounds of nitrogen per acre, only 160 pounds of TN per acre shall be applied). For septage application, groundwater monitoring is not required if the site nutrient management plan limits application rates to 30,000 gallons per acre for sites accepting mixtures of septage and grease (food establishment sludge) or to 40,000 gallons per acre for sites accepting septage without grease. The permit renewal application will include a trend analysis for nitrate in groundwater monitoring wells during the previous permit cycle, and an evaluation of the potential for the facility to cause or contribute to exceedance of the TMDL.

1.6 Other Scientific and Historical Information

In preparing this BMAP, DEP collected and evaluated credible scientific information on the effect of nutrients, particularly forms of nitrogen, on springs and spring systems. **Table 3** lists research and modeling efforts that are completed or proposed.

1.6.1 SJRWMD Silver Springs Investigation

Beginning in 2012, SJRWMD focused district resources on development and coordination of the protection and restoration of major springs. This detailed investigation increased the scientific

understanding of spring systems, with one of the primary issues studied the reduction of nitrogen loads to springs. In addition, cost-share funds were made available to local stakeholders throughout the district to assist with projects that yield reductions in nitrogen loads. Wastewater treatment plant (WWTP) upgrades and reuse projects, included in the project tables, have received cost-share funding in the Silver Springs and Upper Silver River BMAP area.

The *Collaborative Research Initiative on Sustainability and Protection of Springs* (CRISPS) was a three-year collaborative study with the University of Florida (UF), primarily focused on the Silver Springs system (Reddy et al. 2017). Research efforts were carried out in both the springshed and springs ecosystem. More information about CRISPS is available at https://www.sjrwmd.com/waterways/springs/springs-science-investigation/.

Springshed research was focused on identifying the sources of nitrogen in the springshed and the fate and transport of nitrogen in the soils and aquifer. The main findings were that nitrate concentrations in soils reflected overlying land use; that within a few kilometers of the Silver Springs, much of the nitrate delivered to the springs is via flow through conduits in the limestone of the Floridan Aquifer system (FAS), and that denitrification in the aquifer has the potential to remove a fraction of the nitrate in groundwater before it reaches the springs group.

The springs ecosystem research efforts were focused on the headspring and Silver River and included studies of primary producer community structure and function, food web dynamics, hydrodynamics, and sediment composition. A major finding of these efforts was that ecosystem primary production does not appear to be nitrogen limited in high-nitrate springs such as the Silver River. These findings support the need for BMAP nitrogen load reductions to restore the primary producer community to a nitrogen-limited condition. Other findings showed that high concentrations of nitrate do not inhibit macrophyte growth or invertebrate grazing, that current velocity strongly influences epiphyte biomass on submerged macrophytes, and that algal abundance in the Silver River is not currently influenced by grazing.

Following the CRISPS' findings, SJRWMD is continuing to develop tools to better target nitrogen load reduction projects based on spatial patterns in groundwater nitrogen concentrations and sources of nitrogen. A spatial model to predict groundwater nitrogen vulnerability was developed using data from SJRWMD monitoring wells and DEP and Florida Department of Health (FDOH) public water systems (PWS) monitoring data (Canion et al. 2017). SJRWMD also plans to use the nutrient source markers evaluated in the CRISPS project to evaluate the relative contributions of nutrient sources to groundwater in different areas of the springshed.

Quantitative biological data were collected in Silver Spring and the Silver River at 3 locations as part of a broad, synoptic biological survey of 14 spring-run stream systems in north and central Florida conducted in 2015 under contract to the district. Quantitative measurements were made of submerged macrophytes (cover and dry weight per unit area), macroalgae (cover, dry weight, and ash-free dry weight per unit area), epiphytic algae (dry weight and ash-free dry weight per unit area), and the macroinvertebrate communities (taxa richness, density, diversity, feeding guild, and life habit) associated with macrophytes and algae. This effort was a supplement to the

CRISPS study, and the data are currently being compiled and analyzed. Over the next 2 years the district will issue technical reports on these data.

1.6.2 SWFWMD Rainbow Springs Initiatives

SWFWMD's Springs Management Plan (SWFWMD 2016, SWFWMD 2014) summarizes the vision, issues, and Surface Water Improvement and Management (SWIM) plan revisions that over the next five years will be implemented to manage and protect springs, including Rainbow Spring Group. The plan is focused on understanding natural variability while mitigating impacts caused by human activity where practical. Through strategic investments and partnerships, SWFWMD is implementing projects to conserve and restore the ecological balance of spring systems.

The plan provides a road map that is consistent with SWFWMD's Strategic Plan and builds on previous planning efforts for the Springs Coast, as well as more than 20 years of districtwide expertise in designing and implementing projects and monitoring activities. A living document with adaptive management at its core, the plan lays out a general restoration strategy, an overview of the goals and issues, and a list of proposed projects for the five-year period from 2015 to 2019.

In 2014, SWFWMD—together with local, regional, and state partners—formed the Springs Coast Steering Committee, whose first goal was to develop comprehensive conservation and management plans tailored to each of the five first magnitude spring systems in the district, beginning with Rainbow Spring Group. The Rainbow River SWIM Plan identifies the issues, solutions, and specific management actions for Rainbow Spring Group and Rainbow River, including water quality improvement projects to reduce nitrogen loading from sources identified in the BMAP. The plan can be accessed from the SWFWMD website at: http://www.swfwmd.state.fl.us/projects/swim/.

Phase 1 of a groundwater quality source evaluation for the Rainbow Spring Group was initiated in 2016 through the Rainbow River SWIM Plan (SWFWMD, 2015). This evaluation uses existing groundwater wells and water quality data to identify the most likely primary sources of nutrients. This type of evaluation can lead to strategies for cost effective improvement of the quantity and quality of the system.

The Rainbow River Algae and Sediment Assessment Project, started in 2014 by SWFWMD in collaboration with UF, investigates the relationships between water chemistry, river sediments, and aquatic plants. Aquatic plant communities in the river are changing with increases in various types of algae and the loss of more desirable submerged aquatic vegetation (SAV). The study focuses on the role of river sediments as a potential nutrient source. The Rainbow River and its immediate surroundings were mined for phosphate in the early part of the 20th century, and it is unknown if this early mining activity impacted the Rainbow River (SWFWMD 2018).

SWFWMD is expanding their groundwater monitoring network. The new sampling wells will provide additional water quality and water level elevation data that support assessment of groundwater quality and improve the delineation of Rainbow's springs contributing area.

1.6.3 Other Investigative and Modeling Efforts

Marion County prepares watershed management plans (WMPs) for surface water drainage basins in the county, several of which are located in the BMAP areas. The program is carried out in cooperation with SWFWMD in the Rainbow Spring Group and Rainbow River BMAP area. Detailed hydrologic and hydraulic models developed for the WMP identify floodplains and areas with diminished level of service because of road flooding. A detailed pollutant loading model is also produced to identify the locations of significant stormwater pollutant loading to surface waters and groundwater (i.e., via sinkholes, recharge in natural depressions, and retention ponds). The WMP identifies conceptual capital projects to address water quality and flooding level-of-service concerns. The WMP results may also be used in the land development review process.

The county completed a Floridan Aquifer vulnerability assessment in 2007 that is more detailed and locally specific than the state aquifer vulnerability maps. Maps generated from that effort are used to guide development actions and reduce impacts to groundwater. Alachua County completed a similar aquifer vulnerability mapping for the county in 2005. DEP worked with Florida State University (FSU) in 2006 to investigate the contribution of groundwater to Lochloosa Lake.

The City of Dunnellon completed the Dunnellon WMP, in cooperation with SWFWMD, in 2004. The plan identified floodplain areas in the city and also stormwater outfalls where discharge to the Rainbow and Withlacoochee Rivers was a water quality concern.

1.6.4 Additional Source Identification Effort

Additional actions that reduce nitrogen loading to the UFA could be identified through modeling and data analysis tools that can identity "hot spots," or groundwater locations with consistently high nitrate concentrations and help identify reasons for the high concentration of nitrate. These areas may need prioritization for policy implementation, or additional policy implementation or adjustment, or simply the remediation of identified sources. Groundwater monitoring networks as well as targeted data collected for public drinking water supplies provide valuable data for assessing the concentration of nitrate in the Floridan Aquifer. This effort builds upon the spatial vulnerability modeling, source marker evaluation, and data collection already underway by water management districts, other state agencies, and local governments. The effort will be initiated early during the implementation of the BMAP starting with defining appropriate analytical protocols.

Table 3. Investigative and modeling efforts

Project Title	BMAP Area	Lead Entity and Partners	Project Description	Start Date	Status	Completion Date
Marion County WMP	Silver Springs and Rainbow Spring Group	Marion County Office of the County Engineer and SWFWMD	WMPs will be completed countywide and used to identify and address Marion County water quality issues. They will include creation and maintenance of comprehensive geodatabase for Marion County storm sewer system data, watershed boundaries, and hydrologic features countywide.	2003	Ongoing	Ongoing
MCAVA	Silver Springs and Rainbow Spring Group	Marion County Office of the County Engineer	Project to identify vulnerable areas of aquifer provides scientifically defensible water resource management and protection tool that will facilitate planning of human activities to help minimize adverse impacts on groundwater quality. Aquifer vulnerability maps are displayed in classes of relative vulnerability (i.e., one area is more vulnerable than another). Maps benefit local government, planners, and developers in guiding growth into more appropriate areas (e.g., away from groundwater recharge areas) and improve site selection for expanding existing or establishing new wellfields. Prepared by Baker et al. 2007 at Advanced Geospatial Inc	2007	Completed	2007
Groundwater-Surface Water Interaction Study, Lake Lochloosa Area, Alachua and Marion Counties	Silver Springs	DEP and FSU,	Study of Lake Lochloosa and Orange Lake Watersheds examined groundwater pathways through which nutrients enter these lakes. Field investigations were carried out to determine levels of TP and TN in different aquifers associated with land use categories. Radon studies were performed to estimate groundwater seepage into Lake Lochloosa.	2006	Completed	2008
SJRWMD Springs Protection and CRISPS	Silver Springs	SJRWMD and UF	SJRWMD recognized Springs Protection as a strategic priority and acknowledged that effective management of springs requires understanding of relative influences and manageabilities of numerous natural and anthropogenic forces that affect their ecological health, and that additional interdisciplinary research is needed to achieve this goal. CRISPs included three major components of projects, regulation, and science. CRISPS Workgroups were established: Springshed Supergroup (Surface Water, Groundwater, and Nitrogen	2013	Completed	2017

Project Title	BMAP Area	Lead Entity and Partners	Project Description	Start Date	Status	Completion Date
			Biogeochemistry) and Springs Ecosystem Supergroup (Hydrology and Hydrodynamics, Biology, and Physicochemistry). District contracted with UF Water Institute for support for this integrated work. SJRWMD continues to develop tools to better target nitrogen load reduction projects based on spatial patterns in groundwater nitrogen concentrations and sources of nitrogen. Spatial models to predict groundwater nitrogen vulnerability were developed using data from SJRWMD monitoring wells and DEP and FDOH public water supply monitoring data (Canion et al. 2017). SJRWMD is using nutrient source markers evaluated in the CRISPS project to evaluate relative contributions of nutrient sources to groundwater in different areas of the springshed. Findings and results of the CRISP study and follow-up studies are expected to support future BMAP activities.			
Alachua County Aquifer Vulnerability Assessment	Silver Springs	Alachua County Environmental Protection Department (ACEPD)	Groundwater management and protection tool displays aquifer vulnerability in classes of relative vulnerability. Maps benefit local government, planners, and developers in guiding growth into more appropriate areas. Incorporated into local planning and management documents. Prepared by Prepared by Baker et al 2005 at the Florida Geological Survey (FGS). http://www.alachuacounty.us/Depts/epd/WaterResources/GroundwaterAndSprings/Reports%20and%20Maps%20Documents/Alachua_County_Aquifer_Vulnerability_Assessment.pdf	2004	Completed	2005
Dunnellon WMP	Rainbow Spring Group	City of Dunnellon, Marion County, and SWFWMD	Dunnellon WMP developed hydrologic and hydraulic model and water quality treatment recommendations for nine stormwater discharge outfalls to Rainbow and Withlacoochee Rivers.	2004	Completed	2004
2015–19 Springs Management Plan	Rainbow Spring Group	SWFWMD	Springs Management Plan summarizes vision, issues, and solutions that district will address over next five years to manage and protect springs. Through strategic investments and partnerships, district is implementing projects to conserve and restore ecological balance of spring systems, thus supporting regional economies and	2014	Completed	2016

Project Title	BMAP Area	Lead Entity and Partners	Project Description	Start Date	Status	Completion Date
			quality of life. Plan lays out general restoration strategy, overview of goals and issues, and list of proposed projects.			
Rainbow River SWIM Plan	Rainbow Spring Group	SWFWMD	Rainbow River is designated as priority SWIM waterbody. Water quality and natural resource protection initiative. Focus is on water quality and habitat restoration. Phase 1 of a groundwater quality source evaluation for the Rainbow Spring Group was initiated in 2016.	2015	Completed	2016
Expanded Groundwater Well Sampling Network	Rainbow Spring Group	SWFWMD	Expansion of groundwater monitoring wells locations. Additional water quality and water level elevation data can be collected that support assessment of groundwater quality and improve the delineation of Rainbow's springs contributing area.	2017	Ongoing	Ongoing

1.7 Stakeholder Involvement

Stakeholder involvement is critical to develop, gain support for, and secure commitments in a BMAP. The BMAP process engages stakeholders and promotes coordination and collaboration to address the pollutant load reductions necessary to achieve the TMDLs. DEP invites stakeholders to participate in the BMAP development process and encourages public participation and consensus to the greatest practicable extent. **Table A-1** lists the stakeholders who participated in the development of this BMAP.

During the development of the Silver Spring and Upper Silver River and Rainbow Spring and Rainbow River BMAP, DEP held a series of meetings involving stakeholders and the general public. The purpose of these meetings was to consult with stakeholders to gather information, evaluate the best available science, develop an OSTDS remediation plan (including a public education plan), define management strategies and milestones, and establish monitoring requirements. All of the meetings were open to the public and noticed in the *Florida Administrative Register* (F.A.R.). An OSTDS Advisory Committee was formed in 2016 specifically to assist with development and review of an OSTDS remediation plan. All of the meetings held by that committee were open to the public and noticed in the F.A.R. Local governments or organizations participating on that committee are listed in Table A-1. Additionally, a public meeting on this BMAP was held on May 24, 2018 and was noticed in F.A.R. and in local newspapers.

Upon BMAP adoption, DEP intends to facilitate annual meetings with stakeholders to review progress towards achieving the TMDLs.

1.8 Description of BMPs Adopted by Rule

Table 4 lists the adopted BMPs and BMP manuals relevant to this BMAP.

Table 4. BMPs and BMP manuals adopted by rule as of June 2017

Agency	F.A.C. Chapter	Chapter Title
FDACS Office of Agricultural Water Policy (OAWP)	5M-6	Florida Container Nursery BMP Guide
FDACS OAWP	5M-8	BMPs for Florida Vegetable and Agronomic Crops
FDACS OAWP	5M-9	BMPs for Florida Sod
FDACS OAWP	5M-11	BMPs for Florida Cow/Calf Operations
FDACS OAWP	5M-12	Conservation Plans for Specified Agricultural Operations
FDACS OAWP	5M-13	BMPs for Florida Specialty Fruit and Nut Crop Operations
FDACS OAWP	5M-14	BMPs for Florida Equine Operations
FDACS OAWP	5M-16	BMPs for Florida Citrus
FDACS OAWP	5M-17	BMPs for Florida Dairies
FDACS OAWP	5M-18	Florida Agriculture Wildlife BMPs
FDACS OAWP	5M-19	BMPs for Florida Poultry
FDACS Division of Agricultural Environmental Services	5E-1	Fertilizer
FDACS Division of Aquaculture	5L-3	Aquaculture BMPs
FDACS Florida Forest Service	5I-6	BMPs for Silviculture
FDACS Florida Forest Service	5I-8	Florida Forestry Wildlife BMPs for State Imperiled Species
DEP	62-330	Environmental Resource Permitting

Section 2: Implementation to Achieve the TMDLs

2.1 Allocation of Pollutant Loads

DEP collected and evaluated credible scientific information on the effect of nutrients, particularly forms of nitrogen, on Silver Spring and the Upper Silver River and Rainbow Spring and the Rainbow River, described below.

2.1.1 Nutrients in the Springs and Spring Systems

DEP developed the Nitrogen Source Inventory Loading Tool (NSILT) to provide information on the major sources of nitrogen in the groundwater contributing area and spring contributing area for each OFS. In addition, the tool is used to estimate nitrogen loads to groundwater from these sources in the spring contributing area. The NSILT is a GIS and spreadsheet-based tool that provides spatial estimates of the relative contribution of nitrogen from major nitrogen sources and accounts for the transport pathways and processes affecting the various forms of nitrogen as they move from the land surface through the soil and geologic strata.

The first major factor to consider in estimating the loading to groundwater using the NSILT is the attenuation of nitrogen as it moves from its source through the environment, before it reaches the UFA. The movement of nitrogen from the land surface to groundwater is controlled by biological and chemical processes that occur as part of the nitrogen cycle, as well as hydrogeological processes. Many of these processes attenuate (impede or remove) the amount of nitrogen transported to groundwater. An understanding of how water moves through the subsurface and the processes that transform the different forms of nitrogen is essential for estimating nitrogen loading to groundwater from various sources.

A second major factor to consider is the geologic features in the contributing area and the related "recharge rate." Water movement between the shallow groundwater (surficial aquifer, where present) and the deeper aquifer (UFA) can be slowed by a low-permeability layer of clay, silt, and fine sand that retards the vertical movement of infiltrating water from the surface. The presence of the Hawthorne Group in the Silver Springs and Upper Silver River BMAP area provides such an aquitard layer. The UFA occurs in limestone that can be prone to dissolving, and, over geologic time, numerous karst features (sinkholes, caves, and conduits) occur. These features allow water from the land surface to move directly and relatively rapidly into the aquifer and in some areas for groundwater in the aquifer to move rapidly to the springs.

Potential recharge rates from the surface to the UFA are affected by variations in the geologic materials and the presence of karst features. DEP used SJRWMD data for the Silver Springs and Upper Silver River BMAP area and U.S. Geological Survey (USGS) data for the Rainbow Spring BMAP area, estimated the recharge rate ranges, and grouped them into three rate categories, which were applied in the respective NSILT:

Silver Springs and Upper Silver River BMAP area:

- Low recharge (Less than 4 inches per year [in/yr]).
- Medium recharge (4 to 12 in/yr).
- High recharge (greater than 12 in/yr).

Rainbow Spring Group and Rainbow River BMAP area:

- Low recharge (Less than 4 in/yr).
- Medium recharge (4 to 10 in/yr).
- High recharge (greater than 10 in/yr).

In addition to the low-, medium-, and high-recharge categories for Silver Springs, there are areas located near Lochloosa Lake and Marshall Swamp where water is discharged from the UFA. Discharge areas were not included in the NSILT. There are no low-recharge areas in the Rainbow Spring Group and Rainbow River BMAP area.

In the NSILT analysis, DEP applied different attenuation factors to different types of sources so that various biological, chemical, and hydrogeological effects could be estimated. The attenuation that was applied means that the amount of nitrogen leaving a source (such as a livestock operation or a newly fertilized yard) reduces the amount of nitrogen predicted to reach the aquifer. In the NSILT estimates, the attenuation rates ranged from 90 % (for atmospheric deposition) to 25 % (for wastewater disposal in a RIB). This means that, for these examples, only 10 % of nitrogen from atmospheric deposition is expected to reach the aquifer, while 75 % of nitrogen from a RIB is expected to reach groundwater, respectively, because the remainder is attenuated by various chemical and biological processes.

Phosphorus is naturally abundant in the geologic material underlying much of Florida and is often present in high concentrations in surface water and groundwater. The monitoring and evaluation of phosphorus and its influences on the springs continue as the nitrate TMDLs are implemented.

2.1.2 Estimated Nitrogen Loads

Table 5a lists the estimated nitrogen loads to groundwater by source for the Silver Springs and Upper Silver River BMAP area, and **Table 5b** provides the same information for the Rainbow Spring Group and Rainbow River BMAP area. Note that urban stormwater loads are included in UTF estimates, while agricultural stormwater loads are included in FF and LW estimates. Nitrogen loading to surface water will be reduced through the activities and strategies for the sources identified in this chapter for groundwater loading.

Table 5a. Estimated nitrogen load to groundwater by source in the Silver Springs and Upper Silver River BMAP area

lb-N/yr = pounds of nitrogen per year

Nitrogen Source	Total Nitrogen Load to Groundwater (lb-N/yr)	% Contribution
OSTDS	482,215	29
UTF	169,488	10
Atmospheric Deposition	170,690	10
FF	119,120	7
STF	175,240	10
LW	469,486	29
WWTF	42,643	2
WWTF Reuse	29,574	2
Drainage Wells	26,194	1
Total	**1,684,649**	**100**

Table 5b. Estimated nitrogen load to groundwater by source in the Rainbow Spring Group and Rainbow River BMAP area

lb-N/yr = pounds of nitrogen per year

Nitrogen Source	Total Nitrogen Load to Groundwater (lb-N/yr)	% Contribution
OSTDS	305,873	20
UTF	141,267	9
Atmospheric Deposition	174,027	11
FF	190,092	12
STF	56,620	4
LW	650,235	42
WWTF	23,102	2
Total	**1,541,216**	**100**

2.1.3 Assumptions and Considerations

The NSILT estimates are based on the following assumptions and considerations:

- **NSILT Nitrogen Inputs** – The methods used to estimate nitrogen inputs for each pollutant source were based on a detailed synthesis of information, including direct water quality measurements, U.S. Census Bureau data, surveys, WWTF permits, published scientific studies and reports, and information obtained in meetings with agricultural producers. For some pollutant source categories, nitrogen inputs were obtained using assumptions and extrapolations and, as a

result, these inputs could be subject to further refinement if more detailed information becomes available.

- **OSTDS Load Contribution** – A per capita contribution to an OSTDS of 9.012 pounds of nitrogen per year (lb-N/yr) was used to calculate the loading from OSTDS. The average household contribution was estimated based on 2010 Census data on the average number of people per household by county (2.45 for Lake County, 2.41 for Marion County, 2.46 for Alachua County, 2.26 for Sumter County, 2.53 for Putnam County, and 2.49 for Levy County).

- **Nitrogen Attenuation Factors** – To estimate the amount of nitrogen loading to the aquifer, DEP applied two nitrogen attenuation factors. Biological and chemical processes that occur as part of the nitrogen cycle, as well as hydrogeological processes, control the movement of nitrogen from the land surface to groundwater. Biochemical attenuation accounts for biochemical processes that convert or transform the different forms of nitrogen, while hydrogeological attenuation accounts for spatial variations that affect the rate of water infiltrating through geological media to recharge the UFA. Given the relatively large range of literature-reported values of biochemical nitrogen attenuation for each source category, DEP used an average biochemical attenuation factor for each source based on land use practices and hydrogeological (i.e., recharge) conditions in the contributing areas.

Other assumptions and considerations for BMAP implementation include the following:

- **Unquantified Project Benefits** – Nitrogen reductions for some of the projects and activities listed in this BMAP cannot currently be quantified. However, because of their positive impact, it is assumed that these actions will help reduce pollutant loads, and estimated loading reductions may be determined later and assigned to these activities.

- **Atmospheric Deposition** – Atmospheric sources of nitrogen are local, national, and international. Generally, they contain low nitrogen concentrations compared with other sources and are further diminished through additional biological and chemical processes before reaching groundwater. Atmospheric deposition sources and trends will be reevaluated periodically.

- **OSTDS Inventory and Loading Calculations** – The total number of OSTDS in the basin is estimated based on local information and FDOH data. Future BMAPs and the associated OSTDS loading calculations may be adjusted based on improved data on the number, location, and type (conventional and enhanced nitrogen reducing) of existing septic systems, and may include additional OSTDS installed since BMAP adoption.

- **PFAs** – The PFAs provide a guide for focusing strategies where science suggests efforts will most benefit the springs. The PFA boundaries may be adjusted in the future or secondary PFA zones established if additional relevant information becomes available.

- **Project Collection Period –** The BMAP project collection period is limited to projects after a certain date, based on the data used to calculate the reductions needed. Reductions from older projects are already accounted for in the baseline loading. Projects completed afterwards in the respective BMAP areas were considered for inclusion in this BMAP.

- **Legacy Sources** – Land uses or management practices not currently active in the basin may still be affecting the nitrate concentration of the springs. The movement of water from the land surface through the soil column to the UFA and through the UFA to the spring system varies both spatially and temporally and is influenced by local soil and aquifer conditions. As a result, there may be a delay between when a nitrogen input to the UFA occurs and when that load ultimately arrives at an OFS. The impact of this delay is not fully known.

- **Implementation Schedule** – BMAP implementation is a 20-year process. This plan defines nitrogen reduction milestones for 5-year (30 %), 10-year (40 %), and 15-year (30 %) implementation, so that the TMDL will be met no later than the 20-year goal (see **Section 2.1.6** for additional details). Further, the total reductions and project credits may be adjusted under the adaptive management approach used for the BMAP. This approach requires regular follow-up to ensure that management strategies are carried out and that their incremental effects are assessed. This process acknowledges that there is some uncertainty associated with the outcomes of proposed management strategies and the estimated response in nitrogen concentrations at the springs. As more information is gathered and progress towards each 5-year milestone is reviewed, additional management strategies to achieve the TMDLs will be developed or existing strategies refined to better address the sources of nitrogen loading.

- **Changes in Spring Flows** – The role of this BMAP is specifically to promote the implementation of projects that reduce the nitrogen load to groundwater, while the minimum flows and levels (MFLs) established for each spring system address water flows and levels. To maximize the results of the two programs, spring protection projects should provide both water quality and quantity benefits.

2.1.4 Loading by Source

Based on the NSILT estimates, the pie charts in **Figures 3a** and **3b** depict the percentage of nitrogen loading to groundwater by source in the respective BMAP area. Stormwater loading to groundwater is incorporated into UTF and STF, but overall contributes 20 % of the loading to

the UFA in the Silver Springs and Upper Silver River BMAP area and 13 % of the loading to the UFA in the Rainbow Spring Group and Rainbow River BMAP area. Septic systems contribute 29 % of the loading to the UFA in the Silver Springs and Upper Silver River BMAP area and 20 % of the loading to the UFA in the Rainbow Spring Group and Rainbow River BMAP area. The combined agricultural categories of LW, FF, and miscellaneous livestock contribute 36 % of the loading to the UFA in the Silver Springs and Upper Silver River BMAP area and 56 % of the loading to the UFA in the Rainbow Spring Group and Rainbow River BMAP area.

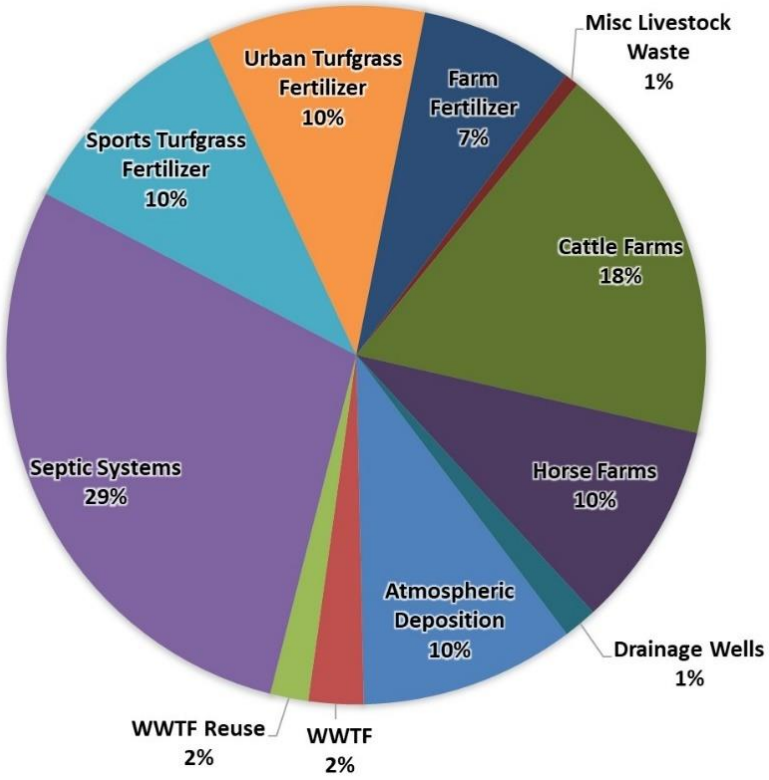

Figure 3a. Loading to groundwater by source in the Silver Springs and Upper Silver River BMAP area

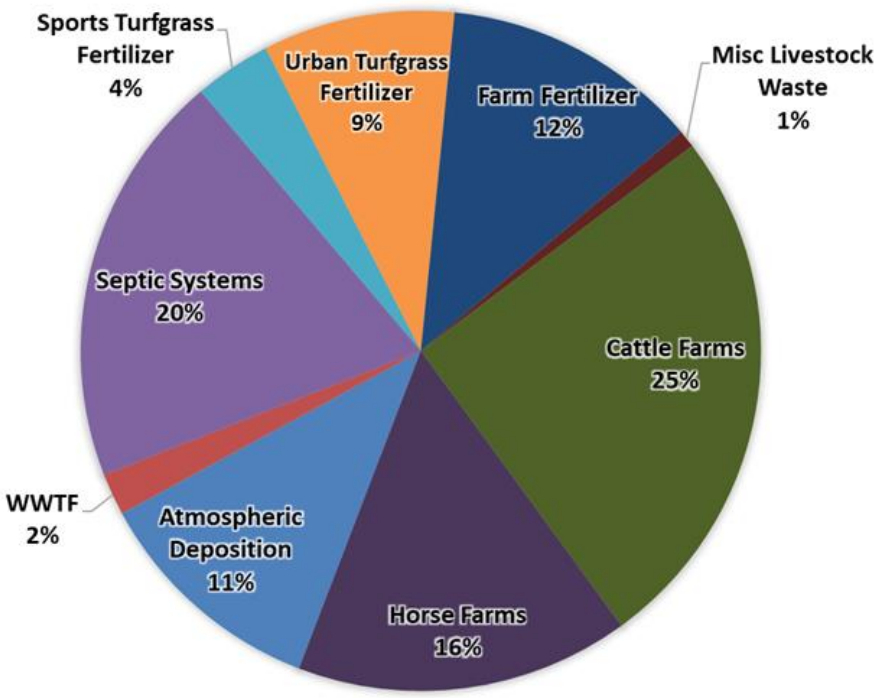

Figure 3b. Loading to groundwater by source in the Rainbow Spring Group and Rainbow River BMAP area

2.1.5 Loading Allocation

The nitrogen source reductions are based on the measured nitrate concentrations and flows for the Upper Silver River (composite of data for Silver Springs Group) and the Upper Rainbow River (composite of data for Rainbow Spring Group Run), along with the TMDL target nitrate concentration. Upper river segments were selected to provide a basis for loading because a large number of individual spring vent discharges contribute flow and loading to the Silver and Rainbow Rivers, resulting in nutrient impairments of these segments, and ensuring they would be predominantly composed of groundwater.

Table 6a and Table 6b list the measured nitrate (as nitrogen) loads compared with the TMDL loading based on a target nitrate concentration of 0.35 mg/L. The difference between the river loading and the TMDL loading estimate is the required reduction to meet the TMDL. The total load reduction required in each basin is being allocated to the entire basin and actions defined by the BMAP to reduce loading to the aquifer are needed to implement this allocated load.

Table 6a lists the measured nitrate (as nitrogen) load compared with the TMDL loading as well as the required reductions for Silver Springs and the Upper Silver River based on flow and nitrate concentration data for 2005 to 2016.

Table 6a. Total reduction required to meet the TMDLs for Silver Springs and Upper Silver River

Description	Nitrogen Loads (lb-N/yr)	Notes Regarding Data Used
Total Load for Upper Silver River	1,298,498	Upper 95 % confidence interval—nitrate data and average annual flow data from 2005 to 2016 (535.6 cubic feet per second [cfs])
TMDL Load	368,363	TMDL target is 0.35 mg/L at spring vents using the same average annual flow data from 2005 to 2016
Required Reduction	**930,135**	

Table 6b lists the measured nitrate (as nitrogen) load for Upper Rainbow River compared with the TMDL loading based on a target nitrate concentration of 0.35 mg/L. Nitrate levels in the Upper Rainbow River and Rainbow Spring Group are increasing. Thus, the most recent 5 years of nitrate concentration data were used for loading calculations. Average annual flow data for the last 5 years were 3.5 cfs higher than in the 2005–16 period, but was not used for loading calculation. The total loading calculated for the Upper Rainbow River is substantially larger than what was estimated using the NSILT methodologies. There are several possible explanations for this difference, as follows:

- Legacy loads already in groundwater have moved through the system to be discharged at the springs.
- Rainbow Spring Group is discharging water that may be originating in DEP's defined Silver Springs and Upper Silver River BMAP area.
- There is an unidentified source of loading not accounted for in the NSILT analysis.
- Hydrogeological changes have occurred that move water more quickly to the springs potentially reducing the attenuation of sources.

Table 6b. Total reduction required to meet the TMDLs for Rainbow Spring Group and Rainbow River

Description	Nitrogen Loads (lb-N/yr)	Notes Regarding Data Used
Total Load for Upper Rainbow River	2,198,348	Upper 95 % confidence interval – nitrate data from 2012 to 2016 and average annual flow data from 2005 to 2016 (601.9 cfs)
TMDL Load	414,741	TMDL target is 0.35 mg/L at spring vents using the same average annual flow data from 2005 to 2016
Required Reduction	**1,783,607**	

2.1.6 Description of 5-, 10-, and 15-Year Milestones/Reduction Schedule

The overall load reduction targets are 30 % of the total within 5 years, 70 % of the total within 10 years, and 100 % of the total within 15 years. DEP will evaluate progress towards these milestones and will report to the Governor and Florida Legislature. DEP will adjust management strategies that reduce loading to the aquifer to ensure the target concentrations are achieved. This may include expanding the area to which the OSTDS remediation policies apply, additional policy implementation or adjustment, or development of better or new BMPs that better address nitrogen sources. Any such change, however, would be incorporated into an updated BMAP through a formal adoption process.

Table 7 lists the estimated nitrogen reduction schedule by milestone. Progress will be tracked yearly, and adjustments made as needed. At the 5-year milestone, progress will be assessed, and load reductions adjusted as necessary. Entities have flexibility in the types and locations of projects as long as they achieve the overall required load reductions. The monitoring of existing groundwater and springs sampling locations is essential. **Section 2.2** describes detailed source reduction strategies.

Table 7. Nitrogen reduction schedule (lb-N/yr)

Spring BMAP Area	5-Year Milestone (30 % of Total)	10-Year Milestone (40 % of Total)	15-Year Milestone (30 % of Total)	Total Nitrogen Reduction (100 %)
Silver Springs and Upper Silver River	279,041	372,054	279,040	930,135
Rainbow Spring Group and Rainbow River	535,082	713,443	535,082	1,783,607

2.2 Prioritization of Management Strategies

The management strategies listed in **Appendix B** and **Appendix D** are ranked with a priority of high, medium, or low. In 2016, the Legislature amended the Florida Watershed Restoration Act (FWRA) (Section 403.067, F.S.), creating additional requirements for all new or revised BMAPs. BMAPs must now include planning-level details for each listed project, along with its priority ranking.

Project status was selected as the most appropriate indicator of a project's priority ranking based primarily on need for funding. Projects with a "completed" status were assigned a low priority. Projects classified as "underway" were assigned a medium priority because some resources have been allocated to these projects but additional assistance may be needed for the project to be completed. High priority was assigned to projects listed as "planned" as well as certain "completed" projects that are ongoing each year (any project with one of these project types: "street sweeping," "catch basin inserts/inlet filter cleanout," "public education efforts," "fertilizer cessation," "fertilizer reduction," or "aquatic vegetation harvesting"), and select projects that are elevated because substantial, subsequent project(s) are reliant on their completion.

Projects with the prefix S apply to the Silver Springs and Upper Silver River BMAP area. Projects with the prefix R apply to the Rainbow Spring Group and Rainbow River BMAP area. The prefix B means that the project is either located in the area where the two springsheds interact and its benefits are applicable to both BMAP areas, or the policy applies to both springsheds. Loading reductions assigned to projects included adjustments for source attenuation and recharge factors.

2.3 Load Reduction Strategy

A precise total load reduction to groundwater needed to meet the TMDLs is unknown and dependent on a number of complex factors. Ultimately there must be a combined reduction at the spring vents of at least 930,135 lb-N/yr for Silver Springs and Upper Silver River and at least 1,783,607 lb-N/yr for Rainbow Spring Group and Rainbow River. Based on the totals of all the credits from BMAP actions and policies, the range of total reductions to groundwater for Silver Springs and Upper Silver River is 499,475 to 691,719 lb-N/yr (see **Table 8a**). Based on the totals of all the credits from BMAP actions and policies, the range of total reductions to groundwater for Rainbow Spring Group and Rainbow River is 340,689 to 508,644 lb-N/yr (see **Table 8b**). However, due to the proximity of these reductions to the spring and the uncertainties of fate and transport in the karst geology, additional actions may be necessary to ensure that the loading at the spring vents is achieved within the timeline of the BMAP

To achieve reductions outside the scope of the policies listed, additional project options are available to local entities and agriculture within both BMAP areas, but have not been planned. Other efforts could be pursued to further reduce the nitrogen load to groundwater in the Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP areas, such as locating and remediating sources that are providing high loading through more detailed refinement of source location.

Table 8a. Summary of potential credits for the Silver Springs and Upper Silver River BMAP area to meet the TMDLs

Note: No reductions are estimated for atmospheric deposition sources.

Nitrogen Source	Credits to Load to Groundwater (lb-N/yr)	Description
OSTDS	313,865 – 458,461	Credits are based on all lot sizes in the BMAP area being remediated by either enhancing OSTDS or connecting to sewer. A credit of 8,477 lb-N/yr is provided for OSTDS remediation projects. Completion of proposed projects that connect existing OSTDS to central sewer would add to reductions.
UTF	17,236	DEP approved credits (6 %) for public education activities as well as credits identified for stakeholder stormwater projects.
STF	16,880	6 % BMP credit for sports fields and 10 % BMP credit for golf courses on STF load to groundwater, assuming 100 % BMP implementation on golf courses and sports fields.
FF	17,868	15 % BMP credit on FF load to groundwater, assuming 100 % owner-implemented and verified BMPs on all fertilized lands.
FF Projects	27,099	Implemented cost share projects.
LW	46,949	10 % BMP credit on load to groundwater, assuming 100 % owner-implemented and verified BMPs at all livestock facilities.
WWTF/WWTF Reuse	46,345	Achieved by basinwide BMAP WWTF policy (3, 6, or 10 mg/L).
Drainage Wells	1,322	Treatment of stormwater before discharge or removal of well.
Total Credits from BMAP Policies and Submitted Projects	**487,563 – 632,159**	**Implement additional source identification activities and pursue additional practices over the next 20 years, contingent on funding.**
Advanced Agricultural Practices and Procedures	11,912 – 59,560	Includes 10 % to 50 % reduction from 100 % of fertilized acres with a change in practice.
Total Credits	**499,475 – 691,719**	**Load reduction to meet the TMDL at the spring vents is 930,135 lb-N/yr.**

Table 8b. Summary of potential credits for the Rainbow Spring Group and Rainbow River BMAP area to meet the TMDLs

Note: No reductions are estimated for atmospheric deposition sources.

Nitrogen Source	Credits to Load to Groundwater (lb-N/yr)	Description
OSTDS	199,154 – 291,071	Credits are based on lots of all sizes being remediated by either enhancing OSTDS or connecting to sewer. A credit of 8,503lb-N/yr is provided for OSTDS remediation projects. Completion of proposed projects that connect existing OSTDS to central sewer would add to reductions.
UTF	12,108	DEP approved credits (6 %) for public education activities as well as credits identified for stakeholder stormwater projects.
STF	5,610	6 % BMP credit for sports fields and 10 % BMP credit for golf courses on STF load to groundwater, assuming 100 % BMP implementation on golf courses and sports fields.
FF	28,514	15 % BMP credit on FF load to groundwater, assuming 100 % owner-implemented and verified BMPs on all fertilized lands.
LW	65,024	10 % BMP credit on load to groundwater, assuming 100 % owner-implemented and verified BMPs at all livestock facilities.
WWTF	11,272	Achieved by basinwide BMAP WWTF policy (3, 6, or 10 mg/L).
Total Credits from BMAP Policies and Submitted Projects	**321,680 – 413,598**	**Implement additional source identification activities and pursue additional practices over the next 20 years, contingent on funding.**
Advanced Agricultural Practices and Procedures	19,009 – 95,046	Includes 10 % to 50 % reduction from 100 % of fertilized acres with a change in practice.
Total Credits	**340,689 – 508,644**	**Load reduction to meet the TMDL at the spring vents is 1,783,607 lb-N/yr.**

2.4 OSTDS Management Strategies

In the Silver Springs and Upper Silver River BMAP area, there are approximately 26,550 OSTDS in the PFA and approximately 66,311 OSTDS in the entire BMAP area, based on FDOH estimates. This BMAP lists 5 ongoing or proposed projects (**Appendix B**) that reduce nitrogen loading from existing OSTDS on variably sized parcels by a total of 8,477 lb-N/yr. Projects completed before 2016 were not included in the estimated reduction because they were accounted for in the FDOH updated OSTDS inventory estimates (i.e., the sewering of former Silver River State Park). **Figure 4a** shows the locations of all OSTDS in the Silver Springs and Upper Silver River BMAP area.

In the Rainbow Spring Group and Rainbow River BMAP area, there are 3,623 OSTDS in the PFAs and 33,859 OSTDS in the entire BMAP area, based on FDOH estimates. This BMAP lists 6 ongoing or proposed specific projects (**Appendix B**) that reduce nitrogen loading from existing

OSTDS on variably sized parcels by a total of 8,503 lb-N/yr. **Figure 4b** shows the locations of all OSTDS in the Rainbow Spring Group and Rainbow River BMAP area.

Additional proposed projects listed in **Appendix B** would connect OSTDS to central sewer through the expansion of utility service areas, but feasibility analyses need to be completed and funding secured for those projects. Additional areas under consideration for utility service area expansion include Belleview and Silver Springs Shores (SSS) in the Silver Springs and Upper Silver River BMAP area and State Road (SR) 200 in the Rainbow Spring Group and Rainbow River BMAP area as well as development in Ocala west of I-75.

In addition to the 11 listed projects for these 2 BMAP areas, DEP assessed the overall OSTDS loading compared with other nitrogen sources in the PFAs, as well as the relative loading in the wider BMAP area. Based on these assessment results, DEP determined that for the Silver Springs and Upper Silver River BMAP area, OSTDS contribute more than 20 % of nonpoint source nitrogen pollution to the OFS. Based on the Silver Springs NSILT results, septic systems contribute 29 % of the pollutant loading in the springshed area and 39 % of the nitrogen loading in the PFA. Based on the Rainbow Springs NSILT results, septic systems contribute 20 % of the pollutant loading in the springshed area and 23 % of the nitrogen loading in the PFA.

Cumulatively, nitrogen loading from OSTDS in these springsheds results in the significant degradation of groundwater that impacts both BMAP areas. Therefore, the comprehensive remediation of OSTDS, consistent with the requirements of this BMAP, is necessary to prevent associated groundwater and surface water contamination so that the TMDLs can ultimately be achieved and increases in nitrogen loads from future growth are limited. The OSTDS remediation plan is incorporated as **Appendix D.**

An OSTDS Advisory Committee was created to assist DEP in the development of the OSTDS remediation plan. The purpose of the committee was to offer advice to DEP in the development of the remediation plan. The Committee members represented local government, utilities, environmental interests, industry representatives, and home builder associations.

In addition to the actions outlined in the OSTDS remediation plan, remedial efforts on existing conventional OSTDS could achieve additional nitrogen reductions. **Table 9a** and **Table 9b** summarize the nitrogen inputs, attenuation and recharge factors, and loads to groundwater for a conventional OSTDS. The conventional OSTDS nitrogen input is based on a per capita contribution of 9.012 lb-N/yr. This value is multiplied by the estimated number of people using the system. The number of persons per household varies by county. A weighted average nitrogen input was calculated for each of the BMAP areas weighted by the number of OSTDS in each county. Percent reductions for enhanced or replaced systems are applied to the conventional OSTDS nitrogen groundwater loads to evaluate possible improvements to groundwater. Enhanced OSTDS can achieve an estimated 65 % improvement in the load to groundwater compared to a conventional system. OSTDS replaced by sewer reduce the conventional nitrogen inputs by an estimated 95 %, assuming a sewer connection to a WWTF meeting AWT levels.

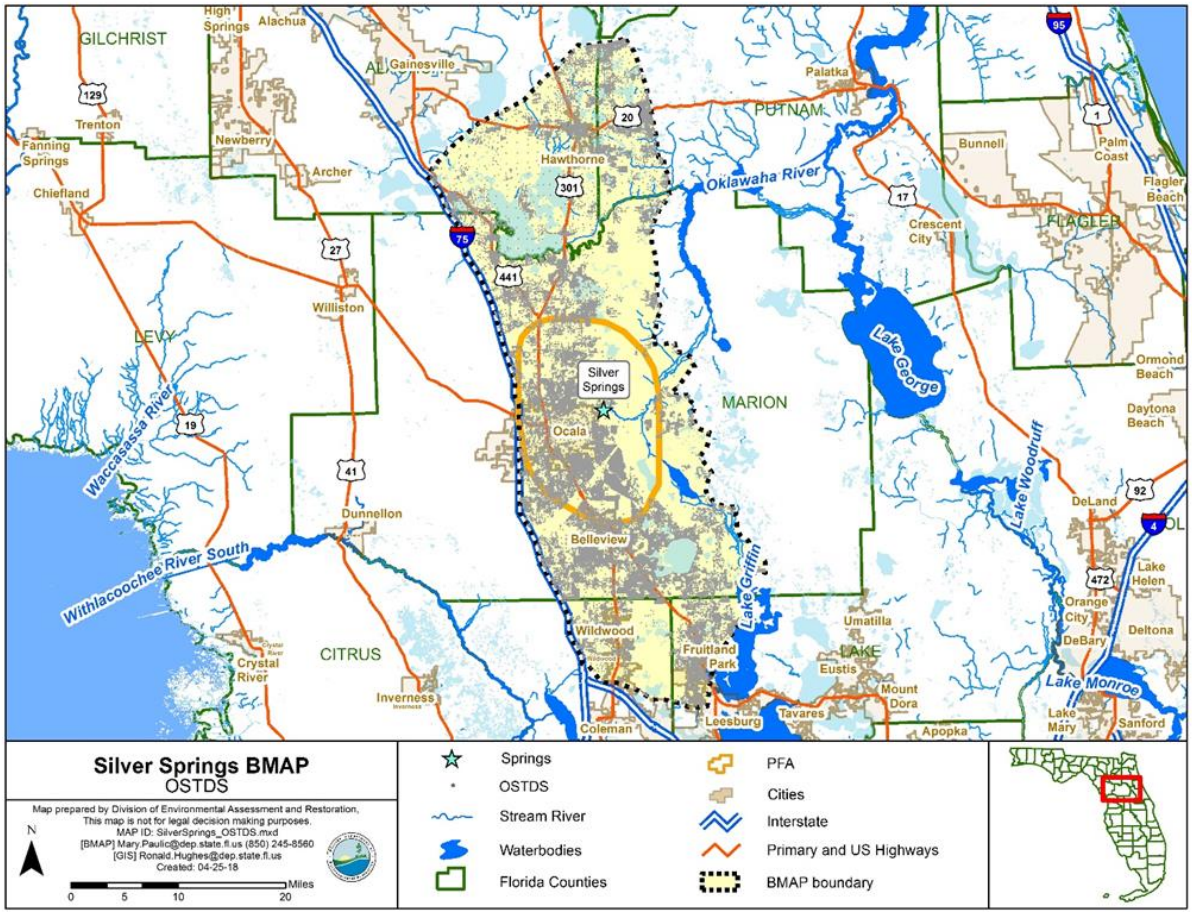

Figure 4a. OSTDS locations in the Silver Springs and Upper Silver River BMAP area and PFAs

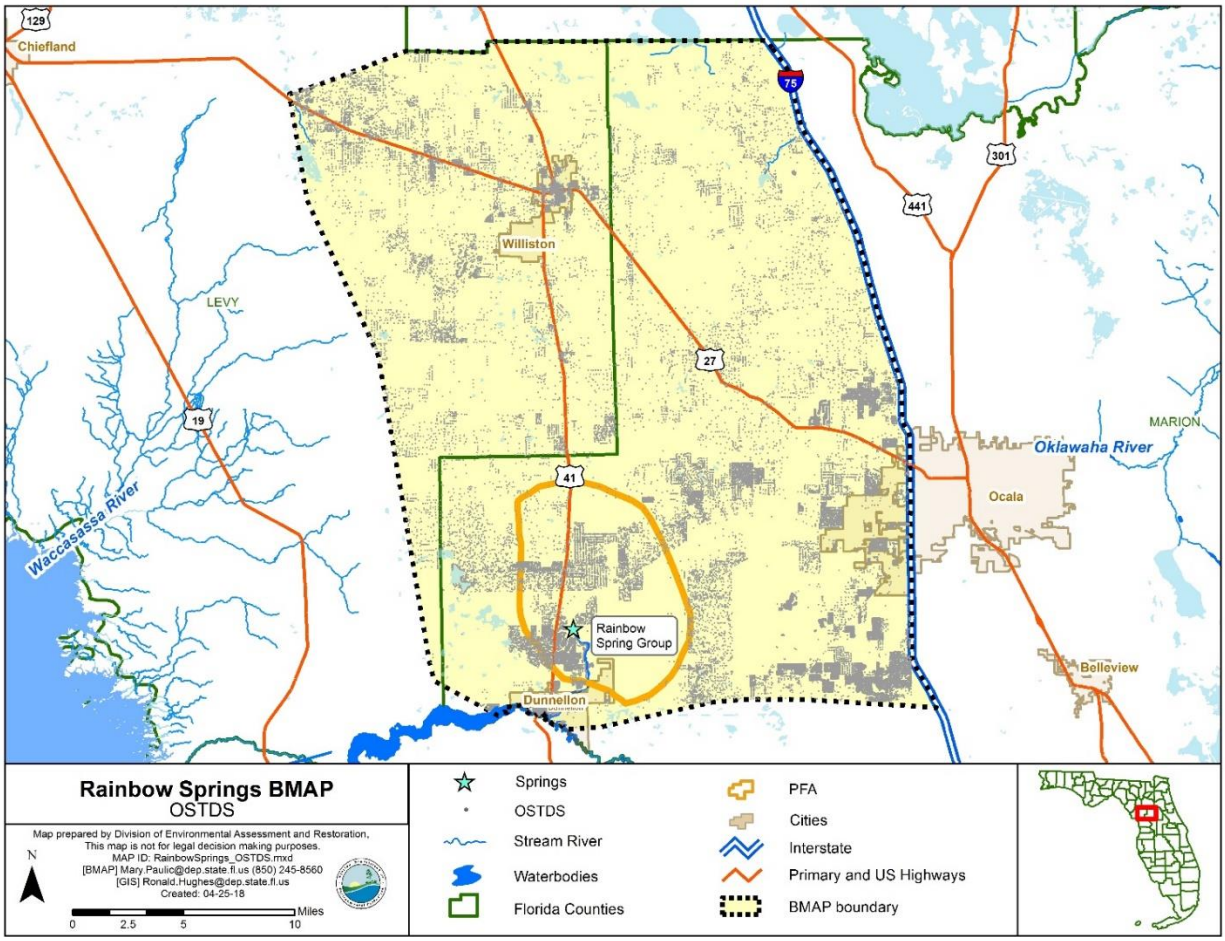

Figure 4b. OSTDS locations in the Rainbow Spring Group and Rainbow River BMAP area and PFAs

The results for the Silver Springs and Upper Silver River BMAP area show an estimated nitrogen reduction (i.e., credit) of 6.4 in high-recharge areas, 3.5 in medium-recharge areas, and 0.7 in low-recharge areas for each enhanced OSTDS and an estimated nitrogen reduction of 9.3 in high-recharge areas, 5.2 in medium-recharge areas, and 1.0 in low-recharge areas for each replaced OSTDS. The results for the Rainbow Spring Group and Rainbow River BMAP area show that a nitrogen reduction (i.e., credit) of 6.5 in high-recharge areas and 3.6 in medium-recharge areas for each enhanced OSTDS and a nitrogen reduction of 9.4 in high-recharge areas and 5.2 in medium-recharge areas for each replaced OSTDS. Estimated costs for retrofitting (onsite treatment improvements) or removing (sewering) OSTDS range from $10,000 to $20,000 per system, which would be anticipated to be offset somewhat by cost-share from state funds. These costs can be refined as projects are completed and detailed cost data are available.

Local ordinances provide additional support for the remediation of pollutant loading from OSTDS. New development in unincorporated Marion County is required to connect to central sewer if the treatment plant has available capacity and if a connection line is available within 400

feet (Marion County Land Development Code, Section 6.14.2). Activities in Marion County that require a Repair or Modification permit from FDOH in Marion County for new, modified, or repaired OSTDS, regardless of the installation date, must achieve a minimum 24-inch separation between the bottom of the drain field and the estimated wettest season water table (Marion County Land Development Code, Section 6.14.3, Onsite Waste Treatment and Disposal Systems). In Belleview, if an existing OSTDS fails and central sewer is available, FDOH in Marion County will not issue a repair permit.

Table 9a. Estimated individual OSTDS improvements to groundwater for the Silver Springs BMAP area

Recharge Category	Conventional OSTDS Load to Groundwater (lb-N/yr/OSTDS)	Credit Per System (lb-N/yr/OSTDS)	
		Enhanced OSTDS	Replaced OSTDS
Nitrogen Input	21.8		
Attenuation (0.5)	10.9		
Low Recharge (0.1)	1.1	0.7	1.0
Medium Recharge (0.5)	5.4	3.5	5.2
High Recharge (0.9)	9.8	6.4	9.3

Table 9b. Estimated individual OSTDS improvements to groundwater for the Rainbow Spring Group and Rainbow River BMAP area

Recharge Category	Conventional OSTDS Load to Groundwater (lb-N/yr/OSTDS)	Credit Per System (lb-N/yr/OSTDS)	
		Enhanced OSTDS	Replaced OSTDS
Nitrogen Input	21.9		
Attenuation (0.5)	10.9		
Medium Recharge (0.5)	5.5	3.6	5.2
High Recharge (0.9)	9.9	6.5	9.4

2.5 UTF Management Strategies

UTF consists of fertilizers applied to the turfgrass typically found in residential and urban areas (including residential lawns and public green spaces). It is applied by either the homeowner or a lawn service company on residential properties, while on nonresidential properties it may be applied by contractors or maintenance staff.

2.5.1 Fertilizer Ordinance Adoption

As required by the Florida Legislature, as described in Subsection 373.807(2), F.S., local governments with jurisdictional boundaries that include an OFS or any part of a springshed or the delineated PFAs of an OFS are required to develop, enact, and implement a fertilizer ordinance by July 1, 2017. The statutes require any ordinance to be based, at a minimum, on the DEP Model Ordinance for Florida-Friendly Fertilizer Use on Urban Landscapes.

2.5.2 Prioritized Management Strategies and Milestones

Based on the fertilizer ordinances and public education activities in place at the time of BMAP adoption, the associated credits for UTF reductions to groundwater are 6,695 lb-N/yr for the Silver Springs and Upper Silver River BMAP area (see **Table 10a**). The associated fertilizer ordinance and public education activity credits for UTF reductions to groundwater for the Rainbow Spring Group and Rainbow River BMAP area are 4,484 lb-N/yr (see **Table 10b**). Credits for the FYN program includes the area of city jurisdictions if the county where the city is located receives full credit for the FYN program. The justification for this is that county programs are available to all residents regardless of where they reside. This credit scheme was applied to jurisdictions within Alachua County and Marion County.

Local stormwater projects to treat urban runoff, including nitrogen from urban fertilizer, are also in place (see **Appendix B**). Stakeholders agreed that only stormwater treatment projects which provided additional treatment to remove nitrogen would receive credit. The reduction to groundwater loading from stormwater projects for the Silver Springs BMAP area is 7,067 lb-N/yr and, for the Rainbow Springs BMAP area, 3,631 lb-N/yr.

Since there is uncertainty about the data used in the NSILT to calculate UTF loading to groundwater, DEP will work toward collecting better data by documenting usage and potential reductions with the stakeholders. Also, DEP will work with stakeholders to develop additional measures to reduce fertilizer application. DEP met with local stormwater managers in December 2017and an outcome of that discussion was the identification of challenges in meeting further reduction in fertilizer use. Many new residents to Florida have the perception that their yard should be lush and green all year or continue to manage their landscape as they would have in more northern parts of the country.

Table 10a. Current project credits to reduce UTF loading to groundwater in the Silver Springs and Upper Silver River BMAP area

Project Category	Project Credits (lb-N/yr) Based on Management Actions Listed in Appendix B
Fertilizer Ordinances and Public Education Activities	6,695
Stormwater Improvements	7,067
Total Project Credits	**13,762**

Table 10b. Current project credits to reduce UTF loading to groundwater in the Rainbow Spring Group and Rainbow River BMAP area

Project Category	Project Credits (lb-N/yr) Based on Management Actions Listed in Appendix B
Fertilizer Ordinances and Public Education Activities	4,484
Stormwater Improvements	3,631
Total Project Credits	**8,115**

2.5.3 Additional UTF Reduction Options

The anticipated reduction from UTF sources is currently limited to 6 % of the estimated load to groundwater. This reduction can be achieved through a 6 % total credit if each local government has an applicable fertilizer ordinance, landscape ordinance, irrigation ordinance, and pet waste ordinance; carries out public education activities; and implements the Florida Yards and Neighborhood (FYN) Program (see **Tables 11a** and **11b**).

If all the local governments were to implement the full suite of public education measures, a 10,169 lb-N/yr reduction can be achieved for the Silver Springs and Upper Silver River BMAP area. Currently, these credits total 6,695 lb-N/yr. Thus, an additional 3,474 lb-N/yr reduction could be achieved through public education and source control efforts.

Similarly, for the Rainbow Spring Group and Rainbow River BMAP area, if all local governments were to implement the full suite of public education measures, an 8,476 lb-N/yr reduction can be achieved. Currently, these credits total 4,484 lb-N/yr. Thus, an additional 3,992 lb-N/yr reduction can be achieved through public education and source control efforts.

Appendix E contains technical support information that further explains the concepts presented in this section, including nitrogen loading by source category, reduction obligations, and management strategies.

Table 11a. Maximum UTF load reductions for the Silver Springs and Upper Silver River BMAP area based on existing public education credit policies

UTF Source Control Measures	Credit Based on Estimated Load to Groundwater (%)	Possible Nitrogen Credits (lb-N/yr)
Fertilizer Ordinance	0.5	847
Pet Waste Ordinance	0.5	847
Landscape Ordinance	0.5	847
Irrigation Ordinance	0.5	847
FYN Program	3.0	5,085
Public Education Program	1.0	1,695
Total Possible Credits	**6.00**	**10,169**

Table 11b. Maximum UTF load reductions for the Rainbow Spring Group and Rainbow River BMAP area based on existing public education credit policies

UTF Source Control Measures	Credit Based on Estimated Load to Groundwater (%)	Possible Nitrogen Credits (lb-N/yr)
Fertilizer Ordinance	0.5	706
Pet Waste Ordinance	0.5	706
Landscape Ordinance	0.5	706
Irrigation Ordinance	0.5	706
FYN Program	3.0	4,238
Public Education Program	1.0	1,413
Total Possible Credits	**6.00**	**8,476**

2.5.4 Project Benefits to Silver and Rainbow Rivers

Many of the management activities that reduce loading to the UFA also remediate or eliminate direct discharges to Silver River or Rainbow River. The SR 40 Pollution Reduction Project, hydrologic restoration of Half Mile Creek (S134), and the restoration activities at Silver Springs State Park (**Section 1.4.1**) are three of these projects, as well as the construction of stormwater treatment areas near the Rainbow River that intercept and treat stormwater runoff.

The SR 40 Pollution Reduction Project was a joint project led by the city of Ocala and Marion County to address stormwater runoff from over 1,200 acres of surface water basins draining to the SR 40 stormwater conveyance system and discharged with minimal water quality treatment into Half-Mile Creek, the only tributary of the impaired Upper Silver River. New retention ponds were added to increase storage capacity and reduce discharge to storm sewers. A pump station was constructed near Half Mile Creek. DEP, SJRWMD, and Florida Department of Transportation (FDOT) District 5 provided additional project funding. FDOT District 5 provides for maintenance of the system, which includes operation and maintenance costs for the pump systems.

Hydrologic restoration of Half Mile Creek will provide reduction of turbid water discharges and nutrient loading to Silver River. The project is located in Silver Springs Forest north of SR 40 and Silver Springs State Park off of SR 326. Purchase of Silver Springs Forest as a conservation area was completed in 2016.

Three stormwater projects have been completed that treat runoff from CR 484 before discharge into the Rainbow River. A retention storage area was constructed along Rainbow River to treat stormwater discharges from the Sa-Te-Ke Village area. Another stormwater pond is proposed for the Rainbow River Acres subdivision to provide water quality treatment for stormwater runoff that discharges into the Rainbow River.

2.6 STF Management Strategies

Sports turfgrass areas fall into two main categories that are evaluated separately: golf courses and sporting facilities (such as baseball, football, soccer, and other fields). There are 47 golf courses covering 7,024 acres in the Silver Springs BMAP area. The majority are associated with the Villages CDD (29). The majority of golf course acreage is located in medium-recharge areas (4,435 acres) or high-recharge areas (1,629 acres). The majority of sporting facility acreage is located in high-recharge areas (494 acres) or medium-recharge areas (256 acres).

The Rainbow Springs BMAP area has 11 golf courses covering 1,435 acres, of which 1,400 acres are in high-recharge areas. Sports fields cover 59 acres, with 40 acres in high-recharge areas and almost 10 acres in medium-recharge areas.

2.6.1 Prioritized Management Strategies and Milestones

DEP will work with sports field managers and golf course superintendents to ensure relevant BMP implementation and to estimate the reductions associated with these efforts. To improve the golf course loading estimate over a literature-based approach, DEP will also confer with golf course superintendents to identify the actual rate of fertilizer application to update the estimate of the golf course load to groundwater. Golf courses are expected to implement the BMPs described in DEP's BMP manual, *Best Management Practices for the Enhancement of Environmental Quality on Florida Golf Courses*, for an estimated 10 % reduction in loads to groundwater.

Managers of sports fields can assist by reducing fertilizer use, using products that reduce leaching, and more efficiently irrigating sports turf. The estimated credit for better management of nongolf sports turfgrass is 6 % of the starting load to groundwater. Based on these approaches, the initial reduction from STF sources is 16,880 lb-N/yr for the Silver Springs and Upper Silver River BMAP area (**Table 12a**). The reduction from STF sources is 5,610 lb-N/yr for the Rainbow Spring Group and Rainbow River BMAP area (**Table 12b**).

Reuse water is supplied to many of the golf courses in both BMAP areas. More effectively managing reuse water, which already carries a nutrient load, to minimize the use of additional fertilizer could further reduce loading to the UFA. The Villages CDD uses reuse water extensively, relying on outside communities such as the City of Wildwood and Town of Lady Lake (including wastewater from Fruitland Park) to supply them with reuse water.

Table 12a. Maximum load reductions for the Silver Springs BMAP area from STF improvements based on existing credit policies

STF Source Control Measures	Credit Based on Estimated Load to Groundwater (%)	Possible Nitrogen Credits (lb-N/yr)
Golf Course BMP Implementation	10	15,915
Sports Fields BMPs	6	965
Total Possible Credits		**16,880**

Table 12b. Maximum load reductions for the Rainbow Springs BMAP area from STF improvements based on existing credit policies

STF Source Control Measures	Credit Based on Estimated Load to Groundwater (%)	Possible Nitrogen Credits (lb-N/yr)
Golf Course BMP Implementation	10	5,530
Sports Fields BMPs	6	80
Total Possible Credits		**5,610**

2.7 Drainage Well Management Strategies

Drainage wells directly recharge the UFA. They are used in closed surface water drainage basins to prevent flooding. For the Silver Springs and Upper Silver River BMAP area, the input from an estimated 42 drainage wells owned by the City of Ocala was included in the Silver Springs NSILT analysis. The annual runoff volume for each well's drainage area and literature-based event mean concentrations (EMCs) for TN in stormwater runoff were used to estimate the nitrogen load from drainage wells. Three remediation projects are in progress that pretreat stormwater runoff at 5 drainage well locations with denitrifying bioabsorptive medias that help denitrify (remove nitrogen) before water is discharged into the wells. **Table 13** lists the total reductions for these projects. Another option for addressing groundwater loading from drainage wells is to remove the wells from service. Ocala is inventorying the actual number of wells in use.

Table 13. Load reductions from drainage well improvements

Project Category	Project Credits (lb-N/yr) Based on Management Actions Listed in Appendix B
Drainage Well Remediation	1,322
Total Possible Credits	**1,322**

2.8 Agricultural Source Management Strategies and Additional Reduction Options

Based on data including Florida Statewide Agriculture Irrigation Demand IV geodatabase land use, FDACS identified agricultural acreage within the respective BMAP areas. An estimated 129,887 acres are considered agricultural land use in the Silver Springs BMAP area: 15,747 acres are classified as livestock lands, 39,714 acres as fertilized crops, and 74,425 acres as both fertilized croplands and livestock lands. There are an estimated 169,712 acres considered agricultural land use in the Rainbow Springs BMAP area: 46,494 acres are classified as livestock lands, 15,865 acres as fertilized crops, and 107,353 acres as both fertilized croplands and livestock lands. Horse farms and cattle operations are a prominent feature in both BMAP areas.

2.8.1 FF Loading

Nitrogen in agricultural fertilizer is applied at varying rates, depending on the crop and individual farm practices. FF includes commercial inorganic fertilizer applied to row crops, field crops, pasture, and hay fields. The NSILT analysis for the Silver Springs BMAP estimated the TN load to groundwater from FF as 119,120 lb-N/yr, or 7 % of the TN load to groundwater in the BMAP area. The NSILT analysis for the Rainbow Springs BMAP estimated the TN load to groundwater from FF as 190,092 lb-N/yr or 12 % of the TN load to groundwater in the BMAP area.

2.8.2 LW Loading

Agricultural practices specific to LW management were obtained through meetings with UF–Institute of Food and Agricultural Science (IFAS) Extension staff, FDACS field representatives, agricultural producers, and stakeholders. The Silver Springs BMAP NSILT estimated TN load to groundwater from LW is 469,486 lb-N/yr, or 29 % of the TN load to groundwater in the BMAP area. The Rainbow Springs BMAP NSILT estimated TN load to groundwater from LW is 650,235 lb-N/yr, or 42 % of the TN load to groundwater in the BMAP area.

2.8.3 Prioritized Management Strategies and Milestones

Subsection 403.067, F.S., requires agricultural nonpoint sources in a BMAP area either to implement the applicable FDACS-adopted BMPs, which provides a presumption of compliance with water quality standards, or to conduct water quality monitoring prescribed by DEP, SJRWMD, or SWFWMD that demonstrates compliance with water quality standards. Further, the Florida Springs and Aquifer Protection Act, Subsection 373.811(5), F.S., prohibits any new agricultural operations within the PFAs that do not implement applicable FDACS BMPs, measures necessary to achieve pollution reduction levels established by DEP, or groundwater monitoring plans approved by a WMD or DEP. Failure to implement BMPs or conduct water quality monitoring that demonstrates compliance with pollutant reductions may result in enforcement action by DEP (s. 403.067(7)(b), F.S.).

FDACS will work with applicable producers in the BMAP areas to implement BMPs. As of December 31, 2017, NOIs covered 23,407 agricultural acres in the Silver Springs and Upper

Silver River BMAP area and 67,885 acres in the Rainbow Spring Group and Rainbow River area. No producers are currently conducting water quality monitoring in lieu of implementing BMPs in either BMAP area at this time. **Appendix B** lists project information, and **Appendix F** provides detailed information on BMPs and agricultural practices in the BMAP areas.

With crop-specific BMP enrollment or monitoring for FF areas, a 17,868 lb-N/yr reduction to groundwater can be achieved in the Silver Springs and Upper Silver River BMAP area, based on an average reduction of 15 % in the nitrogen load to groundwater. For the Rainbow Spring Group and Rainbow River BMAP area, a 28,514 lb-N/yr reduction to groundwater can be achieved. While DEP has listed larger percentage reductions in nitrogen from agricultural BMPs in calculating benefits to surface waters, the best data available indicate a 15 % reduction in the load to groundwater where owner-implemented BMPs are in place (Athearn and Hochmuth 2016 and CEAP Cropland Modeling Team 2014). This percentage could increase as more data are collected on the impact of BMPs to groundwater.

For all livestock operations in the Silver Springs and Upper Silver River BMAP area, owner-implemented BMPs are expected to achieve a reduction of 46,949 lb-N/yr, using a 10 % reduction in the load to groundwater from owner-implemented BMPs at livestock operations. For all livestock operations in the Rainbow Spring Group and Rainbow River BMAP area, owner-implemented BMPs could achieve a reduction of 65,024 lb-N/yr, using a 10 % reduction in the load to groundwater from owner-implemented BMPs at livestock operations.

Summarizing the reductions discussed above, the total reduction from BMP implementation from all agricultural sources is 64,817 lb-N/yr for the Silver Springs and Upper Silver River BMAP area and 93,538 lb-N/yr for the Rainbow Spring Group and Rainbow River BMAP area.

2.8.4 Additional Agricultural Reduction Options

Further reductions may be achieved through implementing additional agricultural projects or practices, including land acquisition and conservation easements. SJRWMD is implementing projects that encourage low input agriculture and water quality improvement technologies. Examples of these projects include providing incentives for producers to transition to the use of soil moisture and climate sensors, precision irrigation and fertigation, and soil grid mapping and variable rate fertilizer application. SWFWMD is supporting research into composting of livestock manure as a way to provide better nutrient management on farms. Other examples of additional practices include providing incentives for producers to transition to less intensive cropping systems, changing land use to fallow or native landscape, or changing the type of cropping system. Other reductions associated with the implementation and modification of BMPs may be realized through ongoing studies, data collection, and WMD initiatives. Basin-specific studies are underway to evaluate and demonstrate the effectiveness of BMPs on a site-specific basis.

Table 14a for the Silver Springs and Upper Silver River BMAP area and **Table 14b** for the Rainbow Spring Group and Rainbow River BMAP area identifies possible projects and practices, the estimated load reductions, and the estimated cost of implementation. FDACS used

Florida Statewide Agricultural Irrigation Demand (FSAID) IV to identify crop types and acreages where projects and practices could potentially be implemented.

Current additional agricultural practices are more focused on irrigated acreage and practices that are more applicable to row crops. The largest agricultural activities in both BMAP areas are horse and cattle farms. Identifying and/or refining additional practices specific to cattle and horse farms is suggested during the first 5 years of the BMAP. Manure management for horses and cattle is one area where improvements could be gained. **Section 2.8.5** suggests additional approaches.

Table 14a. Estimated acreages for additional agricultural projects or practices in the Silver Springs and Upper Silver River BMAP area

Action	Acreage
Precision Irrigation	1,148
Soil Moisture Probes	4,959
Precision Fertilization	2,623
Controlled-Release Fertilizer	2,382
Cover Crops	16,050
Rotational Production	83

Table 14b. Estimated acreages for additional agricultural projects or practices in the Rainbow Spring Group and Rainbow River BMAP area

Action	Acreage
Precision Irrigation	2,038
Soil Moisture Probes	5,960
Precision Fertilization	3,787
Cover Crops	4,931

The projects and practices listed in **Table 14a and 14b** are a component of the reductions to groundwater that could be achieved through changes in practices (**Table 15a and 15b**). For example, for the Silver Springs and Upper Silver River BMAP area, a 75 % reduction of fertilizer loss to groundwater on 25 % of the fertilized lands would result in a reduction of 22,335 lb-N/yr. For the Rainbow Spring Group and Rainbow River BMAP area, a 75 % reduction of fertilizer loss to groundwater on 25 % of the fertilized lands would result in a reduction of 35,642 lb-N/yr. Note that these estimates are averaged over the entire basin, and the recharge characteristics of a specific site and the fertilization practices for specific crops may change the estimated reduction for specific acres with a conservation easement or change in fertilization.

Table 15a. Potential for additional load reductions to groundwater in the Silver Springs and Upper Silver River BMAP area

% of Fertilized Acres with a Change in Practice	Amount of Fertilized Acres with a Change in Practice	100 % Reduction in Load to Ground-water (lb-N/yr)	75 % Reduction in Load to Ground-water (lb-N/yr)	50 % Reduction in Load to Ground-water (lb-N/yr)	25 % Reduction in Load to Ground-water (lb-N/yr)	10 % Reduction in Load to Ground-water (lb-N/yr)
100	113,412	119,120	89,340	59,560	29,780	11,912
75	85,059	89,340	67,005	44,670	22,335	8,934
50	56,706	59,560	44,670	29,780	14,890	5,956
25	28,353	29,780	22,335	14,890	7,445	2,978
10	11,341	11,912	8,934	5,956	2,978	1,191

Table 15b. Potential for additional load reductions to groundwater in the Rainbow Spring Group and Rainbow River BMAP area

% of Fertilized Acres with a Change in Practice	Amount of Fertilized Acres with a Change in Practice	100 % Reduction in Load to Ground-water (lb-N/yr)	75 % Reduction in Load to Ground-water (lb-N/yr)	50 % Reduction in Load to Ground-water (lb-N/yr)	25 % Reduction in Load to Ground-water (lb-N/yr)	10 % Reduction in Load to Ground-water (lb-N/yr)
100	145,804	190,092	142,569	95,046	47,523	19,009
75	109,353	142,569	106,927	71,285	35,642	14,257
50	72,902	95,046	71,285	47,523	23,762	9,505
25	36,451	47,523	35,642	23,762	11,881	4,752
10	14,580	19,009	14,257	9,505	4,752	1,901

Beyond enrolling producers in the FDACS BMP Program and verifying implementation, FDACS will work with DEP to improve the data used to estimate agricultural land uses in these BMAP areas. FDACS will also work with producers to identify a suite of agricultural projects and research agricultural technologies that could be implemented on properties where they are deemed technically feasible and if funding is made available. The acreages provided by FDACS are preliminary estimates of the maximum acreages and need to be evaluated and refined over time. As presented here, these projects are based on planning-level information. Actual implementation would require funding as well as more detailed designs based on specific information, such as actual applicable acreages and willing landowners.

2.8.5 Other Agricultural Activities and Programs

The Marion County Clean Farms Initiative and UF–IFAS/Marion County Water Quality Education and Equine Farm BMP Program are outreach efforts directed towards large commercial horse farms for the implementation of manure management and nutrient reduction BMPs. The Clean Farms Initiative was completed in 2008 and resulted in the creation of an outreach coordinator position supported by county extension. That position continues to be supported by Marion County for farm outreach and education.

DEP published the *Small Farm Equine BMP Manual* in 2014 to provide a set of manure management and nutrient reduction BMPs appropriate for hobby farms (typically not considered commercial). Horse farms are a prevalent form of agriculture in both BMAP areas One of the projects identified in this BMAP is an outreach program featuring the new manual and directed towards small horse farms. The program is facilitated by DEP in collaboration with UF–IFAS, FDACS, Marion County and other local governments, and the WMDs.

Hobby farms are numerous in both basins and may have issues with manure storage and disposal, denuded areas, etc., but do not have the acreage to resolve these issues. It is typically not appropriate or possible for hobby farms to enroll under FDACS' Equine BMP Program. Initial steps will focus on identifying ways to reach the target audience, identifying and engaging agencies with existing outreach programs, and potentially developing outreach materials to supplement the new DEP manual.

Cost-share dollars from the WMDs are available to local producers. Specifically, for the Silver Springs and Upper Silver River BMAP area, the SJRWMD Districtwide Agricultural Cost-Share Program assists farmers, growers, and ranchers in funding projects that reduce nutrient loading and conserve water. The program helps applicants implement BMPs that may be more-costly but provide significant benefits for water resources. Fifteen projects in the Silver Springs BMAP area were selected for funding since 2014 (**Appendix B**). These projects together reduce TN loading to groundwater by 27,099 lb-N/yr.

In the Rainbow Spring Group and Rainbow River BMAP area, SWFWMD's Facilitating Agricultural Resource Management Systems (FARMS) Program and Mini FARMS program work cooperatively with FDACS to provide incentives to the agricultural community for the implementation of approved water quantity and water quality BMPs. **Appendix B** lists the projects funded by this program.

DEP met in December 2017 and April 2018 with FDACS, water management districts, local government, IFAS, and private agricultural industry representatives to discuss strategies for reducing nitrogen loading from agricultural lands. The following are outcomes of those meetings:

- Currently available BMP manuals and outreach materials as well as funding assistance are not truly directed to assisting small or hobby farms with management. Small farms are considered less than 50 acres.

- Cost of equipment to implement better nitrogen reducing BMPs may be cost prohibitive even with cost share support. This is particularly true for small farms.

- Different agricultural communities may require different approaches to BMP implementation, financial assistance, and outreach. Cattle farms and horse farms are both prevalent in the BMAP area, but are not equivalent.

- For livestock farms, encourage BMPs that maintain ground cover to assist with uptake of nutrients in animal waste. For horse farms, composting of manure or better handling and storage of waste can be a challenge.

There are designations for local farms that engage in good stewardship practices including Farms of Distinction and CARES (County Alliance for Responsible Environmental Stewardship) Program that acknowledge good agricultural stewardship.

2.9 WWTF Management Strategies

In both BMAP areas, treated effluent containing nitrogen is discharged to sprayfields, RIBs, and absorption fields, and is reused for irrigation water. The nitrogen load from WWTFs in the Silver Springs and Upper Silver River BMAP area is 42,643 lb-N/yr. All reuse accounts for an additional 29,574 lb-N/yr. The nitrogen load from WWTFs in the Rainbow Spring Group and Rainbow River BMAP area is 23,102 lb-N/yr.

The discharge location (such as proximity to the spring, highly permeable soils, etc.) and level of wastewater treatment are important factors to consider when calculating loadings to groundwater. Additionally, addressing the nitrogen loading from OSTDS could increase the volume of effluent treated and disposed of by WWTFs. The NSILT calculation did not distinguish between sprayfield and RIB disposal methods for wastewater, applying one attenuation rate to all facilities. If separate attenuation rates were applied to sprayfields and RIBs, the nitrogen load from WWTFs in the Silver Springs and Upper Silver River BMAP area is 61,221 lb-N/yr, an 18,578 lb-N increase from the Silver Springs NSILT. Similarly, applying separate attenuation rates to the WWTFs in the Rainbow Spring Group and Rainbow River BMAP area, the nitrogen load is 30,403 lb-N/yr, an increase of 7,301 lb-N/yr from the Rainbow Springs NSILT.

2.9.1 Summary of Facilities

The Silver Springs NSILT identified 95 domestic WWTFs, 1 industrial WWTF, and 1 residuals site located in the Silver Springs and Upper Silver River BMAP area. Sixteen WWTFs are permitted to discharge more than 0.1 million gallons per day (mgd) of treated effluent. **Figure 5a** shows the locations of WWTFs in the Silver Springs and Upper Silver River BMAP area with discharges greater than or equal to 0.1 mgd and discharges less than 0.1 mgd. The largest WWTFs, based on permitted discharge capacity, are operated by Marion County Utilities, City of Ocala Utilities, and the 4 WWTF that serve the Villages.

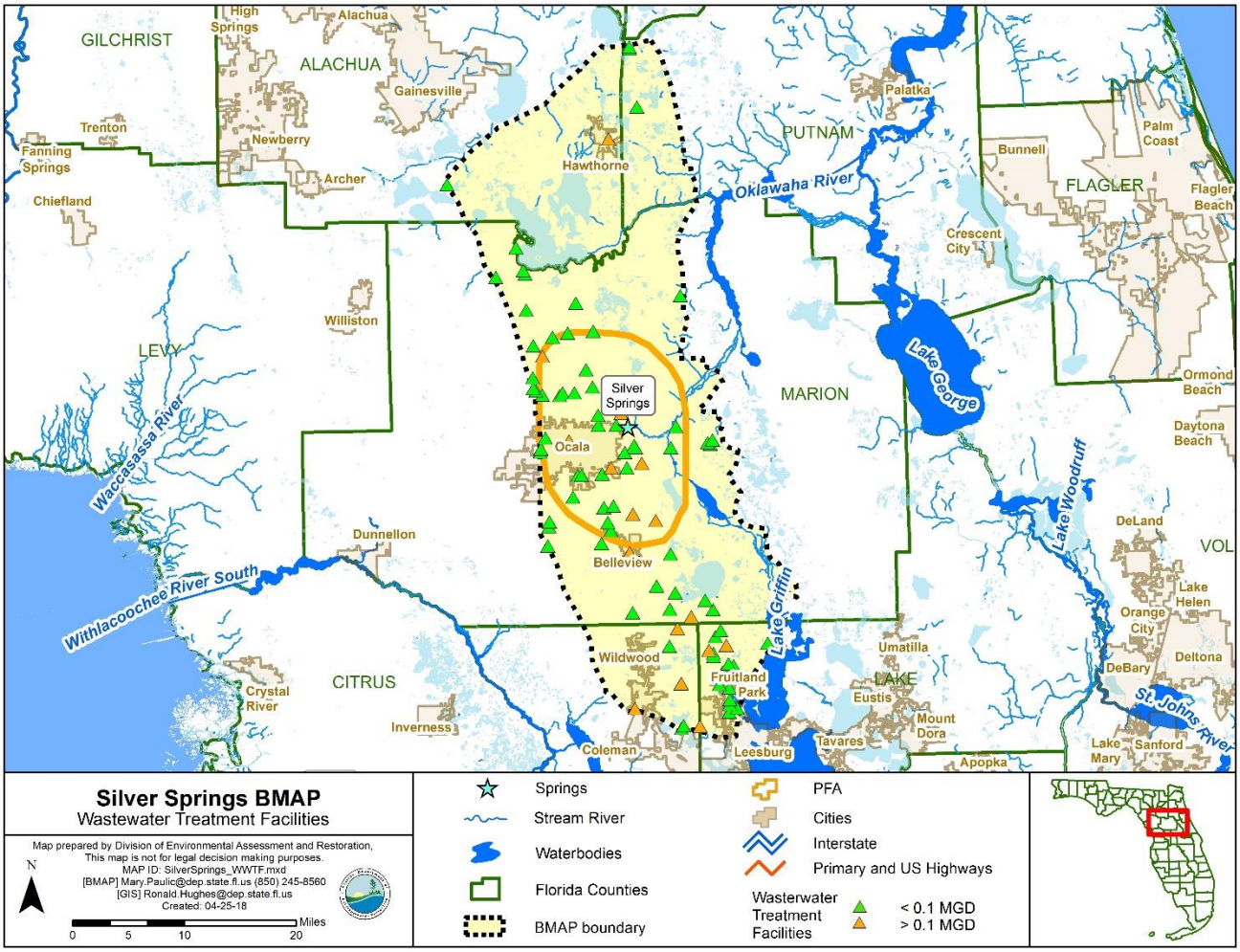

Figure 5a. Location of used in the NSILT WWTFs in the Silver Springs and Upper Silver River BMAP area

The Rainbow Springs NSILT identified 37 WWTFs. Seven of those facilities are permitted to discharge at least 0.1 mgd. **Figure 5b** shows the locations of WWTFs in the Rainbow Spring Group and Rainbow River BMAP area with discharges greater than or equal to 0.1 mgd and discharges less than 0.1 mgd. The largest facilities are operated by Marion County Utilities, City of Ocala Utilities, City of Williston, and Bay Laurel Center CDD (On Top of The World).

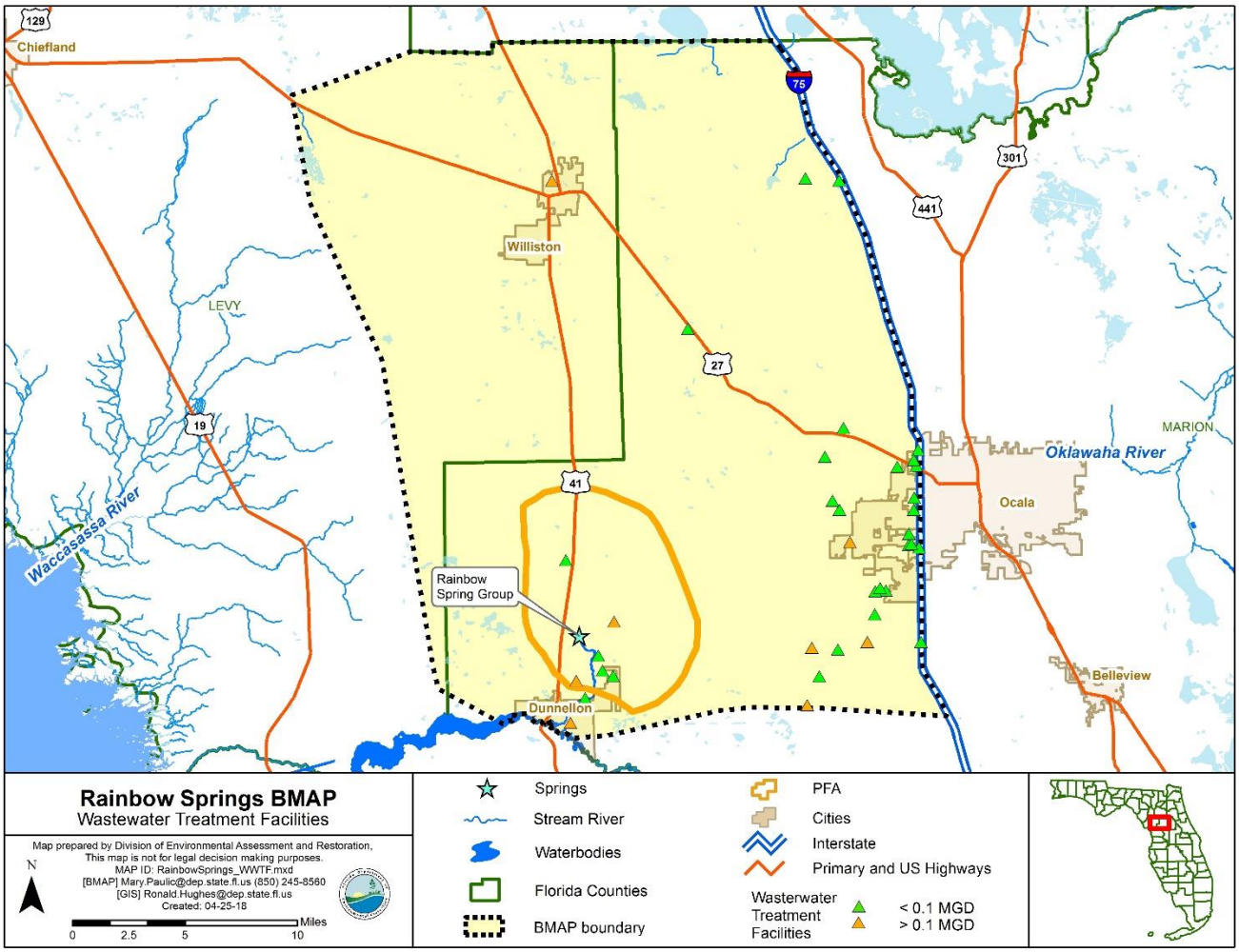

Figure 5b. Location of WWTFs used in the NSILT in the Rainbow Spring Group and Rainbow River BMAP area

2.9.2 Wastewater Management Standards and Reuse Management

The Florida Springs and Aquifer Protection Act prohibits new domestic wastewater disposal facilities in the PFA, including RIBs, with permitted capacities of 100,000 gpd or more, except for those facilities that provide AWT that reduces TN in the effluent to 3 mg/L or lower, on an annual permitted basis.

DEP requires that within the PFAs, new permits issued for WWTFs with permitted capacities of 0.1 mgd or greater have a nitrogen effluent limit of 3 mg/L, for all disposal methods, unless the utility/entity can demonstrate reasonable assurance that the reuse or land application of effluent would not cause or contribute to an exceedance of the nitrate concentrations established by the TMDL. To demonstrate reasonable assurance, the utility/entity shall provide relevant water quality data, physical circumstances, or other site-specific credible information needed to show their facility would not cause a nitrate concentration that would be greater than 0.35 mg/L at the spring vent. This demonstration may include factors such as dilution, site-specific geological conditions, research/studies, including dye tracer tests, and groundwater transport modeling. Should DEP concur with the reasonable assurance demonstration request, the TN effluent requirements established here may be modified for the applicant or waived. New effluent standards will take effect at the time of permit issuance.

Table 16 lists the nitrogen effluent limits adopted with the 2015 BMAPs for any existing DEP-permitted discharge and new discharges less than 0.1 mgd within the PFAs, unless the utility/entity can demonstrate reasonable assurance that the reuse or land application of effluent would not cause or contribute to an exceedance of the nitrate concentrations established by the TMDL. **Table 17** lists the nitrogen effluent limits adopted with the 2015 BMAPS for any new or existing DEP-permitted discharge outside the PFA, unless the utility/entity can demonstrate reasonable assurance that the reuse or land application of effluent would not cause or contribute to an exceedance of the nitrate concentrations established by the TMDL. These limits are applied as an annual average. New effluent standards will take effect at the time of permit issuance or renewal or no later than 2020 as stated in the 2015 BMAPs, whichever is sooner.

Table 16. WWTF effluent standards for existing DEP-permitted discharges and new DEP-permitted discharges less than 0.1 million gallons per day within the PFAs

Designed Average Daily Flow (mgd)	TN Concentration Limits for Rapid-Rate Land Application (RRLA) Effluent Disposal System (mg/L)	TN Concentration Limits for Slow-Rate Land Application Effluent Disposal System (mg/L)	TN Concentration Limits for Public Access Reuse Effluent Disposal System (mg/L)
Greater than or equal to 0.5	3	3	10
Less than 0.5 and greater than or equal to 0.01	3	6	10
Less than 0.01	10	10	10

Table 17. Wastewater effluent standards for new and existing DEP-permitted discharges outside the PFAs

Permitted Capacity (mgd)	TN Concentration Limits for All Disposal Methods Besides Reuse (mg/L)	Public Access Reuse Effluent Disposal System (mg/L)
Greater than or equal to 10,000	6	10
Less than 10,000	10	10

Additionally, new or existing wastewater permits in both BMAP areas must require at least quarterly sampling of the effluent discharge for TN and report these sampling results in the discharge monitoring reports (DMRs) submitted to DEP.

DEP encourages the reuse of treated wastewater for irrigation as a water conservation measure. The expansion of reuse water for irrigation can reduce reliance on the Floridan Aquifer for water supply. The nitrogen load to groundwater from reuse water is expected to be reduced through these WWTF policies, as improvements in reuse water quality will both reduce loads from this source and limit future increases in loading from reuse because of higher treatment levels.

Additional local government requirements exist in both BMAP areas. By January 1, 2019, the Marion County code requires existing WWTFs currently using RRLA or RIBs to either connect to a central sewer system that does not use RRLA, or meet a standard of 10 mg/L TN and convert to a slow-rate land application system or a public access reuse system. The code provides for waivers for RIB disposal systems unable to meet the code requirements. Through this BMAP, all WWTFs using RIBs outside Marion County are encouraged to investigate the practicality of increasing treatment, connecting to central sewer systems, or converting to a slow-rate land application system or public access reuse system.

Alachua County's Unified Land Development Code (ULDC) (Article 12, Sections 406.70, 406.114, and 407.115) requires all new WWTFs in high aquifer recharge areas of the county to provide AWT, including nutrient removal. Alachua County defines high aquifer recharge areas as those areas depicted on the Alachua County Floridan Aquifer High Recharge Area map (adopted with the 2011–13 Comprehensive Plan) as areas where the Floridan Aquifer is classified as vulnerable or highly vulnerable, or there are stream to sink basins. The portion of the Silver Springs and Upper Silver River BMAP area in Alachua County that surrounds Orange Lake meets the definition of vulnerable.

2.9.3 Prioritized Management Strategies and Milestones

Based on the current volumes of discharge and effluent concentrations in the Silver Springs and Upper Silver River BMAP area, the reductions to be achieved through the implementation of these revised wastewater standards and reuse are 46,345 lb-N/yr. For the Rainbow Spring Group and Rainbow River the reductions expected to be achieved through the implementation of these revised wastewater standards are 11,272 lb-N/yr. **Appendix B** contains detailed information on projects that have been completed, are underway, or are planned to reduce nitrogen loading from WWTFs. Many of the smaller or older WWTFs included in the NSILT that could not meet

revised effluent standards have been or will be decommissioned and their effluent sent to other facilities that can meet effluent standards. Projects undertaken by individual WWTFs to improve effluent quality and the decommissioning of WWTFs were not given additional credits beyond the reductions expected from implementation of wastewater standards.

2.10 Atmospheric Deposition Management Strategies

2.10.1 Summary of Loading

Atmospheric deposition is largely a diffuse, albeit continual, source of nitrogen. Nitrogen species and other chemical constituents are measured in wet and dry deposition at discrete locations around the U.S. In 2014, Schwede and Lear published a hybrid model for estimating the total atmospheric deposition of nitrogen and sulfur for the entire U.S., referred to as "TDEP." Deposition data from several monitoring networks—including the Clean Air Status and Trends Network (CASTNET), the NADP Ammonia Monitoring Network, the Southeastern Aerosol Research and Characterization Network, and modeled data from the Community Multiscale Air Quality (CMAQ) Modeling System—are combined in a multistep process with National Trends Network (NTN) wet deposition values to model total deposition. The TDEP model run used for the NSILT included data from 2011 to 2013.

2.10.2 Description of Approach

Atmospheric sources of nitrogen are local, national, and international. Atmospheric sources generally have a low nitrogen concentration compared with other sources and are further diminished through additional biological and chemical processes before they reach groundwater. Atmospheric deposition sources and trends will be re-evaluated periodically.

2.11 Future Growth Management Strategies

New development primarily falls into to two general source categories: new urban development and new agriculture. Nutrient impacts from new development are addressed through a variety of mechanisms outlined in this BMAP as well as other provisions of Florida law. For instance, wastewater from all new and existing urban development is treated through either domestic WWTFs or OSTDS. New WWTFs must meet the stringent nitrogen limitations set forth in this BMAP. Existing WWTFs also must be upgraded to meet these same BMAP requirements. Florida law requires new development to connect to WWTFs where sewer lines are available. Where sewer is not available within the PFA, this BMAP still prohibits the installation of new OSTDS on lots of less than one-acre unless the system includes enhanced treatment of nitrogen, as described in Appendix D. Likewise, all new agricultural operations must implement FDACS-adopted BMPs and potentially other additional measures (**Section 2.7**) or must conduct water quality monitoring that demonstrates compliance with water quality standards.

Other laws such as local land development regulations, comprehensive plans, ordinances, incentives, environmental resource permit requirements, and consumptive use permit requirements, all provide additional mechanisms for protecting water resources and reducing the impact of new development and other land use changes as they occur (see **Appendix G**).

Through this array of laws and the requirements in this BMAP, new development must undertake nitrogen-reduction measures before the development is complete.

2.12 Protection of Surface Water and Groundwater Resources through Land Conservation

Maintaining land at lower intensity uses through land purchases or easements for conservation and recreational use is one strategy for reducing water quality impacts to Silver Springs, Silver River, Rainbow Spring Group, and Rainbow River. **Table 18a** lists the acquisitions made in the Silver Springs and Upper Silver River BMAP area, and **Table 18b** lists the acquisitions made in the Rainbow Spring Group and Rainbow River BMAP area since 2000.

Overall, 49,990 acres have been purchased or proposed by different entities. Land purchases for conservation have occurred primarily in two locations in the Silver Springs and Upper Silver River BMAP area: around Silver Springs State Park and around Lochloosa Lake. Within the Rainbow Spring Group and Rainbow River BMAP area most land purchases are close to Rainbow River. Most of the projects listed were purchased through local government land conservation programs or in partnership with other state and federal programs.

Table 18a. Stakeholder conservation land purchases and proposed purchases in the Silver Springs and Upper Silver River BMAP area

Lead Entity	Name of Conservation Purchase	Description	Purchase Status	Cost	Acreage Acquired	Year Acquired
DEP – Division of State Lands	**Acquisition of Indian Lake State Forest**	Acquisition of 4,400 acres of sandhills and pastureland previously known as Avatar property. Forest is within 2- and 10-year modeled capture areas for Silver Springs and contains Indian Lake, karst feature directly connected to UFA, and numerous sinkholes. Restoration of native sandhills is underway. Forest was acquired with Florida Communities Trust (FCT) contributing $76 million, with additional $2 million provided by Marion County.	Completed; managed by Florida Forest Service	$78,000,000	4,400	2007
DEP – Division of State Lands	**Silver Springs Conservation Area**	Acquisition of 346 acres of undeveloped land directly across SR 35 from Silver Springs State Park. Land was acquired under Florida's First Magnitude Springs Project by Division of State Lands. By preserving land around springs, project will help to protect springs, karst windows, and Floridan Aquifer from effects of commercial, residential, and agricultural runoff; clear cutting and mining; and unsupervised recreation.	Completed; managed by Marion County	$7,847,000	346	2005
ACEPD	**Little Orange Creek Land Acquisition**	Little Orange Creek addition is 699 acres in size. No increase in surface runoff of pollutants because of land use change, continued aquifer recharge and ecosystem/habitat preservation; implement Alachua County Comp Plan Conservation and Open Space Element – Alachua County Forever Policy 6.2.1.	Completed	$795,437.55	699	2012
ACEPD	**Phifer Flatwoods Land Acquisition #1 – Lochloosa Creek**	Phifer Flatwoods #1 is 600 acres in size. No increase in surface runoff of pollutants because of land use change; aquifer recharge and ecosystem/habitat preservation will continue; implements Alachua County Comp Plan Conservation and Open Space Element – Alachua County Forever Policy 6.2.1.	Completed	$2,882,239	600	2006

Lead Entity	Name of Conservation Purchase	Description	Purchase Status	Cost	Acreage Acquired	Year Acquired
ACEPD	**Phifer Flatwoods Land Acquisition #2 – Lochloosa Creek**	Phifer Flatwoods #2 is 380 acres in size. No increase in surface runoff of pollutants because of land use change; aquifer recharge and ecosystem/habitat preservation will continue; implements Alachua County Comp Plan Conservation and Open Space Element – Alachua County Forever Policy 6.2.1.	Completed	$1,170,864	380	2009
ACEPD	**Longleaf Flatwoods Preserve Land Acquisition**	Purchase of 1,388.5 acres of longleaf flatwoods. No increase in surface runoff of pollutants because of land use change; aquifer recharge and ecosystem/habitat preservation will continue; implements Alachua County Comprehensive Plan Conservation and Open Space Element – Alachua County Forever Policy 6.2.1.	Completed	$2,259,654	1,388.5	2003
ACEPD	**Rayonier Tract Acquisition (River Styx)**	Rayonier Tract purchase of 1,450 acres. No increase in surface runoff of pollutants because of land use change; aquifer recharge and ecosystem/habitat preservation will continue; implements Alachua County Comp Plan Conservation and Open Space Element – Alachua County Forever Policy 6.2.1.	Completed	$4,855,506	1,450	2008
ACEPD	**Freddy Wood Land Tract Acquisition**	Freddy Wood Tract covers 600 acres. No increase in surface runoff of pollutants because of land use change; aquifer recharge and ecosystem/habitat preservation will continue; implements Alachua County Comp Plan Conservation and Open Space Element – Alachua County Forever Policy 6.2.1.	Completed	$1,136,000	600	2008
SJRWMD	**Lochloosa Wildlife Conservation Area**	Acquisition of 28,337 acres of land around Lochloosa Lake and around north side of Orange Lake for Lochloosa Wildlife Conservation Area.	Completed; managed by SJRWMD	$16,058,211 Cost-Share	28,337	2003
ACEPD	**Cypress Point Creamery Land Acquisition**	Acquisition of 600 acres. No increase in surface runoff of pollutants because of land use change; aquifer recharge and ecosystem/habitat preservation will continue; implements Alachua County Comprehensive Plan Conservation and Open Space Element – Alachua County Forever Policy 6.2.1.	Completed	$461,000	600	2014

Lead Entity	Name of Conservation Purchase	Description	Purchase Status	Cost	Acreage Acquired	Year Acquired
ACEPD	**Higginbotham Ranch Acquisition**	Acquisition of 600 acres. No increase in surface runoff of pollutants because of land use change; aquifer recharge and ecosystem/habitat preservation will continue; implements Alachua County Comp Plan Conservation and Open Space Element – Alachua County Forever Policy 6.2.1.	Completed	$756,000	600	2014
Marion County Parks	**Silver Springs Sandhill Acquisition**	Marion County applied to have the Silver Springs Sandhill acquisition project added to the Florida Forever list. This project would preserve 470 acres of high recharge sandhills that are within a mile of Silver Springs. The project is located just south of Indian Lake State Forest and east of the Cohadjoe Park (County). The majority of the acreage is zoned for medium and high density residential use but 221 acres are currently used for improved cattle with the balance being pasture unmanaged hardwoods. Acquisition has been assigned to a third-party non-profit organization to close the sale of this site. Site has been acquired and is under management by Marion County Parks and Recreation. Consultants are being solicited to write state-required Unit Management Plan.	Completed	$4,432,979	470	2017
Marion County Parks	**Silver Springs Forest**	This project involves acquisition of 4,900 acres of managed forest land, owned by Rayonier, east of Indian Lake State Forest and west of C.R. 315. The acquired land will be restored to an appropriate ecosystem and opened for recreational use. This tract is identified in the Heather Island Florida Forever Project and as a US Forest Service Forest Legacy Project: Silver Springs Watershed (Phase 1).	Completed	Not available	4,900	2016

Lead Entity	Name of Conservation Purchase	Description	Purchase Status	Cost	Acreage Acquired	Year Acquired
Marion County Parks	**Heather Island Conservation Easement**	Project established conservation easement on 5,223 acres of privately owned forest land east of CR 315 along Ocklawaha River. Tract is part of Heather Island Florida Forever Project and is identified as Phase 2 of Silver Springs Watershed Forest Legacy Project. Land has been acquired by SJRWMD with plans for surface water improvements underway.	Completed	Not available	5,223	2016

Table 18b. Stakeholder conservation land purchases and proposed purchases in the Rainbow Spring Group and Rainbow River BMAP area

TBD = to be determined.

Lead Entity	Name of Conservation Purchase	Description	Purchase Status	Cost	Acreage Acquired	Year Acquired
DEP – Division of State Lands	**Rainbow River Corridor**	Rainbow River Corridor project is designed to protect most of undeveloped or minimally developed private land remaining along Rainbow River. Southern parcels would bring remaining large portion of undeveloped shoreline along eastern side of the river into state ownership, and provide connection to southern end of Rainbow Springs State Park. Public acquisition of these lands will prevent further development and conflicting land uses that could further degrade ecological value of area. In addition, potential restoration of altered habitats would help restore and maintain water quality and habitat along one of Florida's largest spring-run streams. 32 acres were acquired for Blue Run of Dunnellon Park (R013) in 2008.	Completed; Managed by Florida Forest Service	$3,200,000	32	2007
DEP – Division of State Lands	**South Goethe**	Addition provides corridor from Goethe State Forest to Marjorie Harris Carr Cross-Florida Greenway State Recreation and Conservation Area along Withlacoochee River and also forms linkage to Etoniah Cross-Florida Greenway Florida Forever project. One of primary concepts of project is to protect Withlacoochee River Watershed by connecting Goethe State Forest with Greenway. Another stated goal of project is to provide significant buffer along southern boundary of forest while eventually enhancing forest and its associated habitat through restoration.	Underway	Estimated $11,574,303		TBD
DEP – Division of State Lands	**Bear Hammock**	Acquiring Bear Hammock project in southern Marion County would meet state goals of enhanced coordination of land-acquisition efforts by making conservation link that fills gap among several other properties. One goal of state conservation is to preserve areas of at least 50,000 acres, and Bear Hammock provides connector between Goethe State Forest and Marjorie Harris Carr Cross-Florida Greenway, creating continuity of more than 200,000 acres.	Underway	Estimated $32,576,529		TBD

Lead Entity	Name of Conservation Purchase	Description	Purchase Status	Cost	Acreage Acquired	Year Acquired
DEP – Division of State Lands	**Carr Farm/Price's Scrub**	The Carr Farm/Price's Scrub in southwestern Alachua County and northwestern Marion County includes scrub, upland mixed forest, scrubby flatwoods, wet flatwoods, depression marsh, marsh lake and sinkhole lake. This scrub is one of the northernmost examples of the community in peninsular Florida. 962 acres, located in Marion County, have been acquired to date. Purchase of remaining 305 acres to complete acquisition.	Underway	Estimated $2,061,144		TBD

2.13 Commitment to Implementation

Successful BMAP implementation requires commitment, dedicated state funding, and follow-up. Stakeholders have expressed their intention to carry out the plan, monitor its effects, and continue to coordinate within and across jurisdictions to achieve nutrient reduction goals. As the TMDLs must be achieved within 20 years, DEP, WMDs, FDOH, and FDACS will implement management strategies using the annual Legacy Florida appropriation from the legislature of at least $50 million to reduce nitrogen in impaired OFS. DEP, working with the coordinating agencies, will continue to invest existing funds and explore other opportunities and potential funding sources for springs restoration efforts.

Conversations held during BMAP development led to agreement among stakeholders to endorse a set of Guiding Principles that direct the implementation of this BMAP, as follows:

- Stakeholders are encouraged to implement, where feasible, emerging treatment technologies or innovative uses of more established technologies that offer improved nitrogen treatment efficiency over available typical treatment practices.

- To focus efforts in areas of high nitrogen loading, stakeholders are encouraged to use the NSILT or develop their own methods to determine areas of high loading.

- To focus efforts in areas of high nitrogen loading, stakeholders are encouraged to develop decision-making processes to prioritize potential retrofit projects. These prioritization processes can be included in the BMAP as projects.

- Stakeholders are encouraged to participate in public outreach and education programs that make information available to residents in urban areas regarding methods they can use to reduce nitrogen sources and protect springs. Efforts that are not communitywide should be directed towards areas of high loading.

    - Coordination of outreach efforts and messaging about springs between organizations and local governments is important and is addressed through project B036.

- Stakeholders are encouraged to consider implementing ordinances and regulations to address the overapplication of nitrogen from fertilizer in landscape areas.

    - Operators of golf courses are encouraged to implement the practices in DEP's BMP manual for golf courses.

    - Operators of golf courses and other entities, such as homeowner associations, using reuse water are encouraged to learn how to properly adjust the fertilizer application rate to account for nitrogen supplied through reuse water.

- Agricultural activities should strive to achieve the most appropriate and effective nutrient management that decreases potential for runoff or leaching of nutrients to the environment.
    - Proper manure management is critical on animal operations at all scales, from hobby farm to commercial, to protect environmental resources.
    - Management of the frequency, timing, and amount of irrigation applications to target water delivery to the plant root zone.

Section 3: Monitoring and Reporting

3.1 Methods for Evaluating Progress

DEP will work with stakeholders to track project implementation and organize the monitoring data collected each year. The project and monitoring information will be presented in an annual update. Stakeholders have agreed to meet at least annually after the adoption of the BMAP to follow up on plan implementation, share new information, and continue to coordinate on TMDL restoration–related issues. The following activities may occur at annual meetings:

Implementation data and reporting:

- Collect project implementation information from stakeholders, including FDACS agricultural BMP enrollment and FDOH-issued permits, and compare with the BMAP schedule.
- Discuss the data collection process, including any concerns and possible improvements to the process.
- Review the monitoring plan implementation, as detailed in **Section 3.3**.

Sharing new information:

- Report on results from water quality monitoring and trend information.
- Provide updates on new management strategies in the basin that will help reduce nutrient loading.
- Identify and review new scientific developments on addressing nutrient loads and incorporate any new information into annual progress reports.

Coordinating on TMDL restoration–related issues:

- Provide updates from DEP on the basin assessment cycle and activities related to any impairments, TMDLs, and BMAP.
- Obtain reports from other basins where tools or other information may be applicable to the TMDLs.

3.2 Adaptive Management Measures

Adaptive management involves adjusting the BMAP when circumstances change or monitoring indicates the need for additional or more effective restoration strategies. Adaptive management measures may include the following:

- Implementing procedures to determine whether additional cooperative strategies are needed.

- Using criteria/processes for determining whether and when plan components need revision because of changes in costs, project effectiveness, social effects, watershed conditions, or other factors.

- Revising descriptions of stakeholders' roles during BMAP implementation and after BMAP completion.

- Updating information on corrective actions (and any supporting documentation) being implemented as data are gathered to refine project implementation schedules and performance expectations.

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

3.3 Water Quality and Vegetation Monitoring

The purpose of the monitoring network is to support the evaluation of progress made toward achieving the TMDL target nitrate concentration of 0.35 mg/L. The sampling locations, frequency, and sampled parameters identified in this chapter represent the minimum requirements needed to achieve this purpose. The monitoring strategy includes the following distinct sampling networks:

- A Surface Water Network to evaluate the water quality of Silver River and Rainbow River and their associated springs and identify and track changes.

- A Groundwater Network to evaluate changes in groundwater quality in the Silver Springs and Rainbow Springs BMAP areas, as well as the response of the aquifer to different land uses.

- A Targeted Groundwater Network to evaluate the general conditions of the Floridan Aquifer in the Silver Springs and Rainbow Springs BMAP area using public water supply and surveillance well data, and to aid in the identification of "hot spot" areas with persistent elevated concentrations of nitrate.

- Aquatic Vegetation Monitoring Network for Silver River and Rainbow River.

3.3.1 Objectives

Focused objectives are critical for a monitoring strategy to provide the information needed to evaluate implementation success. Since the BMAP implementation involves an iterative process, the monitoring efforts are related to primary and secondary objectives. The primary objectives

focus on achieving water quality targets, while the secondary objectives focus on water quality parameters that can be used to provide information for future refinements of the BMAP. The monitoring strategy may be updated as necessary.

Surface Water Monitoring Network Goals and Objectives:

- Primary Objective: Identify and track changes in nitrate concentration in spring discharges and in Silver River and Rainbow River to determine if TMDL targets are being achieved.

- Secondary Objective: Estimate TN loadings and track changes in TN loading for Silver River and Rainbow River.

Groundwater Monitoring Network Goals and Objectives:

- Primary Objective: Identify and track changes in nitrate concentration in the UFA at specific well locations to estimate progress made towards achieving the TMDL target concentration.

- Secondary Objective: Determine the response of UFA nitrate concentrations to different land uses.

- Secondary Objective: Provide a comparison of nitrate concentrations between the surficial and Floridan Aquifers.

Targeted Groundwater Monitoring Network Goals and Objectives:

- Primary Objective: Evaluate the condition of the UFA to determine if patterns in nitrate concentration are occurring.

- Secondary Objective: Support identification of hot spots, or areas with persistent elevated levels of nitrate, for further investigation of the sources and causes of the problem.

Aquatic Vegetation Monitoring Network

- Primary Objective: Map, monitor, and evaluate SAV.

- Secondary Objective: Identify and track the biological response of Silver Springs, Silver Springs Group, and Silver River to changes in nitrate concentration.

3.3.2 Water Quality Parameters, Frequency, and Network

Table 19 lists the indicators monitored by each network for each spring and river system. For this BMAP, nitrate is the core parameter measured to track progress in decreasing concentrations in groundwater and surface waters. TN and its components nitrate, ammonia, and organic

nitrogen measurements are the core parameters needed to estimate nitrogen loading in the Silver and Rainbow Rivers. The other parameters are considered supplementary parameters for the BMAP, as they build information about groundwater, the springs, and surface waters, but are not direct measurements of impairment.

At a minimum, the core parameters will be tracked to determine the progress that has been made towards meeting the TMDLs and/or achieving the numeric nutrient criteria (NNC). Resource responses to BMAP implementation may also be tracked. A significant amount of time may be needed for changes in water chemistry to be observed.

Table 19. Minimum core monitoring indicators

Indicator	Groundwater Monitoring Network	Surface Water Monitoring Network	Aquatic Vegetation Network
Dissolved Oxygen (DO)	√	√	√
Specific Conductance	√	√	√
pH	√	√	√
Nitrate	√	√	
TN – Includes Total Kjeldahl Nitrogen (TKN), Nitrate, Ammonia	√	√	√
Total Organic Carbon (TOC)	√	√	-
TP	√	√	√
Total Suspended Solids (TSS)		√	-
Chloride, Sulfate, Fluoride	√	√	-
Alkalinity	√	√	-
Turbidity		√	
Color		√	
Photosynthetically Active Radiation (PAR)	-	√	-
Chlorophyll *a*	-	√	-
Algal Surveys and SAV Monitoring	-	-	√

Surface Water and Groundwater Monitoring Network locations were selected to represent the minimum density of data collection sites needed to track changes in water quality and allow the annual evaluation of progress toward achieving the TMDL.

Figure 6a shows the location of active Silver River surface water quality monitoring stations, and **Table 20a** lists the station locations. There are additional sampling locations in the Ocklawaha River upstream and downstream of Silver River. Surface water data are collected to represent conditions in each of the impaired waterbodies as well as downstream conditions. SJRWMD and DEP's Oklawaha River Aquatic Preserve staff collect surface water quality data. SJRWMD typically samples at stations every other month, or six times per year, and the Oklawaha River Aquatic Preserve samples quarterly. Discharge information is collected downstream of Mammoth Spring, at USGS site number 02239501, Silver River Near Ocala, Fl.

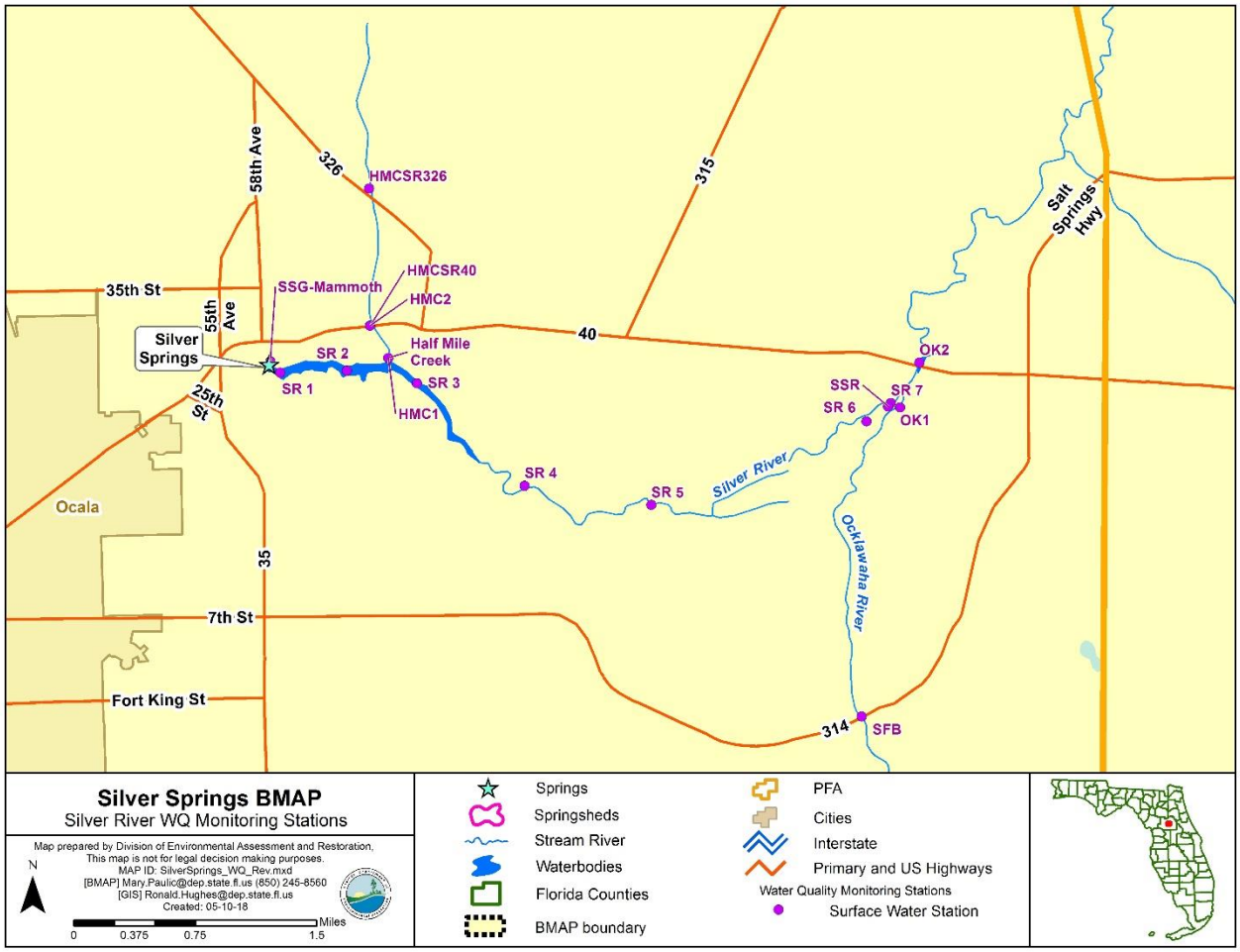

Figure 6a. Surface water stations sampled for the Silver Springs and Silver River

Table 20a. Description of surface water monitoring locations for Silver Springs and Silver River

- = Empty cell/no data.
*=Storm event sampling only.

Station Description	SJRWMD Station	DEP Station	Description and Purpose
Main Spring	SSG – Mammoth Spring	SR1	WBID 2772A; track nitrate levels in springs discharge
Silver River upstream of Half Mile Creek		SR2	WBID 2772C; track nitrate levels
Half Mile Creek	Half Mile Creek HMCSR40* HMCSR326*	HMC2 HMC1	Source of turbidity and water quality impacts to Silver River
Silver River downstream of Half Mile Creek	-	SR3	WBID 2772E; measure effect of Half Mile Creek
Silver River at downstream end of WBID	-	SR4	WBID 2772E
Silver River downstream of impaired WBIDs	-	SR5	Downstream of impaired WBIDs to measure impact on unimpaired Silver River
Silver River upstream of confluence with Ocklawaha River	SSR	SR6 SR7	Downstream of impaired WBIDs; monitors water quality of Silver River delivered to Ocklawaha River

Figure 6b shows the locations of active Rainbow River and springs surface water monitoring locations, and **Table 20b** lists the station locations. SWFWMD and DEP's Rainbow River Aquatic Preserve staff collect samples quarterly. Rainbow River discharge information is collected downstream near Dunnellon, at USGS site number 02313100, Rainbow River at Dunnellon, Fl.

Figure 7a shows the locations where SJRWMD conducts groundwater sampling in the Silver Springs and Upper Silver River BMAP area. **Figure 7b** shows the locations where SWFWMD conducts groundwater sampling in the Rainbow Spring Group and Rainbow River BMAP area. DEP and SWFMWD are expanding the groundwater monitoring network for Rainbow Springs to give better spatial coverage of groundwater quality and improve estimates of groundwater levels used for the estimation of the direction of groundwater movement.

Station locations for the surface water networks and the groundwater networks will be reviewed annually and modified as needed. The results of water quality data collection and any adjustments to monitoring locations will be reported annually to stakeholders.

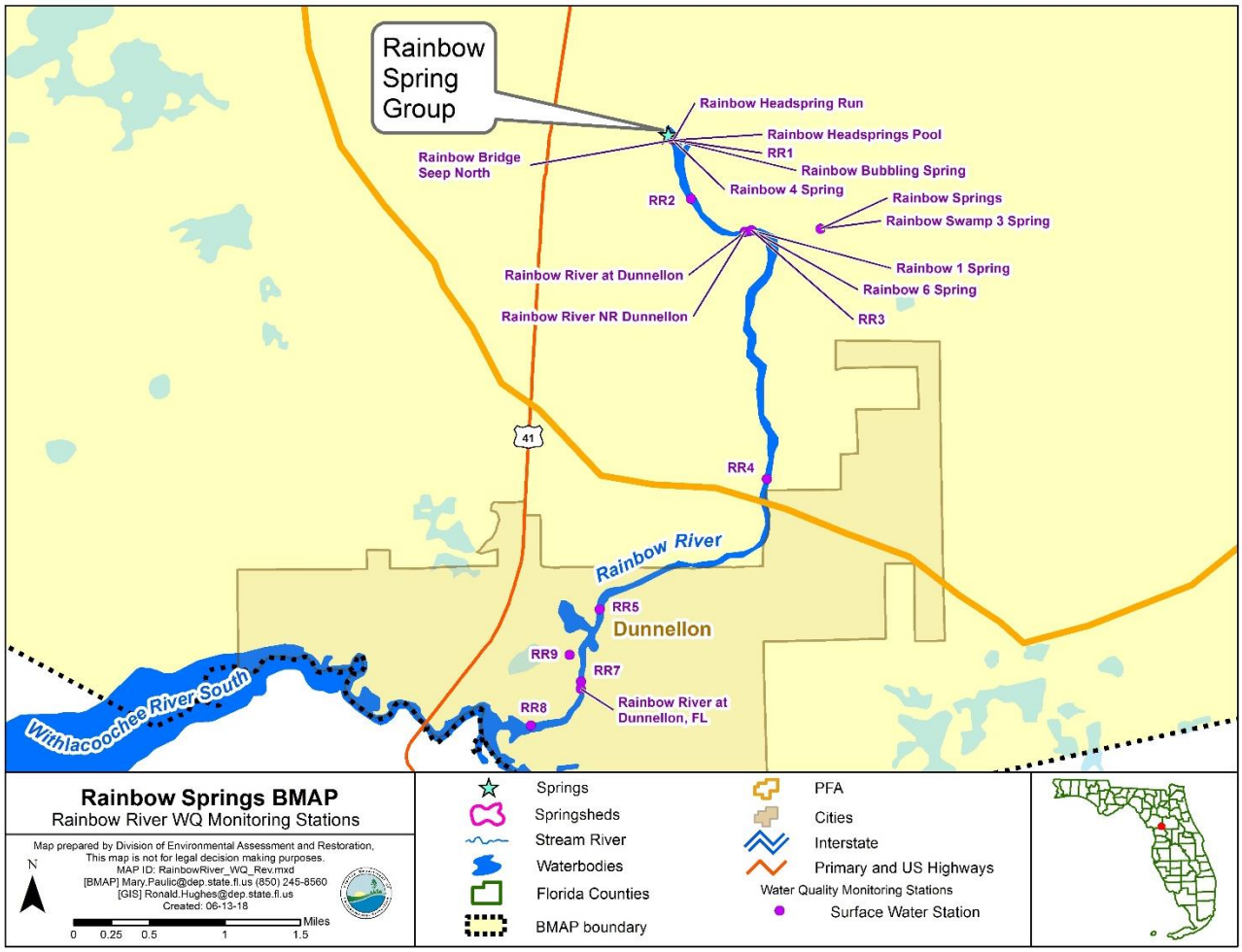

Figure 6b. Surface water stations sampled for Rainbow Springs Group and the Rainbow River

Table 20b. Description of surface water monitoring locations for Rainbow Spring Group and Rainbow River

Station Description	SWFWMD/DEP Station	Description and Purpose
Rainbow 1 spring at vent	Rainbow 1 Spring	WBID 1320A; track nitrate levels in springs discharge
Rainbow 4 spring at vent	Rainbow 4 Spring	WBID 1320A; track nitrate levels in springs discharge
Rainbow 6 spring at vent	Rainbow 6 Spring	WBID 1320B; track nitrate levels
Rainbow bridge seep north spring at vent	Rainbow Bridge Seep North	WBID 1320A; track nitrate levels in springs discharge
Rainbow Bubbling Spring at vent	Rainbow Bubbling Spring	WBID 1320B; track nitrate levels
Rainbow Swamp 3 spring at vent	Rainbow Swamp 3 Spring	WBID 1320A; track nitrate levels in springs discharge
Rainbow River Headspring Pool river segment	Rainbow Headspring Pool	WBID 1320A; track nitrate levels in springs discharge
Rainbow River Headspring Run river segment	Rainbow Headspring Run	WBID 1320A; track nitrate levels in springs discharge
Rainbow River at Dunnellon river segment	Rainbow River at Dunnellon	Downstream of impaired segments to measure impact on Rainbow River
Rainbow River Near Dunnellon river segment	Rainbow River NR Dunnellon	Downstream of impaired segments to measure impact on Rainbow River
Rainbow River 1 segment	RR1	WBID 1320B; track nitrate levels
Rainbow River 2 segment	RR2	WBID 1320B; track nitrate levels
Rainbow River 3 segment	RR3	WBID 1320B; track nitrate levels
Rainbow River 4 segment	RR4	Downstream of impaired segments to measure impact on Rainbow River
Rainbow River 5 segment	RR5	Downstream of impaired segments to measure impact on Rainbow River
Rainbow River 7 segment	RR7	Downstream of impaired segments to measure impact on Rainbow River
Rainbow River 8 segment	RR8	Downstream of impaired segments to measure impact on Rainbow River
Rainbow River 9 segment	RR9	Downstream of impaired segments to measure impact on Rainbow River

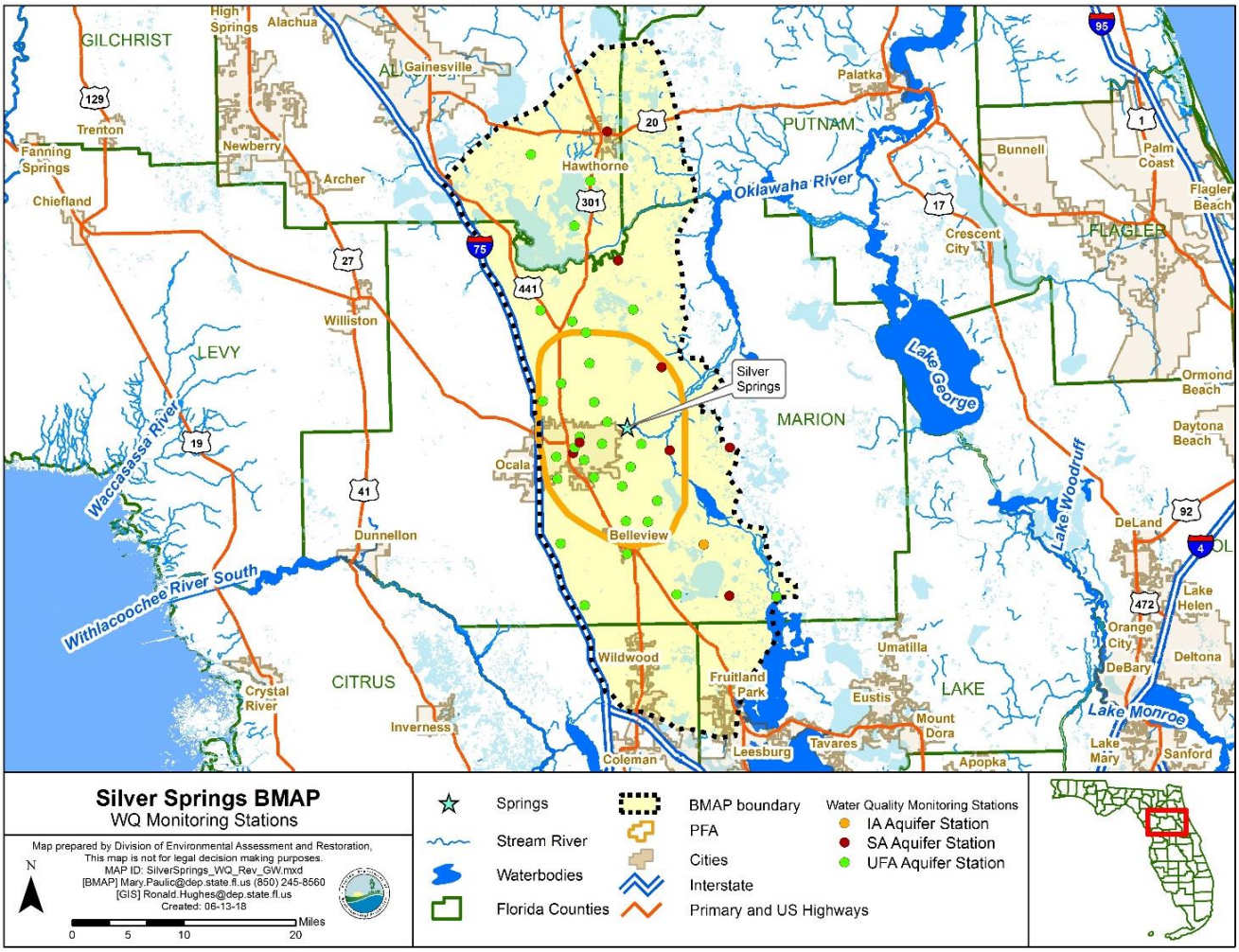

Figure 7a. Groundwater stations sampled in the Silver Springs and Upper Silver River BMAP area

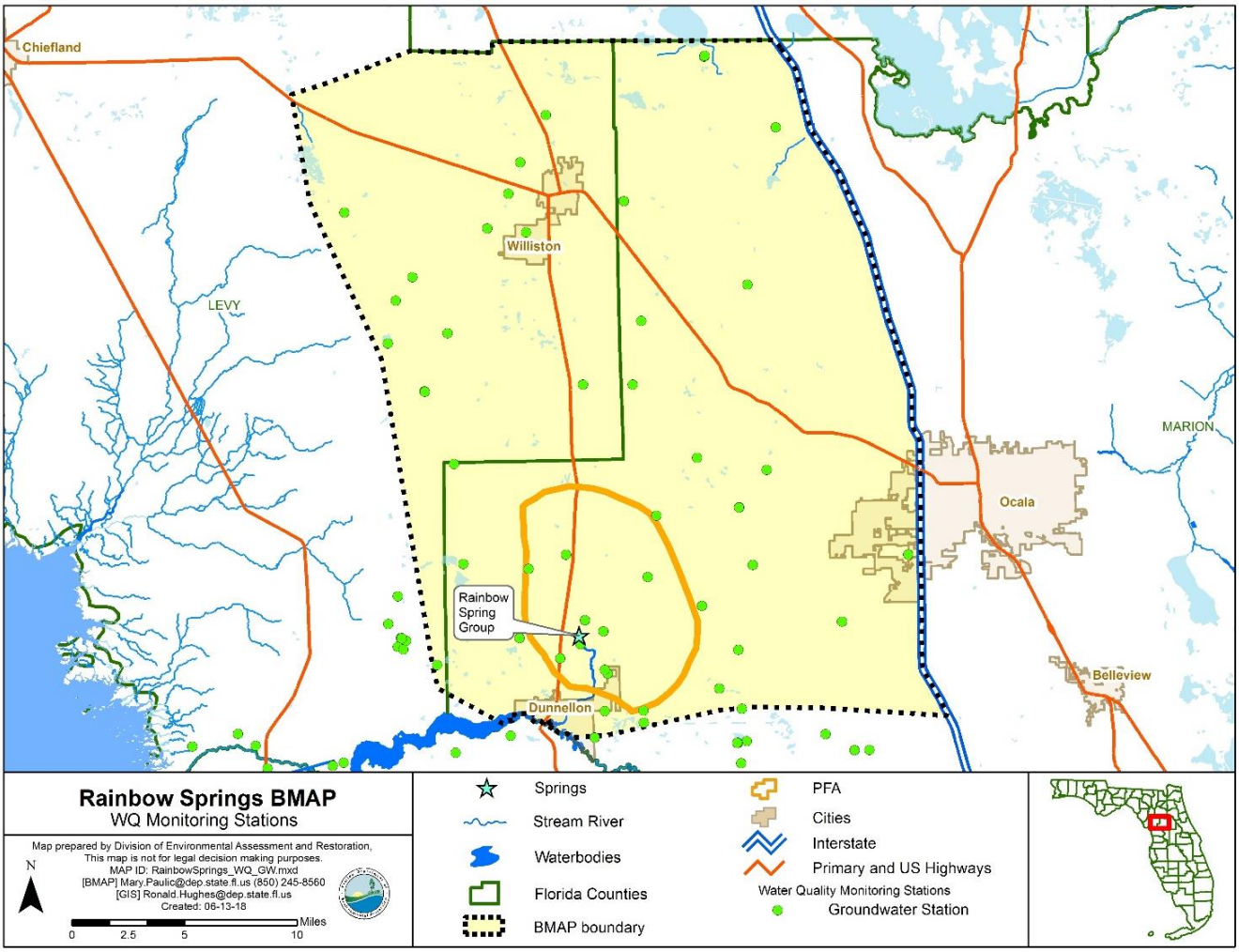

Figure 7b. Groundwater stations sampled in the Rainbow Spring Group and Rainbow River BMAP area

The Targeted Monitoring Network uses data collected from existing public water supply wells and surveillance wells. Depending on the number of people served, public water supply wells are permitted either by DEP as Potable Water Supply or by FDOH as Limited Use Systems. Nitrate is the core parameter, and data for this analyte are collected annually for DEP-permitted facilities and at least once every five years for FDOH-permitted facilities. Surveillance well data represent data collected by FDOH when there is suspected groundwater contamination in an area or well owner complaints. These data sources are evaluated every five years as part of the fifth-year assessment of progress made in implementing the TMDLs. The datasets are valuable for identifying locations in the BMAP area with persistent elevated levels of nitrate that should be investigated to provide information for the Additional Sources Identification Effort.

3.3.3 Aquatic Vegetation Monitoring

Mapping and evaluating SAV provides another tool for assessing the condition of Silver River and Rainbow River and identifying the responses of the vegetative community to changes in nitrate levels. For the Silver River, SJRWMD collects annual SAV data at the transect locations shown in **Figure 8**. SWFMWD surveys the Rainbow River for SAV every four to five years.

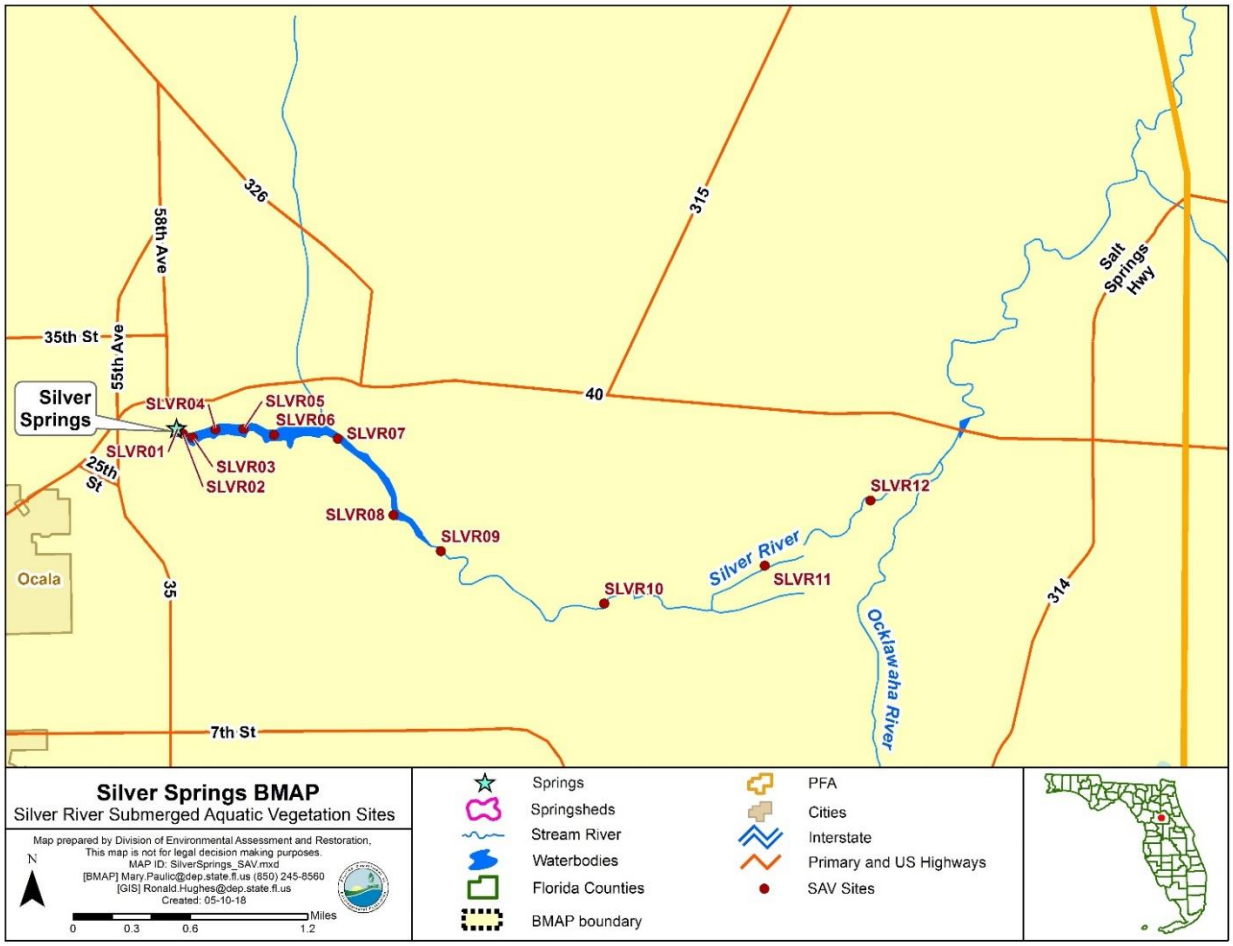

Figure 8. Location of SJRWMD SAV transects on the Silver River

3.3.4 Data Management and Assessment

As of June 30, 2017, water quality data in Florida are entered by the entity collecting the data into the Florida Watershed Information Network (WIN) Database, which has replaced the Florida Storage and Retrieval System (STORET) Database. DEP pulls water quality data directly from WIN and USGS for impaired waters evaluations and TMDL development. Data providers are required to upload their data regularly, so the information can be used as part of the water quality assessment process and for annual reporting. Data providers should upload their data to WIN upon the completion of the appropriate quality assurance/quality control (QA/QC) checks. All data collected in the last quarter of the calendar year should be uploaded no later than April 1 of the following year.

Biological data collected by DEP are stored in the DEP Statewide Biological (SBIO) database. Biological date should be collected and regularly provided to DEP following the applicable standard operating procedures. All biological data collected in the last quarter of the calendar year should be uploaded or provided no later than April 1 of the following year.

The water quality data will be analyzed during BMAP implementation to determine trends in water quality and the health of the biological community. A wide variety of statistical methods are available for the water quality trend analyses. The selection of an appropriate data analysis method depends on the frequency, spatial distribution, and period of record available from existing data. Specific statistical analyses were not identified during BMAP development.

3.3.5 QA/QC

Stakeholders participating in the monitoring plan must collect water quality data in a manner consistent with Chapter 62-160, F.A.C., and DEP standard operating procedures (SOPs) for QA/QC required by rule. The most current version of these procedures is available on the DEP website. For BMAP-related data analyses, entities should use National Environmental Laboratory Accreditation Conference (NELAC) National Environmental Laboratory Accreditation Program (NELAP)–certified laboratories or other labs that meet the certification and other requirements outlined in the SOPs.

SJRWMD staff and contractors collect, process, and preserve samples according to the SJRWMD's *Standard Operating Procedures for the Collection of Surface Water Quality Samples and Field Data–Feb. 13, 2004*, as well as DEP's SOPs. Through cooperation on TMDL-related data collection, the SJRWMD and DEP have consistently used similar SOPs for field sampling and lab analyses. This consistency will continue into the future to ensure that data can be used not only for tracking BMAP progress but also for future TMDL evaluations and other purposes.

Appendices

Appendix A. References Cited and Important Links

The links below were correct at the time of document preparation. Over time, the locations may change and the links may no longer be accurate. None of these linked materials is adopted into this BMAP.

- DEP website: http://www.floridadep.gov.
- DEP Map Direct webpage: https://ca.dep.state.fl.us/mapdirect/.
- Searchable online version of PFA maps: https://www.floridadep.gov/pfamap.
- Florida Statutes: http://www.leg.state.fl.us/statutes:
    - Florida Watershed Recovery Act (Section 403.067, F.S.).
    - Florida Springs and Aquifer Protection Act (Part VIII of Chapter 373, F.S.).
- DEP Model Ordinances: http://fyn.ifas.ufl.edu/fert_ordinances.html.
- DEP Standard Operating Procedures for Water Quality Samples: https://floridadep.gov/dear/quality-assurance/content/dep-sop.
- NELAC NELAP: https://fldeploc.dep.state.fl.us/aams/index.asp.
- FDACS BMPs: https://www.freshfromflorida.com/Business-Services/Best-Management-Practices-BMPs/Agricultural-Best-Management-Practices
- FDACS BMP and Field Staff Contacts: http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy
- Florida Administrative Code (Florida Rules): https://www.flrules.org/.
- UF–IFAS Research: http://research.ifas.ufl.edu/.

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Appendix B. Projects to Reduce Nitrogen Sources

Prioritization of Management Strategies

The management strategies in **Tables B-1** and **B-2** are ranked with a priority of high, medium, or low. In 2016, the Florida Legislature amended the FWRA (Section 403.067, F.S.), creating additional requirements for all new or revised BMAPs. BMAPs must now include planning-level details for each listed project, along with its priority ranking.

Project status was selected as the most appropriate indicator of a project's priority ranking based primarily on need for funding. Projects with a "completed" status were assigned a low priority. Projects classified as "underway" were assigned a medium priority because some resources have been allocated to these projects, but additional assistance may be needed for the project to be completed. High priority was assigned to projects listed with as "planned" as well as certain "completed" projects that are ongoing each year (any of these project types: "street sweeping," "catch basin inserts/inlet filter cleanout," "public education efforts," "fertilizer cessation," "fertilizer reduction," or "aquatic vegetation harvesting"), and select projects that are elevated because substantial, subsequent project(s) are reliant on their completion.

Description of the Management Strategies

Responsible entities submitted these management strategies to DEP with the understanding that the strategies would be included in the BMAP, thus requiring each entity to implement the proposed strategies in a timely way and achieve the assigned load reduction estimates. However, this list of strategies is meant to be flexible enough to allow for changes that may occur over time. Any change in listed management strategies, or the deadline to complete these actions, must first be approved by DEP. Substituted strategies must result in equivalent or greater nutrient reductions than expected from the original strategies.

While the 20-year planning period for this BMAP is 2018 to 2038, projects completed since January 1, 2010, count toward the overall nitrogen reduction goals.

Estimated nitrogen reductions are subject to refinement based on DEP verification and/or on adjustment to calculations based on loading to groundwater rather than surface water. Agricultural load reductions (FDACS-01 and FDACS-02) assume 100 % enrollment and verification. Projects with a designation of TBD (to be determined) denotes that information is not currently available but will be provided by the stakeholder when it is available. Projects with a designation of N/A (not applicable) indicates that the information for that category is not relevant to that project. Projects with a designation of "Not Provided" denotes that information was requested by DEP but was not provided by the lead entity.

Projects with the prefix S apply to the Silver Springs and Upper Silver River BMAP area. Projects with the prefix R apply to the Rainbow Spring Group and Rainbow River BMAP area. The prefix B means that the project is either located in the area where the two springsheds

interact and its benefits are applicable to both BMAP areas, or that a policy applies to both springsheds.

Credits assigned to projects adjust for source attenuation and recharge rate. Stormwater and agriculture fertilizer projects were assigned the recharge rate for the project location. Only stormwater projects located on soils that had some denitrification capability or the project used bioasbsorptive medias to reduce nitrogen loading were given credit. OSTDS project reduction estimates were based on basin weighted recharge rates to provide planning level estimates of loading reductions. State roads were mapped with recharge and rates assigned to segments of roadway. The recharge rate used for state road projects (street sweeping and fertilizer cessation) was weighted by the number of miles of roadway in each recharge category.

Table B-1. Stakeholder projects to reduce nitrogen sources in the Silver Springs BMAP area

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Growth Services	B001	Marion County Transfer of Development Rights (TDR)	TDR Program is designed to protect natural resources, especially those listed in Policy 1.1.2 of Conservation Element of Marion County Comprehensive Plan and locally important and prime farmlands in Marion County. These resources include, but are not limited to, preservation of high-water recharge and underground drainage basins, springs, karst areas, sinkholes, sinks, sinkhole ponds, and other karst features. Land from which development rights are transferred is subject to conservation easement. Article 3 of Land Development Code defines TDR Program and eligible sending and receiving areas.	Study	Completed	2000	Not Provided	FF	N/A	Not Provided	Not Provided	Not Provided
Marion County Growth Services	B002	Marion County Transfer of Vested Rights (TVR)	TVR Program is designed to minimize dense development of vested properties without central water and sewer systems, and/or other supporting infrastructure, and thus protect natural resources, encourage and enhance development of larger parcels, reduce county's inventory of vested properties, and permit county to better plan for future growth. Land from which vested rights are transferred is subject to conservation easement. Article 3 of Land Development Code defines TVR Program and eligible sending and receiving areas.	Study	Completed	2000	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided
Marion County Growth Services	B003	Marion County Hamlet Design Option	Comprehensive Plan Future Land Use Element Policy 2.1.13 establishes Hamlet Development Option, designed to provide for clustered low-density development patterns in rural designated lands,	Study	Completed	2000	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			while requiring permanent open spaces reserved from development and some increased additional urban services (e.g., central water, central sewer, designed/ constructed stormwater systems) that comply with Marion County's design and development standards, including Springs Protection. Article 3 of Land Development Code generally defines Hamlet design provisions.									
Marion County Growth Services	B004	Marion County Rural Community Land Use Designation	Comprehensive Plan Future Land Use Element Policy 2.1.18 establishes Rural Community future land use designation to provide for clustered urban density development patterns in rural designated lands, while requiring permanent open spaces reserved from development and complete urban services (e.g., central water, central sewer, and designed/constructed stormwater systems) that comply with Marion County's design and development standards, including Springs Protection. Article 3 of Land Development Code will generally define Rural Community design provisions.	Study	Completed	2000	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided
Marion County Growth Services	B005	Marion County Community Redevelopment Area Program	Comprehensive Plan Future Land Use Element Objective 2.2 establishes specific limited density and specialized design standards for wetland and floodplain areas slated for development. Articles 5 and 6 of Land Development Code set forth specific design and development criteria related to applicable areas.	Study	Completed	2000	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided
Marion County	B006	Marion County Springs	Comprehensive Plan Future Land Use Element Objective 7.2 establishes Springs Protection	Study	Completed	2005	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Growth Services		Protection Zones	Overlay Zones (SPOZ) and identifies extent of Primary and Secondary Zones along with other design and development standards. Articles 5 and 6 of Land Development Code set forth specific design and development criteria related to applicable SPOZ.									
Marion County Office of the County Engineer	B007	Marion County Irrigation Ordinance	Ordinance sets enforceable irrigation schedule and rates of irrigation for Marion County. It also identifies efficient irrigation systems that are exempt from schedule.	Regulations, Ordinances, and Guidelines	Completed	2008	N/A	UTF	N/A	Not Provided	Marion County	Not Provided
Marion County Office of the County Engineer	B008	Marion County Fertilizer Ordinance	County's Florida-Friendly Fertilizer Use on Urban Landscapes Ordinance regulates proper use of fertilizers by any applicator; requires proper training of commercial and institutional fertilizer applicators; establishes training and licensing requirements; and specifies allowable fertilizer application rates and methods, fertilizer-free zones, low-maintenance zones, and exemptions. It requires use of BMPs that provide specific management guidelines to minimize negative secondary and cumulative environmental effects associated with misuse of fertilizers. Latest land development code now includes 2008 ordinance.	Regulations, Ordinances, and Guidelines	Completed	2008	N/A	UTF	N/A	Not Provided	Marion County	Not Provided
Florida Forest Service	B009	Silviculture BMP Implementation and Compliance	Covers silviculture lands in Rainbow and Silver Springs BMAP areas. BMPs for silviculture are applicable to public and private industrial and non-industrial forest-lands. Silviculture BMPs are minimum standards for protecting and maintaining water quality during ongoing silviculture activities, including forest	Agricultural BMPs	Completed	2004	N/A	FF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			fertilization. Projects include biennial BMP surveys, targeted training, and technical assistance for landowners and forestry professionals.									
Marion County Office of the County Engineer	B010	Clean Farms Initiative	Clean Farms Initiative was designed to assist Marion County farm owners and managers with implementation of BMPs, and to recognize them for their cooperative efforts. As part of initiative, more than 7,500 surveys and brochures were mailed in October 2006 to owners of agricultural land, ranging from large operations of several hundred acres to small tracts of land with fewer than 12 animals. Survey measures current manure management and fertilization practices. Results of survey, and input from focus groups held in February and March 2007, were used to create Farm Outreach Coordinator position to educate horse farm owners and managers on water quality, targeting practices such as manure management and fertilization.	Agricultural BMPs	Completed	2003	N/A	FF	N/A	Not Provided	Not Provided	Not Provided
UF–IFAS Extension Marion County	B011	Water Quality Education and Equine Farm BMPs	Equine BMPs and Manure Management Education and Outreach Program sponsored by UF–IFAS Extension and Marion County. Between 2010 and 2013 the program developed 44 types of educational materials, made 3,507 client consultations of which 464 were in field. 301 producers participated in group education events including manure management summit and tour. Program website received 446 views during this period. Program is ongoing.	Agricultural BMPs	Completed	2010	N/A	LW	N/A	Not Provided	IFAS	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
DEP	B012	Implementation of Outreach Program for Small Equine BMP Manual	Small Equine BMP manual is intended to educate owners of noncommercial horse farms on BMPs to reduce nutrient loads. Outreach program will be developed for effective implementation of BMPs on noncommercial horse farms in Silver and Rainbow Springs BMAP areas. Implementation program will identify key agencies with existing public education activities where BMP manual can be incorporated, develop or modify existing recognition programs to provide measurable goals for both participants and types of BMPs implemented, and identify existing cost-share programs that may assist noncommercial operations in BMP implementation.	Agricultural BMPs	Completed	2015	N/A	LW	N/A	Not Provided	Not Provided	Not Provided
FDOT District 5	B022	SR 40 Design Project-Pond 3	238719-1, SR 40 from County Road (CR) 328 to SW 80th Ave (CR 225A) – Pond 3/dry retention-closed basin in poorly drained soils	Retention BMP	Underway	2014	2020	UTF	3	Not Provided	Florida Legislature	Not Provided
FDOT District 5	B023	SR 40 Design Project-Pond 4	238719-1, SR 40 from CR 328 to SW 80th Ave (CR 225A) – Pond 4/dry retention-closed basin in poorly drained soils	Retention BMP	Underway	2014	2020	UTF	4	Not Provided	Florida Legislature	Not Provided
FDOT District 5	B024	SR 40 Design Project-Pond 5	238719-1, SR 40 from CR 328 to SW 80th Ave (CR 225A) - Pond 5/dry retention-closed basin in poorly drained soils	Retention BMP	Underway	2014	2020	UTF	4	Not Provided	Florida Legislature	Not Provided
FDOT District 5	B025	SR 40 Design Project-Pond 6	238719-1, SR 40 from CR 328 to SW 80th Ave (CR 225A) - Pond 6/dry retention-closed basin in poorly drained soils	Retention BMP	Underway	2014	2020	UTF	3	Not Provided	Florida Legislature	Not Provided
Marion County Office of the County Engineer	B028	SW 85th St/SW 40th Ave Stormwater Retrofit	Construction of drainage retention area lined with Bold and Gold soil amendment to enhance nitrogen removal. Postconstruction event	Retention BMP with Nutrient	Completed	2012	2012	UTF	26	$330,000	Marion County Stormwater Assessment	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			monitoring has shown 70 % reduction in TN through soil amendment layer.	Reducing Media							, SWFWMD Cooperative Funding	
Marion County Office of the County Engineer	B029	West Highway 316 at 119th Ave Stormwater Retrofit	Proposed project to construct wet retention area to reduce nitrate in stormwater runoff from transportation and residential land uses that is currently infiltrating to aquifer without treatment. project is currently identified in adopted 2014 Stormwater Implementation Plan.	Retention BMP	Completed	2016	2016	UTF	4	$52,654	Marion County Stormwater Assessment , SWFWMD Cooperative Funding	Not Provided
Marion County Office of the County Engineer	B030	West Highway 316 at Highway 329 Stormwater Retrofit	Proposed project to construct retention area to reduce nitrate in stormwater runoff from transportation and residential land uses that is currently infiltrating to aquifer without treatment. project is currently identified in adopted 2014 Stormwater Implementation Plan.	Retention BMP	Canceled	N/A	N/A	UTF	N/A	N/A	N/A	N/A
Marion County Office of the County Engineer	B032	Sinkhole Repair Program in County Drainage Retention Areas (DRAs)	Part of ongoing stormwater system maintenance activities. Performed as needed by county crews or contractors depending on size and scope of repair.	Stormwater System Operation and Maintenance	Completed	2003	N/A	UTF	N/A	N/A	Marion County Annual Stormwater Budget for Internal Repairs-$50,000 Typical Annual Expenditure for Contracted Repairs from Stormwater Budget – $10K–$100K	Not Provided
Marion County Office of the County Engineer	B033	Street Sweeping of Marion County Roads	Sweeping of Marion County–maintained roads. Sweeping of roads with curb and gutter is completed nine times per year. Benefits: Remove debris, sediment,	Street Sweeping	Completed	2003	N/A	UTF	30	N/A	Marion County Stormwater Assessment	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			and potential pollutants from streets. Prevent entry into storm sewer system.									
Marion County Office of the County Engineer	B034	Marion County WMP	Countywide WMPs prepared that include creation and maintenance of comprehensive geodatabase for Marion County storm sewer system data, watershed boundaries, and hydrologic features countywide.	Study	Completed	2003	Not Provided	UTF	N/A	$337,000	Marion County Stormwater Assessment, SWFWMD	Not Provided
Marion County Office of the County Engineer	B035	Marion County Aquifer Vulnerability Assessment	Identification of vulnerable areas of aquifer. Project provided scientifically defensible water resource management and protection tool that facilitates planning of human activities to help minimize adverse impacts on groundwater quality. Aquifer vulnerability maps are displayed in classes of relative vulnerability (one area is more vulnerable than another). Maps benefit local government, planners and developers in guiding growth into more appropriate areas (e.g., groundwater recharge areas) and improve site selection for expanding existing or establishing new well fields. Benefits: Identifies areas where aquifer is vulnerable to pollution. Potential for future management of activities in those areas to reduce groundwater pollution.	Study	Completed	2007	2007	UTF	N/A	$82,850	Marion County Stormwater Assessment	$82,850
Marion County Office of the County Engineer	B036	Public Education Coordination	Formation of public education coordination team consisting of representatives from local government, state agencies, WMDs, and local interest groups. Purpose of groups would be to ensure consistent and accurate information on pollution prevention is provided to citizens and maximize efforts among coordination team members.	Education Efforts	Completed	2017	N/A	UTF	N/A	Not Provided	Local, State and Federal Agencies, WMDS, Local Interest Groups	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Office of the County Engineer	B037	Marion County Stormwater Program - National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit	Public outreach and education programs including informational pamphlet distribution, PSAs, and public outreach events. Other efforts include illicit discharge inspection and education, mapping and modeling efforts, construction site pollution prevention program, and municipal operations pollution prevention program.	Education Efforts	Completed	2003	N/A	UTF	N/A	Not Provided	Marion County Stormwater Assessment	Not Provided
FDOT Districts 2 and 5	B038	FDOT Public Education	FDOT conducts inspections and provides annual illicit discharge, spill prevention and erosion and sediment control training to staff and contractors.	Education Efforts	Completed	2000	N/A	UTF	N/A	Not Provided	Florida Legislature	Not Provided
Rainbow River Conservation	B039	Springs Awareness for Educators	A workshop for Marion County teachers and educators to provide resources on springs, water issues and wildlife which can be used in classroom to enhance teaching common core standards.	Education Efforts	Completed	2014	N/A	UTF	N/A	Not Provided	SWFWMD, Florida Springs Institute	Not Provided
Private Interest	B040	Collection Center for Septic System Pumpage	Proposed project to construct centralized collection center for septic tank pumpage in lieu of land application currently done. Collection center would process pumpage and discharge into municipal collection system. Project is conceptual. SB 550 would ban land application of septic pumpage effective 2016.	Septage Land Application	Canceled	2020	N/A	OSTDS	N/A	N/A	N/A	N/A
FDACS	B041	FDACS Cost-Share Programs	FDACS will be providing at least $250,000 in BMP cost-share for Silver Springs/Rainbow Springs BMAP areas.	Agricultural BMPs	Underway	2014	2020	FF	N/A	Not Provided	FDACS Cost-Share	Not Provided
FDACS	B042	FDACS Refinement of Appropriate BMPs	To help focus cost-share expenditures and BMP implementation follow-up, FDACS will review its rule-adopted	Agricultural BMPs	Underway	2015	2020	FF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			cow/calf and equine BMPs to identify practices likely to have greatest nutrient load reduction benefits.									
UF-IFAS Extension Marion County	B043	Technical Agriculture Committee	Formation of technical agriculture committee consisting of representatives from local interest groups, local government, WMDs, and state agencies. Purpose of group is to ensure consistent and accurate information for pollutant load contribution associated with agricultural uses and evaluate effectiveness of BMPs.	Agricultural BMPs	Underway	2016	2020	FF	N/A	Not Provided	Not Provided	Not Provided
UF-IFAS Extension Marion County	B044	Assessment of the Role of Beef Cattle in Nitrogen Loading in the Silver and Rainbow Springs Basin	As part of BMAP, inventories have been developed that estimate relative nitrogen loading from different sources or categories of land use in basins. Concerns have been expressed that amount of nitrogen load allocated to cattle may not accurately reflect key characteristics of Florida cow-calf production system. These issues include typical cattle stocking rates on pasture, low inputs of commercial nitrogen fertilizer to pasture systems, diets based on C4 (i.e., warm climate) grasses with relatively low nitrogen concentration, nitrogen levels in dung and urine that are not comparable to those of dairy animals or beef cattle on feedlots, significant gaseous losses of nitrogen from animal waste, capability of grass roots to efficiently capture nitrogen as it passes through root zone, and amount of nitrogen stored in below-ground organs of pasture grasses. More accurate quantification of these characteristics for specific	Study	Underway	2016	2019	LW	N/A	$495,000	Florida Legislature	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			conditions of regional production systems will aid assessments of nitrogen loading from cattle operations.									
FDACS	B045	Revised Vegetable and Agronomic Crop BMP Manual	In 2015, FDACS OAWP adopted 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.	Agricultural BMPs	Completed	2015	2015	FF	N/A	Not Provided	Not Provided	Not Provided
FDACS	B046	Dairy BMP Manual	In early 2016, FDACS adopted dairy manual that targets dairies without DEP-issued National Pollutant Discharge Elimination System permits.	Agricultural BMPs	Completed	2015	2016	LW	N/A	Not Provided	Not Provided	Not Provided
FDACS	B047	Poultry BMP Manual	OAWP adopted poultry BMP manual in June 2016.	Agricultural BMPs	Completed	2015	2016	LW	N/A	Not Provided	Not Provided	Not Provided
FDACS	B048	Enhanced Implementation Assurance (IA) Program	Additional emphasis was given to IA in 2016 legislation, particularly Chapter 2016-1, Laws of Florida. Among its provisions, law requires enhancement and formalization of OAWP IA policies and procedures through rulemaking. Rulemaking will be initiated prior to January 1, 2017. Once rulemaking is completed, FDACS will implement enhanced IA Program and more detailed reporting, as prescribed by legislation, onsite visits and surveys will be provided on annual basis. Enhanced IA Program, as component of FDACS BMP Program, will be designed as follows: • To provide accurate and timely information on status of BMP enrollments. • To provide accurate and timely information on extent of BMP implementation.	Agricultural BMPs	Underway	2016	2018	FF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			• To provide information from which reports on BMP enrollment and implementation can be made to BMAP stakeholders and annual report required by Chapter 2016-1, Section 34, Laws of Florida. • To inform educational, research, and technical assistance efforts targeted to strengthen BMP implementation and effectiveness. • To guide review and potential revision of BMP manuals.									
City of Ocala	B049	Fox Meadow Sewer Expansion Project	Project objective is to design and construct sanitary sewer system to remove from service 275 septic tanks from associated single family residential lots. Septic tanks contribute to TN and total phosphorus (TP) impairment of Rainbow Springs and Rainbow River.	Septic Tank Phase Out, Wastewater Service Area Expansion	Planned	2018	2020	OSTDS	1,443	$4,705,000	City of Ocala	Not Provided
City of Ocala	B050	Fairfield Village Sewer Expansion Project	Project objective is to design and construct sanitary sewer system to remove from service package plant serving 350 mixed-use residential lots and 1 community center. Package plant contributes to TN and TP impairment of Rainbow Springs and Rainbow River.	Package Plant Phase Out, Wastewater Service Area Expansion	Planned	2018	2020	WWTF	TBD	$875,000	City of Ocala	Not Provided
City of Ocala	B051	Timberwood Sewer Expansion Project	Project objective is to design and construct sanitary sewer system to remove from service 180 septic tanks from associated single-family residential lots. Septic tanks contribute to TN and TP impairment of Rainbow Springs and Rainbow River.	Septic Tank Phase Out, Wastewater Service Area Expansion	Planned	2018	2020	OSTDS	1,483	$3,316,000	City of Ocala	Not Provided
ACEPD	S001	Fertilizer and Landscape Irrigation Codes	Alachua County – Adopt and enforce Fertilizer Management and Landscape Irrigation Ordinances. Benefits: Reduce volume of runoff from over irrigation and reduce nutrient loading from the use of fertilizers. Implements Alachua	Regulations, Ordinances, and Guidelines	Completed	2009	N/A	UTF	N/A	Not Provided	Alachua County General Fund	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			County Comp Plan Conservation and Open Space Element - Surface Water Systems Objective 4.6									
Villages Center CDD	S002	Stormwater Management-Policy Adoption	Adopted policy that prohibits illicit discharges for Villages Center CDD No. 1	Regulations, Ordinances, and Guidelines	Completed	2007	N/A	UTF	N/A	Not Provided	Villages Center CDD	Not Provided
Lake County Economic Growth	S003	Golf Course Resource Management Plan	Plans are applicable to unincorporated Lake County. They apply to new and existing golf courses. Regulatory approach will protect to groundwater and surface water.	Regulations, Ordinances, and Guidelines	Completed	2001	N/A	STF	N/A	Not Provided	Lake County	Not Provided
Lake County Public Works	S004	Lake County Shoreline Protection Guide	Guide for lakefront land owners on water resource issues, including shoreline protection, stormwater BMPs, erosion, and aquatic plants. Outreach program targeted at county residents. Inform property owners of better land management practices to improve water quality protection.	Regulations, Ordinances, and Guidelines	Completed	2000	N/A	UTF	N/A	Not Provided	Lake County	Not Provided
DEP - Division of State Lands	S005	Acquisition of Indian Lake State Forest	Acquisition of 4,400 acres of sandhills and pasture land previously known as Avatar property. Forest is in 2- and 10-year modeled capture areas for Silver Springs and contains Indian Lake, karst feature directly connected to UFA, and numerous sinkholes. Restoration of native sandhills is underway. Forest was acquired with FCT contributing $76,000,000, with additional $2,000,000 provided by Marion County.	Land Acquisition	Completed	2007	2007	UTF	N/A	$78,000,000	FCT, Marion County	Not Provided
DEP - Division of State Land	S006	Silver Springs Conservation Area	Acquisition of 346 acres of undeveloped land directly across SR 35 from Silver Springs State Park. Land was acquired under Florida's First Magnitude Springs Project by Division of State Lands.	Land Acquisition	Completed	2005	2005	UTF	N/A	$7,847,000	FCT	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			By preserving land around springs, project will aid in protection of springs, karst windows, and Floridan Aquifer from effects of commercial, residential, and agricultural runoff; clear-cutting and mining; and unsupervised recreation.									
ACEPD	S007	Little Orange Creek Land Acquisition	No increase in surface runoff of pollutants because of land use change, continued aquifer recharge and ecosystem/habitat preservation; implement Alachua County Comp Plan Conservation and Open Space Element - Alachua County Forever Policy 6.2.1.	Land Acquisition	Completed	2012	2012	UTF	N/A	$795,438	Alachua County Fee Simple, Wild Spaces and Public Places Sales Tax, North American Wetland Act Grant, Alachua Conservation Trust	Not Provided
ACEPD	S008	Phifer Flatwoods Land Acquisition #1 - Lochloosa Creek	No increase in surface runoff of pollutants because of land use change, continued aquifer recharge and ecosystem/habitat preservation; implement Alachua County Comp Plan Conservation and Open Space Element - Alachua County Forever Policy 6.2.1.	Land Acquisition	Completed	2006	2006	UTF	N/A	$2,882,239	Alachua County Forever Bond Proceeds	Not Provided
ACEPD	S009	Phifer Flatwoods Land Acquisition #2 - Lochloosa Creek; Little Lochloosa Creek	No increase in surface runoff of pollutants because of land use change, continued aquifer recharge and ecosystem/habitat preservation; implement Alachua County Comp Plan Conservation and Open Space Element - Alachua County Forever Policy 6.2.1.	Land Acquisition	Completed	2009	2009	UTF	N/A	$1,170,864	Alachua County Forever Bond Proceeds	Not Provided
ACEPD	S010	Longleaf Flatwoods Preserve Land Acquisition	No increase in surface runoff of pollutants because of land use change, continued aquifer recharge and ecosystem/habitat preservation; implement Alachua County Comp	Land Acquisition	Completed	2003	2003	UTF	N/A	$2,259,654	Alachua County Forever Bond Proceeds	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			Plan Conservation and Open Space Element - Alachua County Forever Policy 6.2.1.									
ACEPD	S011	Rayonier Tract Acquisition (River Styx)	No increase in surface runoff of pollutants du because of land use change, continued aquifer recharge and ecosystem/habitat preservation; implement Alachua County Comp Plan Conservation and Open Space Element - Alachua County Forever Policy 6.2.1.	Land Acquisition	Completed	2008	2008	UTF	N/A	$4,855,506	Alachua County Forever Bond Proceeds, SJRWMD, FFLP	Not Provided
ACEPD	S012	Freddy Wood Land Tract Acquisition	No increase in surface runoff of pollutants because of land use change, continued aquifer recharge and ecosystem/habitat preservation; implement Alachua County Comp Plan Conservation and Open Space Element - Alachua County Forever Policy 6.2.1.	Land Acquisition	Completed	2008	2008	UTF	N/A	$1,136,000	Alachua County Forever Bond proceeds, FFLP	Not Provided
SJRWMD	S013	Lochloosa Wildlife Conservation Area	Acquisition of land around Lochloosa Lake and around north side of Orange Lake for Lochloosa Wildlife Conservation Area. Benefits: No increase in surface runoff of pollutants because of land-use change.	Land Acquisition	Completed	2003	2003	UTF	N/A	$16,058,211	SJRWMD Ad Valorem, Preservation 2000, Alachua County Cost-Share	Not Provided
City of Ocala	S014	City of Ocala Silver Spring/ River Pollution Reduction Project	Addresses surface water discharge. Project provided water quality treatment for four drainage basins in City of Ocala. These basins historically discharged untreated stormwater runoff to Half-Mile Creek via SR 40/Silver Springs Blvd. storm sewer system.	Stormwater	Completed	2009	2018	UTF	94	$3,501,034	SJRWMD, FDOT, DEP, CBIR, City of Ocala Stormwater Utility Fees	Not Provided
FDOT District 2	S015	SR 20 Widening	Widening of SR 20 from 2- to 4-lane road with stormwater runoff treatment. Benefits: Pollutant removal by treatment of stormwater runoff. No previous treatment.	Wet Detention Pond	Completed	2006	2006	UTF	444	$10,763,788	State Legislature	10763788

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
FDOT District 5	S017	SR 500 (US441) Design Project-Basin C	238395-4, SR 500 (US 441) From Martin Luther King to Lake Ella Rd - Basin C / Wet Detention-Open Basin Discharge to Lake Griffin	Wet Detention Pond	Completed	2011	2014	UTF	3	Not Provided	State Legislature	Not Provided
FDOT District 5	S019	SR 500 (US441) Design Project-Basin E	238395-4, SR 500 (US 441) From Martin Luther King to Lake Ella Rd - Basin E / Dry Retention-Open Basin Discharge to Lake Griffin	Retention BMP	Completed	2011	2014	UTF	16	Not Provided	State Legislature	Not Provided
FDOT District 5	S027	SR 35 Design Project-Pond 9	238677-1, SR 35 from SR 464 (Maricamp Rd) to SR 40 - Basin 9 (Pond 9) / Dry Retention	Retention BMP	Completed	2010	2012	UTF	1	Not Provided	State Legislature	Not Provided
Marion County Office of the County Engineer	S030	31st Street Stormwater Retrofit	Construction of stormwater wetland to treat runoff from US 441 and adjacent commercial land uses prior to discharge to active sinkhole. Project was jointly funded by Marion County, DEP, and SJRWMD. Postconstruction monitoring found 72 % reduction in nitrate concentrations in wetland.	Wetland Treatment	Completed	2009	2009	UTF	1	$600,000	Marion County Stormwater Assessment, SJRWMD, DEP	Not Provided
Marion County Office of the County Engineer	S031	Marion County Silver Springs/River Pollution Reduction Project	Addresses surface water discharge. Construction of pump station to intercept runoff from 42.6 acres of SR 40 right-of-way and adjacent commercial land uses prior to discharge to Half-Mile Creek, tributary of Silver River. Runoff is pumped to retention pond located on state lands across from Silver Springs Attraction. Marion County was lead agency for engineering design and for construction. Project partners each contributed funds towards construction.	Retention BMP	Completed	2009	2010	UTF	293	$1,766,828	Marion County Stormwater Assessment, SJRWMD, DEP, FDOT	Not Provided
Marion County Office of the County Engineer	S032	Hunter's Trace Retention Area Retrofit	Project was field-scale research installation of Bold and Gold Soil Amendment. Project goal was to assess pollutant removal potential of 12" of Bold and Gold. Construction and postconstruction monitoring was conducted through	Retention BMP Retrofit with Nutrient Reducing Media	Completed	2009	2009	UTF	Not Provided	$500,000	Marion County Stormwater Assessment, SWFWMD, DEP	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			UCF. Final report to DEP found approximately 50 % removal of nitrogen through soil amendment layer.									
Marion County Office of the County Engineer	S033	Country Gardens Stormwater Retrofit	Proposed project to construct retention area to treat stormwater runoff from residential land uses that currently discharging to relict sinkhole/quarry.	Retention BMP	Planned	2016	2017	UTF	4	$188,500	Marion County Stormwater Assessment	Not Provided
City of Belleview	S034	US 441 Sewer Main Expansion	Construction of new sewer line south of city along US 441. Sewer line will allow commercial and residential area to hook up to centralized system. Project will provide 79 central sewer connections to rapidly developing corridor, with potential for up to 60 more connections.	Wastewater Service Area Expansion	Completed	2014	2016	OSTDS	414	$1,000,000	DEP, Marion County EDIG	Not Provided
City of Ocala	S035	Citywide Septic Tank and Well Elimination Program	Project includes connection of remaining septic tanks in City of Ocala at no cost to homeowners. It is estimated that septic tanks provide 26 % to and 40 % of pollutant load to groundwater in springshed. Elimination of septic tanks in project is estimated reduce nitrogen loading to Silver Springs by 20,321 lb-N/yr.	Septic Tank Phase Out,	Underway	2015	2018	OSTDS	4,612	$10,500,000	City of Ocala, DEP, SJRWMD, Florida Legislature	DEP- $5,000,000, SJRWMD- $5,000,000, Florida Legislature- $500,000
City of Ocala	S036	Package Plant Abatement	Connection of White Oak MHP, Magnolia Gardens, and 301 Plaza to central sewer.	Package Plant Phase Out, Wastewater Service Area Expansion	Completed	2015	2016	WWTF	N/A	Not Provided	Not Provided	Not Provided
Marion County Utilities	S037	Divert Wastewater Flows from Silver Springs Regional WWTF to SSS WWTF	Install force main that will reroute all sewage from Silver Springs regional wastewater plant via 3-mile-long force main connected to SSS wastewater plant. Route of new force main will allow for other decentralized wastewater plants in vicinity of Silver Springs to connect in future.	Package Plant Phase Out, Wastewater Service Area Expansion	Completed	2014	2015	WWTF	N/A	$1,023,114	Marion County Utilities Fund, DEP TMDL Fund, SJRWMD	Marion County Utilities Fund- $563,057, DEP TMDL Fund- $463,056.96

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
												, SJRWMD-$100,000
Marion County Utilities	S038	SSS WWTF Upgrade	Upgrades to existing WWTP located in SSSs, upgrading it to reclaimed quality effluent standards. Utility customers are already paying $5,031,738 for treatment facility upgrades.	WWTF Upgrade	Completed	2012	2015	WWTF	N/A	$5,031,738	Marion County Utilities	$5,031,738
Villages Center CDD	S039	VCSA WWTP - Anaerobic Denitrification	WWTP includes anoxic basin for denitrification of NO_3 to reduce NO_3 discharge in effluent.	WWTF Nutrient Reduction	Completed	1991	2012	WWTF	N/A	Not Provided	Village Center CDD	Not Provided
Villages Center CDD	S040	LSSA WTTP - Anaerobic Denitrification	WWTP includes anoxic basin for denitrification of NO_3 to reduce NO_3 discharge in effluent.	WWTF Nutrient Reduction	Completed	1997	2012	WWTF	N/A	Not Provided	Village Center CDD	Not Provided
Villages Center CDD	S041	NSU WWTP - Anaerobic Denitrification	WWTP includes anoxic basin for denitrification of NO_3 to reduce NO_3 discharge in effluent.	WWTF Nutrient Reduction	Completed	2003	2012	WWTF	N/A	Not Provided	North Sumter County Utility Dependent District	Not Provided
City of Ocala	S042	Reuse Projects	Reuse projects to three golf courses and city parks and recreation sites. Courses may be served by any of sewer facilities because of infrastructure configuration.	Reclaimed Water	Completed	2014	2016	WWTF	N/A	Not Provided	Not Provided	Not Provided
Villages Center CDD	S043	VCSA WWTP - Reuse	Public access reuse system provides reclaimed water for irrigation of golf courses and roadways	Reclaimed Water	Completed	1991	2012	WWTF	N/A	Not Provided	Village Center CDD	Not Provided
Villages Center CDD	S044	LSSA WWTP - Reuse	Public access reuse system provides reclaimed water for irrigation of golf courses and roadways	Reclaimed Water	Completed	1997	2012	WWTF	N/A	Not Provided	Village Center CDD	Not Provided
Villages Center CDD	S045	NSU WWTP - Reuse	Public access reuse system provides reclaimed water for irrigation of golf courses	Reclaimed Water	Completed	2003	2012	WWTF	N/A	Not Provided	North Sumter County Utility Dependent District	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Villages Center CDD	S046	CSU WWTP - Reuse	Public access reuse system provides reclaimed water for irrigation of golf courses	Reclaimed Water	Completed	2012	2013	WWTF	N/A	Not Provided	Central Sumter Utility	Not Provided
FDOT District 5	S047	Fertilizer Cessation	FDOT operations and maintenance fertilizer cessation	Fertilizer Cessation	Completed	2010	N/A	UTF	5,314	N/A	N/A	N/A
Villages Center CDD	S048	Staff Training	Train staff and certain subcontractors to aid in identification of illicit discharges and reduce/eliminate illicit discharges and improper disposal of waste internally	Education Efforts	Completed	2010	N/A	UTF	N/A	N/A	Village Center CDD, North Sumter County Utility Dependent District, Sumter Landing CDD	Not Provided
Villages Center CDD	S049	Pond Maintenance	Pond maintenance to ensure optimal pollutant removal and verify performance is at design criteria by monthly checks and treating nuisance species such as algae, grasses, hydrilla, spike rush, duckweed, cattails, etc., as necessary	Stormwater System Operation and Maintenance	Completed	2000	N/A	UTF	N/A	N/A	Village Center CCD, Sumter Landing CDD	Not Provided
Villages Center CDD	S050	Stormwater System Inspections	Routine stormwater system inspections, cleaning, and maintenance performed as needed.	Stormwater System Operation and Maintenance	Completed	2000	N/A	UTF	N/A	N/A	Village Center CDD, Sumter Landing CDD	Not Provided
Town of Lady Lake	S051	Skyline Drive Drainage Improvement	Skyline Drive Drainage Improvement. Improved stormwater conveyance system. Area covers Skyline Drive north to Ray Street, west to Summit Street, and east to High Street.	Stormwater System Rehabilitatio n	Completed	2014	2014	UTF	Not Provided	$1,300,000	Town of Lady Lake, DEO	Not Provided
Town of Lady Lake	S052	Lady Lake Stormwater System Maintenance	Townwide curb and gutter cleaning and catch basin vacuuming. Removes pollutants and debris before entering storm sewer system. Benchmark frequency for	BMP Cleanout	Completed	2000	N/A	UTF	Not Provided	N/A	Town of Lady Lake	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			this routine maintenance shall be quarterly or as needed.									
FDOT District 5	S053	SR 40 Stormwater Pump Station Operation and Maintenance	Operation and maintenance of pump station and collection system constructed as part of Marion County portion of Silver/Springs River Pollution Reduction Project. Activities include servicing and repair of pump station and clean out of accumulated sediment. Construction cost represents FDOT contribution to Marion County project. Treated acres are portion of drainage area that is FDOT right-of-way.	Stormwater System Operation and Maintenance	Completed	2010	N/A	UTF	38	$595,927	State Legislature	Not Provided
City of Belleview	S054	Collection System Maintenance Program	Rehabilitation of 200 brick manholes to date and pipe replacement as needed.	Sanitary Sewer and WWTF Maintenance	Completed	2000	2010	WWTF	N/A	Not Provided	Not Provided	Not Provided
City of Ocala	S055	Collection System Maintenance Program	Maintenance program has used TV inspection on entire collection system. Slip lining of 175,000 feet of clay pipe is complete and 40,000 feet per year scheduled through 2020. Lift stations are upgraded at rate of 3 per year. System and plants are SCADA controlled and flows can be rerouted.	Sanitary Sewer and WWTF Maintenance	Completed	2000	2020	WWTF	N/A	Not Provided	Not Provided	Not Provided
Marion County Utilities	S056	Collection System Maintenance Program	Collection system maintenance program includes lift station maintenance and addition of SCADA. Capital Improvement Plan calls for lift station renovation every 10 years and identifies pipe replacement needs. Pipe replacement is done as funding allows.	Sanitary Sewer and WWTF Maintenance	Completed	2000	N/A	WWTF	N/A	N/A	Not Provided	Not Provided
Villages Center CDD	S057	Sanitary Sewer Repairs	Inspection of main pipelines and manholes and timely repair of sewer and service line breaks	Sanitary Sewer and WWTF Maintenance	Completed	2000	N/A	WWTF	N/A	N/A	Village Center CDD, North	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
											Sumter County Utility Dependent District, Central Sumter Utility	
Villages Center CDD	S058	Sanitary Sewer Cleaning	Cleaning of 10 % of collection system per year	Sanitary Sewer and WWTF Maintenance	Completed	2013	N/A	WWTF	N/A	N/A	Village Center CDD, North Sumter County Utility Dependent District, Central Sumter Utility	Not Provided
Villages Center CDD	S059	Lift Station Rehab	VCSA Lift Station No. 12 Rehabilitation	Sanitary Sewer and WWTF Maintenance	Completed	2012	2013	WWTF	N/A	$75,000	Village Center CDD, North Sumter County Utility Dependent District, Central Sumter Utility, Sumter Water Conservation Authority	Not Provided
Villages Center CDD	S060	Lift Station Rehab	VCSA Lift Station Nos. 4, 8, 13, and 14 Rehabilitation	Sanitary Sewer and WWTF Maintenance	Completed	2013	2014	WWTF	N/A	$150,000	Village Center CDD	$150,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Villages Center CDD	S061	Lift Station Rehab	VCSA List Station Nos. 16 and 33 – Replace risers and recoat wet well; LSSA List Station No. 16 – Replace risers and recoat wet well.	Sanitary Sewer and WWTF Maintenance	Completed	2015	2016	WWTF	N/A	$118,000	Village Center CDD	$118,000
Villages Center CDD	S062	Sanitary Sewer Replacement	VCSA sanitary sewer replacement	Sanitary Sewer and WWTF Maintenance	Completed	2014	2016	WWTF	N/A	$250,000	Village Center CDD	$250,000
Villages Center CDD	S063	Street Sweeping	All shopping centers and all 3 downtown areas anywhere from 3 times per week to quarterly, depending on the location	Street Sweeping	Completed	2000	N/A	UTF	Not Provided	N/A	Villages Center CDD	Not Provided
FDOT District 2	S064	State Road Street Sweeping	Quarterly street sweeping of urban portions of SR 20 and SR 26 (0.75 miles within the springshed). Benefits: Remove debris, sediment, and potential pollutants from streets. Prevent entry into storm sewer system.	Street Sweeping	Completed	2003	N/A	N/A	Not calculated	N/A	Not Provided	Not Provided
Town of Lady Lake	S065	Lady Lake - Street Sweeping	Townwide street sweeping to remove dirt and debris. Benchmark frequency shall be quarterly or as needed. Removal of debris and potential pollutants prevents their entry into lakes. Performance benchmark shall be 250 cubic yards of material removed annually.	Street Sweeping	Completed	2000	N/A	UTF	2	N/A	Town of Lady Lake	Not Provided
DEP	S066	Groundwater - Surface Water Interaction Study Lake Lochloosa Area, Alachua and Marion Counties	Lake Lochloosa and Orange Lake Watersheds – Study examined groundwater pathways through which nutrients enter Lakes Lochloosa and Orange. Field investigations with Florida State University to determine levels of TP and TN in different aquifers associated with land use categories. Radon studies performed to estimate groundwater seepage into Lake Lochloosa. Benefits: Better estimation of groundwater inputs of TP in TMDL models.	Study	Completed	2006	2008	UTF	N/A	$64,000	USGS	$64,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
SJRWMD	S067	SJRWMD Springs Protection and Collaborative Research Initiative on Sustainability and Protection of Springs (CRISPS)	SJRWMD recognized Springs Protection as a strategic priority and acknowledged that effective management of springs requires understanding of relative influences and manageabilities of numerous natural and anthropogenic forces that affect their ecological health, and that additional interdisciplinary research is needed to achieve this goal. CRISPs included three major components of projects, regulation, and science. CRISPS Workgroups were established: Springshed Supergroup (Surface Water, Groundwater, and Nitrogen Biogeochemistry) and Springs Ecosystem Supergroup (Hydrology and Hydrodynamics, Biology, and Physicochemistry). District contracted with UF Water Institute for support for this integrated work. SJRWMD continues to develop tools to better target nitrogen load reduction projects based on spatial patterns in groundwater nitrogen concentrations and sources of nitrogen. Spatial models to predict groundwater nitrogen vulnerability were developed using data from SJRWMD monitoring wells and DEP and FDOH public water supply monitoring data (Canion et al. 2017). SJRWMD is using nutrient source markers evaluated in the CRISPS project to evaluate relative contributions of nutrient sources to groundwater in different areas of the springshed. Findings and results of the CRISP study and follow-up studies are expected to support future BMAP activities.	Study	Completed	2013	2017	UTF	N/A	Not Provided	SJRWMD	Not Provided
SJRWMD	S068	SJRWMD Water Resource	SJRWMD has core monitoring in/on Silver Springs, Silver River and contributing area to Silver	Monitoring/ Data Collection	Completed	2000	N/A	UTF	N/A	N/A	SJRWMD	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
		Information and Data Collection	Springs. The core monitoring consists of discharge monitoring, surface and groundwater levels, surface and groundwater quality, and biological monitoring. As part of SJRWMD Springs Protection Initiative, district has added discharge monitoring site, increased number and sampling frequency of surface water and groundwater quality sites, increased biological monitoring, and added continuous water quality monitoring at five sites in Silver River. Upon conclusion of SPIS, some monitoring sites have been eliminated.									
ACEPD	S069	Water Quality Protection BMP Training	Alachua County. Training and education for contractors, government, and citizens in sedimentation and erosion control to improve stormwater quality.	Education Efforts	Completed	2007	N/A	UTF	N/A	N/A	Gainesville Cleanwater Partnership Cost Share	Not Provided
ACEPD	S070	Pet Waste Outreach	Alachua County. Implement social marketing campaign to motivate citizens to scoop, bag, and trash dog wastes at home and in community. Benefits: Reduces bacteria and nutrient sources in all watersheds. Implements Alachua County Comp Plan Conservation and Open Space Element - Surface Water Systems Objective 4.6.	Education Efforts	Completed	2009	N/A	UTF	N/A	$40,655	Gainesville Cleanwater Partnership Cost Share	Not Provided
ACEPD	S071	Landscape Debris Social Marketing	Alachua County. Implement social marketing campaign designed to get citizens to keep landscaping debris out of roads and stormwater collection systems. Benefits: Reduces bacteria and nutrient sources in all watersheds. Implements Alachua County Comp Plan Conservation and Open Space Element - Surface Water Systems Objective 4.6.	Education Efforts	Completed	2009	2010	UTF	N/A	Not Provided	Gainesville Cleanwater Partnership Cost Share	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
ACEPD	S072	Water Conservation and Low-Impact Development (LID)	Alachua County. Conduct targeted public outreach to encourage water conservation and rain harvesting. Includes rain barrel sales and LID promotion. Benefits: By harvesting rainwater and keeping stormwater onsite, stormwater and pollutants transported are decreased.	Education Efforts	Completed	2009	N/A	UTF	N/A	Not Provided	Gainesville Clean Water Partnership Cost Share	Not Provided
ACEPD	S073	Quantifying Nutrient Improvement in Street Sweeping	Gainesville urban area and Alachua County – Monitor and assess street sweepings to quantify nutrient reductions and subsequent potential water quality improvements. Benefits: Provide data to quantify nutrients in street sweepings and assess potential for water quality improvement. Implements Alachua County Comp Plan Conservation and Open Space Element - Surface Water Systems Objective 4.6 and policies.	Study	Completed	2013	2016	UTF	N/A	$38,940	Gainesville Clean Water Partnership Cost Share	Not Provided
ACEPD	S074	Landscaping Behavior Change Social Marketing	Gainesville urban area and Alachua County. Alachua County. Implement social marketing campaign designed to get citizens to make landscaping behavior changes that reduce nutrients in stormwater. Benefits: Reduces nutrients sources in all watersheds. Implements Alachua County Comp Plan Conservation and Open Space Element - Surface Water Systems Objective 4.6. Benefits: Behavior changes to reduce nutrient inputs to stormwater; implement Alachua County Comp Plan Conservation and Open Space Element - Education and Outreach Objective 2.2; Surface Water Systems Objective 4.6; Alachua County ULDC, Chapter 407 Article 4 Landscaping - 406.43 Water Resources Buffers; ULDC Article 9 Stormwater Management.	Education Efforts	Underway	2013	TBD	UTF	N/A	Not Provided	Gainesville Clean Water Partnership Cost Share	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Villages Center CDD	S076	Stormwater Management-Amenity Bill Inserts	Amenity bill inserts to address what residents can do to reduce impacts to stormwater	Education Efforts	Completed	2010	N/A	UTF	N/A	Not Provided	Village Center CDD, North Sumter County Utility Dependent District	Not Provided
Villages Center CDD	S077	Stormwater Management-Telephone Book Aid	Villages public service telephone book aid explaining purpose of stormwater program and how to participate in stormwater activities	Education Efforts	Completed	2010	N/A	UTF	N/A	Not Provided	Village Center CDD, North Sumter County Utility Dependent District	Not Provided
Villages Center CDD	S078	Stormwater Management-Public Service Newspaper Column	Created public service newspaper column in Villages newspaper to promote awareness of effects of illicit discharges and illegal disposal	Education Efforts	Completed	2010	N/A	UTF	N/A	Not Provided	The Villages	Not Provided
Villages Center CDD	S079	Stormwater Management-CDD School/ Hometown Social	Monthly public educational meeting with residents	Education Efforts	Completed	2010	N/A	UTF	N/A	Not Provided	Village Center CDD, North Sumter County Utility Dependent District, Central Sumter Utility, Sumter Water Conservation Authority	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Villages Center CDD	S080	Illicit Discharge Awareness Notifications	Provide illicit discharge awareness notifications and educational material to area businesses to make them aware of hazards associated with illicit discharges and improper disposal of waste	Education Efforts	Completed	2010	N/A	UTF	N/A	Not Provided	Village CDD, North Sumter County Utility Dependent District	Not Provided
Villages Center CDD	S081	Stormwater Pollution on Website	Section of district website for residents dedicated to providing education and links on stormwater pollution	Education Efforts	Completed	2010	N/A	UTF	N/A	Not Provided	Village Center CDD, Sumter Landing CDD	Not Provided
Town of Lady Lake	S082	Adopt and enforce Fertilizer Management and Landscape Irrigation Ordinances. Benefits: Reduce volume of runoff from over irrigation and reduce nutrient loading from the use of fertilizers. Implements Alachua County Comp Plan Conservation and Open Space Element - Surface Water Systems Objective 4.6	Town of Lady Lake uses consultant for education and outreach. Activities include PSAs in cooperation with City of Leesburg and SJRWMD, distribution of pamphlets, educational website, illicit discharge inspection and education program, utility bill inserts, and informational displays for proper irrigation techniques and landscape management.	Education Efforts	Completed	2000	N/A	UTF	N/A	Not Provided	Town of Lady Lake	Not Provided
Lake County Public Works	S083	Lake County NPDES Permit Education and Outreach	Activities include distribution of pamphlets and both recurring and nonrecurring public outreach events. Other efforts include construction site pollution	Education Efforts	Completed	2001	N/A	UTF	N/A	Not Provided	Lake County	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			prevention, illicit discharge inspection and education, resource support of County Extension training in Florida -friendly Landscaping/Florida Yards and Neighborhoods (FYN), and Adopt-a-Lake Program formerly known as Watershed Action Volunteers (WAV) Program.									
Lake County Public Works	S084	Landscaper BMP training	Landscaper education about BMPs for landscapers and those who hire landscapers. Seminar was held in cooperation with Lake County Ag Center to educate landscapers about BMPs, and BMP brochures were mailed out countywide to landscape companies	Education Efforts	Completed	2010	2010	UTF	N/A	$1,276	Lake County	$1,276
City of Ocala	S085	SkimBoss Filtration System - Tuscawilla Pond	Addresses drainage well discharge. Retrofit installation of SkimBoss filtration system with Bold and Gold media -Tuscawilla Pond	Drainage Well	Underway	TBD 2016	2019	Drainage Well	858	$236,397	Section 319(h) Grant, City of Ocala Stormwater Utility Fees	Not Provided
City of Ocala	S086	SkimBoss Filtration System - Chazal Park Pond	Addresses drainage well discharge. Retrofit installation of SkimBoss filtration system with Bold and Gold Media -Chazal Park Pond	Drainage Well	Underway	2015–16	2019	Drainage Well	68	$236,397	Section 319(h) Grant, City of Ocala Stormwater Utility Fees	Not Provided
City of Ocala	S087	Silver Springs Protection/ Stormwater Nutrient Reduction Project (Cameo Pond)	Addresses surface water discharge. Silver Springs Protection/Stormwater Nutrient Reduction Project	Stormwater	Underway	2015	2018	UTF	70	$3,000,000	TMDL, FDOT, City of Ocala Stormwater Utility Fees	Not Provided
Marion County Office of the County Engineer	S088	Bold and Gold Stormwater Retrofits in Silver Springs BMAP Area	Project proposes $1,400,000 through Fiscal Year 2019 for retrofit of county-owned drainage retention areas in Silver Springs BMAP area. Number and location of DRAs retrofitted will depend on several factors, including potential load reductions, land availability,	Retention BMP Retrofit with Nutrient Reducing Media	Underway	2015	2019	UTF	Not Provided	$1,400,000	Marion County Stormwater Assessment	$1,400,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			and location in PFAs identified in BMAP. Project is currently in preliminary scoping stages and is identified in adopted 2014 Stormwater Implementation Plan.									
DEP - Division of Recreation and Parks	S089	Silver Springs State Park Management Plan Amendment - Runoff	Management plan for Silver Springs State Park was formally amended in May 2014 to account for inclusion of former Silver Springs attraction into Silver River State Park. In addition to change in park name, management goals were developed to improve water quality, specifically nitrate, from surface discharges. Removal of animals and animal enclosures on Ross Allen Island will reduce nitrate inputs to Silver River and allow for existing water retention berm to be breached to reconnect wetlands to river. Evaluation of park's stormwater management system and amount of impervious area, particularly in parking lots, will also be undertaken. Impervious areas in parking lots and buildings will be removed and restored to natural communities. Sheet flow will be restored and stormwater system improved and maintained.	Study	Planned	2014	Not Provided	UTF	N/A	Not Provided	DEP	Not Provided
DEP- Division of Recreation and Parks	S090	Silver Springs State Park Management Plan Amendment - State Park Sewer Connection	Management plan for Silver Springs State Park was formally amended in May 2014 to account for inclusion of former Silver Springs attraction into Silver River State Park. In addition to change in park name, management goals were developed to connect park services in former Silver River State Park to central sewer, thus eliminating nitrate inputs to aquifer and Silver River.	Septic Tank Phase Out	Completed	2009	2015	OSTDS	N/A	$977,490	DEP	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
City of Ocala	S091	City of Ocala Nitrogen Reduction Project	Upgrade of WRF #2 to AWT standard for TN and decommissioning of WRF #1. WRF #1, constructed in 1949, is trickling filter facility and is not designed for removal of nitrate. WRF #2 and #3 have sufficient capacity to handle flows from WRF #1, and all plants will be interconnected to allow for routing of flows as needed. WRF #1 will remain operational as relay and to process stormwater for reuse.	WWTF Nutrient Reduction	Completed	2017 2016	2016	WWTF	N/A	$16,000,000	City of Ocala	City of Ocala- $9,600,001
City of Ocala	S092	City of Ocala Water Reclamation Facility 2 Nutrient Reduction Plan	Upgrade existing wastewater plant to allow for AWT and expand availability of reclaimed water for irrigation use. Project consists of construction of 2 3.25 mgd carrousels equipped with 3 100-horsepower mechanical surface aerators with variable-frequency drives (VFDs) and lower impeller and anaerobic and anoxic zone submersible mixers. This will allow City of Ocala to reduce effluent TN to 3 mg/L or less. About 500,000 gpd of public access reclaimed water is expected to be made available from project, reducing draws on aquifer and increasing flows to springs.	WWTF Nutrient Reduction, Reclaimed Water	Completed	2014	2016	WWTF	N/A	$12,144,000	City of Ocala, SJRWMD, Legislative Funding	City of Ocala- $8,304,000, SJRWMD- $1,920,000, Legislative Funding- $1,275,620
DEP Division of Recreation and Parks	S093	Silver Springs State Park Management Plan Amendment - Sewer Upgrades	Management plan for Silver Springs State Park was formally amended in May 2014 to account for inclusion of former Silver Springs attraction into Silver River State Park. In addition to change in park name, management goals were developed to provide maintenance of sewer system for former attraction. Existing system was in poor repair, potentially leaking nitrogen to headspring and river.	Septic Tank Enhancement	Planned	2014	TBD	OSTDS	Not Provided	$1,976,335	DEP	$1,976,335

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Parks	S094	Sports Field Maintenance Equipment Wash-Down Area	DEP has developed BMP manual for Florida golf courses highlighting series of BMPs that can be implemented to offset impacts of golf courses on environment. Active sports complexes can have same impacts. One commonly used BMP is construction of "closed system equipment wash-down area." Similar facilities would allow parks staff to wash down mowers and other equipment used while maintaining sports fields. Four sites (Brick City Adventure Park, Rotary Sportsplex, Shocker Park and Ralph Russell Memorial Park) are all within 10 miles of Silver Springs and therefore should receive higher priority for scheduling construction of wash-down facilities.	Regulations, Ordinances, and Guidelines	Planned	TBD	N/A	STF	N/A	Not Provided	Marion County General Fund	Not Provided
Marion County Parks	S095	Parks Retention Pond Retrofits	Project consists of inventory of stormwater facilities in Marion County Parks to identify and prioritize them for potential retrofits to enhance nitrogen removal. Retrofits would involve removal of layer of soil from bottom of basins and then constructing engineered soil matrix. Project goal is to retrofit specific stormwater basins to reduce groundwater pollution. Inventory will be conducted using GIS asset management tools.	Study	Planned	TBD	Not Provided	UTF	N/A	Not Provided	Marion County General Fund	Not Provided
Marion County Parks	S096	Septic System Connection Removal in County Parks	Project focuses the removal of OSTDS (septic systems) and connection to centralized wastewater facilities. Several parks in BMAP area are close to existing or planned wastewater facilities (Brick City Adventure Park, Rotary Sportsplex, and Baseline Road	Septic Tank Phase Out, Wastewater Service Area Expansion	Completed	TBD	Not Provided	OSTDS	TBD	Not Provided	Marion County General Fund	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			Trailhead). Project goal is to remove as many septic systems in this area as possible.									
Marion County Parks	S097	Gore's Landing Package Plant Upgrade	DEP has one package plant wastewater facility located at Gore's Landing, which is flood-prone area located along Ocklawaha River. Current system is antiquated and may not meet current sewage disposal standards and should be upgraded. Project goal is to bring existing sewage treatment system into compliance with current standards and regulations while being mindful of potential expansion of park. Exact dollar figures for project are currently unknown.	OSTDS	Planned	TBD	Not Provided	WWTF	N/A	Not Provided	Marion County General Fund	Not Provided
Marion County Utilities	S098	SSS Reuse to Spruce Creek Golf and Country Club	South Portion - Project will provide for delivery of reclaimed quality effluent and consists of reclaimed pumps, control valves, metering stations, and 21,600' of 16" pipeline from SSS WWTP to Spruce Creek Golf and Country Club (SCGCC) golf course located in southeast quadrant of Marion County 12 to 14 miles from Silver Springs. SSS WWTP is currently permitted to treat 1.5 mgd and has potential to generate close to 1.0 mgd of reuse quality water based on current flows. Removes 54,794 lb-TN/yr. North Portion - Project will provide for delivery of reclaimed quality effluent and consists of reclaimed pumps, control valves, metering stations, and 8,000' of 12" pipeline from SSS WWTP to SSS golf course and Lake Diamond located in southeast quadrant of Marion County 7 to 10 miles from Silver	Reclaimed Water	Underway	2014	2015–17	WWTF	N/A	$3,192,000	SJRWMD, Florida Legislature	SJRWMD-$1,596,000, Legislative Funding-$1,275,620

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			Springs. SSS WWTP is currently permitted to treat 1.5 mgd and has potential to generate close to 1.2 mgd of reuse quality water based on current flows. This will reduce use of potable water for irrigation, improve flow at Silver Springs, and reduce nutrient load to Silver Springs and Silver River.									
Marion County Parks	S099	Marion/Aquifer-Friendly Fertilization Program for Sports Facilities	Project goal is to develop method of maintaining 67.77 acres (Wrigley Fields, Brick City Adventure Park, Shocker Park, Rotary Sportsplex, Ralph Russell Memorial Park and Belleview Sportsplex) of sports fields to reduce, if not eliminate, pollutant loading while keeping fields healthy and safe. Program includes creation and use of specific fertilizer formulas on playing fields at various sports complexes that Parks Department manages.	Fertilizer Reduction	Planned	TBD	N/A	UTF	Not Provided	Not Provided	Marion County General Fund	Not Provided
Lake County Growth Management	S100	Lake County Landscaping Ordinance	Landscaping Ordinance 2009-062 implements Water Wise and Florida Friendly Landscaping, tree protection, and buffer requirements: Codified into LDR.	Regulations, Ordinances, and Guidelines	Completed	2009	N/A	UTF	N/A	Not Provided	Lake County	Not Provided
Lake County Growth Management	S101	Lake County Irrigation Ordinance	Irrigation Ordinance 2009-17 implements SJRWMD watering requirements and encourages water efficient landscape design: Codified into LDR.	Regulations, Ordinances, and Guidelines	Completed	2009	N/A	UTF	N/A	Not Provided	Lake County	Not Provided
Town of Lady Lake	S102	Lady Lake Landscape Requirements	County codes and ordinances require Florida-Friendly Landscaping principles to be applied in design of landscapes and irrigation systems. Fertilizer application restrictions require 30 % or more slow-release nitrogen and restrict frequency to "as needed."	Regulations, Ordinances, and Guidelines	Completed	2012	N/A	UTF	N/A	Not Provided	Town of Lady Lake	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Town of Lady Lake	S103	Lady Lake Irrigation Schedules	SJRWMD irrigation schedule is adopted, specific water conservation measures are encouraged, and seven basic principles of water-efficient landscaping are incorporated. Intent is to establish minimum standards for development, installation, and maintenance of landscaped areas on site with goal of water use efficiency without inhibiting use of creative landscape design.	Regulations, Ordinances, and Guidelines	Completed	2009	N/A	UTF	N/A	Not Provided	Town of Lady Lake	Not Provided
Town of Lady Lake	S104	Lady Lake Pet Waste Management	County code related to illicit discharges includes provisions requiring removal of pet waste.	Regulations, Ordinances, and Guidelines	Completed	2008	N/A	UTF	N/A	Not Provided	Town of Lady Lake	Not Provided
Villages Center CDD	S105	VCSA WWTP - SCADA	SCADA installation and operation at VCSA plant and collection system lift stations	WWTF Upgrade	Completed	1991	Not Provided	WWTF	N/A	Not Provided	Village Center CDD	Not Provided
Villages Center CDD	S106	LSSA WWTP - SCADA	SCADA installation and operation at LSSA plant and collection system lift stations	WWTF Upgrade	Completed	1997	Not Provided	WWTF	N/A	Not Provided	Village Center CDD	Not Provided
Villages Center CDD	S107	NSU WWTP - SCADA	SCADA installation and operation at NSU plant and collection system lift stations	WWTF Upgrade	Completed	2003	Not Provided	WWTF	N/A	Not Provided	Village Center CDD	Not Provided
Villages Center CDD	S108	CSU WWTP - SCADA	SCADA installation and operation at the CSU plant and collection system lift stations	WWTF Upgrade	Completed	2012	Not Provided	WWTF	N/A	Not Provided	Central Sumter Utility	Not Provided
Marion County Utilities	S109	Package Plant Abatement	Baseline Square, Truck stops at CR 326 and I-75 package plants connected to central system. Removes 412 lb-TN/yr.	Package Plant Phase Out, Wastewater Service Area Expansion	Completed	2014	2015	WWTF	N/A	Not Provided	Not Provided	Not Provided
ACEPD	S110	Cypress Point Creamery Land Acquisition	No increase in surface runoff of pollutants because of land use change, continued aquifer recharge, and ecosystem/habitat preservation; implement Alachua County Comp Plan Conservation and Open Space Element - Alachua County Forever Policy 6.2.1.	Land Acquisition	Completed	2014	2014	UTF	N/A	$461,000	Wild Spaces and Public Places surtax; FRPP cost share	Not Provided

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ACEPD	S111	Higginbotham Ranch Acquisition	No increase in surface runoff of pollutants because of land use change, continued aquifer recharge and ecosystem/habitat preservation; implement Alachua County Comp Plan Conservation and Open Space Element - Alachua County Forever Policy 6.2.1.	Land Acquisition	Completed	2014	2014	UTF	N/A	$756,000	Wild Spaces and Public Places surtax, FRPP Cost-Share	Not Provided
DEP, FDOH, Marion County	S112	OSTDS 9-1-1 Strategy	Develop strategy for addressing OSTDS and other wastewater management issues. Goal is to enhance communication and coordination among utilities and agencies.	Study	Completed	2015	2018	OSTDS	N/A	Not Provided	Not Provided	Not Provided
Marion County Parks	S113	Silver Springs Sandhill Acquisition	Marion County has applied to have Silver Springs Sandhill acquisition project added to Florida Forever list. Project would preserve 470 acres of high-recharge sandhills within mile of Silver Springs. Project is located just south of Indian Lake State Forest and east of Cohadjoe Park (county). Majority of acreage is zoned for medium- and high-density residential use but 221 acres are currently used for improved cattle with balance in pasture unmanaged hardwoods. Acquisition has been assigned to third-party nonprofit organization to close sale of site. Site has been acquired and is under management by Marion County Parks and Recreation. Consultants are being solicited to write state-required Unit Management Plan.	Land Acquisition	Completed	2016	2017	UTF	N/A	$4,432,979	Florida Forever, Marion County	Not Provided
SJRWMD	S114	Silver Springs Forest	Project involves acquisition of 4,900 acres of managed forest land, owned by Rayonier, east of Indian Lake State Forest and west of CR 315. Land will be restored to appropriate ecosystem and opened for recreational use. Tract is identified in Heather Island Florida	Land Acquisition	Completed	2016	2016	UTF	N/A	$11,617,000	DEP, SJRWMD, Marion County	DEP-$2,000,000, SJRWMD-$8,700,000, Marion County-$917,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			Forever Project and as US Forest Service Forest Legacy Project: Silver Springs Watershed (Phase 1).									
City of Ocala	S115	Miscellaneous Water and Sewer	Miscellaneous extension of existing water, sewer, and reuse facilities to provide services.	Wastewater Service Area Expansion, Reclaimed Water	Underway	2015	2020	WWTF	N/A	$500,000	City of Ocala	$500,000
City of Ocala	S116	Sanitary sewer smoke testing, TVing, and lining program	Smoke testing and inspection of existing sanitary sewer system	Sanitary Sewer and WWTF Maintenance	Underway	2015	2020	WWTF	N/A	$3,000,000	City of Ocala	$3,000,000
Marion County Parks	S117	Heather Island Conservation Easement	Project would establish conservation easement on 5,223 acres of privately owned forestland east of C.R. 315 along Ocklawaha River. Tract is part of Heather Island Florida Forever project and is identified as Phase 2 of Silver Springs Watershed Forest Legacy project. Land has been acquired by SJRWMD with plans for surface water improvements underway.	Land Acquisition	Completed	2015	2016	UTF	N/A	Not Provided	Not Provided	Not Provided
City of Fruitland Park	S118	Fruitland Park WWTF Decommis-sioning	Remove existing WWTF from service. Construction of lift station to allow transfer of wastewater to Lady Lake for treatment. Improved treatment at Lady Lake facility.	WWTF Upgrade	Underway	2016	2020	WWTF	N/A	$1,500,000	Not Provided	Not Provided
City of Fruitland Park	S119	Construction of New WWTF	New WWTF constructed with improved treatment and SCADA system. Expected 9 to 10 years for project completion.	WWTF Nutrient Reduction	Canceled	2020	N/A	WWTF	N/A	N/A	N/A	N/A
City of Fruitland Park	S120	Street Sweeping and Storm Drain Inlet Cleaning	Sweep streets 4 times per year and clean out 12 storm drain inlets	Street Sweeping	Completed	2012	N/A	UTF	Not Provided	N/A	City of Fruitland Park	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
City of Fruitland Park	S121	Fruitland Park NPDES Permit Education and Outreach	Landscaping, irrigation, fertilizer, and pet waste ordinances. City of Fruitland Park uses consultant for education and outreach. Activities include PSAs in cooperation with City of Leesburg and SJRWMD, distribution of pamphlets, educational website, illicit discharge inspection and education program, utility bill inserts, and informational displays for proper irrigation techniques and landscape management.	Education Efforts	Completed	2012	N/A	UTF	N/A	Not Provided	City of Fruitland Park	Not Provided
Putnam County	S122	Education and Outreach	Provide educational materials, including information about importance of protecting Silver Springs and implementing small farm equine BMPs at Ft. Gates Ferry kiosks and at agricultural center and county fair.	Education Efforts	Completed	2012	N/A	LW	N/A	Not Provided	Putnam County	Not Provided
Marion County Office of the County Engineer	S123	SSS Unit 55 Stormwater Retrofit	Project will retrofit 2 drainage retention areas in SSS Unit 55 with nitrogen-reducing Bold and Gold media. Both DRAs are adjacent to Baseline Golf Course. In addition to surface runoff from SSS Unit 55, runoff is also discharged into DRAs from golf course through pipes and as overland flow. Retrofit will prevent 106 lb-TN/yr from reaching aquifer.	Retention BMP Retrofit with Nutrient Reducing Media	Underway	2016	2016	UTF	29	$370,000	Marion County Stormwater Assessment	370000
City of Ocala	S124	City of Ocala - Retrofit Installation of SkimBoss Filtration System with Bold and Gold	Installation of SkimBoss Filtration Systems using Bold and Gold Media to treat water leaving ponds and flowing into recharge wells at 613 SE 13th Ave, NE 10th St @ 1200 Block, NE 14th St and 12th St	Drainage Well	Underway	2016	2019	Drainage Well	397	$485,650	TMDL, FY16 Legislative Appropriation, City of Ocala Stormwater Utility Fees	Not Provided
FDOT District 2	S125	Fertilizer Cessation	FDOT operations and maintenance fertilizer cessation	Fertilizer Cessation	Completed	2012	N/A	UTF	448	N/A	N/A	N/A

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Town of McIntosh	S126	Town of McIntosh Education and Outreach	Town provides information at City Hall about Florida Friendly Landscaping, OSTDS maintenance, and agricultural BMPs.	Education Efforts	Completed	2014	N/A	UTF	N/A	Not Provided	Town of McIntosh	Not Provided
City of Belleview	S127	Sanitary Sewer and Water Main Loop along SE 132nd from US 441/27 to CR 484	Economic engine to promote residential and commercial growth along SE 132nd Street (Belleview Beltway)	Wastewater Service Area Expansion	Planned	2016	Not Provided	WWTF	N/A	$1,300,000	Special Legislative Appropriation	Not Provided
City of Belleview	S128	Provide reuse irrigation water to Belleview Sportplex	Meets requirement of Springs Protection Act by reducing groundwater withdrawals	Reclaimed Water	Planned	2020	Not Provided	WWTF	N/A	$500,000	City of Belleview	500000
City of Belleview	S129	Providing water and sewer to residents in Utility Service Area adjacent to and west of SE 92nd Loop	Multiyear project will serve over 1,200 single-family units currently on septic tanks and individual wells between US 441 and new SE 92nd Loop, and from SE 105th Place south to SE 135th Street. Meets requirement of Springs Protection Act by reducing and/or eliminating groundwater withdrawals and septic tank leachates. First year would consist of study to define phases and estimate construction costs of each phase.	Reclaimed Water	Planned	2020	Not Provided	WWTF	N/A	$100,000	Not Provided	Not Provided
Marion County Office of the County Engineer	S130	SSS Unit 7 Stormwater Retrofit - CP #77	Retrofit of DRAs 7244 and 7396 with Bold and Gold biosorption activated media for nitrogen reduction.	Retention BMP Retrofit with Nutrient Reducing Media	Planned	2017	2017	UTF	7	$1,400,000	Marion County Stormwater Assessment, SJRWMD Cooperative Funding, Florida Legislative (Springs Funds)	Not Provided
Marion County Utilities	S131	Sleepy Hollow Package Plant Abatement (LS and FM)	Project is being funded via grant from SJRWMD and DEP to remove existing wastewater package plant in subdivision and replace it with new duplex lift	Package Plant Phase Out, Wastewater	Underway	2016	2016	WWTF	N/A	$456,025	SJRWMD, Marion County Utilities Funding	SJRWMD-$309,00.00, Marion County Utilities

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			station and 1,830 LF of new 6" force main along SE 4th Street to tie in to existing 16" force main along SE 58th Avenue. Nutrient reduction expected from project is 365 lb/yr of nitrates that are currently being discharged from Sleepy Hollow WWTF annually. This will reduce amount of nutrients reaching Silver Springs.	Service Area Expansion								Funding-$117,388.58
Marion County Utilities	S132	CR464 FM	Installation of new 12" PVC force main with valves and appurtenances, using installation methods of open-cut trenching, jack and boring, and horizontal directional drilling, to connect to the existing force mains and reconnect services. Upsizing of force main will allow county to handle future flows at SSS WWTP from OSTDS abatement in primary protection zone for Silver Springs.	WWTF Upgrade	Completed	2016	2015	WWTF	N/A	$654,416	Marion County Utilities	$654,415.91
Lake County Public Works	S133	Erosion Control Inspection Training and Certification	Provide DEP Erosion Control Inspector Training and Certification exam to private construction and local government employees through qualified county staffer for free annually. Conduct ongoing site inspections for use of erosion control BMPs at all construction sites throughout unincorporated Lake County. Education of contractors and municipal employees on construction erosion control measures	Education Efforts	Completed	2013	N/A	UTF	N/A	Not Provided	Lake County	Not Provided
SJRWMD	S134	Silver Springs Forest	Project will address water resources at site and in receiving system with hydrology, attenuation, and sediment transport improvements. Project will reduce turbid water discharges to Silver River and will reduce nutrient loading by up to 13,000 pounds per year. Evaluation	Hydrologic Restoration	Completed	2017	2018	UTF	TBD	$2,370,000	SJRWMD, DEP	SJRWMD-$1,895,000, DEP-$475,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			of final project elements is still underway.									
City of Ocala	S135	Wetland Recharge Park	Creation of wetland park that will primarily use treated wastewater, along with some stormwater. Wetland area will be over 30 acres in size and will receive 3 to 5 mgd of treated wastewater/ stormwater. Water will then recharge UFA. Plants in wetland area will naturally take up large portion of excess nutrients. This will potentially reduce nitrogen levels to near zero, along with significant reduction of all TN as well.	Reclaimed Water	Underway	2016	2019	WWTF	N/A	$10,000,000	SJWRMD Cost-Share, DEP Springs Funding, City of Ocala	Not Provided
City of Ocala	S136	Southwood Villas and Lake Weir Sewer Expansion Project	Project objective is to design and construct sanitary sewer system to remove from service 100 septic tanks from associated single-family residential lots.	Septic Tank Phase Out, Wastewater Service Area Expansion	Planned	2019	2021	OSTDS	525	$1,500,000	City of Ocala	$1,500,000
SJRWMD	S137	SJRWMD SAV and algae monitoring	SJRWMD monitors SAV and algae annually on Silver River between April and June. District staff estimate SAV cover by species and algal cover collectively, using 0.25 m^2 quadrats and the Braun-Blanquet cover scale.	Monitoring/ Data Collection	Completed	2012	N/A	UTF	N/A	N/A	SJRWMD	Not Provided
Lake County	S138	Lake County Enhanced Fertilizer Ordinance	November 2017 Lake County BCC adopted enhanced fertilizer ordinance. Includes 15' application setback from waterbodies, 50 % slow-release content requirement, and summer phosphorus and nitrogen application blackout period from 6/1 to 9/30.	Regulations, Ordinances, and Guidelines	Completed	43040	N/A	UTF	N/A	Not Provided	Lake County	Not Provided
Villages Center CDD	S139	CSU WWTP access reuse system – Anaerobic Denitrification	WWTP includes anoxic basin for denitrification of NO_3, which reduces NO_3 discharge in effluent	Wastewater Nutrient Reduction	Completed	2012	Not Provided	WWTF	N/A	Not Provided	Central Sumter Utility	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Utilities	S140	Provide central sewer service to old platted subdivision served by septic	SSS Subdivision was platted in early 1970s. Existing subdivision has 3,000 platted lots without access to centralized sewer system. Area has been divided into six phases of 500 lots per phase. Area is located in PPZ for Silver Springs.	Septic Tank Phase Out, Wastewater Service Area Expansion	Planned	2018	Not Provided	OSTDS	Not Provided	Not Provided	Marion County Utility Funds, Grants	Not Provided
City of Ocala	S141	SkimBoss Filtration System - Chazal Park Pond	Retrofit Installation of SkimBoss™ filtration system with Bold and Gold™ media for Lake Anderson, Yum Yum Pond, and Heritage Pond	Retention BMP Retrofit with Nutrient-Reducing Media	Underway	2017	2019	UTF	153	$660,000	DEP, FY Legislative Appropriation, City Ocala	DEP - $328,000, FY Legislative Appropriation - $250,000, City of Ocala - $82,000
Marion County Utilities	S142	Provide central sewer service to major commercial corridor	Construct 5,800 LF of 12" force main and 9,200 LF of 16" force main along CR 464. Project will provide infrastructure and capacity to connect future septic to sewer projects to SSS WWTF.	Septic Tank Phase Out, Wastewater Service Area Expansion	Underway	2017	2019	OSTDS	Not Provided	$6,424,210	Marion County Utility Funds, Grants	Not Provided
Marion County Utilities	S143	Provide central sewer service to major commercial corridor	For this phase, project consists of constructing force main though commercial corridor in Silver Springs, Silver River, and Upper Silver River Springshed. Proposed sewer force main will be 17,000 LF of 12" PVC sewer force main connecting SCGCC sewer system to Stonecrest sewer system. This is first project being constructed with overall goal of making service available and providing opportunity for septic to sewer conversions in corridor. By making connection to central sewer available, county can avoid additional septic tank installation in Silver Springs Springshed and possible conversion from septic to sewer in future.	Septic Tank Phase Out, Wastewater Service Area Expansion	Underway	2018	2019	OSTDS	Not Provided	$1,791,600	Marion County Utility Funds, Grants	Not Provided

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Marion County Utilities	S144	SSS WWTP Nutrient and Capacity Improvement	Enhance nutrient removal capabilities to AWT standards and expand capacity at SSS WWTF by 500,000 gpd.	WWTF Upgrade	Underway	2018	2020	WWTF	N/A	$6,424,210	Marion County Utility Funds, Grants	Not Provided
FDOT District 5	S145	State Road Street Sweeping	Street sweeping of state roads in urbanized areas that have curb and gutter.	Street Sweeping	Completed	Not Provided	N/A	UTF	65	Not Provided	Florida Legislature	Not Provided
FDACS	S146	Agricultural Farm Fertilizer BMP Implementation	Enrollment and verification of farm fertilizer BMPs by agricultural producers.	Agricultural BMPs	Underway	Prior to 2018	2038	FF	17,868	Not Provided	Not Provided	Not Provided
FDACS	S147	Agricultural Livestock Waste BMP Implementation	Enrollment and verification of livestock wastes BMPs by agricultural producers.	Agricultural BMPs	Underway	Prior to 2019	2038	LW	46,949	Not Provided	Not Provided	Not Provided
Golf Courses	S148	Golf Course Reduction Credits	10 % BMP credit on golf course load to groundwater, assuming 100 % BMP implementation by golf course owners.	Golf Course BMPs	Planned	TBD	2038	STF	15,915	TBD	N/A	N/A
Sports Fields	S149	Sports Field Reduction Credits	6 % BMP credit on sports field load to groundwater, assuming 100 % BMP implementation by sports field owners.	Sports Field BMPs	Planned	TBD	2038	STF	965	TBD	N/A	N/A
Wastewater Utilities	S150	WWTF Policy Reductions	Achieved by WWTF policy if implemented BMAP-wide, achieving 3 or 6 mg/L.	Wastewater Management	Underway	TBD	2038	WWTF	46,345	TBD	TBD	TBD
SJRWMD	S151	Colvin Farms Center Pivot Nozzle Retrofit	Center pivot nozzle retrofit	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	5,451	Not Provided	SJRWMD	$91,989
SJRWMD	S152	Brown's Farm Irrigation Conversion	Irrigation conversion	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	289	Not Provided	SJRWMD	$110,312.51
SJRWMD	S153	Colvin Farms Soil Moisture and Climate Sensor Telemetry	Soil moisture and climate sensor telemetry	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	10,844	Not Provided	SJRWMD	$75,881.16

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SJRWMD	S154	Colvin Farms Soil Grid Mapping and Variable Rater Fertilizer Applicator	Soil grid mapping and variable rater fertilizer applicator	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	5,336	Not Provided	SJRWMD	$36,050
SJRWMD	S155	Mid-State Research Irrigation Conversion	Irrigation conversion	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	124	Not Provided	SJRWMD	$43,813.8
SJRWMD	S156	Mid-State Research Soil Grid Mapping and Variable Rater Fertilizer Applicator	Soil grid mapping and variable rater fertilizer applicator	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	1,720	Not Provided	SJRWMD	$8,075.52
SJRWMD	S157	North Caledonia Tailwater Storage and Recovery, Variable Rate Fertilizer Equipment	Tailwater storage and recovery, variable rate fertilizer equipment	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	2,655	Not Provided	SJRWMD	$291,262.5
SJRWMD	S158	Brown's Farm Irrigation Conversion	Irrigation conversion	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	43	Not Provided	SJRWMD	$102,750
SJRWMD	S159	Island Grove Irrigation System Automation	Irrigation system automation	Advanced Agricultural BMPs	Completed	Not Provided	Not Provided	FF	209	Not Provided	SJRWMD	$152,610.55
SJRWMD	S160	Brown's Farm Sprayer with Global Positioning System (GPS) Guidance	Sprayer with GPS guidance	Advanced Agricultural BMPs	Planned	2018-2019	TBD	FF	159	Not Provided	SJRWMD	$10,087.5
SJRWMD	S161	Lochloosa Farm Soil Moisture Probes and Weather Stations	Soil moisture probes and weather stations	Advanced Agricultural BMPs	Planned	2018-2019	TBD	FF	6	Not Provided	SJRWMD	$14,880

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
SJRWMD	S162	MacKay Farm Precision Irrigation and Fertigation	Precision irrigation and fertigation	Advanced Agricultural BMPs	Planned	2018-2019	TBD	FF	12	Not Provided	SJRWMD	$37,245.97
SJRWMD	S163	North Caledonia Tailwater Storage and Recovery, Soil Moisture Sensors, and Telemetry	Tailwater storage and recovery, soil moisture sensors and telemetry	Advanced Agricultural BMPs	Planned	2018-2019	TBD	FF	203	Not Provided	SJRWMD	$450,034.87
SJRWMD	S164	Yancey's Blueberry Farm Zone Irrigation and Soil Moisture Sensors and Weather Stations	Zone irrigation and soil moisture sensors and weather stations	Advanced Agricultural BMPs	Planned	2018-2019	TBD	FF	6	Not Provided	SJRWMD	$19,265.25
SJRWMD	S165	Southern Grace Farm Irrigation Conversion from Overhead to Drip	Irrigation conversion from overhead to drip	Advanced Agricultural BMPs	Planned	2018-2019	TBD	FF	41	Not Provided	SJRWMD	$167,727.38
Alachua County	S166	Public Education and Outreach Activities	Public education (6 % credit) to promote stormwater nutrient (nitrogen and phosphorus) reduction to protect groundwater and surface water resources. Includes FYN Program; ordinances for pet waste, landscaping, irrigation, and fertilizer; PSAs; pamphlets; website; and inspection program. Benefits: Reduce pollutant concentrations in stormwater runoff; public education effort to demonstrate the importance of preventing nonpoint source pollution; implement Alachua County Comp Plan Conservation and Open Space Element - Education and Outreach Objective 2.2; Surface Water	Education Efforts	Completed	Not Provided	N/A	UTF	448	Not Provided	Alachua County	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			Systems Objective 4.6; Alachua County ULDC - 406.43 Water Resources Buffers; ULDC 407.56 Requirements for Stormwater Management Areas used as Open Space; ULDC Article 9 Stormwater Management.									
Lake County	S167	Public Education and Outreach Activities	Outreach program (5.5 % credit) to residents of Lake County that enhances knowledge and awareness of stormwater management. Includes FYN Program; ordinances for landscaping, irrigation, and fertilizer; PSAs; pamphlets; website; and inspection program.	Education Efforts	Completed	Not Provided	N/A	UTF	541	Not Provided	Lake County	Not Provided
Marion County	S168	Public Education and Outreach Activities	Outreach program (5.5 % credit) to residents of Marion County that enhances knowledge and awareness of stormwater management. Includes FYN Program; ordinances for landscaping, irrigation, and fertilizer; PSAs; pamphlets; website; and inspection program.	Education Efforts	Completed	Not Provided	N/A	UTF	3,885	Not Provided	Marion County	Not Provided
City of Hawthorne	S169	Public Education and Outreach Activities	Outreach program (1.0 % credit) to residents of City of Hawthorne enhances knowledge and awareness of stormwater management. Includes ordinances for irrigation and fertilizer.	Education Efforts	Completed	Not Provided	N/A	UTF	13	Not Provided	City of Hawthorne	Not Provided
City of Fruitland Park	S170	Public Education and Outreach Activities	Outreach program (5.5 % credit) to residents of City of Fruitland Park enhances knowledge and awareness of stormwater management. Includes FYN Program; ordinances for landscaping, irrigation, and pet waste; PSAs; pamphlets; website; and inspection program.	Education Efforts	Completed	Not Provided	N/A	UTF	300	Not Provided	City of Fruitland Park	Not Provided
Town of Lady Lake	S171	Public Education and Outreach Activities	Outreach program (6 % credit) to residents of Town of Lady Lake enhances knowledge and awareness of stormwater management. Includes FYN program; ordinances for pet waste, landscaping, irrigation, and fertilizer; PSAs;	Education Efforts	Completed	Not Provided	N/A	UTF	193	Not Provided	Town of Lady Lake	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			pamphlets; website; and inspection program.									
City of Wildwood	S172	Public Education and Outreach Activities	Outreach program (1 % credit) to residents of City of Wildwood enhances knowledge and awareness of stormwater management. Includes ordinances for irrigation and landscaping.	Education Efforts	Completed	Not Provided	N/A	UTF	43	Not Provided	City of Wildwood	Not Provided
Villages Center CDD	S173	Public Education and Outreach Activities	Outreach program (1 % credit) to residents of The Villages enhances knowledge and awareness of stormwater management. Includes PSAs; pamphlets; website; and inspection program.	Education Efforts	Completed	Not Provided	N/A	UTF	257	Not Provided	Villages Center CDD	Not Provided
City of Ocala	S174	Public Education and Outreach Activities	Outreach program (1 % credit) to residents of City of Ocala enhances knowledge and awareness of stormwater management. Includes PSAs; pamphlets; website; and inspection program.	Education Efforts	Completed	Not Provided	N/A	UTF	197	Not Provided	City of Ocala	Not Provided
City of Wildwood	S175	Wildwood Street Sweeping	Sweeping of local streets.	Street Sweeping	Completed	Not Provided	N/A	UTF	10	Not Provided	City of Wildwood	Not Provided
DEP	OSTDS-01	Enhancement of Existing OSTDS - Voluntary	Repair, upgrade, replacement, drainfield modification, addition of effective nitrogen reducing features, initial connection to a central sewerage system, or other action to reduce nutrient loading, voluntarily taken by the owner of an OSTDS within the BMAP.	OSTDS Enhnacement	Underway	N/A	TBD	OSTDS	TBD	TBD	DEP	TBD
DEP	OSTDS-02	Enhancement of Existing OSTDS - Required	Repair, upgrade, replacement, drainfield modification, addition of effective nitrogen reducing features, initial connection to a central sewerage system, or other action taken to comply with the OSTDS Remediation Plan for the group of systems identified for remediation (see Appendix D).	OSTDS Enhancement	Planned	TBD	TBD	OSTDS	TBD	TBD	DEP	TBD

Table B-2. Stakeholder projects to reduce nitrogen sources in the Rainbow Springs BMAP area

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Growth Services	B001	Marion County TDR	TDR Program is designed to protect natural resources, especially those listed in Policy 1.1.2 of Conservation Element of Marion County Comprehensive Plan and locally important and prime farmlands in Marion County. These resources include, but are not limited to, preservation of high-water recharge and underground drainage basins, springs, karst areas, sinkholes, sinks, sinkhole ponds, and other karst features. Land from which development rights are transferred is subject to conservation easement. Article 3 of Land Development Code defines TDR Program and eligible sending and receiving areas.	Study	Completed	2000	Not Provided	FF	N/A	Not Provided	Not Provided	Not Provided
Marion County Growth Services	B002	Marion County TVR	TVR Program is designed to minimize dense development of vested properties without central water and sewer systems, and/or other supporting infrastructure, and thus protect natural resources, encourage and enhance development of larger parcels, reduce county's inventory of vested properties, and permit county to better plan for future growth. Land from which vested rights are transferred is subject to conservation easement. Article 3 of Land Development Code defines TVR Program and eligible sending and receiving areas.	Study	Completed	2000	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Growth Services	B003	Marion County Hamlet Design Option	Comprehensive Plan Future Land Use Element Policy 2.1.13 establishes Hamlet Development Option, designed to provide for clustered low-density development patterns in rural designated lands, while requiring permanent open spaces reserved from development and some increased additional urban services (e.g., central water, central sewer, designed/ constructed stormwater systems) that comply with Marion County's design and development standards, including Springs Protection. Article 3 of Land Development Code generally defines Hamlet design provisions.	Study	Completed	2000	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided
Marion County Growth Services	B004	Marion County Rural Community Land Use Designation	Comprehensive Plan Future Land Use Element Policy 2.1.18 establishes Rural Community future land use designation to provide for clustered urban density development patterns in rural designated lands, while requiring permanent open spaces reserved from development and complete urban services (e.g., central water, central sewer, and designed/constructed stormwater systems) that comply with Marion County's design and development standards, including Springs Protection. Article 3 of Land Development Code will generally define Rural Community design provisions.	Study	Completed	2000	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Growth Services	B005	Marion County Community Redevelopment Area Program	Comprehensive Plan Future Land Use Element Objective 2.2 establishes specific limited density and specialized design standards for wetland and floodplain areas slated for development. Articles 5 and 6 of Land Development Code set forth specific design and development criteria related to applicable areas.	Study	Completed	2000	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided
Marion County Growth Services	B006	Marion County Springs Protection Zones	Comprehensive Plan Future Land Use Element Objective 7.2 establishes Springs Protection Overlay Zones (SPOZ) and identifies extent of Primary and Secondary Zones along with other design and development standards. Articles 5 and 6 of Land Development Code set forth specific design and development criteria related to applicable SPOZ.	Study	Completed	2005	Not Provided	UTF	N/A	Not Provided	Not Provided	Not Provided
Marion County Office of the County Engineer	B007	Marion County Irrigation Ordinance	Ordinance sets enforceable irrigation schedule and rates of irrigation for Marion County. It also identifies efficient irrigation systems that are exempt from schedule.	Regulations, Ordinances, and Guidelines	Completed	2008	N/A	UTF	N/A	Not Provided	Marion County	Not Provided
Marion County Office of the County Engineer	B008	Marion County Fertilizer Ordinance	County's Florida-Friendly Fertilizer Use on Urban Landscapes Ordinance regulates proper use of fertilizers by any applicator; requires proper training of commercial and institutional fertilizer applicators; establishes training and licensing requirements; and specifies allowable fertilizer application rates and methods, fertilizer-free zones, low-maintenance zones, and	Regulations, Ordinances, and Guidelines	Completed	2008	N/A	UTF	N/A	Not Provided	Marion County	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			exemptions. It requires use of BMPs that provide specific management guidelines to minimize negative secondary and cumulative environmental effects associated with misuse of fertilizers. 2008 ordinance is now included in latest land development code.									
Florida Forest Service	B009	Silviculture BMP Implementation and Compliance	Covers silviculture lands in Rainbow and Silver Springs BMAP areas. BMPs for silviculture are applicable to public and private industrial and nonindustrial forestlands. Silviculture BMPs are minimum standards for protecting and maintaining water quality during ongoing silviculture activities, including forest fertilization. Projects include biennial BMP surveys, targeted training, and technical assistance for landowners and forestry professionals.	Agriculture BMPs	Completed	2004	N/A	FF	N/A	Not Provided	Not Provided	Not Provided
Marion County Office of the County Engineer	B010	Clean Farms Initiative	The Clean Farms Initiative was designed to assist Marion County farm owners and managers with implementation of BMPs, and to recognize them for their cooperative efforts. As part of initiative, more than 7,500 surveys and brochures were mailed in October 2006 to owners of agricultural land, ranging from large operations of several hundred acres to small tracts of land with fewer than dozen animals. Survey measures current manure management and fertilization practices. Results of survey, and input from focus groups held in	Agriculture BMPs	Completed	2003	N/A	FF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			February and March 2007, were used to create Farm Outreach Coordinator position to educate horse farm owners and managers on water quality, targeting practices such as manure management and fertilization.									
UF–IFAS Extension Marion County	B011	Water Quality Education and Equine Farm BMPs	Equine BMPs and Manure Management Education and Outreach Program sponsored by UF–IFAS Extension and Marion County. Between 2010 and 2013 program developed 44 types of educational materials, made 3,507 client consultations, of which 464 were in field. 301 producers participated in group education events including manure management summit and tour. Program website received 446 views during this period. Program is ongoing.	Agriculture BMPs	Completed	2010	N/A	LW	N/A	Not Provided	IFAS	Not Provided
DEP	B012	Implementation of Outreach Program for Small Equine BMP Manual	Small Equine BMP manual is intended to educate owners of noncommercial horse farms on BMPs to reduce nutrient loads. Outreach program will be developed for effective implementation of BMPs on noncommercial horse farms in Silver and Rainbow Springs BMAP areas. Implementation program will consist of identification of key agencies with existing public education activities where BMP manual can be incorporated, development or modification of existing recognition programs to provide measurable goals for both participants and types of BMPs implemented, and	Agriculture BMPs	Completed	2015	N/A	LW	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			identification of existing cost share programs that may assist noncommercial operations in BMP implementation.									
FDOT District 5	B022	State Road (SR) 40 Design Project-Pond 3	238719-1, SR 40 from County Road (CR) 328 to SW 80th Ave (CR 225A) - Pond 3/dry retention-closed basin in poorly drained soils	Retention BMP	Underway	2014	2020	UTF	3	Not Provided	Florida Legislature	Not Provided
FDOT District 5	B023	SR40 Design Project-Pond 4	238719-1, SR 40 from CR 328 to SW 80th Ave (CR 225A) - Pond 4/dry retention-closed basin in poorly drained soils	Retention BMP	Underway	2014	2020	UTF	4	Not Provided	Florida Legislature	Not Provided
FDOT District 5	B024	SR40 Design Project-Pond 5	238719-1, SR 40 from CR 328 to SW 80th Ave (CR 225A) - Pond 5/dry retention-closed basin in poorly drained soils	Retention BMP	Underway	2014	2020	UTF	4	Not Provided	Florida Legislature	Not Provided
FDOT District 5	B025	SR40 Design Project-Pond 6	238719-1, SR 40 from CR 328 to SW 80th Ave (CR 225A) - Pond 6/dry retention-closed basin in poorly drained soils	Retention BMP	Underway	2014	2020	UTF	3	Not Provided	Florida Legislature	Not Provided
Marion County Office of the County Engineer	B028	SW 85th St/SW 40th Ave Stormwater Retrofit	Construction of drainage retention area lined with Bold and Gold soil amendment to enhance nitrogen removal. Postconstruction event monitoring shows 70 % reduction in TN through soil amendment layer.	Retention BMP with Nutrient Reducing Media	Completed	2012	2012	UTF	26	$330,000	Marion County Stormwater Assessment, SWFWMD Cooperative Funding	Not Provided
Marion County Office of the County Engineer	B029	West Highway 316 at 119th Ave Stormwater Retrofit- CP #41	Proposed project to construct wet retention area to reduce nitrate in stormwater runoff from transportation and residential land uses that is currently infiltrating to aquifer without treatment. Project is currently identified in adopted 2014 Stormwater Implementation Plan.	Retention BMP	Completed	2016	2016	UTF	4	$52,654	Marion County Stormwater Assessment, SWFWMD Cooperative Funding	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Office of the County Engineer	B030	West Highway 316 at Highway 329 Stormwater Retrofit	Proposed project to construct retention area to reduce nitrate in stormwater runoff from transportation and residential land uses that is currently infiltrating to aquifer without treatment. Project is currently identified in adopted 2014 Stormwater Implementation Plan.	Retention BMP	Canceled	N/A	N/A	UTF	N/A	N/A	N/A	N/A
Marion County Office of the County Engineer	B032	Sinkhole Repair Program in County DRAs	Part of ongoing stormwater system maintenance activities. Performed as needed by county crews or contractors depending on size and scope of repair.	Stormwater System Operation and Maintenance	Completed	2003	N/A	UTF	N/A	N/A	Marion County: Annual Stormwater Budget for Internal Repairs-$50,000; Typical Annual Expenditure for Contracted Repairs from Stormwater Budget - $10K-$100K	Not Provided
Marion County Office of the County Engineer	B033	Street Sweeping of Marion County Roads	Sweeping of Marion County–maintained roads. Sweeping of roads with curb and gutter is completed nine times per year. Benefits: Remove debris, sediment, and potential pollutants from streets. Prevent entry into storm sewer system.	Street Sweeping	Completed	2003	N/A	UTF	49	N/A	Marion County Stormwater Assessment	Not Provided
Marion County Office of the County Engineer	B034	Marion County WMP	Countywide WMPs prepare that include creation and maintenance of comprehensive geodatabase for Marion County storm sewer system data, watershed boundaries and hydrologic features countywide.	Study	Completed	2003	N/A	UTF	N/A	$337,000	Marion County Stormwater Assessment, SWFWMD	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Office of the County Engineer	B035	Marion County Aquifer Vulnerability Assessment	Identification of vulnerable areas of aquifer. Project provided scientifically defensible water-resource management and protection tool that facilitates planning of human activities to minimize adverse impacts on groundwater quality. Aquifer vulnerability maps are displayed in classes of relative vulnerability (one area is more vulnerable than another). Maps benefit local government, planners, and developers in guiding growth into more appropriate areas (e.g., groundwater recharge areas) and improve site selection for expanding existing or establishing new well fields. Benefits: Identifies areas where aquifer is vulnerable to pollution. Potential for future management of activities in those areas to reduce pollution of groundwater.	Study	Completed	2007	2007	UTF	N/A	$82,850	Marion County Stormwater Assessment	$82,850
Marion County Office of the County Engineer	B036	Public Education Coordination	Formation of public education coordination team consisting of representatives from local government, state agencies, WMDs, and local interest groups. Purpose of groups would be to provide consistent and accurate information on pollution prevention is provided to citizens and maximize efforts among coordination team members.	Education Efforts	Completed	2017	N/A	UTF	N/A	Not Provided	Local, State and Federal Agencies, WMDS, Local Interest Groups	Not Provided
Marion County Office of the County Engineer	B037	Marion County Stormwater Program - NPDES MS4 Permit	Public outreach and education programs including informational pamphlet distribution, PSAs, and public outreach events. Other efforts	Education Efforts	Completed	2003	N/A	UTF	N/A	Not Provided	Marion County Stormwater Assessment	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			include: Illicit discharge inspection and education, mapping and modeling efforts, construction site pollution prevention program, and municipal operations pollution prevention program.									
FDOT Districts 2 and 5	B038	FDOT Public Education	FDOT conducts inspections and provides annual illicit discharge, spill prevention and erosion and sediment control training to staff and contractors.	Education Efforts	Completed	2000	N/A	UTF	N/A	Not Provided	Florida Legislature	Not Provided
Rainbow River Conservation	B039	Springs Awareness for Educators	Workshop for Marion County teachers and educators to provide resources on springs, water issues, and wildlife that can be used in classroom to enhance teaching common core standards.	Septage Land Application	Completed	2014	N/A	UTF	N/A	Not Provided	SWFWMD, Florida Springs Institute	Not Provided
Private Interest	B040	Collection Center for Septic System Pumpage	Proposed project to construct centralized collection center for septic tank pumpage in lieu of land application currently done. Collection center would process the pumpage and discharge into municipal collection system. Project is conceptual. SB 550 would ban land application of septic pumpage effective 2016.	Septage Land Application	Canceled	N/A	N/A	OSTDS	N/A	N/A	N/A	N/A
FDACS	B041	FDACS Cost-Share Programs	FDACS will be providing at least $250,000 in BMP cost-share for Silver Springs/Rainbow Springs BMAP areas.	Agriculture BMPs	Underway	2014	2020	FF	N/A	Not Provided	FDACS Cost Share	Not Provided
FDACS	B042	FDACS Refinement of Appropriate BMPs	To help focus cost-share expenditures and BMP implementation follow-up, FDACS will review rule-adopted cow/calf and equine BMPs to identify practices likely to have greatest nutrient load reduction benefits.	Agriculture BMPs	Underway	2015	2020	FF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
UF-IFAS Extension Marion County	B043	Technical Agriculture Committee	Formation of technical agriculture committee consisting of representatives from local interest groups, local government, WMDs, and state agencies. Purpose of group would be to ensure consistent and accurate information for pollutant load contribution associated with agricultural uses and evaluate effectiveness of BMPs.	Agriculture BMPs	Underway	2016	2020	FF	N/A	Not Provided	Not Provided	Not Provided
UF/IFAS Extension Marion County	B044	Assessment of the Role of Beef Cattle in Nitrogen Loading in the Silver and Rainbow Springs Basin	As part of the BMAP, inventories have been developed that estimate relative nitrogen loading from different sources or categories of land use in basins. Concerns have been expressed that amount of nitrogen load allocated to cattle may not accurately reflect key characteristics of Florida cow-calf production system. Issues include typical cattle stocking rates on pasture, low inputs of commercial nitrogen fertilizer to pasture systems, diets based on C4 (i.e., warm climate) grasses that have relatively low nitrogen concentration, nitrogen levels in dung and urine that are not comparable to those of dairy animals or beef cattle on feedlots, significant gaseous losses of nitrogen from animal waste, capability of grass roots to efficiently capture nitrogen as it passes through root zone, and amount of nitrogen stored in below-ground organs of pasture grasses. More accurate quantification of these characteristics for specific	Study	Underway	2016	2019	LW	N/A	$495,000	Florida Legislature	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			conditions of regional production systems will aid assessments of nitrogen loading from cattle operations.									
FDACS	B045	Revised Vegetable and Agronomic Crop BMP Manual	In 2015, FDACS OAWP adopted 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.	Agriculture BMPs	Completed	2015	2015	FF	N/A	Not Provided	Not Provided	Not Provided
FDACS	B046	Dairy BMP Manual	In early 2016, FDACS adopted dairy manual targeting dairies without DEP-issued NPDES permits.	Agriculture BMPs	Completed	2015	2016	LW	N/A	Not Provided	Not Provided	Not Provided
FDACS	B047	Poultry BMP Manual	OAWP adopted poultry BMP manual in June 2016.	Agriculture BMPs	Completed	2015	2016	LW	N/A	Not Provided	Not Provided	Not Provided
FDACS	B048	Enhanced IA Program	Additional emphasis was given to IA in 2016 legislation, particularly Chapter 2016-1, Laws of Florida. Among its provisions, law requires enhancement and formalization of OAWP IA policies and procedures through rulemaking. Rulemaking will be initiated prior to January 1, 2017. Once rulemaking is completed, FDACS will implement enhanced IA Program and more detailed reporting, as prescribed by legislation, and onsite visits and surveys will be carried out annually. Enhanced IA Program, as component of FDACS BMP Program, will be designed: • To provide accurate and	Agriculture BMPs	Underway	2016	2018	FF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			timely information on status of BMP enrollments. • To provide accurate and timely information on extent of BMP implementation. • To provide information from which reports on BMP enrollment and implementation can be made to BMAP stakeholders and to annual report required by Chapter 2016-1, Section 34, Laws of Florida. • To inform educational, research, and technical assistance efforts targeted to strengthen BMP implementation and effectiveness. • To guide review and potential revision of BMP manuals.									
City of Ocala	B049	Fox Meadow Sewer Expansion Project	Project objective is to design and construct sanitary sewer system to remove from service 275 septic tanks from associated single-family residential lots. Septic tanks contribute to TN and TP impairment of Rainbow Springs and Rainbow River.	Septic Tank Phase Out, Wastewater Service Area Expansion	Planned	2018	2020	OSTDS	1,443	$4,705,000	City of Ocala	Not Provided
City of Ocala	B050	Fairfield Village Sewer Expansion Project	Project objective is to design and construct sanitary sewer system that will remove from service package plant serving 350 mixed use residential lots and 1 community center. Package plant contributes to TN and TP impairment of Rainbow Springs and Rainbow River.	Package Plant Phase Out, Wastewater Service Area Expansion	Planned	2018	2020	WWTF	TBD	$875,000	City of Ocala	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
City of Ocala	B051	Timberwood Sewer Expansion Project	Project objective is to design and construct sanitary sewer system to remove from service 180 septic tanks from associated single-family residential lots. Septic tanks contribute to TN and TP impairment of Rainbow Springs and Rainbow River.	Septic Tank Phase Out, Wastewater Service Area Expansion	Planned	2018	2020	OSTDS	1,483	$3,316,000	City of Ocala	Not Provided
City of Dunnellon	R001	River Protection Corridors	City of Dunnellon River Protection Corridor Areas for both Rainbow and Withlacoochee Rivers. Corridor extends 150 feet from ordinary high-water line and implements specific development standards for new development and for construction on existing lots with vested development rights after 2008.	Regulations, Ordinances, and Guidelines	Completed	2008	N/A	UTF	N/A	Not Provided	Marion County	Not Provided
DEP - Division of State Lands	R002	Rainbow River Corridor	Rainbow River Corridor project is designed to protect most of undeveloped or minimally developed private land remaining along Rainbow River. Southern parcels would bring remaining large portion of undeveloped shoreline along eastern side of river into state ownership, and provide connection to southern end of Rainbow Springs State Park. Public acquisition of these lands will prevent further development and conflicting land uses that could further degrade ecological value of area. In addition, potential restoration of altered habitats would help restore and maintain water quality and habitat along one of Florida's largest spring-run streams.	Land Acquisition	Completed	2007	N/A	UTF	N/A	$1,157,483	FCT	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			1,140 acres remain for acquisition, which will continue as funds and sales agreements allow. 32.44 acres were acquired for Blue Run of Dunnellon Park (R013) in 2008.									
City of Dunnellon	R003	Blue Cove Emergency Overflow Project	Project to construct retention pond with control structure and pipe conveyance system to treat and convey flood overflows from Blue Cove to Rainbow River. Prior to construction, overflows sheet flowed through residential neighborhood to river.	Retention BMP	Completed	2000	2011	UTF	Not Provided	Not Provided	City of Dunnellon	Not Provided
City of Dunnellon	R004	Datesman Park Overflow Parking Lot Improvement	Project retrofitted car and boat trailer overflow parking lot with pervious pavers and stormwater retention pond.	Retention BMP	Completed	2000	2010	UTF	Not Provided	Not Provided	City of Dunnellon	Not Provided
Marion County Office of the County Engineer	R011	Village of Rainbow Springs Stormwater Retrofit	Retrofit of existing drainage retention area with aerobic filtration cells for conversion of TN to nitrate and infiltration cell lined with Bold and Gold for nitrate removal. Project also includes stormwater wetland to treat runoff discharged into Section 16 lake.	Wetland Treatment, Retention BMP with Media Filter	Completed	2014	2015	UTF	8	$336,800	Marion County Stormwater Assessment, SWFWMD	Not Provided
Marion County Office of the County Engineer	R012	CR 484 Stormwater Retrofit, Phase 1	Construction of bioretention area and collection system to treat runoff from bridge spanning Rainbow River.	Retention BMP	Completed	2009	2010	UTF	1	$62,081	Marion County Stormwater Assessment, SWFWMD	Not Provided
Marion County Office of the County Engineer	R013	CR 484 Stormwater Retrofit, Phase 2	Construction of wet detention pond to treat runoff discharged into Rainbow River from CR 484.	Wet Detention Pond	Completed	2011	2012	UTF	13	$73,890	Marion County Stormwater Assessment, SWFWMD	Not Provided
Marion County Office of the	R014	CR 484 Stormwater Retrofit, Phase 3	Upgrade of limerock parking lot in Blue Run of Dunnellon Park with pervious brick paver parking area and paved aisles	Wet Detention Pond	Completed	2011	2011	UTF	2	$223,700	Marion County Stormwater Assessment,	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
County Engineer			to address sediment discharge into Rainbow River. Three wet detention ponds were constructed to treat stormwater runoff from new parking lot and CR 484 east of Rainbow River.								Marion County Parks, SWFWMD	
Marion County Office of the County Engineer	R015	Rainbow Springs Country Club Estates Stormwater Retrofit	Expansion and conversion of existing retention pond to wetland/wet retention pond to enhance nitrate removal from runoff generated from county road, golf course, and residential land uses.	Wetland Treatment	Completed	2012	2012	UTF	3	$136,423	Marion County Stormwater Assessment, SWFWMD	Not Provided
Marion County Office of the County Engineer	R016	Rainbow Park Unit 8 Stormwater Retrofit	Construction of three wet detention ponds to treat runoff prior to discharge to relict karst feature and isolated surface wetlands.	Wet Detention Pond	Completed	2012	2013	UTF	11	$443,399	Marion County Stormwater Assessment, SWFWMD	Not Provided
Marion County Office of the County Engineer	R017	Rolling Hills unit 5 Stormwater Retrofit	Construction of interconnected system of four retention ponds and one wet retention pond to treat stormwater runoff from roads, residential, and agricultural land uses.	BMP Treatment Train	Completed	2012	2013	UTF	19	$484,097	Marion County Stormwater Assessment, SWFWMD	Not Provided
SWFWMD	R018	WR01 Rainbow River Phosphate Mine Pit Restoration	Implementation of restoration alternatives in lower Rainbow River and adjacent phosphate mine pits.	Restoration	Canceled	N/A	N/A	UTF	N/A	N/A	N/A	N/A
City of Dunnellon	R019	Sewer Conversion Project, Phases 1-4	Project constructed new sewer system within city limits allowing properties previously on OSTDS (140 in Phase 2) to hook up to central sewer.	Septic Tank Phase Out, Wastewater Service Area Expansion	Completed	2000	2012	OSTDS	1,153	Not Provided	Not Provided	Not Provided
SWFWMD	R020	P301 Feasibility Phase - Wastewater Disposal Treatment Wetlands	Siting and feasibility assessment for treatment wetlands to polish WWTP effluent.	Study	Completed	2015	2015	WWTF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
FDOT Districts 5	R021	Fertilizer Cessation	FDOT operations and maintenance fertilizer cessation.	Fertilizer Cessation	Completed	2010/ 2012	N/A	UTF	2,443	N/A	N/A	N/A
City of Dunnellon	R022	Dunnellon WMP	Includes hydrologic and hydraulic model and water quality treatment recommendations for nine stormwater discharge outfalls to Rainbow and Withlacoochee Rivers.	Study	Completed	2004	2004	UTF	N/A	$50,000	City of Dunnellon	$50,000
SWFWMD	R023	WR01 Rainbow River Phosphate Mine Pit Feasibility Study	Feasibility study to assess restoration alternatives in lower Rainbow River and adjacent phosphate mine pits.	Study	Canceled	2014	N/A	UTF	N/A	N/A	N/A	N/A
SWFWMD	R024	Efficient Irrigation Workshops	Community presentations on efficient-irrigation practices.	Education Efforts	Completed	2005	2005	UTF	N/A	$2,500	SWFWMD	$2,500
SWFWMD	R025	Florida-Friendly Landscaping™ (FFL) Program Coordinator	UF FFL Program educates homeowners on how to design, install, and maintain healthy landscapes that use minimum of water, fertilizer, and pesticides. SWFWMD funds programs in 11 of its 16 counties in partnership with county governments and university.	Education Efforts	Completed	2004	N/A	UTF	N/A	$279,000	SWFWMD	$279,000
SWFWMD	R026	Restoring Our Springs! media campaign	PSAs to promote SWFWMD's "Restoring Our Springs!" media campaign. Advertising will be in Citrus, Hernando and Marion Counties and will direct people to "Join us in the community effort to restore our springs."	Education Efforts	Completed	2014	2016	UTF	N/A	$35,698	SWFWMD	$35,698
SWFWMD	R027	Newspaper in Education: Springs in west-central Florida	In-depth look at springs in west-central Florida through Newspaper in Education produced by Tampa Bay Times. Distributed to middle school students in Citrus, Hernando, and Marion Counties as well as Tampa Bay	Education Efforts	Completed	2013	2014	UTF	N/A	$16,600	SWFWMD	$16,600

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			Times and Citrus County Chronicle readers.									
SWFWMD	R028	Crystal River/King's Bay/Rainbow River Public Service Advertising	Messaging on how residents can help protect quality of local springs through proper application of fertilizer. Social research was used to help develop messages.	Education Efforts	Completed	2007	2011	UTF	N/A	$83,641	SWFWMD	$83,641
SWFWMD	R029	Crystal River/King's Bay/Rainbow River Outreach Coordinator	Education effort to reduce water quality impacts from landscaping and other homeowner practices, such as overfertilization and leaky OSTDS, that increase nitrates in springs. Targeted homeowners, landscape professionals, retail outlets, OSTDS maintenance companies, and others. Included education effort titled "You want your lawn green, not your water. Don't over-fertilize."	Education Efforts	Completed	2008	2011	UTF	N/A	$82,600	SWFWMD	$82,600
SWFWMD	R030	Marion County Springs Festival Sponsorship	Event to educate public on protection of Marion County's springs and other water resources. Event alternates between Rainbow Springs State Park and Silver Springs State Park.	Education Efforts	Completed	2006	2016	UTF	N/A	$25,598	SWFWMD	$25,598
SWFWMD	R031	Marion County Master Gardeners Spring Festival Sponsorship	Festival supporting FFL outreach and education, including focus on water conservation, watersheds, and water quality.	Education Efforts	Completed	2000	2011	UTF	N/A	$30,750	SWFWMD	$30,750
SWFWMD	R032	Springs Awareness Week - Springs Neighborhood Challenge	One-day workshop taught participants about water quality issues specific to Rainbow Springs and Crystal River/Kings Bay. Workshop focused on proper fertilizer application.	Education Efforts	Completed	2011	2011	UTF	N/A	$3,000	SWFWMD	$3,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
SWFWMD	R033	Get Out and Explore Marion County Springs	Guided canoe trip, hiking trip and water quality demonstration to educate residents about aquatic ecology, karst geology, native and invasive plants, water sampling, and human impacts to springs.	Education Efforts	Completed	2012	2012	UTF	N/A	$1,945	SWFWMD	$1,945
SWFWMD	R034	Marion County Earth Day	One-day event educated Marion County residents about springs and water quality protection.	Education Efforts	Completed	2011	2011	UTF	N/A	$1,500	SWFWMD	$1,500
SWFWMD	R035	Rainbow River Vegetation Education	Funding helped develop DVDs, brochures, and posters describing value of aquatic vegetation to sustainability of aquatic community and recommending proper etiquette of river use.	Education Efforts	Completed	2011	2011	UTF	N/A	$4,800	SWFWMD	$4,800
SWFWMD	R035	Microirrigation Workshops	Through 3 educational workshops and distribution of microirrigation kits, project educated homeowners living in 55+ communities about FFL principles and benefits of using microirrigation.	Education Efforts	Completed	2010	2011	UTF	N/A	$2,690	SWFWMD	$2,690
SWFWMD	R037	Soil Analysis by UF	Up to 200 soil analysis tests were conducted as part of Crystal River/ King's Bay/Rainbow River Watershed Education project.	Education Efforts	Completed	2010	2010	UTF	N/A	$1,400	SWFWMD	$1,400
SWFWMD	R038	Best Management Practices Awareness Campaign	Project educated equine enthusiasts on importance of protecting water resources to ensure water quality by using proper manure management, fertilization techniques, and water conservation practices.	Education Efforts	Completed	2010	2010	LW	N/A	$4,988	SWFWMD	$4,988
SWFWMD	R039	FFL Expo	Project encouraged Marion County homeowners to reduce water use by incorporating FFL principles.	Education Efforts	Completed	2010	2010	UTF	N/A	$4,999	SWFWMD	$4,999

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SWFWMD	R040	Blue Run Aquatic Planting	30 volunteers learned how aquatic plants help filter stormwater and participated in planting at Blue Run.	Education Efforts	Completed	2009	2009	UTF	N/A	$2,000	SWFWMD	$2,000
SWFWMD	R041	Storm drain markers	Storm drain markers purchased to conduct storm drain marking events in Marion County.	Education Efforts	Completed	2009	2009	UTF	N/A	$2,695	SWFWMD	$2,695
SWFWMD	R042	Community Landscape/Irrigation Evaluation Specialist	Consultant evaluated 10 locations in 5 counties, including Marion, and made recommendations for water conservation in community landscapes and irrigation.	Education Efforts	Completed	2009	2009	UTF	N/A	$6,000	SWFWMD	$6,000
SWFWMD	R043	Rainbow River Springshed Tour	Educational program to inform local officials, homeowners, retail store managers, and lawn care providers on how fertilizer impacts local springshed.	Education Efforts	Completed	2009	2009	UTF	N/A	$1,500	SWFWMD	$1,500
SWFWMD	R044	Aquatic Vegetation Video	10-minute video showing value of submerged and emergent aquatic vegetation in Rainbow Springs Aquatic Preserve and impact of recreational use on vegetation.	Education Efforts	Completed	2009	2009	UTF	N/A	$4,289	SWFWMD	$4,289
SWFWMD	R045	Florida Friendly Demonstration Garden at the Dunnellon Library	FFL demonstration garden was installed to educate visitors to Dunnellon Library about benefits of FFL principles.	Education Efforts	Completed	2009	2009	UTF	N/A	$4,550	SWFWMD	$4,550
SWFWMD	R047	TDR for Watershed Protection	Through series of five workshops, landowners, developers, and citizens were educated about TDR Program and Farmland Preservation Area in northwest Marion County.	Education Efforts	Completed	2007	2007	UTF	N/A	$3,000	SWFWMD	$3,000
SWFWMD	R048	FYN Program - Color in the Landscape Spring Festival	FFL festival provided information workshops on practices.	Education Efforts	Completed	2006	2006	UTF	N/A	$5,000	SWFWMD	$5,000

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SWFWMD	R049	Splash! Grants to Teachers in Marion County	Various water resource grants; most projects directly related to education about Rainbow Springs.	Education Efforts	Completed	2007	2013	UTF	N/A	$35,240	SWFWMD	$35,240
City of Dunnellon	R050	Rainbow River Acres Stormwater Retrofit	Proposed project in vicinity of Oak St and Palmetto Way in Rainbow River Acres subdivision. Project would construct stormwater pond to address flooding and to provide water quality for untreated stormwater runoff that currently sheet flows into Rainbow River.	Stormwater	Planned	2023	Not Provided	UTF	Not Provided	Not Provided	City of Dunnellon	Not Provided
Marion County Office of the County Engineer	R051	Bold and Gold Stormwater Retrofits in Rainbow Springs BMAP Area	Project proposes $1,400,000 through FY 2019 for retrofit of county-owned DRAs in Rainbow Springs BMAP area. Number and location of DRAs retrofitted will depend on several factors, including potential load reductions, land availability, and location in PFAs identified in BMAP. Project is currently in preliminary scoping stages and is identified in adopted 2014 Stormwater Implementation Plan.	Retention BMP Retrofit with Nutrient Reducing Media	Underway	2015	2019	UTF	Not Provided	$1,400,000	Marion County Stormwater Assessment	$1,400,000
Marion County Utilities/City of Dunnellon	R052	Wastewater Level of Service Coordination – System Upgrade	Coordination between Marion County Utilities and City of Dunnellon utility to improve level of wastewater treatment in Rainbow Springs area. Project would improve level of treatment provided by existing four city treatment facilities by constructing new facility that meets AWT standards.	WWTF Nutrient Reduction	Canceled	N/A	N/A	WWTF	N/A	N/A	N/A	N/A

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Marion County Utilities/City of Dunnellon	R053	Wastewater Level of Service Coordination – OSTDS Abatement	Coordination between Marion County Utilities and City of Dunnellon utility to improve level of wastewater treatment in Rainbow Springs area. Project would initially allow 266 OSTDS to hook up to central sewer, with potential for additional connections in future.	Septic Tank Phase Out, WWTF Nutrient Reduction	Canceled	N/A	N/A	OSTDS	N/A	N/A	N/A	N/A
Marion County Utilities/ City of Dunnellon	R054	Wastewater Level of Service Coordination – Package Plant Abatement	Coordination between Marion County Utilities and City of Dunnellon utility to improve the level of treatment of wastewater in Rainbow Springs area. Project would initially allow 5 package plants to hook up to central sewer, with potential for additional connections in future.	Package Plant Phase Out, WWTF Nutrient Reduction	Planned	2020	Not Provided	WWTF	N/A	Not Provided	SWFWMD, City of Dunnellon	Not Provided
SWFWMD	R055	P301 Design and Permitting Phase - Wastewater Disposal Treatment Wetlands	Design and permitting of treatment wetland(s) to polish WWTP effluent.	WWTF Upgrade	Canceled	N/A	N/A	WWTF	N/A	N/A	N/A	N/A
SWFWMD	R056	P301 Implementation Phase - Wastewater Disposal Treatment Wetlands	Construction of treatment wetland(s) to polish WWTP effluent.	WWTF Upgrade	Canceled	N/A	N/A	WWTF	N/A	N/A	N/A	N/A
City of Dunnellon	R057	Rio Vista WWTP Decommissioning	Planned project will decommission Rio Vista WWTP and convert existing lift station to pump wastewater to Rainbow Springs plant.	WWTF Phase Out	Completed	2014	2015	WWTF	N/A	Not Provided	Not Provided	Not Provided
City of Dunnellon	R058	Rio Vista Collection System Maintenance	Companion project to Rio Vista WWTP decommissioning. Collection system is subject to high infiltration into system after	Sanitary Sewer and WWTF Maintenance	Completed	2014	2015	WWTF	N/A	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			storm events, resulting in overflows from plant holding pond.									
City of Dunnellon	R059	Supervisory Control and Data Acquisition (SCADA) Installation	Planned phased project for installation of SCADA at city WWTPs followed by installation at lift stations.	WWTF Upgrade	Planned	2020	Not Provided	WWTF	N/A	Not Provided	Not Provided	Not Provided
Marion County Office of the County Engineer	R062	Sa-Te-Ke Village Stormwater Retrofit	Construction of retention storage along Rainbow River to treat direct discharge to river from culvert discharging along SW 183rd Court and SW 102nd Street Road.	Retention BMP	Completed	2011	2011	UTF	1	$73,512	Marion County Stormwater Assessment	$73,512
Marion County Office of the County Engineer	R063	Rainbow Springs 5th Replat Stormwater Retrofit- CP #67	Project will retrofit three drainage retention areas in Rainbow Springs 5th replat with nitrogen reducing Bold and Gold media. Retrofit will prevent 250 pounds of TN from reaching aquifer annually.	Retention BMP Retrofit with Nutrient Reducing Media	Underway	2016	TBD	UTF	68	$931,510	Marion County Stormwater Assessment, SWFWMD	Not Provided
FDOT District 5	R064	Blue Cove Lake Water Quality Structure	Load reduction estimated using efficiency for baffle box. However, box includes Bold and Gold filter media, which may reduce pollutant load more than estimated.	Baffle Boxes-Second Generation with Media	Completed	2013	2013	UTF	0	Not Provided	Florida Legislative	Not Provided
Town of Bronson	R065	Levy Blue Spring Water Quality Improvement Project	Project will expand town's existing wastewater collection and transmission system and eliminate use of approximately 60 OSTDS and holding tanks at no cost to homeowners.	Septic Tank Phase Out, Wastewater Service Area Expansion	Planned	2015	Not Provided	OSTDS	494	Not Provided	Florida Legislature, SRWMD	Not Provided
DEP - Division of State Lands	R066	South Goethe	Addition provides corridor from Goethe State Forest to Marjorie Harris Carr Cross-Florida Greenway State Recreation and Conservation Area along Withlacoochee River and connects to Etoniah Cross-Florida Greenway Florida Forever project. One of	Land Acquisition	Underway	2006	TBD	UTF	N/A	$11,574,303	FCT	$11,574,303

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			project's primary concepts is to protect Withlacoochee River Watershed by connecting Goethe State Forest with Greenway. Another stated goal is to provide significant buffer along southern boundary of forest while eventually enhancing forest and its associated habitat through restoration.									
DEP - Division of State Lands	R067	Bear Hammock	Acquiring Bear Hammock project in southern Marion County would meet state goals of enhanced coordination of land acquisition efforts by making conservation link that fills gap among several other properties. One goal of state conservation is to preserve areas of at least 50,000 acres, and Bear Hammock provides connector between Goethe State Forest and Marjorie Harris Carr Cross-Florida Greenway, creating continuity of more than 200,000 acres.	Land Acquisition	Underway	2008	TBD	UTF	N/A	$32,576,529	FCT	$32,576,529
DEP - Division of State Lands	R068	Carr Farm/Price's Scrub	Carr Farm/Price's Scrub in southwestern Alachua County and northwestern Marion County includes scrub, upland mixed forest, scrubby flatwoods, wet flatwoods, depression marsh, marsh lake, and sinkhole lake. This scrub is one the northernmost examples of community in peninsular Florida. 962 acres, located in Marion County, have been acquired to date. Purchase of remaining 305 acres to complete acquisition.	Land Acquisition	Underway	2001	TBD	UTF	N/A	$2,061,144	FCT/Office of Greenways and Trails	$2,061,144

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SWFWMD	R070	2013-2017 Springs Management Plan	District Springs Management Plan summarizes vision, issues, and solutions that district will address over next five years to manage and protect springs. Through strategic investments and partnerships, district is implementing projects to conserve and restore ecological balance of spring systems, thus supporting regional economies and quality of life. Plan lays out general restoration strategy, overview of goals and issues, and list of proposed projects.	Study	Completed	2013	2014	UTF	N/A	Not Provided	SWFWMD	Not Provided
DEP/ FDOH	R071	OSTDS 9-1-1 Strategy	Develop strategy for addressing OSTDS and other wastewater management issues. Goal is to enhance communication and coordination among utilities and agencies.	Study	Completed	2015	Not Provided	OSTDS	N/A	Not Provided	Not Provided	Not Provided
Bay Laurel Center CDD	R072	Operational Improvements	Operational staff using oxidation-reduction potential probes and cyclic aeration to provide denitrification.	WWTF Nutrient Reduction	Completed	2013	N/A	WWTF	N/A	$1,500	Bay Laurel Center CDD	$1,500
Bay Laurel Center CDD	R073	Public Access Reuse	Design and construct reclaimed water system, including pumping, storage, and distribution main that provides reclaimed water for irrigation at On Top of the World and Candler Hills golf courses.	Reuse Project	Completed	2008	2010	WWTF	N/A	$2,198,000	Bay Laurel Center CDD	$2,198,000
SWFWMD	R074	Dunnellon High School Legacy Program	Program taught students basic land management techniques. Students also educated community, which included promoting springshed protection. In 2007, educational signage about watershed protection was placed in kiosks at drop-in and	Education Efforts	Completed	2004	2007	UTF	N/A	$11,853	SWFWMD	$11,853

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			take-out tubing sites at Rainbow River State Park.									
SWFWMD	R075	Dunnellon Elementary School Rain Barrels	Students and families were educated on use of rain barrels for irrigation as way of conserving water.	Education Efforts	Completed	2003	2003	UTF	N/A	$2,975	SWFWMD	$2,975
Marion County Office of the County Engineer	R076	Rainbow Springs 5th Replat Stormwater Retrofit - CP #72	Retrofit of DRAs 2166, 2176, and 2188 with Bold and Gold biosorption activated media for nitrogen reduction.	Retention BMP Retrofit with Nutrient Reducing Media	Planned	2017	2017	UTF	36	$414,000	Marion County Stormwater Assessment; SWFWMD Cooperative Funding (Potentially)	Not Provided
City of Williston	R077	Williston WWTP Upgrade	Upgrade city WWTP to improve nitrogen removal. Currently WWTF does not have effluent reporting limit for TN.	WWTF Nutrient Reduction	Underway	2017	2020	WWTF	N/A	$3,021,000	City Matching Funds, CDBG, Springs Funding	N/A
SWFWMD	R078	Save Our Springs, Manage the Manure	Project educated equine community in Rainbow Springs Springshed about need for BMPs to protect springs. Informational brochure was created to accompany promotional item passed out at local tack stores. Goal was for Extension Service to meet and schedule one-on-one farm consultations to teach BMPs.	Education Efforts	Planned	2015	2016	LW	31	$1,600	SWFWMD	$1,600
FDOT District 2	R079	Fertilizer Cessation	FDOT operations and maintenance fertilizer cessation on SR 121 and SR 500 (US 27A). Cessation began in 2009 and is ongoing.	Fertilizer Cessation	Completed	2012	N/A	UTF	872	N/A	N/A	N/A
FDOT District 2	R080	Wet Detention/Retention Ponds in FDOT Roads	Nitrogen reduction from wet detention/retention ponds on SR 500 (US 27A). Ponds 1 and 5 were completed in 2002 and Pond 10 was completed in 2004.	Wet Detention Ponds, Retention BMPs	Completed	2000	2004	UTF	31	Not Provided	Not Provided	Not Provided

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City of Dunnellon	R081	Dunnellon City Beach	Proposed project located at Dinkins Park/City Beach. Project would construct riverwalk along Rainbow River and provide for water quality for untreated stormwater runoff that currently sheetflows into Rainbow River.	Stormwater	Underway	2018	2021	UTF	Not Provided	Not Provided	City of Dunnellon	Not Provided
SWFWMD	R082	Composting at Animal Stock Facilities	Research project will evaluate nutrient removal efficiency from composting animal waste. Project will investigate various composting BMPs to determine which is most effective. It will also compare nutrient leaching efficiency for manure stockpiling and composting facilities.	Study	Underway	2017	2019	LW	N/A	Not Provided	SWFWMD	Not Provided
FDACS	R083	Marion County Equine Compost Facilities Pilot Project	Program will focus on implementation of manure management BMPs for commercial equine operations in Rainbow Springs BMAP area, specifically in areas of Marion County within SWFWMD jurisdiction. Effort will be in conjunction and coordination with UF–IFAS Marion County Extension Service, in which education and outreach will be provided for commercial and small equine operations. It will also be in conjunction with Marion County Solid Waste Department to remove static manure piles on commercial equine operations.	Agriculture BMPs, Education Efforts	Underway	2018	2019	LW	TBD	$200,000	FDACS, SWFWMD	Not Provided
City of Dunnellon	R084	Rainbow Springs WRF Decommissioning	Rerate City of Dunnellon WRF to 0.50 mgd and construct force main from Rainbow Springs WRF to the City's WRF and Decommission Rainbow Springs WRF. City of	Package Plant Phase Out, Wastewater Service Area Expansion	Planned	2020	2021	WWTF	N/A	Not Provided	Not Provided	Not Provided

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			Dunnellon recognizes vital ecological and economic importance that Rainbow Springs and Rainbow River have in community. These waterbodies are listed as OFWs and are classified as high priorities in SWIM Plan. These waterbodies are impaired under Subsection 62-303(d), F.A.C., by TN as identified in adopted TMDL. Project's primary objective is to design and construct sanitary sewer system that will remove from service Rainbow Springs WRF (highlighted on location map) which treats approximately 0.15 mgd. WRF contributes to TN impairment of Rainbow Springs and Rainbow River. Removal of WRF will result in substantial and measurable reduction in identified pollutant sources. This is quantified in the Total Nutrient Removal section. Project is dependent on rerating City of Dunnellon WRF to 0.50 mgd.									
Marion County Utilities	R085	Golden Ocala WWTP Nutrient and Capacity Improvement	Golden Ocala WWTF expansion project is initiative by county to improve wastewater treatment and expand capacity at plant. Project consists of constructing new 0.675 mgd oxidation ditch with biological nutrient removal, 2 0.750 mgd clarifiers, 2 flow splitting structures for future oxidation ditches, 0.5 million-gallon equalization basin, new headworks, and screening structure. Existing 0.2 mgd	WWTF Nutrient Reduction	Underway	2018	2020	WWTF	N/A	$17,300,000	Marion County Utility Funds/Grants	Not Provided

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			plant will be retrofitted into aerobic digester or sludge holding tank. Plant will be upgraded to AWT standards.									
Marion County Utilities	R086	Removal of septic tanks along the Rainbow River and PPZ	Rainbow Springs sewer expansion project intent is to determine feasibility of removing existing septic tanks and connecting to central sewer system. Project will improve water quality to Rainbow Springs and Rainbow River. Subject to funding limitations, consultant would develop feasibility study to include multiyear phased approach for planning projects in Primary Spring Protection Zone of Rainbow River. Feasibility study will focus on quantifying and locating existing OSTDS systems, estimating construction costs (for new infrastructure and system updates, including lift stations, gravity sewer mains, force mains, sewer laterals, eliminating septic tanks, and constructing new regional wastewater treatment facility to meet current, future demands and BMAP water quality standards, and decommissioning package plants) as well as operation and maintenance costs of new infrastructure that will be put in place.	Study	Planned	2018	Not Provided	OSTDS	N/A	$20,000	Marion County Utility Funds	$20,000
Marion County Utilities	R087	Provide central sewer service to major commercial corridor	Project will construct 10,750 feet of sanitary sewer force main along SR 200 corridor in Ocala. Project will connect existing development so that	Septic Tank Phase Out, Wastewater Service Area Expansion	Underway	2017	2018	OSTDS	TBD	$2,490,984	Marion County Utility Funds/Grants	$2,490,984

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			septic tanks can be abandoned, prevent further installation of septic tanks along corridor by making central sewer available to new development, and reduce groundwater withdrawals by sending new sewer flows to WWTF that produces and distributes reclaimed water to customers.									
City of Williston	R088	Northwood Estates Septic-to-Sewer	Connection of 35 residential properties in Northwood Estates to City of Williston central sewer system.	Septic Tank Phase Out	Planned	2018	2019	OSTDS	255	$2,500,000	Springs Funding, City in-kind services	N/A
Marion County Utilities	R089	Financial Feasibility Study for a New Centralized Water Reclamation Facility and Collection system	Study will focus on estimating construction costs (for new infrastructure and system updates, including lift stations, gravity sewer mains, force mains, sewer laterals, eliminating septic tanks, upgrading existing WWTFs to meet future demands and county water quality standards, and decommissioning package plants) as well as operation and maintenance costs of new infrastructure that will be put in place. Study will determine cost-benefit ratio to determine feasibility of implementing OSTDS to Central Sewer program in Rainbow Springs area.	Study	Planned	2018	Not Provided	WWTF	N/A	$150,000	Marion County	$150,000
FDACS	R090	Agricultural Farm Fertilizer BMP Implementation	Enrollment and verification of farm fertilizer BMPs by agricultural producers.	Agricultural BMPs	Underway	Prior to 2018	2038	FF	#REF!	Not Provided	Not Provided	Not Provided
FDACS	R091	Agricultural Livestock Waste BMP Implementation	Enrollment and verification of livestock wastes BMPs by agricultural producers.	Agricultural BMPs	Underway	Prior to 2019	2038	LW	65,024	Not Provided	Not Provided	Not Provided

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
Golf Courses	R092	Golf Course Reduction Credits	10 % BMP credit on golf course load to groundwater, assuming 100 % BMP implementation by golf course owners.	Golf Course BMPs	Planned	TBD	2038	STF	5,530	TBD	N/A	N/A
Sports Fields	R093	Sports Field Reduction Credits	6 % BMP credit on sports field load to groundwater, assuming 100 % BMP implementation by sports field owners.	Sports Field BMPs	Planned	TBD	2038	STF	79	TBD	N/A	N/A
Wastewater Utilities	R094	WWTF Policy Reductions	Achieved by WWTF policy if implemented BMAP-wide, achieving 3 or 6 mg/L.	Wastewater Management	Underway	TBD	2038	WWTF	11,272	TBD	TBD	TBD
FDOT District 5	R095	Sweeping of State Roads	Not Provided	Street Sweeping	Completed	Not Provided	N/A	UTF	31	Not Provided	Not Provided	Not Provided
FDOT District 2	R096	Sweeping of State Roads	Monthly street sweeping of 7.33 miles of SR 500 and SR 121. Total solids collected per year is 7,356 lbs.	Street Sweeping	Completed	Not Provided	N/A	UTF	1	Not Provided	Not Provided	Not Provided
Marion County	R097	Public Education and Outreach Activities	Outreach program (5.5 % credit) to residents of Marion County that enhances knowledge and awareness of stormwater management. Includes FYN Program; ordinances for landscaping, irrigation, and fertilizer; PSAs; pamphlets; website; and inspection program.	Education Efforts	Completed	Not Provided	N/A	UTF	2,696	Not Provided	Marion County	Not Provided
City of Ocala	R098	Public Education and Outreach Activities	Outreach program (1.0 % credit) to residents of City of Ocala that enhances knowledge and awareness of stormwater management. Includes PSAs, pamphlets, website, and inspection program.	Education Efforts	Completed	Not Provided	N/A	UTF	56	Not Provided	Ocala	Not Provided
City of Dunnellon	R099	Burkett Road Septic to Sewer Project	City recognizes vital ecological and economic importance that Rainbow Springs and Rainbow River have in community. These waterbodies of water are listed as OFWs and are classified as high priorities in	Septic Tank Phase Out	Planned	2019	2020	OSTDS	91	Not Provided	Not Provided	$350,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			SWIM Plan. BMAP is currently being updated. These waterbodies are impaired under Chapter 62-303(d), F.A.C., by TN as identified in adopted TMDL. With this in mind, City of Dunnellon has identified Burkett Road Septic to Sewer Project to help improve water quality of these impaired waterbodies. Project's primary objective is to design and construct sanitary sewer system that will remove from service 11 septic tanks from associated single-family residential lots. Septic tanks contribute to TN impairment of Rainbow Springs and Rainbow River. Removal of septic tanks will result in measurable reduction in identified pollutant sources. This is quantified in Total Nutrient Reduction section. Project is dependent on rerating of City of Dunnellon WRF to 0.50 mgd.									
City of Dunnellon	R100	Chatmire Septic to Sewer Project	City recognizes vital ecological and economic importance that Rainbow Springs and Rainbow River have in community. These waterbodies are listed as OFWs and are classified as high priorities in SWIM Plan. BMAP is currently being updated. These waterbodies are impaired under Chapter 62-303(d), F.A.C., by TN as identified in adopted TMDL. With this in mind, city identified Chatmire Septic to Sewer Project to help improve water quality of these impaired waterbodies. Primary project	Septic Tank Phase Out	Planned	2019	2020	OSTDS	1,730	Not Provided	Not Provided	$3,700,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			objective is to design and construct sanitary sewer system that will remove from service 210 septic tanks from associated single-family residential lots. Septic tanks contribute to TN impairment of Rainbow Springs and Rainbow River. Removal of septic tanks will result in measurable reduction in identified pollutant sources. This is quantified in Total Nutrient Reduction section. Project is dependent on rerating of city WRF to 0.50 mgd.									
City of Dunnellon	R101	Rainbow River and Rio Vista Septic-to-Sewer Project	City recognizes vital ecological and economic importance that Rainbow Springs and Rainbow River has in community. These waterbodies are listed as OFWs and are classified as high priorities in SWIM Plan. BMAP is currently being updated. These waterbodies are impaired under Chapter 62-303(d), F.A.C., by TN as identified in adopted TMDL. City of Dunnellon has identified Rainbow River and Rio Vista Septic to Sewer Project to help improve water quality of these impaired waterbodies. Primary project objective is to design and construct sanitary sewer system that will remove from service 329 septic tanks from associated single-family residential lots. Septic tanks contribute to TN impairment of Rainbow Springs and Rainbow River. Removal of the septic tanks will result in measurable	Septic Tank Phase Out	Planned	2020	2021	OSTDS	2,710	Not Provided	Not Provided	$10,000,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			reduction in identified pollutant sources. This is quantified in Total Nutrient Reduction section. Project is dependent on rerating of City of Dunnellon WRF to 0.50 mgd.									
Marion County	R102	Northwest Regional WWTF Expansion	Northwest Regional WWTF expansion project is initiative by county to improve wastewater treatment and expand capacity at one of county's existing WWTFs. Project consists of constructing new 0.675 mgd oxidation ditch with biological nutrient removal, 2 0.750 mgd clarifiers, 2 flow splitting structures for future oxidation ditches, a 0.5 million gallon equalization basin, new headworks and screening structure, rehabilitation of existing lift station, retrofit of existing sand filter structure with disc filters with 2.00 mgd capacity, expansion of existing chlorine contact basins to 2.00 mgd, constructing new dewatering area for the county to bring in existing mobile centrifuge unit, new RAS/WAS pumping system, new MCC room, new automatic generator, new effluent pump station, and associated yard piping. Existing 0.200 mgd plant would be retrofitted into aerobic digester or sludge holding tank. This facility produces reclaimed water and would continue with expansion. Existing facility currently treats to average of	WWTF Nutrient Reduction	Planned	2019	2021	WWTF	N/A	Not Provided	Not Provided	$17,300,000

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			48.6 mg/L of nitrogen as TN. New facility will be designed to treat to AWT standards of 5 mg/L of biochemical oxygen demand (BOD), 5 mg/L of total suspended solids (TSS), and 3 mg/L of TN. This will result in net decrease in nitrogen loading to springshed. County has completed alternatives analysis for expanding and improving facility. County will be moving forward with procuring design services in FY 2018 with construction anticipated to begin in FY 2019 or FY 2020. Application is for construction funding only.									
Marion County	R103	Package Wastewater Plant Removal Program	Series of 6 projects connects developments with existing package plants to Marion County wastewater system and decommissions package plant. Six package plants combined represent total permitted capacity of 225,600 gpd and present-day treatment of 75,750 gpd (average). Currently, none of these facilities produces or distributes reclaimed water to customers. Once connected to Marion County wastewater system, flow will be treated at Oak Run WWTF (FLA012697) or Northwest Regional WWTF (FLA272060). Both facilities produce and deliver reclaimed water. Project scope includes constructing new master lift station (or retrofitting existing onsite lift station), constructing force main to connect to	Package Plant Phase Out	Planned	2018	2021	WWTF	N/A	Not Provided	Not Provided	$5,956,125

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			county's force main network, decommissioning of package plant, and demolition of existing package WWTF.									
Marion County	R104	State Road 200 Force Main Extension	Project will construct 10,750 feet of sanitary sewer force main along SR 200 corridor in Ocala. It would accomplish three objectives: (1) connect existing development so that septic tanks can be abandoned, (2) prevent further installation of septic tanks by making sewer available to new development, and (3) reduce groundwater withdrawals by sending new sewer flows to WWTF that produces and distributes reclaimed water to customers. Currently, 24 existing developments use septic tanks that county would connect with project. County is currently in planning/design of force main from SW 95th Street Road to SW 73rd Street Road, which would make sewer available through corridor. There are 29 undeveloped parcels, totaling approximately 200 acres of land, that would be required to connect to new force main when they are developed. Once connected to Marion County wastewater system, flow will be treated at Oak Run WWTF (FLA012697), which produces and delivers reclaimed water to customers.	Septic Tank Phase Out	Planned	2018	2020	OSTDS	TBD	Not Provided	Not Provided	$2,490,984

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
TBD	R105	OSTDS Remediation Plan Implementation	Project helps homeowners offset costs to replace septic tanks in OFS springsheds with individual systems that have enhanced nitrogen removal technology where conversion to sewer is not feasible.	OSTDS Enhancement	Planned	2018	TBD	OSTDS	TBD	Not Provided	Not Provided	$1,000,000
City of Williston	R106	WWTP Nutrient Upgrade	Nutrient reduction upgrade of City's 0.45 mgd WWTP. Existing plant is conventional oxidation ditch WWTP that does not have nutrient effluent limits. Upgrade will take WWTP to AWT treatment standards. Project components include denitrification filter structure, clarifier, rehabilitation of oxidation ditch and equipment, effluent pump station, screenings structure, carbon addition feed system, electrical and controls upgrades, and miscellaneous piping.	WWTF Nutrient Reduction	Planned	2018	2020	WWTF	N/A	Not Provided	SWFWMD	$3,219,500
DEP	OSTDS-01	Enhancement of Existing OSTDS - VOluntary	Repair, upgrade, replacement, drainfield modification, addition of effective nitrogen reducing features, initial connection to a central sewerage system, or other action to reduce nutrient loading, voluntarily taken by the owner of an OSTDS within the BMAP.	OSTDS Enhancement	Underway	N/A	TBD	OSTDS	TBD	TBD	DEP	TBD
DEP	OSTDS-02	Enhancement of Existing OSTDS - Required	Repair, upgrade, replacement, drainfield modification, addition of effective nitrogen reducing features, initial connection to a central sewerage system, or other action taken to comply with the OSTDS Remediation Plan for the group of systems identified	OSTDS Enhancement	Planned	TBD	TBD	OSTDS	TBD	TBD	DEP	TBD

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	TN Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
			for remediation (see Appendix D).									

Appendix C. PFAs

As required by the Florida Springs and Aquifer Protection Act, DEP is adopting PFAs, which are incorporated by reference into this BMAP. The PFAs delineated for Silver Springs and Rainbow Springs are based on Marion County's identified Primary Protection Zones and supported by local ordinance. Consistency in the enactment of policy was a factor in DEP's consideration of basing PFA boundaries on existing county ordinance.

Marion County's Spring Protection Resolution (05-R-106) was passed in 2005, and the county's Comprehensive Plan, Future Land Use Element, Objective 7.4 establishes the Springs Protection Overlay and identifies the extent of the primary and secondary zones, as well as design and development standards. Subsequent updates to the county Land Development Code incorporated these development standards. They include, but are not limited to, effluent concentration limits for WWTFs, lot size restrictions for septic tanks in new developments, septic tank maintenance requirements, groundwater recharge requirements, and stormwater management standards encouraging LID.

The PFAs delineate the approximate modeled 10-year time of travel to each spring system. Marion County contracted with a hydrogeological consulting firm as part of a comprehensive Water Resource Assessment and Management Study in 2005. One result of the effort was the ground-surface delineation of the estimated 10-year travel time of groundwater to the springs, based on potentiometric surface and hydrogeology. These generalized areas were adopted by the Board of County Commissioners to represent the Primary Springs Protection Zones in 2009 and to form the basis of the PFA.

Dye trace studies performed in the Silver Springs BMAP area confirm the movement of water to the springs in reasonably short times. The movement of groundwater to Silver Springs is a mix of conduit flow and matrix flow. However, comparing modeled results with dye tracer results, most of the groundwater movement in the 2-year capture zone (within the 10-year travel time) is probably by conduit flow, which moves groundwater more quickly toward the springs than matrix flow. (Boniol 2013, McGurk 2012)

Appendix D. OSTDS Remediation Plan

The Florida Aquifer and Springs Protection Act specifies that if, during the development of a BMAP for an OFS, DEP identifies OSTDS as contributors of at least 20 % of nonpoint source nitrogen pollution in a PFA or if DEP determines remediation is necessary to achieve the TMDLs, the BMAP shall include an OSTDS remediation plan Based on the Silver Springs and Rainbow Springs NSILT estimates and GIS coverages, OSTDS contribute 39 % of the pollutant loading in the Silver Springs PFA, and 23 % in the Rainbow Springs PFA. Irrespective of the percent contribution from OSTDS, DEP has determined that an OSTDS remediation plan is necessary to achieve the TMDLs and to limit the increase in nitrogen loads from future growth.

Provisions of this plan are applicable within both Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP areas.

D.1 Plan Elements

D.1.1 Installation of New OSTDS

Per statute, new OSTDS on lots of less than 1 acre are prohibited in PFAs, if the addition of the specific systems conflicts with an OSTDS remediation plan incorporated into an OFS BMAP (see Section 373.811[2], F.S.). This OSTDS remediation plan prohibits new conventional systems on lots of less than 1 acre in the PFAs, unless the OSTDS includes the enhanced treatment of nitrogen or unless the OSTDS permit applicant demonstrates that sewer connections will be available within 5 years. Local governments and utilities are expected to develop master wastewater treatment feasibility analyses to identify specific areas to be sewered within 20 years of BMAP adoption. To aid in implementation, the DEP Map Direct webpage includes a detailed downloadable springs PFA boundary shapefile. DEP also maintains on its website an interactive map of the PFA and BMAP boundaries; the map can be easily searched for specific street locations.

FDOH permits the installation of new OSTDS under Chapter 64E-6, F.A.C., including not only systems installed on a property where one was not previously installed, but also systems installed to replace illegal systems, systems installed in addition to existing systems, and other new systems. FDOH permitting requirements with respect to the definition of "new" or "less than one acre" will be followed for this remediation plan. To meet the enhanced treatment of nitrogen requirement, the system must include at least one of the following nitrogen-reducing enhancements:

- Features allowed under FDOH rule, such as in-ground nitrogen-reducing biofilters (media layer systems).
- Features consistent with and identified in the FDOH Florida Onsite System Nitrogen Removal Strategy Studies report, such as in-tank nitrogen-reducing biofilters.

- Other FDOH-approved treatment systems capable of meeting or exceeding the NSF Standard 245 nitrogen removal rate before disposing of wastewater in the drain field, such as aerobic treatment units (ATUs) and performance-based treatment systems (PBTS). For FDOH-approved treatment systems that meet the NSF 245 standard but do not meet or exceed the minimum treatment level expected from the in-ground nitrogen-reducing biofilters, the drain fields, at a minimum, shall be installed with a 24-inch separation between the bottom of the drain field and the seasonal high-water table.

D.1.2 Modification or Repair of Existing OSTDS

Per statute, the OSTDS remediation plan must provide loading reductions consistent with achieving the TMDL within 20 years of plan adoption (see Subparagraph 373.807[1][b]8., F.S.). This plan therefore establishes the following remediation policy for existing systems, based on (1) the potential for reducing nitrogen loads by converting existing OSTDS to enhanced nitrogen removing systems or by connecting homes to central sewer, (2) the total amount of nitrogen load that must be reduced to achieve the TMDL, and (3) the relative contribution of nitrogen load from existing OSTDS. The following are the answers to some frequently asked questions:

- Where does the remediation policy for existing systems apply? It applies to all existing OSTDS within the respective BMAP boundaries on all lots.

- When is the remediation policy for existing systems effective? The remediation policy for existing systems does not go into effect upon BMAP adoption. The requirements begin following completion of the master wastewater treatment feasibility analyses, FDOH rulemaking, and funding program to help offset the costs to homeowners, but no later than five years after BMAP adoption.

- What will be required by the remediation policy for existing systems when it becomes effective? Upon the need for repair or replacement, an existing OSTDS must include at least one of the following nitrogen reducing enhancements, unless the OSTDS permit applicant demonstrates that sewer connections will be available within 5 years.

    - Enhanced treatment of nitrogen means inclusion of features allowed pursuant to FDOH rules, such as in-ground nitrogen-reducing biofilters (media layer systems); features consistent with and identified in the FDOH Florida Onsite System Nitrogen Removal Strategy Studies report, such as in-tank nitrogen-reducing biofilters; or other FDOH-approved treatment systems capable of meeting or exceeding the NSF Standard 245 nitrogen removal rate before disposing of the wastewater in the drain field, such as ATUs and PBTS. For FDOH-approved treatment systems that meet NSF 245, but do not meet or exceed the minimum treatment level expected from the in-ground nitrogen-reducing biofilters, the drain fields, at minimum, shall be installed with a 24-inch

separation between the bottom of the drain field and the seasonal high-water table.

- FDOH permitting requirements with respect to defining "modification," "repair," and lot size (i.e., acreage) will be followed for this remediation plan

In addition, a utility is required to provide written notice to OSTDS owners of the availability of sewer lines for connection, no later than 1 year prior to the date the utility's sewerage system will become available, which triggers an obligation for OSTDS owners to comply with the requirements of Section 381.00655, F.S.

D.1.3 Achieving Necessary Load Reductions

All conventional OSTDS in areas subject to the remediation policy for existing systems are required to adopt the enhanced treatment of nitrogen or connect to central sewer no later than 20 years after BMAP adoption.

D.1.4 Other Plan Elements

Statutes also require that OSTDS remediation plans contain the following elements.

- An evaluation of credible scientific information on the effect of nutrients, particularly forms of nitrogen, on springs and spring systems. (See **Section D.2**.)
- Options for repair, upgrade, replacement, drain field modification, the addition of effective nitrogen-reducing features, connection to a central sewer system, or other action. (See **Section D.3**.)
- A public education plan to provide area residents with reliable, understandable information about OSTDS and springs. (See **Section D.4**.)
- Cost-effective and financially feasible projects necessary to reduce the nutrient impacts from OSTDS. (See **Section 2** and **Appendix B**.)
- A priority ranking for each project for funding contingent on appropriations in the General Appropriations Act. (See **Section 2** and **Appendix B**.)

The Florida Springs and Aquifer Protection Act defines an OSTDS as a system that contains a standard subsurface, filled, or mound drain field system; an aerobic treatment unit; a graywater system tank; a laundry wastewater system tank; a septic tank; a grease interceptor; a pump tank; a solids or effluent pump; a waterless, incinerating, or organic waste–composting toilet; or a sanitary pit privy that is installed or proposed to be installed beyond the building sewer on land of the owner or on other land on which the owner has the legal right to install such a system. The term includes any item placed within, or intended to be used as a part of or in conjunction with,

the system. The term does not include package sewage treatment facilities and other treatment works regulated under Chapter 403, F.S.

D.2 Collection and Evaluation of Credible Scientific Information

As discussed in **Section 2,** DEP developed the Silver Springs and Rainbow Springs NSILTs. These planning tools provide estimation of nitrogen loading sources to groundwater based on the best available scientific data for a particular geographic area. The NSILT estimates prepared for Silver Springs and Rainbow Springs BMAPs were first published in 2015 but were revised in 2017 to better reflect changes and improvements in methods and data. From 2016 to 2018, DEP worked with FDOH and local utilities to better delineate areas with sewer service, resulting in an improved accounting of the total number of parcels with OSTDS on which to base this remediation plan. The results were peer reviewed by SJRWMD, SWFWMD, FDOH, local governments and utilities, FDACS/UF–IFAS and agricultural trade associations represented in these basins. Additional technical support information concerning the NSILT can be found in **Appendix E**.

Unless noted for a specific BMAP, projects, research findings, and monitoring listed below are applicable to both Silver Springs and Rainbow Springs.

Monitoring and research:

- OFS source marker evaluation includes wells in Silver Springs and Upper Silver River BMAP area (SJRWMD).
- Research and develop advanced septic systems (FDOH/DEP/UF–IFAS).
- Wekiva septic tank research activities (DEP).

Completed project:

- Florida Onsite Sewage Nitrogen Reduction Strategies Study (FDOH).
- Springs Protection Initiative Collaborative Research Initiative on Sustainability and Protection of Springs (CRISPS) for Silver Springs (SJRWMD and University of Florida).
- 2015–2019 springs management plan includes Rainbow Spring Group and Rainbow River BMAP area (SWFWMD).
- Groundwater nitrate concentration modeling in Silver Springs and Upper Silver River BMAP area as part of Springs Protection Initiative (SJRWMD).

Ongoing projects:

- Periodic review and evaluation of groundwater quality data from public water supply systems for nitrate levels and spatial distribution of nitrate (DEP).
- Groundwater quality monitoring for BMAP assessment (SJRWMD/SWFWMD/DEP).
- Septic tank and well elimination program (City of Ocala).

Proposed projects:

- Nutrient source loading identification (DEP/SJRWMD/SWFWMD).
- Improvements to groundwater monitoring network in Rainbow Spring Group and Rainbow River BMAP area (SWFWMD).
- Groundwater nitrate concentration modeling in Rainbow Spring Group and Rainbow River BMAP area.

DEP developed calculation methods to estimate nitrogen reductions associated with septic system enhancement and replacement projects, WWTF projects, golf course BMPs, other sports turfgrass BMPs, and urban turfgrass BMPs.

D.3 Remediation Options

The NSILT results indicate that OSTDS contribute 29 % of the pollutant loading to groundwater in the Silver Springs and Upper Silver River BMAP area and 20 % of the pollutant loading to groundwater in the Rainbow Spring Group and Rainbow River BMAP area. **Tables D-1** and **D-2** list the number of existing OSTDS in the PFA and the BMAP area outside the PFA and the estimated nitrogen reductions associated with enhancement or connection to sewer for the Silver Springs and Upper Silver River BMAP area. **Tables D-3** and **D-4** list the number of existing OSTDS in the PFA and the BMAP area outside the PFA and the estimated nitrogen reductions associated with enhancement or connection to sewer for the Rainbow Spring Group and Rainbow River BMAP area. **Figures D-1** and **D-2** show the OSTDS locations in the Silver Springs and Rainbow Springs BMAP areas, respectively.

Table D-1. Estimated reduction credits for OSTDS enhancement or sewer* for the Silver Springs and Upper Silver River PFA

* Estimated reductions are for either enhancement **or** sewer per parcel classification. Reductions cannot be combined for the same parcel classification but can be combined between the different classifications. For example, the sewer credit associated with parcels less than one acre in size can be combined with the sewer credit associated with parcels one acre or greater in size.

Recharge Area	OSTDS Parcels Less Than One Acre in PFAs	Credit for Enhancement (lb-N/yr)	Credit for Sewering (lb-N/yr)	OSTDS Parcels One Acre and Greater in PFAs	Credit for Enhancement (lb-N/yr)	Credit for Sewer (lb-N/yr)
High	15,169	96,365	140,842	4,186	26,593	38,866
Medium	4,642	16,383	23,945	1,347	4,754	6,948
Low	930	656	959	276	195	285
Total	**20,741**	**113,405**	**165,746**	**5,809**	**31,542**	**46,099**

Table D-2. Estimated reduction credits for additional OSTDS enhancement or sewer* for Silver Springs and Upper Silver River outside the PFA

***** Estimated reductions are for either enhancement **or** sewer per parcel classification. Reductions cannot be combined for the same parcel classification but can be combined between the different classifications. For example, the sewer credit associated with parcels less than one acre in size can be combined with the sewer credit associated with parcels one acre or greater in size.

Recharge Area	OSTDS Parcels Less Than One Acre Outside PFA	Credit for Enhancement (lb-N/yr)	Credit for Sewer (lb-N/yr)	OSTDS Parcels One Acre and Greater Outside PFA	Credit for Enhancement (lb-N/yr)	Credit for Sewer (lb-N/yr)
High	8,305	52,894	77,306	6,797	43,289	63,109
Medium	12,040	42,601	62,263	7,491	26,505	38,640
Low	2,695	1,907	2,787	2,433	1,722	2,510
Total	**23,040**	**97,402**	**142,356**	**16,721**	**71,516**	**104,259**

Table D-3. Estimated reduction credits for additional OSTDS enhancement or sewer* for the Rainbow Spring Group and Rainbow River PFA

* Estimated reductions are for either enhancement **or** sewer per parcel classification. Reductions cannot be combined for the same parcel classification but can be combined between the different classifications. For example, the sewer credit associated with parcels less than one acre in size can be combined with the sewer credit associated with parcels one acre or greater in size.

Recharge Area	OSTDS Parcels Less Than One Acre in PFA	Credit for Enhancement (lb-N/yr)	Credit for Sewer (lb-N/yr)	OSTDS Parcels One Acre and Greater in PFA	Credit for Enhancement (lb-N/yr)	Credit for Sewer (lb-N/yr)
High	1,272	8,081	11,810	1,460	9,275	13,556
Medium	92	325	475	799	2,820	4,121
Total	**1,364**	**8,405**	**12,285**	**2,259**	**12,095**	**17,677**

Table D-4. Estimated reduction credits for additional OSTDS enhancement or sewer* for Rainbow Spring Group and Rainbow River outside the PFA

***** Estimated reductions are for either enhancement **or** sewer per parcel classification. Reductions cannot be combined for the same parcel classification but can be combined between the different classifications. For example, the sewer credit associated with parcels less than one acre in size can be combined with the sewer credit associated with parcels one acre or greater in size.

Recharge Area	OSTDS Parcels Less Than One Acre Outside PFA	Credit for Enhancement (lb-N/yr)	Credit for Sewer (lb-N/yr)	OSTDS Parcels One Acre and Greater Outside PFA	Credit for Enhancement (lb-N/yr)	Credit for Sewer (lb-N/yr)
High	15,312	97,637	142,700	9,701	62,099	90,760
Medium	1,241	4,518	6,603	3,982	14,400	21,046
Total	**16,553**	**102,154**	**149,303**	**13,683**	**76,499**	**111,806**

As required by statute, this OSTDS remediation plan identifies remediation options for existing OSTDS, including repair, upgrade, replacement, drain field modification, the addition of effective nitrogen-reducing features, connection to a central sewer system, or other action. More simply, remediation options can be classified as enhancement or replacement. Enhancement options consist of systems identified in either existing FDOH rules or existing and ongoing FDOH studies, or systems not otherwise prohibited by FDOH. Examples of enhancements include in-ground nitrogen-reducing biofilters (media layer systems); in-tank nitrogen-reducing biofilters; and ATUs or PBTS capable of meeting or exceeding the NSF Standard 245 nitrogen removal rate before disposing of wastewater in the drain field.

Nitrogen impacts from new development could also be reduced by prohibiting new conventional OSTDS on all lot sizes, throughout the BMAP area, or both.

DEP, FDOH, and local governments will develop programs to help fund the additional costs required to upgrade existing OSTDS to include nutrient-reducing features. The funding program will be designed to prioritize OSTDS where they are most economical and efficient to add nutrient-reducing features (i.e., systems needing a permit for a repair or modification, inside the PFA, or on lots of less than one acre).

To facilitate the incorporation of nitrogen-reducing features at the time of a permit to repair or modify an existing OSTDS, FDOH will pursue regulatory solutions to accomplish the following objectives:

- Update OSTDS rule language regarding permits, variances, and waivers to include consideration of DEP-adopted OSTDS remediation plans.
- Update OSTDS rules to allow the installation of passive remediation systems, including, but not limited to, systems featuring liners, nitrogen-reducing material, or both underneath the drain field.

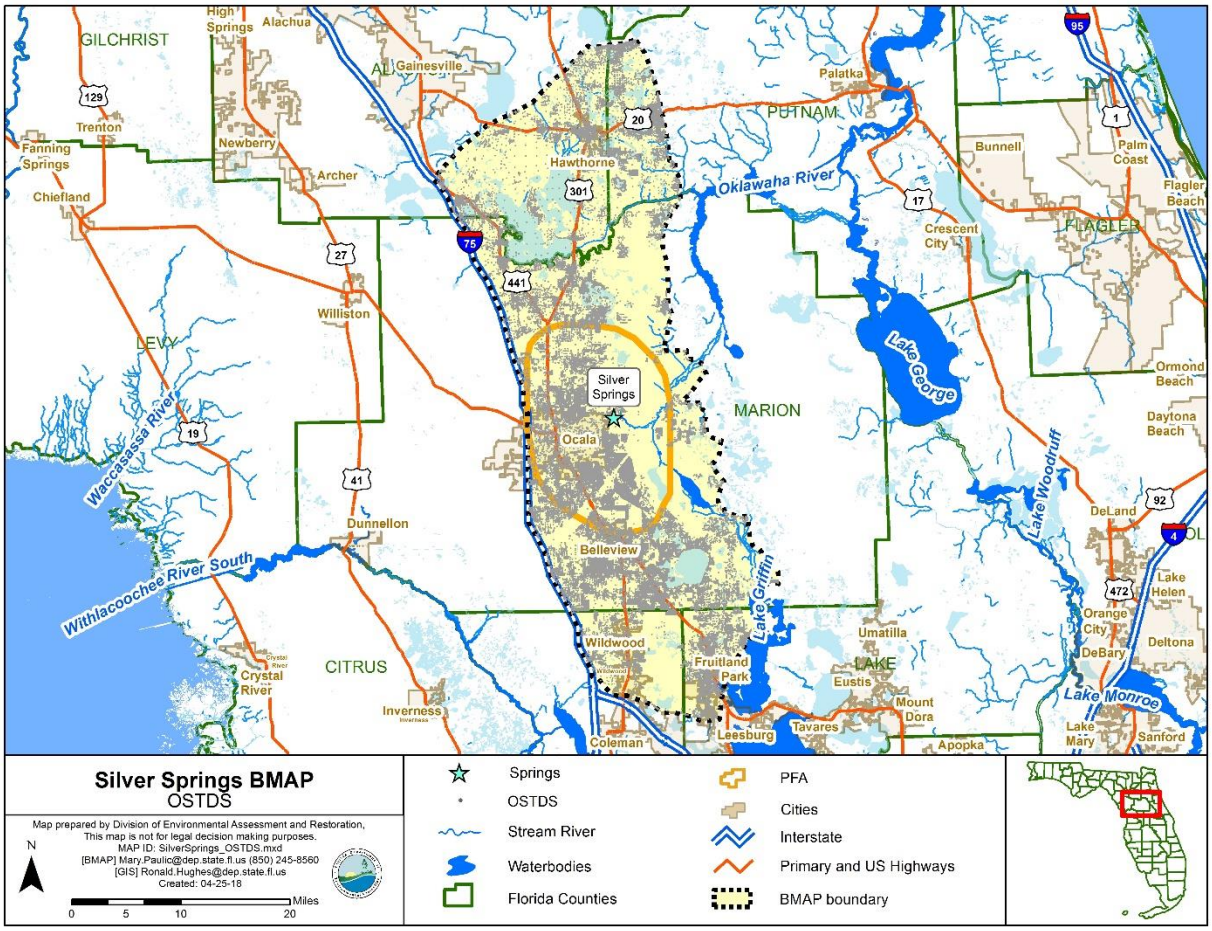

Figure D-1. OSTDS locations in the Silver Springs and Upper Silver River BMAP area

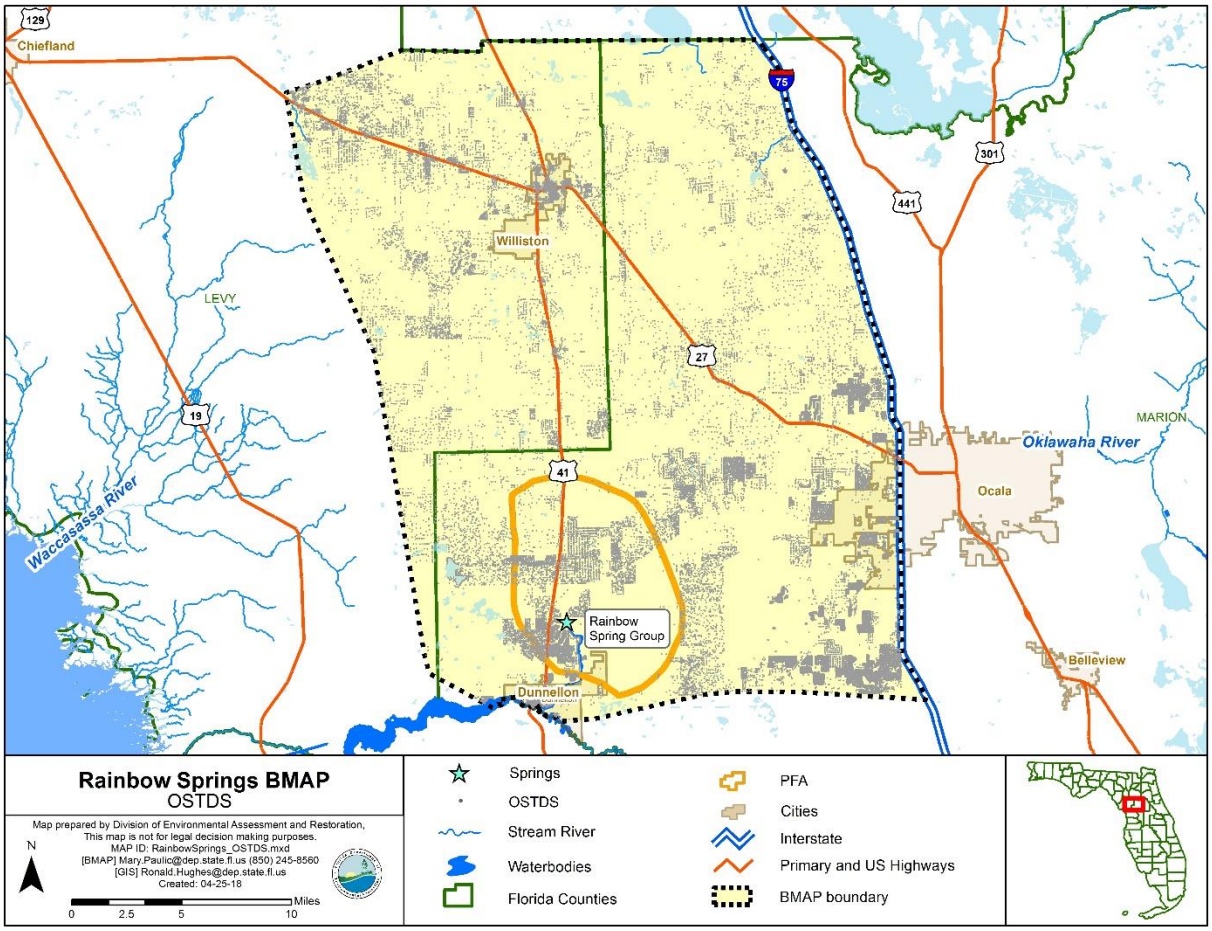

Figure D-2. OSTDS locations in the Rainbow Spring Group and Rainbow River BMAP area

D.4 Public Education Plan

DEP and FDOH will develop and disseminate educational material focused on homeowners and guidance for builders and septic system contractors. The materials will identify the need for advanced, nitrogen-reducing OSTDS along with the requirements for installing nitrogen-reducing technologies under this OSTDS remediation plan. DEP will coordinate with industry groups such as the Florida Home Builders Association and Florida Onsite Wastewater Association.

DEP hosted a brainstorming session on December 13, 2017, to gather local input on the primary facets of a public education plan, including key audiences, the identification of major themes for communication/education, and the identification of misconceptions about septic systems.

During the development of this BMAP, the following list of steps, target audiences, consideration of appropriate messaging, and preparation of materials/resources were identified.

- **Step 1** – Understand the data and issues associated with OSTDS.
- **Step 2** – Identify existing and short-term activities to address the issues.
- **Step 3** – Undertake a pilot project outreach and social marketing campaign.
- **Step 4** – Identify future actions for basinwide implementation.

Target Audiences

- Boards of County Commissioners and City Commissions.
- League of Cities.
- Utility Associations.
- Florida Association of Counties.
- Homeowners and Renters:
    - *Particularly those not located near a spring.*
    - *Visitors (transient winter population) in BMAP area for part of the year.*
- OSTDS Industry.
- Builders.
- Schoolchildren.
- Environmental Groups.

- Real Estate Agents.

Messaging

- Recognition of OSTDS as a source of pollution.
- Perceptions of homeowners that they are part of the problem, particularly those not located near a spring.
- Economics.
- Need incentives for OSTDS enhancement, not just for sewering (equitability of incentives across state).
- Avoid communicating that OSTDS are "bad"—the problem needs to be correctly defined.
- Overcoming old wives' tales (e.g., fats, oils, and grease [FOG] aren't a problem for an OSTDS to process).
- Not all WWTFs treat to AWT levels; the wastewater still goes somewhere when it leaves the WWTF and is a source of nitrogen too.
- Site preparation costs and impact fees need standardization.
- Develop universal treatment standard for all wastewater—OSTDS and WWTFs.
- Consider including examples of wastewater treatment options—such as enhanced OSTDS—in Parade of Homes–type tours or other public events.
- Promote visiting/training at the springs—build connection to spring sites.

Materials/Resources

- Survey of utilities and local government programs.
- Utility or tax bill insert.
- Document "lessons learned" by local programs that address OSTDS upgrade or conversion to central sewer.
- Marion County Water School.
- Marion County OSTDS repair and pump-out rebate program.
- Florida SpringsFest.

- K-12 Education Program.
- Cross-Section Model.
- FOWA Visual Aids.
- Demonstration, display, or tour of enhanced OSTDS.
    - *Annual Parade of Homes.*
    - *SpringsFest.*
    - *FOWA facility.*
    - *Displays at malls, movie theaters, airports.*
    - *Workshops.*
- WWTF Tours.
- State Agency Staff Education.
- U.S. Environmental Protection Agency (EPA) Septic Smart Week in September.

The management strategies listed in **Table D-5** are ranked with a priority of high, medium, or low. In 2016, the Florida Legislature amended the FWRA (Section 403.067, F.S.), creating additional requirements for all new or revised BMAPs. BMAPs must now include planning-level details for each listed project, along with its priority ranking.

Project status was selected as the most appropriate indicator of a project's priority ranking based primarily on need for funding. Projects with a "completed" status were assigned a low priority. Projects classified as "underway" were assigned a medium priority because some resources have been allocated to these projects, but additional assistance may be needed for them to be completed. High priority was assigned to projects listed as "planned," as well as certain "completed" projects that are ongoing each year, which for this plan includes public education efforts, and select projects whose priority is elevated because substantial, subsequent project(s) are reliant on their completion.

Table D-5. Stakeholder education activities to implement the OSTDS remediation plan

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	Estimated Nitrogen Load Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
SWFWMD	R026	"Restoring Our Springs!" media campaign	Public service advertising to promote district's "Restoring Our Springs!" media campaign. Advertising will be in Marion County and will direct people to "Join us in the community effort to restore our springs."	Education Efforts	Completed	2015	2016	All sources	N/A	$35,698	SWFWMD	SWFWMD - $35,698
Marion County Office of the County Engineer Marion County	B036	Public Education Coordination	Formation of public education coordination team consisting of representatives from local government, state agencies, WMDs, and local interest groups. Purpose of groups would be to ensure that consistent and accurate information on pollution prevention is provided to citizens and maximize efforts among coordination team members.	Education Efforts	Underway	2015	N/A	All sources	N/A	Not provided	Local, State and Federal Agencies, WMDs, Local Interest Groups	Not Provided
SWFWMD	R030	Marion County Springs	Event to educate public on protection of Marion County	Education Efforts	Completed	2015	2016	All sources	N/A	$25,598	SWFWMD	SWFWMD - $25,598

Lead Entity	Project Number	Project Name	Project Description	Project Type	Status	Start Date	Estimated Completion Date	Nitrogen Source Addressed by Project	Estimated Nitrogen Load Reduction (lb-N/yr)	Cost Estimate	Funding Source	Funding Amount
		Festival Sponsorship	springs and other water resources. Event alternates between Rainbow Springs State Park and Silver Springs State Park.									
City of Ocala	S035	Septic Tank and Well Elimination Program	Project includes connection of remaining septic tanks in city at no cost to homeowners. Septic tanks provide 26 % to 40 % percent of pollutant load to groundwater in springshed. Elimination of septic tanks will reduce nitrogen loading to Silver Springs by 20,321 lb-N/yr. Includes outreach to homeowners.	Wastewater Service Area Expansion and Education Efforts	Underway	2015	2018	OSTDS		$10,500,000	City of Ocala, DEP, SJRWMD, Florida Legislature	DEP - $5,000,000, SJRWMD - $5,000,000, Florida Legislature - $500,000

Appendix E. Technical Support Information

E.1 NSILT Data

Individual NSILTs were completed for Silver Springs and Rainbow Springs in 2015 and updated in 2017, which both comprise the Silver and Rainbow Springs BMAP. Similar methodologies were used to complete both NSILTs. This technical support information identifies the data sources relied on during NSILT development and documents all the major assumptions used by DEP when applying the NSILT approach to the Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP.

The general NSILT approach involves estimating the nitrogen load to the surface for various source categories based on land use. The NSILT is used to calculate the surface loading to recharge and attenuation to derive the estimated load to groundwater at the top of the aquifer. The estimated load to groundwater determines the scope of reduction strategies needed in the BMAP for each source category. For additional information about the general NSILT approach, see any of the NSILT reports posted on DEP's webpage at: https://floridadep.gov/dear/water-quality-restoration/content/nitrogen-source-inventory-and-loading-tool-nsilt-1.

E.1.1 General Data Inputs

Hydrogeology and Aquifer Recharge

Information on recharge to the UFA for Silver Springs comes directly from the 2015 SJRWMD Floridan Aquifer Recharge Map. The Rainbow Spring Group recharge layer is derived from a groundwater flow model developed in 2002 by the USGS.

Land Use

Land use information is from SJRWMD, SWFWMD, and Suwannee River Water Management District (SRWMD) based on the 2009–11 Florida Land Use Cover and Forms Classification System (FLUCCS) and local county property appraiser offices within the BMAP area boundary.

E.1.2 Land Surface Nitrogen Inputs

Atmospheric Deposition

Atmospheric deposition information is derived from the TDEP hybrid model (Schwede and Lear 2014) that inputs wet and dry monitoring network data for the U.S. and calculates an estimated TN deposition load. The Silver and Rainbow Springs dataset comprises data from 2011 to 2013.

WWTFs

The average annual input of nitrogen to the land surface was estimated for each effluent land application site and reuse service area in the Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP area using TN concentration and discharge volume data available in the DEP Wastewater Facility Regulation (WAFR) Database. Smaller WWTFs are not always required to monitor and report TN effluent concentrations, and therefore may not have data available in the WAFR Database. For these, DEP estimated TN concentrations based on nitrate-N (NO_3-N) data when available (assuming the NO_3-N concentration was 38.5 % of the TN), or when estimated to have an average TN concentration of 8.97 mg/L (based on a 2009 cooperative study with the Water Reuse Foundation of 40 domestic WWTFs across the state). The range of years for which data were available varied with the individual WWTFs; however, most of the data came from 2012 to 2013 and included the most recent complete year.

OSTDS

In 2014, FDOH began the Florida Water Management Inventory (FLWMI), a statewide project to develop GIS mapping attributes for water use and wastewater treatment methods for all parcels by county. The results of this inventory can be obtained from FDOH.

Results from the 2016 release of the FLWMI were used to estimate the total number of septic systems within the BMAP area boundary. ArcGIS files provided the locations of both known and estimated septic systems. FDOH provided DEP with the corrected FLWMI OSTDS coverage for Marion County for use in the NSILT analysis.

The population served by the OSTDS was estimated using the 2010 U.S. Census Bureau data for each county. The 2010 persons per household were as follows: Alachua – 2.46, Lake – 2.45, Marion – 2.41, Sumter – 2.26, Putnam – 2.53, and Levy – 2.49. Also used were 2010 U.S. Census Bureau data to look at population age distribution to account for school or working age population who likely have access to sewer-connected facilities away from home. The collection of data was used to estimate the effective population and OSTDS usage. A per capita contribution of 9.021 lb-N/yr was used in conjunction with the effective population per household.

UTF

In the NSILT analysis, urban fertilizers include fertilizer application estimates for residential purposes, business, parks, and similar properties. Golf course and sports facility fertilizer use is estimated separately (see STF discussion below).

Results from surveys and workshops pertaining to fertilizer application on turfgrass in nearby counties were used to estimate the typical residential fertilizer use habits for urban turfgrass in the Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP areas (Martin 2008; Souto et al. 2009). The results provide data on percent of the

population that fertilize, the applicator (i.e., landscape professional versus homeowner), and application rates.

The type of property where fertilizer is applied is estimated for nonresidential and residential parcels. The acreage receiving fertilizer is estimated the same for both parcel types by using county property appraiser data and zoning data. Impervious and pervious land areas are determined for each parcel. Nonresidential parcels are assumed to be fertilized by a commercial service provider. While application rates and frequencies are recommended in the *Green Industries BMP Manual* (DEP 2010), the University of Central Florida (UCF) study indicated that commercial application rates in this region are slightly higher. The nonresidential parcel fertilization rates are estimated based on the UCF survey results.

Residential parcels are evaluated by estimating the percentage of the property fertilized and the probability of fertilization.

While homeowners may apply fertilizer to all the pervious area on their property (lawns and beds), this is less likely for those with larger lot sizes. For this analysis, it was assumed that the owners of properties with greater than one acre of pervious land area would regularly apply fertilizer to no more than one acre.

Property value may also be a factor when considering the likelihood of fertilizer application. Previous socioeconomic studies have shown that property value is a reliable indicator of the probability that a homeowner will apply fertilizer to a property (Kinzig et al. 2005; Law et al. 2004; Zhou et al. 2008; Cook et al. 2012). Properties with higher assessed values tend to be fertilized more than properties with lower assessed values. To account for this, the range of property values for single-family homes was evaluated for the contributing area and subdivided into three categories based on property value specific to the county: high, medium, and low.

The estimated fertilizer application rates, combined with the consideration of the likely area being fertilized and the likelihood of fertilizer use, were the basis of the estimates of residential fertilizer use.

STF

Sports turfgrass areas include golf courses and sporting facilities. The nitrogen input for golf courses was estimated using voluntary surveys completed by golf course superintendents in the BMAP area. For those golf courses that did not complete a survey, the statewide annual average application rate of 4.5 pounds of nitrogen per 1,000 square feet (lb-N/1,000ft^2) on 72 % of the golf course area was used (Sartain 2002; DEP 2007).

Sports facilities were assessed based on property appraiser data. The parcel types likely to contain these facilities were identified and evaluated based on aerial imagery, including schools, parks, and recreational areas. It was assumed that turf areas at sports facilities are fertilized at

rates applied by lawn service companies (21.78 pounds of nitrogen per acre [lb-N/ac] twice a year).

Miscellaneous LW

The animal populations reported by the 2012 U.S. Department of Agriculture (USDA) Census of Agriculture (CoA) were evaluated for chickens (broilers and layers), goats, hogs, sheep, and turkeys. The WMD land use coverages were used to identify lands likely to contain these livestock in the BMAP area. The land areas were totaled for the counties as well as the individual land areas representing recharge categories. These summations were used to calculate a land use percentage relative to the entire county in the different recharge categories. These percentages were applied to the populations provided by the CoA to estimate the number of animals in the BMAP area. Nitrogen waste factors were multiplied by population numbers to determine the nitrogen contributions from miscellaneous livestock.

Horse and Cattle Farms

Contributions from horse farms and cattle farms include inputs from animal waste and fertilizer use. Population estimates of calves, cows, and horses in the BMAP area were calculated with the same methodology used for miscellaneous livestock. Population numbers were multiplied by daily nitrogen waste factors derived from per animal nitrogen contributions to quantify the nitrogen input from horse and cattle manure in each year, taking into account that calves are not present in the area year-round.

The areas of pasture lands devoted to cattle and horse operations were assessed based on WMD and property appraiser land use coverages. Nitrogen inputs from fertilized pastures at these operations were calculated based on local practices. Agricultural practices specific to this area such as manure management and fertilizer application were identified through conversations with local stakeholders and the Marion County Extension Office.

FF

Agricultural fertilizer is applied at varying rates depending on crop type and farm practices. Estimated application rates are based on UF–IFAS recommendations, and the types of crops likely grown are estimated from the county property appraiser database.

Drainage Wells

Drainage wells are drainage infrastructure for stormwater detention ponds without natural outfalls identified in the Silver Springs contributing area. Information from the WMD land use coverage, USDA Soil Conservation Service runoff coefficients, and rainfall data were used to estimate runoff volume for each drainage well. Loads were then calculated by multiplying the rainfall volume by the nitrogen event mean concentration (EMC) for each land use (H.H. Harper, Environmental Research and Design, Inc., written communication, updated December 8, 2011).

Estimated Nitrogen Inputs to Land Surface

The estimated input from each source category above is summed and a relative percent calculated.

E.1.3 Nitrogen Attenuation and Loading to Groundwater

The two types of attenuation evaluated are biochemical attenuation factors (BAFs) and hydrogeological attenuation (recharge).

BAFs and Uncertainty Factors

The BAFs used to account for the processes affecting the movement of nitrogen from each source category in the subsurface are based on literature review of studies in Florida and similar areas. Research scientists in Florida (UF–IFAS, universities, and USDA Agricultural Research Service) and local stakeholders provided additional guidance. The BAFs listed in **Table E-1** are the result of this evaluation. The BAF is used to estimate what percent of the surface input could infiltrate to groundwater. For example, if 70 % of urban fertilizer is biologically attenuated, then the remaining 30 % could infiltrate to groundwater.

The environmental attenuation of nitrogen from specific sources in each category can vary substantially, both spatially and with depth in the subsurface, and affects the amount of nitrogen leaching to groundwater and the relative contribution of nitrogen from each source category. The range in nitrogen attenuation can result from variability in soil properties, crop types, agricultural practices, nitrogen storage, the volatilization of ammonia to the atmosphere, uptake by vegetation, denitrification, and other removal processes. **Table E-1** lists the potential range in nitrogen attenuation for each source.

Table E-1. Range of environmental attenuation of nitrogen from a detailed literature review

Nitrogen Source Category	Low-Level Attenuation (%)	Attenuation Used for This Analysis (%)	High-Level Attenuation (%)
Atmospheric Deposition	85	90	95
WWTFs	50	60	75
WWTF Reuse	50	75	85
Septic Tanks	30	50	50
Livestock Operations	80	90	95
Farm Fertilizers	40	80	85
Urban Fertilizers	40	70	85
Drainage Wells	25	35	45

Hydrogeological Attenuation (i.e., Recharge)

The recharge rate for the area where the surface input is calculated is based on the SJRWMD and USGS recharge data previously described. To account for variations in recharge rates to the UFA, nonattenuated nitrogen inputs in high rate recharge areas are multiplied by a weighting factor of 0.9, while nitrogen inputs are multiplied by a weighting factor of 0.5 for medium rate recharge areas and 0.1 for low. Groundwater discharge areas were not included in the calculations of nitrogen loads to the groundwater contributing area, as these areas do not contribute nitrogen to the aquifer.

Estimated Nitrogen Load to Groundwater

The surface inputs by source category are adjusted by applying the BAFs for the appropriate source category and location-based recharge factors to estimate the load to groundwater by source category. It is important to note that this load is estimated for the top of the aquifer. As the load interacts with the aquifer, additional factors likely modify it prior to discharge at the spring vents.

E.2 NSILT References

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Appendix F. FDACS Information on BMPs

F.1 Implementation of Agricultural BMPs

Agricultural nonpoint sources in a BMAP area are required by state law (Subsection 403.067[7], F.S.) either to implement FDACS-adopted BMPs, which provides a presumption of compliance with water quality standards, or to conduct water quality monitoring prescribed by DEP, SJRWMD, or SWFWMD. Failure either to implement BMPs or conduct monitoring may result in enforcement action by DEP.

Growers who implement BMPs may be eligible for cost-share funding from FDACS, SJRWMD, SWFWMD, or others to defray partially the costs of implementation. Through OAWP, the Florida Forest Service, and the Division of Aquaculture, FDACS develops, adopts, and assists producers in implementing agricultural BMPs to improve water quality and conserve water resources.

FDACS identified potential land for enrollment in the FDACS BMP Program in the Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP areas using the FSAID IV geodatabase. **Table F-1a** summarizes the land use data for agricultural in the Silver Springs and Upper Silver River BMAP area; total agricultural lands comprise 129,887 acres. **Table F-1b** summarizes the land use data for agriculture in the Rainbow Spring Group and Rainbow River BMAP area; total area of agricultural lands comprises 169,712 acres.

Table F-2a summarizes the agricultural land in the Silver Springs and Upper Silver River BMAP area estimated to be fertilized and the corresponding acreages; cropland and pastureland comprises 85 % of the fertilized land use. **Table F-2b** summarizes the agricultural land in the Rainbow Spring Group and Rainbow River BMAP area estimated to be fertilized and the corresponding acreages; improved pasture comprises 30 % of the fertilized land use. **Tables F-3a** and **F-3b** summarize the agricultural lands with livestock in the Silver Springs and Upper Silver River BMAP area and the Rainbow Spring Group and Rainbow River BMAP area. It is important to note that some of the agricultural lands include more than one agricultural practice.

Figure F-1a shows the approximate location of the agricultural lands in the Silver Springs BMAP area, based on the FSAID data. **Figure F-1b** shows the approximate location of the agricultural lands in the Rainbow Springs BMAP area, based on the FSAID data.

Table F-1a. Agricultural land use in the Silver Springs and Upper Silver River BMAP area

Agricultural Nitrogen Loading Category	Acres
Crop Fertilizer Lands only	39,714
Livestock Lands only	15,747
Crop Fertilizer and Livestock Lands	74,425
Total	129,887

Table F-1b. Agricultural land use in the Rainbow Spring Group and Rainbow River BMAP area

Agricultural Nitrogen Loading Category	Acres
Crop Fertilizer Lands only	15,865
Livestock Lands only	46,494
Crop Fertilizer and Livestock Lands	107,353
Total	**169,712**

Table F-2a. Fertilized croplands in the Silver Springs and Upper Silver River BMAP area

Crop Type	Application Rate (lb-N/ac)	Acres
Blueberries	80	2,106
Citrus	150	1,505
Container Nursery	90	319
Cropland and Pastureland	60	7,194
Fern	80	10
Field Corn	250	83
Field Nursery	90	175
Grains	100	2,945
Grapes	90	31
Grass/Pasture	80	208
Greenhouse	90	10
Greenhouse Nursery	90	7
Hay	240	3,684
Horse Farms	80	12,062
Improved Pasture	100	35,022
Melons	120	244
Mixed Crops	120	199
Ornamental Container	80	861
Ornamental Field Grown	80	344
Other Groves	90	33
Pasture	80	16,364
Peaches	90	6
Peanuts	0	8,044
Peanuts_Rye	100	37
Pecans	80	2,751

Crop Type	Application Rate (lb-N/ac)	Acres
Small Veg	150	99
Small Veg Spring	150	25
Sod	80	258
Strawberries	80	72
Tomatoes Spring	150	37
Tree Crops	90	303
Vegetables	120	43
Zucchini_Sweet Corn	250	265
Total		**110,564**

Table F-2b. Fertilized croplands in the Rainbow Spring Group and Rainbow River BMAP area

Crop Type	Application Rate (lb-N/ac)	Acres
Blueberries	80	78
Container Nursery	90	47
Cropland and Pastureland	80	104,371
Field Nursery	90	776
Grains	100	1,052
Grass/Pasture	80	28
Hay	240	976
Improved Pasture	100	1,029
Melons	120	2,206
Melons_Cucumbers Fall	135	166
Melons_Hay	375	171
Melons_Peanuts	135	124
Pasture	80	1,925
Peanuts	0	4,904
Peanuts Spring	0	3,403
Peanuts_Pasture	80	56
Peanuts_Rye	100	840
Sod	80	394
Sweet Corn_Peanuts Fall	250	145
Tree Plantations	90	357
Vegetables	120	105
Total		**123,153**

Table F-3a. Livestock lands in the Silver Springs and Upper Silver River BMAP area

Livestock Category	Acres
Cropland and Pastureland	7,194
Dairies	335
Feeding Operations	439
Grass/Pasture	208
Herbaceous Dry Prairie	729
Horse Farms	12,062
Improved Pasture	35,022
Pasture	16,364
Poultry Feeding Operations	99
Specialty Farms	3,575
Unimproved Pastures	3,318
Woodland Pastures	10,926
Total	**19,322**

Table F-3b. Livestock lands in the Rainbow Spring Group and Rainbow River BMAP area

Livestock Category	Acres
Cropland and Pastureland	104,371
Feeding Operations	842
Grass/Pasture	28
Improved Pasture	1,029
Other Open Lands (Rural)	31,383
Pasture	1,925
Specialty Farms	14,107
Unimproved Pastures	162
Total	**153,847**

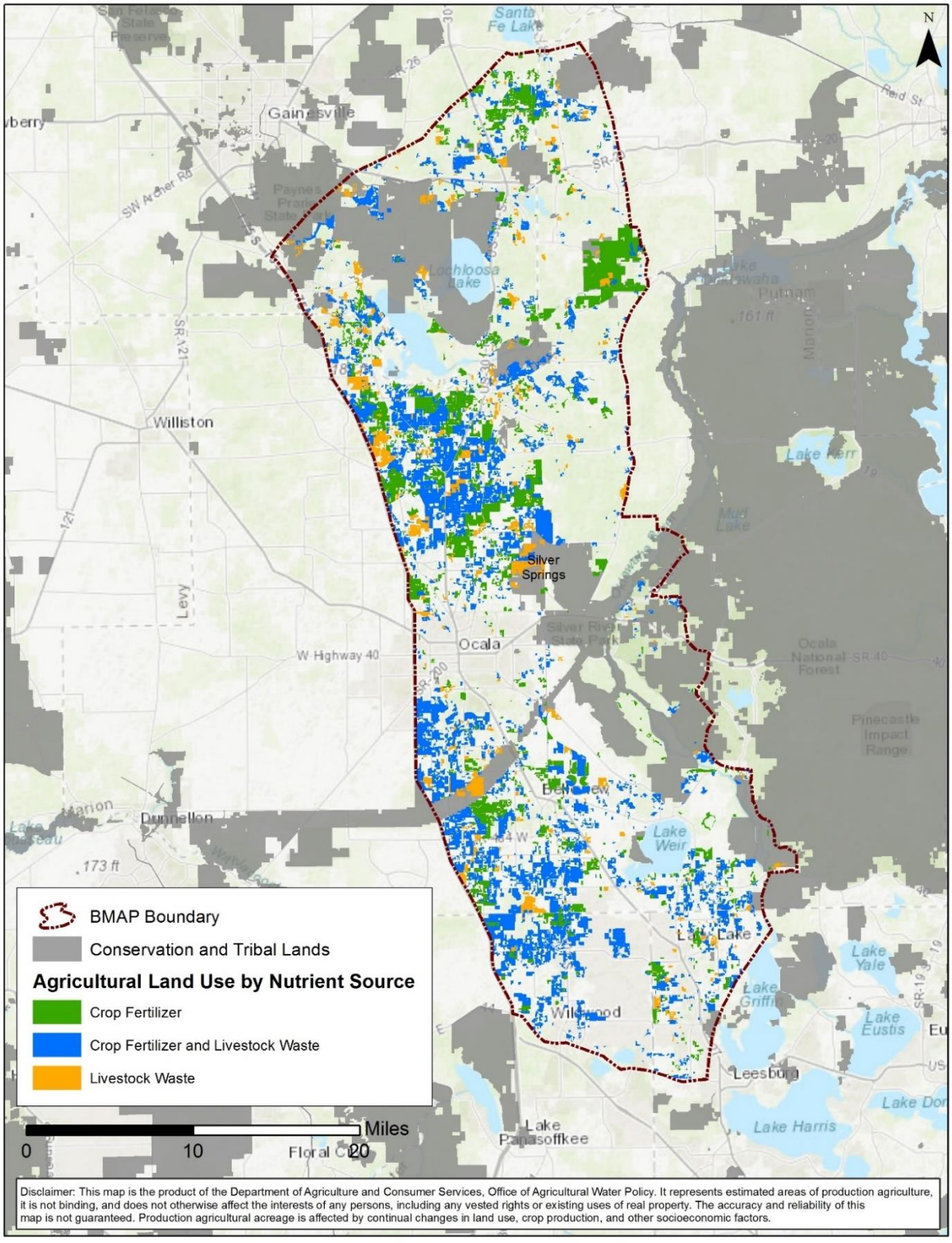

Figure F-1a. Agricultural lands in the Silver Springs and Upper Silver River BMAP area

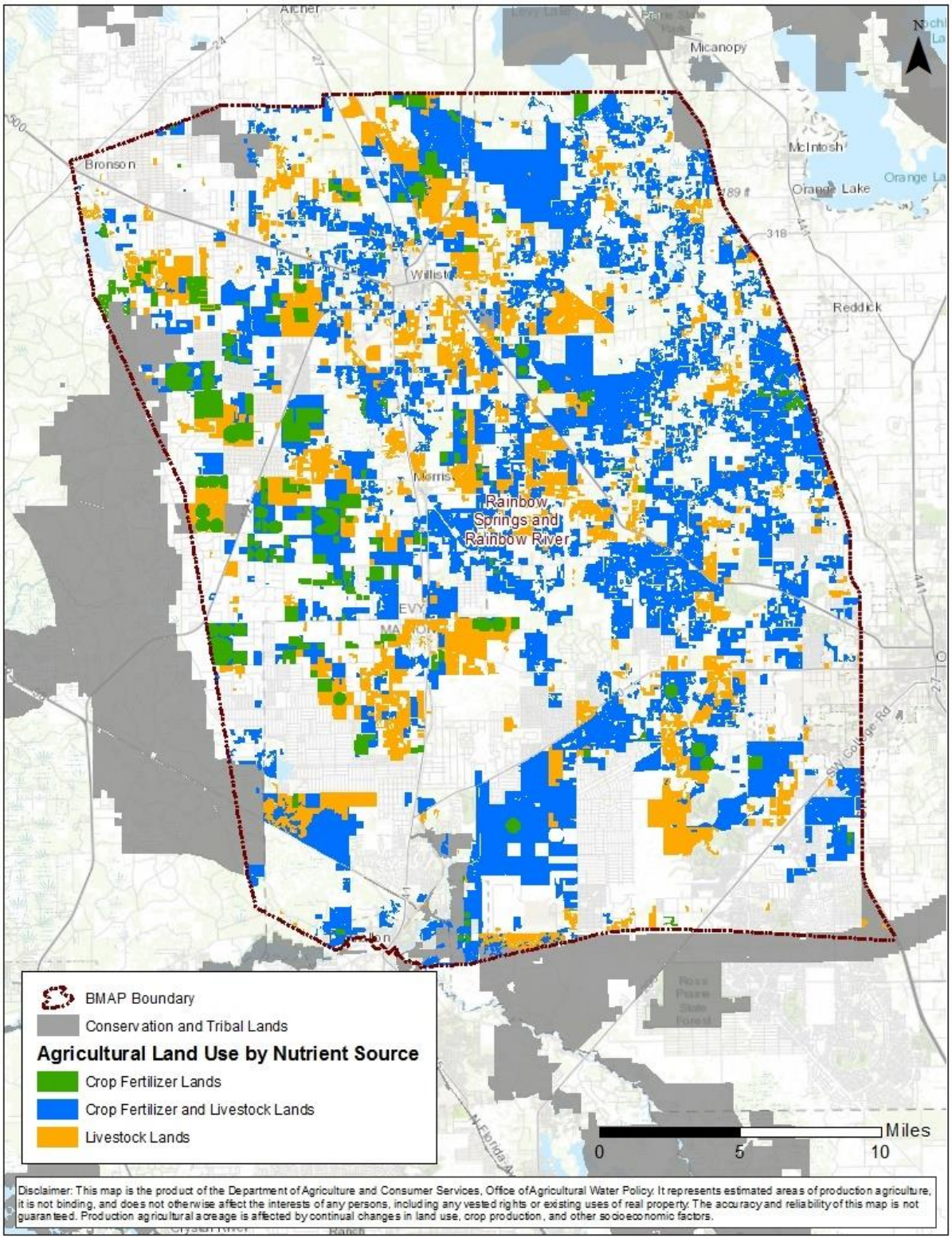

Figure F-1b. Agricultural lands in the Rainbow Spring Group and Rainbow River BMAP area

Agricultural land use data are critical for determining agricultural nonpoint source loads and developing strategies to reduce those loads in a BMAP area, but there are inherent limitations in the available data. The time of year when land use data are collected (through aerial photography) affects the accuracy of photo interpretation. Flights are often scheduled during the winter months because of better weather conditions and reduced leaf canopies, and while these are favorable conditions for capturing aerial imagery, they make photo interpretation for determining agricultural land use more difficult (e.g., more agricultural lands are fallow in the winter months) and can result in incorrect analysis of the photo imagery.
There is also a significant variation in the frequency with which various sources of data are collected and compiled, and older data are less likely to capture the frequent changes that often typify agricultural land use. In addition, agricultural activity being conducted on the land is not always apparent. For example, acreage classified as improved pasture may be used for a cow-calf operation, consist of forage grass that is periodically harvested for hay, or simply be a fallow vegetable field awaiting planting.

Finally, the classification method itself may be an issue. For example, property appraiser data assigns an agricultural land use designation to an entire parcel, although agricultural production may only be conducted on a portion of the parcel. Because of error in the collection and characterization of land use data and changes in land use over time, agricultural land use acreage estimates are subject to adjustment.

F.2 Agricultural BMPs

Through OAWP, the Florida Forest Service, and the Division of Aquaculture, FDACS develops, adopts, and assists producers in implementing agricultural BMPs to improve water quality and water conservation. Adopted BMPs are initially verified by the FDEP as reducing nutrient loss (e.g., total nitrogen and total phosphorus) to the environment. OAWP BMPs are published in commodity-specific manuals that cover key aspects of water quality and water conservation. The BMP categories include:

- Nutrient Management practices that help determine appropriate source, rate, timing, placement of nutrients (including both organic and inorganic sources) to minimize impacts to water resources.

- Irrigation and Water Table Management practices that address methods for irrigating to reduce water and nutrient losses to the environment and to maximize the efficient use and distribution of water.

- Water Resource Protection practices such as buffers, setbacks, and swales to reduce or prevent the transport of nutrients and sediments from production areas to water resources.

The NOI to Implement and BMP checklist are incorporated into each manual.

Information on the BMP manuals and field staff contact information can be obtained here: http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Water-Policy. Printed BMP manuals can be obtained by contacting OAWP field staff.

OAWP outreach to solicit enrollment extends to all types of agricultural operations, but is more intensive in BMAP areas because of the relationship of BMPs to the presumption of compliance with water quality standards in a BMAP area. FDACS field staff works with producers to enroll in the FDACS BMP program by signing a Notice of Intent to Implement BMPs, and enrollment is based on the expectation that producers recognize and address the water quality and conservation issues associated with their operations. Upon completion of all information in the BMP checklist, an NOI must be signed by the landowner or the landowner's authorized agent (who may be the producer if the producer is not the landowner).

F.3 BMP Enrollment

Tables F-4a and **F-4b** list the acres enrolled in the FDACS BMP Program by manual. **Figures F-2a** and **F-2b** show the acres enrolled in the FDACS BMP Program in the Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP areas as of December 31, 2017. Given that the enrolled acres where BMPs are implemented can contain nonproduction acres (such as buildings, parking lots, and fallow acres), only the enrollment for the land classified as agriculture based on the FSAID data is included in the tables.

As of December 31, 2017, NOIs covered 54,389 agricultural acres in the Silver Springs and Upper Silver River BMAP area and 86,681 agricultural acres in the Rainbow Spring Group and Rainbow River BMAP area. No producers are conducting water quality monitoring in lieu of implementing BMPs at this time.

Table F-4a. Agricultural acreage and BMP enrollment in the Silver Springs and Upper Silver River BMAP area as of December 31, 2017

Related FDACS BMP Programs	NOI Acreage Enrolled	Agricultural Land Use Acres with NOIs
Citrus	3,405	498
Cow/Calf	35,887	11,322
Dairy	89	76
Equine	4,889	3,211
Fruit/Nut	1,190	920
Multiple Commodities	2,641	2,228
Nursery	449	326
Row/Field Crops	5,797	4,784
Sod	39	38
Total	**54,389**	**23,407**

Table F-4b. Agricultural acreage and BMP enrollment in the Rainbow Spring Group and Rainbow River BMAP area as of December 31, 2017

Related FDACS BMP Programs	NOI Acreage Enrolled	Agricultural Land Use Acres with NOIs
Cow/Calf Operations	32,423	25,894
Equine	4,518	3,507
Multiple Commodities	26,586	23,046
Nurseries	46	7
Specialty Fruit and Nut	317	199
Vegetable and Agronomic Crops	22,530	15,005
Sod	261	227
Total	**86,681**	**67,885**

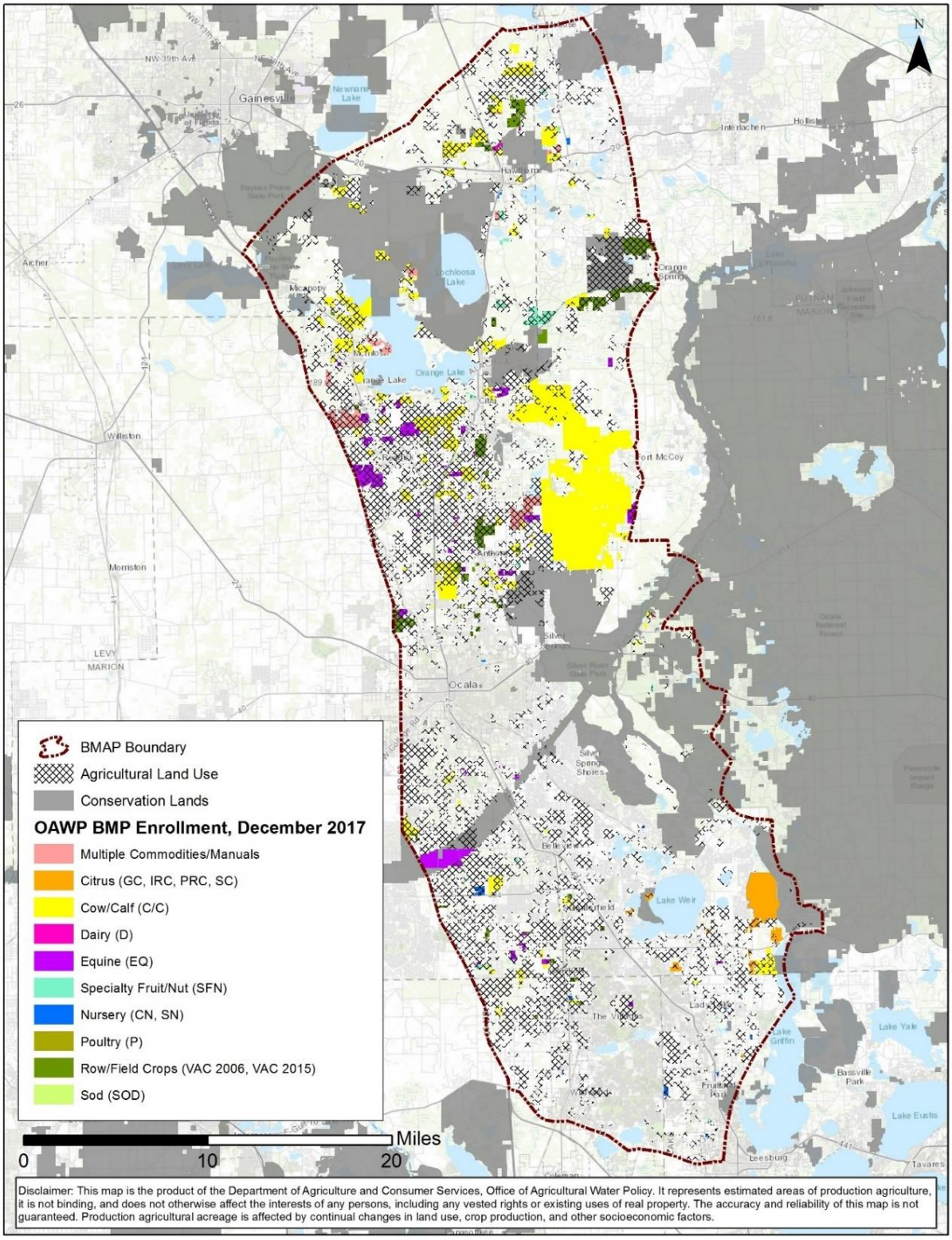

Figure F-2a. BMP enrollment in the Silver Springs and Upper Silver River BMAP area as of December 31, 2017

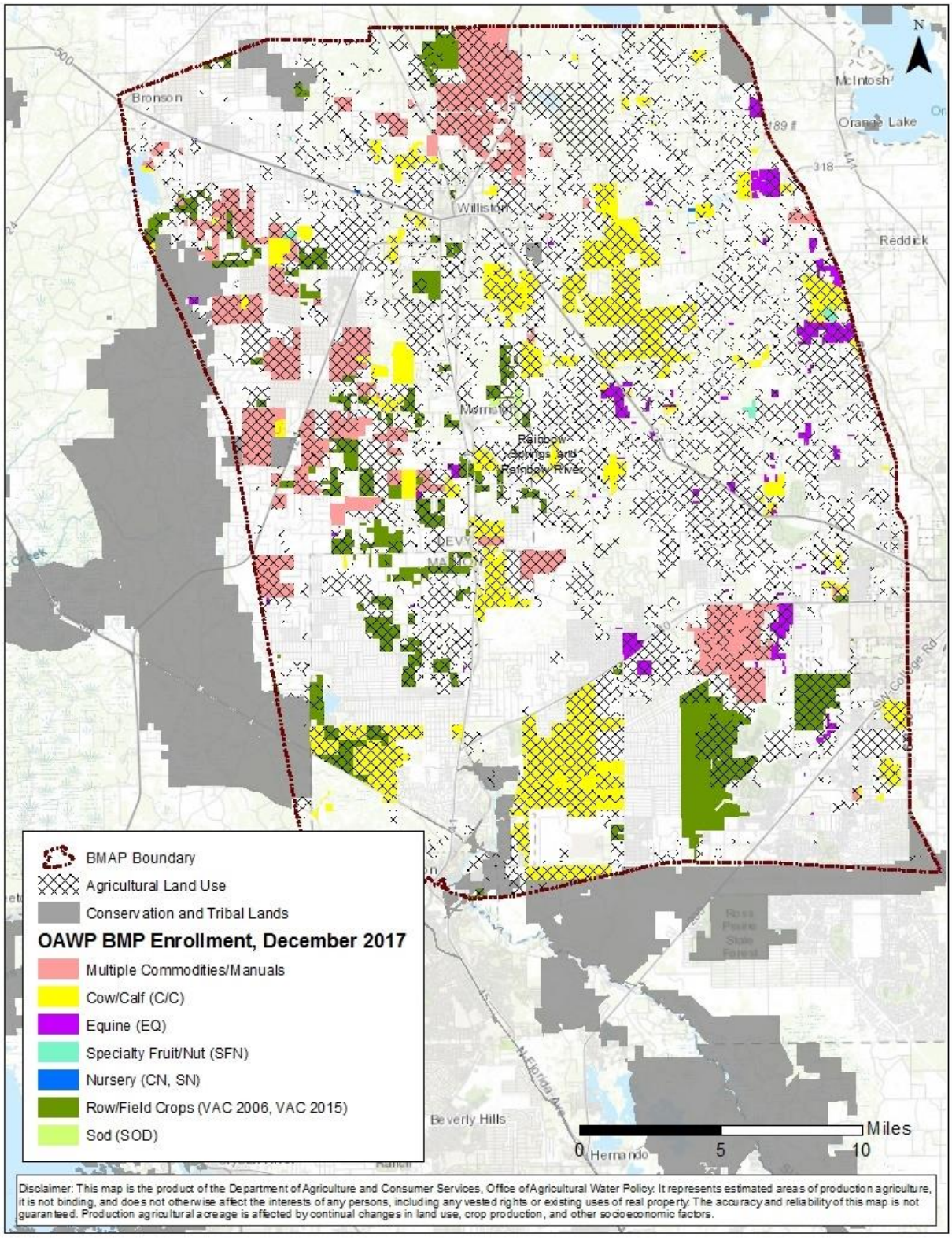

Figure F-2b. BMP enrollment in the Rainbow Spring Group and Rainbow River BMAP area as of December 31, 2017

F.4 FDACS OAWP Role in BMP Implementation and Follow-Up

OAWP works with producers to submit NOIs to implement the BMPs applicable to their operations, provides technical assistance to growers, and distributes cost-share funding, as available, to eligible producers for selected practices. OAWP follows up with growers through site visits to evaluate the level of BMP implementation and record keeping; identify areas for improvement, if any; and discuss cost-share opportunities.

When DEP adopts a BMAP that includes agriculture, it is the agricultural producer's responsibility to implement BMPs adopted by FDACS to help achieve load reductions. If land use acreage corrections and BMP implementation do not fully account for the current agricultural load reduction allocation, it may be necessary to develop and implement additional projects and practices that reduce nutrients from agricultural nonpoint sources. In that case, FDACS will work with DEP, SJRWMD, and SWFWMD to identify appropriate options for achieving further agricultural load reductions.

Section 403.067, F.S. requires that, where water quality problems are demonstrated despite the proper implementation of adopted agricultural BMPs, FDACS must reevaluate the practices, in consultation with DEP, and modify them if necessary. Continuing water quality problems will be detected through the BMAP monitoring component and other DEP, SJRWMD, and SWFWMD activities. If a re-evaluation of the BMPs is needed, FDACS will also include SJRWMD, SWFWMD, and other partners in the process.

F.5 OAWP Implementation Verification (IV) Program

OAWP established an Implementation Assurance (IA) Program in 2005 in the Suwannee River Basin as part of the multi-agency/local stakeholder Suwannee River Partnership. In early 2014, OAWP began to streamline the IA Program to ensure consistency statewide and across commodities and BMP manuals. The IA Program was based on interactions with producers during site visits by OAWP staff and technicians as workload allowed. For the visits, field staff and technicians used a standard form (not BMP specific) developed in 2014, that focused on nutrient management, irrigation management, and water resource protection BMPs common to all of the BMPs that were adopted by rule. Once completed, these paper forms were submitted to OAWP staff and compiled into a spreadsheet, and the data were reported annually.

On November 1, 2017, the OAWP's Implementation Verification rule (Chapter 5M-1, F.A.C.) became effective. The IV Program provides the basis for assessing the status of BMP implementation and for identifying enrolled producers who require assistance with BMP implementation. The components of the IV Program are 1) site visits; 2) implementation status reporting on common practices that apply across all BMP manuals; 3) technical assistance; and 4) external reporting. Implementation verification is confirmed by field staff through site visits and by producers through annual common practices status reports.

Site visits to agricultural operations by OAWP field staff and contract technicians are the most effective means to determine the status of BMP implementation. These visits also provide an opportunity to identify needs for assistance with implementation and explore potential improvements. Resource limitations prevent site visits from occurring on all enrolled operations every year, and for that reason, site visits are prioritized. The program objective is for field staff to conduct site visits for 5-10 % of active NOIs each year, with approximately 10 % of the site visit locations selected randomly.

Per the implementation verification rule, each year, producers participating in the BMP program will be requested to participate in reporting on the status of implementation of common practices only for their operations. Lack of response from enrollees with parcels in a BMAP area raises the priority of the operation for a site visit from field staff. Where a need is identified, the OAWP may facilitate technical assistance for the producer from UF-IFAS or other resources, including third-party vendors. In some cases, cost share support may be available. Data from producers and site visits will be used to complete the annual reports on the status of BMP implementation as required by s. 403.0675(2), F.S., beginning July 1, 2018.

F.6 Beyond BMPs

Beyond enrolling producers in the FDACS BMP Program and verifying implementation, FDACS will work with DEP to improve the data used to estimate agricultural land uses in BMAP areas. FDACS will also work with producers to identify a suite of agricultural projects and research agricultural technologies that could be implemented on properties where they are deemed technically feasible and if funding is made available. Acreages provided by FDACS are preliminary estimates that are the maximum acreages and will need to be evaluated and refined over time.

As presented here, these projects are based on planning-level information. Actual implementation would require funding as well as more detailed design based on specific information, such as actual applicable acreages and willing landowners. **Table F-5** summarizes potential practices that could be implemented in the BMAP areas. It is important to note that the research projects listed in the table are being conducted in the Suwannee River Basin. At some future point, the findings of these studies may be applicable to the Rainbow Springs and Silver Springs BMAP areas.

Table F-5. Beyond BMP implementation

Category	Name	Description
Practices	Precision Irrigation	Deployment of equipment, procedures, and training to improve location, volume, and timing of irrigation to match crop needs more precisely.
Practices	Soil Moisture Probes	Deployment, training, technical support, and use of soil moisture probes to manage irrigation systems.
Practices	Cover Crops	Planting of cover crops between production cycles to increase soil organic content, improve nutrient retention, and reduce erosion.
Research	Bioreactors	Bioreactors/denitrification walls and onsite capture and reuse of high-nitrogen water.
Research	Rotational Production	Conversion of conventional production operations to planned rotational production incorporating grass and cover crops. May include cattle.
Research	Soil Moisture Sensor Deployment and Calibration	Installation, training, monitoring, and research on use of electronic soil moisture sensors, including correlations to nutrient movement through root zone.
Research	Controlled-Release Fertilizer (CRF)	Application of new and developing fertilizer products that become available to crops via dissolution over longer periods in growing season.
Research	Reuse of High Nutrient Value Water Sources	Study of potential sources of high nutrient value water, potential beneficial reuse sites, legal and regulatory obstacles, and costs.

F.7 Florida Forest Service Role in BMP Implementation and Monitoring

FDACS' Florida Forest Service Silviculture BMP Program is responsible for the development, implementation, and monitoring of silviculture BMPs across the state. Silviculture BMPs are applicable to all bonafide ongoing forestry operations. However, they are not intended for use on tree removal or land clearing operations that are associated with a planned land use change for a nonforestry objective. The current *2008 Silviculture BMP Manual* contains 150 individual BMPs in 14 categories. Silviculture BMPs are both structural (forest roads, stream crossings, etc.) and management based (pesticide and fertilizer application, special management zones, etc.). The silviculture BMP NOI Program began on February 11, 2004. As of August 2014, 98,339.2 acres were signed up under the silviculture BMP NOI in the Silver Springs and Upper Silver River BMAP area.

Since 1981, the Florida Forest Service has monitored silviculture operations for compliance with BMPs by conducting biennial surveys of both public and private silviculture operations, with on-the-ground evaluations of randomly selected sites where recent silviculture operations have taken place. The *2013 Silviculture BMP Implementation Survey Report* included sites from 3 counties in the Silver Springs and Upper Silver River BMAP area (Marion, Alachua, and Putnam). Data for these counties were collected from 17 different silviculture operations with a combined total of 339 applicable silviculture BMPs. The overall silviculture BMP compliance rate for these counties in 2013 was 99.7 %.

An important aspect of silviculture BMPs is that they have been proven effective. A multiyear study conducted by the Florida Forest Service with assistance from DEP looked at the effectiveness of silviculture BMPs in protecting aquatic ecosystems during silviculture operations. These BMPs included clear-cut harvesting, intensive mechanical site preparation, machine planting, post-planting herbicide treatments, and forest fertilization treatment. Silviculture BMP effectiveness was evaluated using water chemistry analysis, habitat assessment, and the Stream Condition Index (SCI) (a bioassessment methodology developed for Florida stream ecosystems). The study concluded that silviculture BMPs were effective at protecting aquatic habitat in nearby streams with no evidence of impacts or impairments to the designated beneficial use of the streams.

In cooperation with the University of Florida, the Florida Forest Service is also assisting with two more research projects to evaluate the effectiveness of silviculture BMPs for forest fertilization. One study, completed in November 2013, examined the effectiveness of forest fertilization BMPs for protecting groundwater from nutrient leaching. Study results showed that the groundwater concentrations of ammonium, TKN, and TP observed for wells monitored in the fertilization treatment area did not increase compared with pre-fertilization baseline levels or distant control wells. An ongoing study that looks at the effectiveness of forest fertilization BMPs for protecting nearby surface waters was initiated in 2012 and is expected to be completed in 2017.

More information on silviculture BMPs and the Silviculture BMP Program is available on the Florida Forest Service website at: https://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service.

F.8 Forestry BMP References

Minogue, P.J. et al. 2013. *Effectiveness of silviculture best management practices for forest fertilization in pine straw production to protect water quality in Florida. Four-year monitoring results and interpretation.* Gainesville, FL: University of Florida Institute of Food and Agricultural Sciences, North Florida Research and Education Center.

Vowell, J.L. 2001. Using stream bioassessment to monitor best management practice effectiveness. *Forest Ecology and Management* 143: 237–244.

Vowell, J.L., and R.B. Frydenborg. 2004. A biological assessment of best management practice effectiveness during intensive silviculture and forest chemical application. *Water, Air, and Soil Pollution, Focus* 4: 297–307.

Appendix G. Future Growth Strategies of Local Jurisdictions

Activities that exceed SJRWMD or SWFWMD permitting thresholds for stormwater must be authorized by an Environmental Resource Permit (ERP) from the district (Chapters 40C-4 through 40C-400, F.A.C.) that incorporates both stormwater treatment and the mitigation of any wetland impacts. To obtain an ERP where existing ambient water quality does not meet state water quality standards, an applicant must demonstrate that the proposed activity will result in a net improvement in the parameters that do not meet standards. SJRWMD applies this criterion to waters listed by DEP as impaired.

The NPDES stormwater program regulates discharges to surface waters for several entities in the basin. The basic requirements of this program serve as a foundation for the stormwater management efforts of the basin's communities. All municipal separate storm sewer (MS4) regulated jurisdictions in the Silver and Rainbow Springs BMAP area are Phase II MS4 permit holders. Under a generic permit, the operators of regulated Phase II MS4s must develop a Stormwater Management Program that includes BMPs, with measurable goals, to effectively implement the following six minimum control measures: public education and outreach, public participation/involvement, illicit discharge detection and elimination, construction site runoff control, postconstruction runoff control, and pollution prevention/good housekeeping.

Table G-1 lists local governments and other entities in the BMAP area currently designated as Phase II MS4s. The regulated Phase II MS4 permit areas for Alachua County and FDOT District 2 (Gainesville urbanized area) do not overlap any portion of the BMAP contributing area.

Additionally, the generic permit (Paragraph 62-621.300[7][a], F.A.C.) states, "If a TMDL is approved for any waterbody into which the Phase II MS4 discharges, and the TMDL includes requirements for control of stormwater discharges, the operator must review its Stormwater Management Program for consistency with the TMDL allocation. If the Phase II MS4 is not meeting its TMDL allocation, the operator must modify its Stormwater Management Program to comply with the provisions of the TMDL Implementation Plan applicable to the operator in accordance with the schedule in the Implementation Plan."

Along with ERP requirements and MS4 permit requirements local land development regulations, comprehensive plans, management plans, local codes, incentives, and BMPs provide mechanisms for protecting water resources and reducing the impact of new development and other land use changes as they occur. They are the primary mechanisms available to address additional nitrogen loadings from urban and agricultural growth. The Silver Springs and Rainbow Springs BMAP recognizes the local protections described in this section and listed in **Table G-2** as important components of the BMAP and encourages these local governments to further strengthen local watershed protection frameworks.

Table G-1. Entities in the Silver Springs and Rainbow Springs BMAP areas designated as regulated Phase II MS4s

Permittee	MS4 Permit Number
Alachua County	FLR04E005
Lake County	FLR04E106
Marion County	FLR04E021
FDOT District 2	FLR04E018
FDOT District 5	FLR04E024
City of Dunnellon	FLR04E154
City of Ocala	FLR04E046
City of Leesburg	FLR04E110
City of Fruitland Park	FLR04E114
City of Lady Lake	FLR04E105
The Villages CDD Districts 1-10	FLR04E116

Alachua County

Alachua County's Water Quality Code, in effect since January 1, 2003, establishes standards for environmental protection through the regulation of water pollution. Erosion and sediment control are part of the Water Quality Code, and the code requires land excavation or filling not to adversely impact surface or groundwater quality.

Alachua County requires the review and approval of any development activities that occur within its jurisdiction in the unincorporated portion of the basin. Specific protection standards are in place to protect regulated natural resources, which include wetland and surface waters and associated buffers, 100-year floodplain, significant geological features, listed species habitat, and all areas identified as strategic ecosystems. Local policies and regulations for the protection of regulated natural resources in unincorporated Alachua County are provided in the Conservation and Open Space Element of the Alachua County Comprehensive Plan 2011–2030 and Chapter 406 of the Alachua County ULDC.

County regulations require that all efforts should be made to avoid adverse impacts to wetlands and surface waters. The county evaluates development proposals based on the determination of avoidance of adverse impacts. Where the applicant demonstrates that all reasonable steps have been taken in the attempt to avoid adverse impacts, but impacts are unavoidable, activities are required to minimize the impacts and mitigate if necessary.

To allow significant impacts in wetlands, the application must meet the requirements of Section 406.44, ULDC. Buffer width must be determined on a case-by-case basis, depending on what is demonstrated to be scientifically necessary to protect natural ecosystems from significant adverse impacts. This determination is made in consideration of the development type and potential for adverse impacts, natural community and hydrology, buffer characteristics and function, and the presence of listed plant and animal species. Absent scientific information which

demonstrates that a larger or smaller buffer width is appropriate, buffer widths for the resources are set forth in Table 406.43.1, Alachua County ULDC. Supporting Alachua County Comprehensive Plan Objectives and Policies are available online at: https://growth-management.alachuacounty.us/Planning online.

City of Hawthorne

The City of Hawthorne has land development regulations to protect wetlands and surface waters within its boundaries. Hawthorne Zoning Regulations (Section 4.3.7) require a minimum 35-foot natural buffer from wetlands, perennial rivers, streams, creeks, lakes, and ponds. Any structures (except permitted docks, walkways, and piers) are prohibited in these buffer areas, although non-intensive, resource-based recreational activities are permitted in the riverine buffer areas. In addition, in the riverine and wetland buffer areas, agriculture and silviculture uses conducted in accordance with BMPs may be allowed. Other protection standards and policies may apply. Supporting Hawthorne Comprehensive Plan Policies are available online at: http://www.cityofhawthorne.net/pages/hawthornefl_planning/compplan/CompPlan.pdf.

Marion County

Marion County's Spring Protection Resolution was passed in 2005, and the resulting development standards were included in subsequent updates to the Land Development Code. Standards include effluent concentration limits for WWTFs, lot size restrictions for septic tanks in new developments, septic tank maintenance requirements, groundwater recharge requirements, and stormwater management standards encouraging LID. The Marion County Fertilizer Ordinance was passed in 2009 and its provisions subsequently incorporated into the Land Development Code. The fertilizer ordinance includes provisions for fertilizer content standards, allowable application rates, fertilizer-free zones, and certification standards for commercial applicators.

Future nitrogen loadings may be added from properties with vested development rights. Such developments are not subject to the most current land development regulations. For example, OSTDS tank density that is not permissible under current land development regulations may be possible in these developments. Thus, they have the potential become future sources of nitrogen. Marion County has enacted a TVR Program to address these developments (see **Table G-2** for details).

In June 2013, Marion County designated an area north and west of Silver River State Park and SR 40, as well as part of the park, as a Community Redevelopment Area (CRA) (Marion County Ordinance No. 13-14), in accordance with the 1969 Community Redevelopment Act (Section 163.355, F.S.). The area covered by the CRA encompasses about 4,000 acres.

To protect natural resources, Marion County enacted a Transfer of Vested Rights Program and Transfer of Development Rights Program to minimize the dense development of certain

properties without central water and sewer systems or other supporting infrastructure by allowing the transfer of development rights to another property (see **Table G-2**).

City of Dunnellon

The City of Dunnellon (2012) designated river protection corridor areas for both the Rainbow and Withlacoochee River in the city's land development code. These corridors extend 150 feet from the ordinary high-water line and implement specific development standards for new development and for construction on existing lots with vested development rights. Restrictions for new development include development of a habitat management plan, design standards for river access, prohibitions on seawalls and requirement of hook up to central water and sewer. For property with vested development rights after 2008 (lots of record), buffers are required and the direct discharge of stormwater runoff is prohibited.

Lake County

Lake County Land Development Regulations contain provisions for the protection of wetlands and waterbodies, the removal of shoreline vegetation, stormwater management, and groundwater aquifer recharge protection. An average buffer of 50 feet is required around wetlands, increasing to 100 feet for rivers and streams. Areas identified as managed natural areas by the county comprehensive plan require a development review of all proposed activity within 1,000 feet of the natural area to avoid potential impacts to natural systems. Activities within recharge areas may not reduce the volume of recharge, increase the volume of post-development runoff, or reduce the quality of groundwater below existing county or state standards.

Table G-2. Future growth strategies of local jurisdictions

BMAP Area	Lead Entity	Strategy Name	Description	Strategy Type	Start Date	Status
Silver Springs	The Villages	Stormwater Management-Policy Adoption	Adopted policy prohibits illicit discharges for Village Center CDD No. 1.	Policy	2007	Completed
Silver Springs	ACEPD	Fertilizer and Landscape Irrigation Codes	County's Adopt and Enforce Fertilizer Management and Landscape Irrigation ordinances reduce volume of runoff from overirrigation and reduce nutrient loading from fertilizer use. They implement Alachua County Comprehensive Plan Conservation and Open Space Element – Surface Water Systems Objective 4.6.	Ordinance	2009	Completed
Silver Springs	Lake County Public Works	Golf Course Resource Management Plan	Golf course resource management plans are applicable to unincorporated Lake County. They apply to new and existing golf courses. This regulatory approach will protect groundwater and surface water.	Management Plan	2001	Completed
Silver Springs	Lake County Public Works	Lake County Shoreline Protection Guide	Guide for lakefront landowners on water resource issues includes shoreline protection, stormwater BMPs, erosion, and aquatic plants. As part of outreach program targeted at county residents, it informs property owners of better land management practices to improve water quality protection.	Management Plan	2000	Completed
Rainbow Spring Group	SWFWMD	2013-2017 Springs Management Plan	Springs Management Plan summarizes vision, issues, and solutions that district will address over next five years to manage and protect springs. Through strategic investments and partnerships, district is implementing projects to conserve and restore ecological balance of spring systems, thus supporting regional economies and quality of life. Plan lays out general restoration strategy, overview of goals and issues, and list of proposed projects.	Management Plan	2013	Completed

BMAP Area	Lead Entity	Strategy Name	Description	Strategy Type	Start Date	Status
Rainbow Spring Group	SWFWMD	2015-2019 Springs Management Plan	The District's Springs Management Plan summarizes the vision, issues, and solutions that the District will address over the next five years to manage and protect springs. Through strategic investments and partnerships, the District is implementing projects to conserve and restore the ecological balance of our spring systems, thereby supporting regional economies and quality of life. This Plan lays out a general restoration strategy, an overview of the goals and issues, and a list of proposed projects.	Management Plan	2015	Underway
Rainbow Spring Group	SWFWMD	Rainbow River SWIM Plan	District management and restoration plan for Rainbow River system.	Management Plan	2015	Ongoing
Silver Springs and Rainbow Spring Group	Marion County Growth Services	Marion County Transfer of Development Rights	Transfer of Development Rights (TDR) Program is designed to protect natural resources, especially those listed in Policy 1.1.2 of Conservation Element of Marion County Comprehensive Plan and locally important and prime farmlands in Marion County. These resources include, but are not limited to, preservation of high water recharge and underground drainage basins, springs, karst areas, sinkholes, sinks, sinkhole ponds, and other karst features. Land from which development rights are transferred is subject to conservation easement. Article 3 of Land Development Code defines TDR Program and eligible sending and receiving areas.	Land Development Code	2000	Completed
Silver Springs and Rainbow Spring Group	Marion County Growth Services	Marion County Transfer of Vested Rights	Transfer of Vested Rights (TVR) Program is designed to minimize dense development of vested properties without central water and sewer systems, and/or other supporting infrastructure, and thus protect natural resources, encourage and enhance development of larger parcels, reduce county's inventory of vested properties, and permit county to better plan for future growth. Land from which vested rights are transferred is subject to conservation easement. Article 3 of Land Development Code defines TVR Program and eligible sending and receiving areas.	Land Development Code	2000	Completed

BMAP Area	Lead Entity	Strategy Name	Description	Strategy Type	Start Date	Status
Silver Springs and Rainbow Spring Group	Marion County Growth Services	Marion County Hamlet Design Option	Comprehensive Plan Future Land Use Element Policy 2.1.13 establishes Hamlet Development Option, designed to provide for clustered low-density development patterns in rural designated lands, while requiring permanent open spaces reserved from development and some increased additional urban services (e.g., central water, central sewer, designed/constructed stormwater systems) that comply with Marion County's design and development standards, including Springs Protection. Article 3 of Land Development Code generally defines Hamlet design provisions.	Comprehensive Plan and Land Development Code	2000	Completed
Silver Springs and Rainbow Spring Group	Marion County Growth Services	Marion County Community Redevelopment Area Program	Comprehensive Plan Future Land Use Element Objective 2.2 establishes specific limited density and specialized design standards for wetland and floodplain areas slated for development. Articles 5 and 6 of Land Development Code set forth specific design and development criteria related to applicable areas.	Comprehensive Plan and Land Development Code	2000	Completed
Silver Springs and Rainbow Spring Group	Marion County Office of the County Engineer	Springs Protection Resolution 05-R-106	Resolution establishes springs protection zones with development standards for reduction of nitrogen. Development standards were later incorporated into Marion County Land Development Code.	Resolution	2005	Completed
Silver Springs and Rainbow Spring Group	Marion County Growth Services	Marion County Springs Protection Zones	Comprehensive Plan Future Land Use Element Objective 7.2 establishes Springs Protection Overlay Zones (SPOZ) and identifies extent of Primary and Secondary Zones along with other design and development standards. Articles 5 and 6 of Land Development Code set forth specific design and development criteria for applicable SPOZ.	Comprehensive Plan and Land Development Code		Completed
Silver Springs and Rainbow Spring Group	Marion County Office of the County Engineer	Marion County Irrigation Ordinance	Ordinance sets enforceable irrigation schedule and rates of irrigation for Marion County. It also identifies efficient irrigation systems that are exempt from schedule.	Ordinance	2008	Completed

BMAP Area	Lead Entity	Strategy Name	Description	Strategy Type	Start Date	Status
Silver Springs and Rainbow Spring Group	Marion County Office of the County Engineer	Marion County Fertilizer Ordinance	County's Florida-Friendly Fertilizer Use on Urban Landscapes Ordinance regulates proper use of fertilizers by any applicator; requires proper training of commercial and institutional fertilizer applicators; establishes training and licensing requirements; and specifies allowable fertilizer application rates and methods, fertilizer-free zones, low-maintenance zones, and exemptions. It requires use of BMPs that provide specific management guidelines to minimize negative secondary and cumulative environmental effects associated with fertilizer misuse. 2008 ordinance is now included in latest Land Development Code.	Ordinance	2008	Completed