

**STATE OF FLORIDA  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

|                                     |   |                              |
|-------------------------------------|---|------------------------------|
| <b>SIERRA CLUB,</b>                 | ) |                              |
|                                     | ) |                              |
| <b>Petitioner,</b>                  | ) |                              |
|                                     | ) |                              |
| <b>v.</b>                           | ) | <b>OGC CASE NO. 17-1165</b>  |
|                                     | ) | <b>DOAH CASE NO. 19-0644</b> |
| <b>DEPARTMENT OF ENVIRONMENTAL</b>  | ) |                              |
| <b>PROTECTION,</b>                  | ) |                              |
|                                     | ) |                              |
| <b>Respondent.</b>                  | ) |                              |
|                                     | / |                              |
| <b>THOMAS GREENHALGH,</b>           | ) |                              |
|                                     | ) |                              |
| <b>Petitioner,</b>                  | ) |                              |
|                                     | ) |                              |
| <b>v.</b>                           | ) | <b>OGC CASE NO. 17-1165</b>  |
|                                     | ) | <b>DOAH CASE NO. 19-0645</b> |
| <b>DEPARTMENT OF ENVIRONMENTAL</b>  | ) |                              |
| <b>PROTECTION,</b>                  | ) |                              |
|                                     | ) |                              |
| <b>Respondent.</b>                  | ) |                              |
|                                     | / |                              |
| <b>SAVE THE MANATEE CLUB, INC.,</b> | ) |                              |
|                                     | ) |                              |
| <b>Petitioner,</b>                  | ) |                              |
|                                     | ) |                              |
| <b>v.</b>                           | ) | <b>OGC CASE NO. 17-1167</b>  |
|                                     | ) | <b>DOAH CASE NO. 19-0646</b> |
| <b>DEPARTMENT OF ENVIRONMENTAL</b>  | ) |                              |
| <b>PROTECTION,</b>                  | ) |                              |
|                                     | ) |                              |
| <b>Respondent.</b>                  | ) |                              |
|                                     | / |                              |

SILVER SPRINGS ALLIANCE, INC., AND )  
RAINBOW RIVER CONSERVATION, INC., )

Petitioners, )

v. )

DEPARTMENT OF ENVIRONMENTAL )  
PROTECTION, )

Respondent. )

OGC CASE NO. 18-1060  
DOAH CASE NO. 19-0647

OUR SANTA FE RIVER, INC., )  
ICHETUCKNEE ALLIANCE, INC., GINNIE )  
SPRINGS OUTDOORS, LLC, and JIM TATUM )

Petitioners, )

v. )

DEPARTMENT OF ENVIRONMENTAL )  
PROTECTION, )

Respondent. )

OGC CASE NO. 18-1061  
DOAH CASE NO. 19-0648

PAUL STILL, )

Petitioner, )

v. )

DEPARTMENT OF ENVIRONMENTAL )  
PROTECTION, )

Respondent. )

OGC CASE NO. 18-1061  
DOAH CASE NO. 19-0649

FRIENDS OF WEKIVA RIVER, INC., )

Petitioner, )

v. )

DEPARTMENT OF ENVIRONMENTAL )  
PROTECTION, )

Respondent. )

OGC CASE NO. 18-1065  
DOAH CASE NO. 19-0650

### **CORRECTED FINAL ORDER ON REMAND<sup>1</sup>**

The Department of Environmental Protection (the Department) entered a consolidated Final Order on May 18, 2021 (the 2021 Final Order), approving basin management action plans (BMAPs) addressing spring basins for certain Outstanding Florida Springs. Specifically, the Department approved the Volusia Blue Spring BMAP in OGC Case number 17-1167; the Santa Fe River Basin BMAP in case number 18-1061; the “Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP” in OGC case number 18-1060; the Suwannee River BMAP in OGC case number 17-1165; and the Wekiva Spring and Rock Springs BMAP in case number 18-1065.

In the 2021 Final Order, the Department incorporated a recommended order (the Recommended Order) from the Division of Administrative Hearings in DOAH case number 19-0644 (and consolidated cases), albeit with some clarification of clerical errors. The Recommended Order describes the early procedural history of the case. Petitioners Sierra Club, Thomas Greenhalgh, Save The Manatee Club, Silver Springs Alliance, Rainbow River Conservation, Our Santa Fe River, Ichetucknee Alliance, and Jim Tatum filed a timely appeal in case numbers 17-1167, 18-1061, 18-1060, and 17-1165. No party appealed the final order as to OGC case number 18-1065, and therefore the approval of the Wekiva Spring and Rock Springs BMAP is final. On appeal, the First District Court of Appeal reversed the final order with an opinion, in case number 1D21-1667. The Court observed that the appellants had raised four issues, and “wr[o]te only” to address the second issue, on which it reversed the final order. The opinion discussed certain pie charts which showed current estimated nitrogen loading in spring

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<sup>1</sup> This Order corrects attachments A, B, C, and D, with brief explanation. Each of those attachments supersede and replace the previous versions.

basins and sub-basins, by categories of sources. As observed by the Court, the Department contended that those pie charts were “estimated allocations” as required by section 373.807(1)(b)7., Florida Statutes.

The Court rejected the Department’s argument, reasoning as follows:

Section 373.807(1)(b)7. requires that BMAPs for Outstanding Florida Springs include an “[i]dentification of each point source or category of nonpoint sources . . . .” The BMAPs for Outstanding Florida Springs must also include “[a]n estimated allocation of the pollutant load . . . for each point source or category of nonpoint sources.” § 373.807(1)(b)7., Fla. Stat. However, the pie charts included in the BMAPs only show *current* estimated nitrogen loading in the various springsheds by source. There is no “allocation of the pollutant load” as required by section 373.807(1)(b)7., or put another way, allocation of the necessary load reductions to meet the TMDL. *See also* § 403.067(7)(a)2., Fla. Stat. (“A basin management action plan must equitably allocate . . . pollutant *reductions* to individual basins, as a whole to all basins, or to each identified point source or category of nonpoint sources, as appropriate.” (emphasis added)).

*Sierra Club v. Dep't of Envtl. Prot.*, 357 So. 3d 737, 743 (Fla. 1st DCA 2023) . The Court reversed the 2021 Final Order and remanded for further proceedings consistent with the opinion, but with no further instructions on remand. The Court’s opinion is the law of the case.

Following reversal and remand, when the appellate court provides general directions for further proceedings, the lower tribunal has “broad discretion” in directing the course of subsequent proceedings. *Collins v. State*, 680 So. 2d 458, 459 (Fla. 1st DCA 1996); *see Dade Cnty. Sch. Bd. v. Jackson*, 473 So. 2d 1356, 1357 (Fla. 1st DCA 1985) (applying rule in the context of the “quasi-judicial discretion” of a deputy commissioner). However, state agencies have further constraints upon their discretion. After initiation of a formal proceeding, even after reversal and remand, state agencies must base their determinations upon the findings and record developed before the presiding officer who conducted the evidentiary hearing. *Fox v. Treasure Coast Reg'l Planning Council*, 442 So. 2d 221, 227 (Fla. 1st DCA 1983) (addressing agency action following remand from State Land and Water Adjudicatory Commission). Where no



findings of fact are necessary to take action consistent with the appellate opinion, the agency may reconsider the record evidence in light of the appellate opinion. *Dade Cnty. Sch. Bd. v. Jackson*, 473 So. 2d 1356, 1357 (Fla. 1st DCA 1985).

The existing record and in particular, the findings in Recommended Order, enable the Department to adopt each disputed BMAP, with amendments. The Department will also provide a point of entry to resolve any disputed issues of fact regarding those amendments, if requested by a person whose substantial interests would be affected by the amendments. As explained in the record, there was no dispute in the accuracy of the “pie charts.” [Recommended Order ¶¶ 63-64]. As explained below, those findings provide a factual basis to make the allocations described below.

Based on the holding of the First District Court of Appeal, the pie charts are not deemed an allocation as required by the applicable statutes. Allocations are adopted as described below. The Department prepared these allocations based upon data from the proposed BMAPs, including data on source contributions, loading to groundwater, and the reductions necessary to achieve the TMDL. In making these allocations, the Department considered two optional approaches: first, calculating reductions based on BMAP data regarding loading to groundwater; and second, applying the allocation based on reductions needed at the spring vent. In the case of Rainbow Spring and Rainbow River BMAP, the Department set the allocations based on the spring vent contributions because the alternative approach would have led to lower (less protective) allocations. In all other cases, because allocations based on loading to groundwater were more protective, the Department made allocations based on loading to groundwater.

The Department adopts the “estimated allocation” to categories of nonpoint sources for purposes of section 373.807(1)(b)7., Florida Statutes, as described in attachments A, B, C, and D of this Final Order. These allocations will also be deemed a “detailed allocation to specific point sources and specific categories of nonpoint sources” as described in section 403.067(6)(b), Florida Statutes. These allocations supersede and replace the allocation to the entire basin as previously set forth in Section 2.1.5 of each of the associated BMAPs. Each of these attachments will supplement the existing BMAPs as a final appendix to the BMAP documents, as proposed. Based on the existing record, no other changes to the BMAPs are required at this time. For that reason, this Final Order will adopt the BMAPs as proposed previously, with the new appendices that will create allocations to categories of nonpoint sources. The Division of Environmental Assessment and Restoration is directed to disseminate each of the respective BMAPs with those additional appendices.

The Division of Environmental Assessment and Restoration is directed to review its current data and as appropriate, to update the allocations adopted herein as soon as practicable.

This Final Order is effective upon issuance, and each of those BMAPs are fully enforceable. For each of the BMAPs, the prohibitions on certain activities within a priority focus area identified in section 373.811, Florida Statutes, the adopted OSTDS remediation plans in the BMAPs, and other BMAP requirements are in place. If a timely and sufficient petition for administrative hearing is filed, some or all of the prohibitions and requirements may not take effect, depending on the BMAP, until the completion of appropriate proceedings. The respective BMAPs as amended are incorporated herein. The specific pollutant reduction projects and management actions required of individual entities are set forth in Chapter 2 of the BMAPs, as well as the appendices to the BMAPs. Unless otherwise noted in the BMAPs, all

requirements of the BMAPs are enforceable upon the effective date of this Order. This Final Order on Remand and incorporated BMAPs are enforceable under sections 403.067, 403.121, 403.141, 403.161, 373.119 and 373.129, Florida Statutes.

Consistent with the appellate mandate, this Final Order does not purport to address the matters argued, but not expressly addressed, in the appellate opinion. An appropriate notice of appellate rights is provided.

Having considered the record and the appellate opinion, and being otherwise duly advised, it is

ORDERED that:

- A. The Suwannee River Spring BMAP is approved as amended;
- B. The Volusia Blue Spring BMAP is approved as amended;
- C. Silver Springs and Upper Silver River and Rainbow Spring Group and Rainbow River BMAP is approved as amended; and
- D. The Santa Fe River Springs BMAP is approved as amended.

#### **NOTICE OF RIGHTS**

Existing parties to these proceedings, whose substantial interests are affected by this Final Order, have a right to petition for an administrative hearing under sections 120.569 and 120.57, Florida Statutes. Because the administrative hearing process is designed to formulate final agency action, the filing of a petition concerning this Final Order means that the Department's final action may be different from the position it has taken in the Final Order. The petition for administrative hearing must contain all of the following information:

- a) The name and address of each agency affected and each agency's file or identification number, if known;

b) The name, address, any e-mail address, any facsimile number, and telephone number of the petitioner, if the petitioner is not represented by an attorney or a qualified representative; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the agency determination;

c) A statement of when and how the petitioner received notice of the agency decision;

d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the agency's proposed action;

f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the agency's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and

g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the agency to take with respect to the agency's proposed action.

The petition must be filed (received) at the Department's Office of General Counsel, 3900 Commonwealth Boulevard, MS# 35, Tallahassee, Florida 32399-3000 or received via electronic correspondence at [Agency\\_Clerk@floridadep.gov](mailto:Agency_Clerk@floridadep.gov), within 21 days of receipt of this notice.

Failure to file a petition within the 21-day period constitutes a person's waiver of the right to request an administrative hearing and to participate as a party to this proceeding under sections

120.569 and 120.57, Florida Statutes. Before the deadline for filing a petition, a person whose substantial interests are affected by this Final Order may choose to pursue mediation as an alternative remedy under section 120.573, Florida Statutes. Choosing mediation will not adversely affect such person's right to request an administrative hearing if mediation does not result in a settlement. Additional information about mediation is provided in section 120.573, Florida Statutes and Rule 62-110.106(12), Florida Administrative Code.

### **JUDICIAL REVIEW**

Any party to this proceeding has the right to seek judicial review of the Final Order pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, M.S. 35, Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Final Order is filed with the clerk of the Department.

DONE AND ORDERED this 30<sup>th</sup> day of ~~July~~<sup>June</sup> 2023, in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT  
OF ENVIRONMENTAL PROTECTION



SHAWN HAMILTON  
Secretary

Marjory Stoneman Douglas Building  
3900 Commonwealth Boulevard  
Tallahassee, Florida 32399-3000

FILED ON THIS DATE PURSUANT TO § 120.52,  
FLORIDA STATUTES, WITH THE DESIGNATED  
DEPARTMENT CLERK, RECEIPT OF WHICH IS  
HEREBY ACKNOWLEDGED.



CLERK

June 30, 2023  
DATE

### CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing Final Order has been sent by electronic mail to:

|                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| John R. Thomas, Esq.<br>Law Office of John R. Thomas, P.A.<br>8770 Dr. Martin Luther King, Jr., St. N<br>St. Petersburg, FL 33702<br><a href="mailto:jrthomasesq@gmail.com">jrthomasesq@gmail.com</a> | Douglas MacLaughlin, Esq.<br>319 Greenwood Drive<br>West Palm Beach, FL 33405<br><a href="mailto:douglasmaclaughlin@aol.com">douglasmaclaughlin@aol.com</a>                                                                                                                       |
| Terrell K. Arline, Esq.<br>Terrell K. Arline, Attorney at Law<br>1819 Tamiami Drive<br>Tallahassee, FL 32301<br><a href="mailto:terrell@arlinelaw.com">terrell@arlinelaw.com</a>                      | Anne Michelle Harvey, Esq.<br>Save the Manatee Club<br>500 N. Maitland Ave., Suite 210<br>Maitland, FL 32751<br><a href="mailto:aharvey@savethemanatee.org">aharvey@savethemanatee.org</a>                                                                                        |
| Paul Still<br>14167 SW 101st Avenue<br>Starke, FL 32091<br><a href="mailto:stillpe@aol.com">stillpe@aol.com</a>                                                                                       | Jeffrey Brown, Esq.<br>Kenneth Hayman, Esq.<br>3900 Commonwealth Blvd., MS 35<br>Tallahassee, FL 32399-3000<br><a href="mailto:Jeffrey.Brown@FloridaDEP.gov">Jeffrey.Brown@FloridaDEP.gov</a><br><a href="mailto:Kenneth.Hayman@FloridaDEP.gov">Kenneth.Hayman@FloridaDEP.gov</a> |

this 30<sup>th</sup> day of July 2023.

STATE OF FLORIDA DEPARTMENT  
OF ENVIRONMENTAL PROTECTION



KIRK WHITE  
Deputy General Counsel

3900 Commonwealth Blvd., M.S. 35  
Tallahassee, FL 32399-3000  
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email [Kirk.White@FloridaDEP.gov](mailto:Kirk.White@FloridaDEP.gov)

## Appendix I.

Load reductions for categories of nonpoint sources within the springshed in the Volusia Blue Spring BMAP are allocated as follows:

**Table 1. Allocation of Pollutant Loads**

| <b>Source</b>                                        | <b>NSILT<br/>Percent<br/>Contribution</b> | <b>TN<br/>Reduction<br/>(lbs/yr)</b> |
|------------------------------------------------------|-------------------------------------------|--------------------------------------|
| Onsite Sewage Treatment and Disposal Systems (OSTDS) | 54%                                       | 105,580                              |
| Urban Turfgrass Fertilizer (UTF)                     | 22%                                       | 42,088                               |
| Atmospheric Deposition (AD)                          | 5%                                        | 9,813                                |
| Farm Fertilizer (FF)                                 | 2%                                        | 3,905                                |
| Sports Turfgrass Fertilizer (STF)                    | 4%                                        | 7,698                                |
| Livestock Waste (LW)                                 | 1%                                        | 1,567                                |
| Wastewater Treatment Facilities (WWTF)               | 8%                                        | 15,814                               |
| WWTF - Reuse                                         | 4%                                        | 8,526                                |
| <b>Total</b>                                         | <b>100%</b>                               | <b>194,989</b>                       |

The allocation reductions are established and will serve as the “estimated allocation” to categories of nonpoint sources for purposes of section 373.807(1)(b)7., Florida Statutes. These allocation reductions will also be deemed a “detailed allocation to specific point sources and specific categories of nonpoint sources” as described in section 403.067(6)(b), Florida Statutes. These allocations supersede and replace the allocation to the entire basin as previously set forth in Section 2.1.5 of the BMAP.



## Appendix G.

Load reductions for categories of nonpoint sources within the springsheds in the Santa Fe River BMAP are allocated as follows:

**Table 1. Allocation of Pollutant Load Reductions**

| <b>Source</b>                                        | <b>NSILT Percent Contribution</b> | <b>TN Reduction (lbs/yr)</b> |
|------------------------------------------------------|-----------------------------------|------------------------------|
| Onsite Sewage Treatment and Disposal Systems (OSTDS) | 7%                                | 145,138                      |
| Urban Turfgrass Fertilizer (UTF)                     | 21%                               | 451,093                      |
| Atmospheric Deposition (AD)                          | 10%                               | 214,909                      |
| Farm Fertilizer (FF)                                 | 46%                               | 1,006,518                    |
| Sports Turfgrass Fertilizer (STF)                    | 1%                                | 15,393                       |
| Dairies                                              | 1%                                | 31,151                       |
| Other-Livestock Waste (LW)                           | 14%                               | 311,110                      |
| Wastewater Treatment Facilities (WWTFs)              | 1%                                | 21,566                       |
| <b>Total</b>                                         | <b>100%</b>                       | <b>2,196,878</b>             |

The allocation reductions are established and will serve as the “estimated allocation” to categories of nonpoint sources for purposes of section 373.807(1)(b)7., Florida Statutes. These allocation reductions will also be deemed a “detailed allocation to specific point sources and specific categories of nonpoint sources” as described in section 403.067(6)(b), Florida Statutes. These allocations supersede and replace the allocation to the entire basin as previously set forth in Section 2.1.5 of the BMAP.

## Appendix H.

Load reductions for categories of nonpoint sources for the springsheds in the Silver Springs and Upper Silver River and the Rainbow Spring Group and Rainbow River BMAP are allocated as follows:

**Table 1. Allocation of Pollutant Load Reductions for Silver Springs and Upper Silver River**

| Source                                               | NSILT Percent Contribution | TN Reduction (lbs/yr) |
|------------------------------------------------------|----------------------------|-----------------------|
| Onsite Sewage Treatment and Disposal Systems (OSTDS) | 29%                        | 345,418               |
| Urban Turfgrass Fertilizer (UTF)                     | 10%                        | 121,407               |
| Sports Turfgrass Fertilizer (STF)                    | 10%                        | 125,527               |
| Atmospheric Deposition (AD)                          | 10%                        | 122,268               |
| Farm Fertilizer (FF)                                 | 7%                         | 85,328                |
| Horse Farms                                          | 10%                        | 115,377               |
| Cattle Farms                                         | 18%                        | 212,888               |
| Misc. Livestock                                      | 1%                         | 8,036                 |
| Wastewater Treatment Facilities (WWTFs)              | 2%                         | 30,546                |
| WWTF Reuse                                           | 2%                         | 21,184                |
| Drainage Wells                                       | 1%                         | 18,763                |
| <b>Total</b>                                         | <b>100%</b>                | <b>1,206,742</b>      |

**Table 2. Allocation of Pollutant Load Reductions for Rainbow Spring Group and Rainbow River**

| Source                                               | NSILT Percent Contribution | TN Reduction (lbs/yr) |
|------------------------------------------------------|----------------------------|-----------------------|
| Onsite Sewage Treatment and Disposal Systems (OSTDS) | 20%                        | 353,978               |
| Urban Turfgrass Fertilizer (UTF)                     | 9%                         | 163,484               |
| Sports Turfgrass Fertilizer (STF)                    | 4%                         | 65,525                |
| Atmospheric Deposition (AD)                          | 11%                        | 201,397               |
| Farm Fertilizer (FF)                                 | 12%                        | 219,988               |
| Horse Farms                                          | 16%                        | 284,473               |
| Cattle Farms                                         | 25%                        | 452,829               |
| Misc. Livestock                                      | 1%                         | 15,197                |
| Wastewater Treatment Facilities (WWTFs)              | 1%                         | 26,735                |
| <b>Total</b>                                         | <b>100%</b>                | <b>1,783,607</b>      |

The allocation reductions are established and will serve as the “estimated allocation” to categories of nonpoint sources for purposes of section 373.807(1)(b)7., Florida Statutes. These allocation reductions will also be deemed a “detailed allocation to specific point sources and specific categories of nonpoint sources” as described in section 403.067(6)(b), Florida Statutes. These allocations supersede and replace the allocation to the entire basin as previously set forth in Section 2.1.5 of the BMAP.

## Appendix G.

Load reductions for categories of nonpoint sources within the springsheds in the Suwannee River BMAP are allocated as follows:

**Table 1. Allocation of Pollutant Loads**

| <b>Source</b>                                        | <b>NSILT<br/>Percent<br/>Contribution</b> | <b>TN<br/>Reduction<br/>(lbs/yr)</b> |
|------------------------------------------------------|-------------------------------------------|--------------------------------------|
| Onsite Sewage Treatment and Disposal Systems (OSTDS) | 3.10%                                     | 212,776                              |
| Urban Turfgrass Fertilizer (UTF)                     | 3.01%                                     | 207,071                              |
| Atmospheric Deposition (AD)                          | 8.31%                                     | 570,602                              |
| Farm Fertilizer (FF)                                 | 59.58%                                    | 4,093,274                            |
| Sports Turfgrass Fertilizer (STF)                    | 0.13%                                     | 9,055                                |
| Dairies                                              | 3.49%                                     | 239,581                              |
| Livestock Waste (LW)                                 | 21.46%                                    | 1,474,427                            |
| Wastewater Treatment Facilities (WWTFs)              | 0.92%                                     | 63,391                               |
| <b>Total</b>                                         | <b>100.00%</b>                            | <b>6,870,176</b>                     |

The allocation reductions are established and will serve as the “estimated allocation” to categories of nonpoint sources for purposes of section 373.807(1)(b)7., Florida Statutes. These allocation reductions will also be deemed a “detailed allocation to specific point sources and specific categories of nonpoint sources” as described in section 403.067(6)(b), Florida Statutes. These allocations supersede and replace the allocation to the entire basin as previously set forth in Section 2.1.5 of the BMAP.

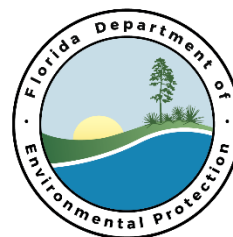
***Suwannee River  
Basin Management Action Plan  
(Lower Suwannee River, Middle  
Suwannee River, and Withlacoochee  
River Sub-basins)***

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

with participation from the  
**Suwannee River Basin Stakeholders**

**June 2018**

2600 Blair Stone Rd.  
Tallahassee, FL 32399  
[floridadep.gov](http://floridadep.gov)



## Acknowledgments

The Florida Department of Environmental Protection adopted the *Suwannee River 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. Suwannee River Basin stakeholders**

| Type of Entity                       | Name                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Responsible Stakeholders</b>      | <p>Agricultural producers</p> <p>Counties:</p> <p>Dixie</p> <p>Gilchrist</p> <p>Hamilton</p> <p>Lafayette</p> <p>Levy</p> <p>Madison</p> <p>Suwannee</p> <p>Taylor</p> <p>Cities, Towns, and Communities:</p> <p>Bell</p> <p>Branford</p> <p>Chiefland</p> <p>Fanning Springs</p> <p>Lee</p> <p>Live Oak</p> <p>Madison</p> <p>Mayo</p> <p>Trenton</p>                                                                              |
| <b>Responsible Agencies</b>          | <p>Florida Department of Agriculture and Consumer Services</p> <p>Florida Department of Environmental Protection</p> <p>Florida Department of Health</p> <p>Florida Fish and Wildlife Conservation Commission</p>                                                                                                                                                                                                                   |
| <b>Other Interested Stakeholders</b> | <p>Homeowners/Citizens</p> <p>Suwannee River Partnership</p> <p>Florida Farm Bureau Federation</p> <p>Florida Onsite Wastewater Association</p> <p>Florida Springs Council</p> <p>Florida Springs Institute</p> <p>Lafayette County Soil and Water Conservation District</p> <p>Madison County Soil and Water Conservation District</p> <p>Sierra Club</p> <p>University of Florida Institute of Food and Agricultural Sciences</p> |

**Appendix A** contains links to important sources referenced in this document. For additional information on the watershed management approach for the Lower Suwannee River, Middle Suwannee River, and Withlacoochee River Sub-basins, contact:

Terry Hansen, P.G., Basin Coordinator  
Florida Department of Environmental Protection  
Water Quality Restoration Program, Watershed Planning and Coordination Section  
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Phone: (850) 245-8561

## Table of Contents

---

|                                                                                               |           |
|-----------------------------------------------------------------------------------------------|-----------|
| <b>Acknowledgments .....</b>                                                                  | <b>2</b>  |
| <b>Table of Contents .....</b>                                                                | <b>4</b>  |
| <b>List of Figures.....</b>                                                                   | <b>6</b>  |
| <b>List of Tables .....</b>                                                                   | <b>7</b>  |
| <b>List of Acronyms and Abbreviations .....</b>                                               | <b>9</b>  |
| <b>Executive Summary .....</b>                                                                | <b>12</b> |
| <b>Section 1 : Background.....</b>                                                            | <b>17</b> |
| 1.1 Legislation.....                                                                          | 17        |
| 1.2 Water Quality Standards and Total Maximum Daily Loads (TMDLs) .....                       | 17        |
| 1.3 BMAP Requirements.....                                                                    | 18        |
| 1.4 BMAP Area .....                                                                           | 19        |
| 1.5 Priority Focus Areas (PFAs) .....                                                         | 19        |
| 1.6 Other Scientific and Historical Information .....                                         | 28        |
| 1.7 Stakeholder Involvement.....                                                              | 28        |
| 1.8 Description of BMPs Adopted by Rule .....                                                 | 29        |
| <b>Section 2 : Implementation to Achieve the TMDLs .....</b>                                  | <b>30</b> |
| 2.1 Allocation of Pollutant Loads .....                                                       | 30        |
| 2.2 Prioritization of Management Strategies.....                                              | 37        |
| 2.3 Load Reduction Strategy.....                                                              | 37        |
| 2.4 OSTDS Management Strategies .....                                                         | 39        |
| 2.5 UTF Management Strategies .....                                                           | 43        |
| 2.6 Agricultural Sources Management Strategies and Additional Reduction<br>Options.....       | 44        |
| 2.7 STF Management Strategies.....                                                            | 47        |
| 2.8 WWTF Management Strategies .....                                                          | 48        |
| 2.9 Atmospheric Deposition Management Strategies .....                                        | 51        |
| 2.10 Future Growth Management Strategies .....                                                | 51        |
| 2.11 Protection of Surface Water and Groundwater Resources through Land<br>Conservation ..... | 52        |
| 2.12 Commitment to Implementation .....                                                       | 52        |
| <b>Section 3 : Monitoring and Reporting .....</b>                                             | <b>53</b> |
| 3.1 Methods for Evaluating Progress.....                                                      | 53        |
| 3.2 Adaptive Management Measures .....                                                        | 53        |
| 3.3 Water Quality and Biological Monitoring.....                                              | 54        |
| <b>Appendices .....</b>                                                                       | <b>60</b> |

|                                                             |           |
|-------------------------------------------------------------|-----------|
| <b>Appendix A. Important Links .....</b>                    | <b>60</b> |
| <b>Appendix B. Projects to Reduce Nitrogen Sources.....</b> | <b>61</b> |
| <b>Appendix C. PFAs.....</b>                                | <b>76</b> |
| <b>Appendix D. OSTDS Remediation Plan .....</b>             | <b>77</b> |
| <b>Appendix E. Technical Support Information.....</b>       | <b>85</b> |
| <b>Appendix F. FDACS Information on BMPs .....</b>          | <b>93</b> |



## List of Figures

---

|                                                                                                 |     |
|-------------------------------------------------------------------------------------------------|-----|
| Figure ES-1. Suwannee River BMAP and PFA boundaries.....                                        | 13  |
| Figure 1. Suwannee River BMAP area.....                                                         | 21  |
| Figure 2. Lower Suwannee River PFA and sub-basin boundary.....                                  | 23  |
| Figure 3. Middle Suwannee River PFA and sub-basin boundary.....                                 | 25  |
| Figure 4. Withlacoochee River PFA and sub-basin boundary.....                                   | 26  |
| Figure 5. Loading to groundwater by source in the Lower Suwannee River Springshed .....         | 34  |
| Figure 6. Loading to groundwater by source in the Middle Suwannee River Springshed .....        | 35  |
| Figure 7. Loading to groundwater by source in the Withlacoochee River Springshed .....          | 35  |
| Figure 8. OSTDS locations in the Lower Suwannee River Sub-basin .....                           | 40  |
| Figure 9. OSTDS locations in the Middle Suwannee River Sub-basin .....                          | 41  |
| Figure 10. OSTDS locations in the Withlacoochee River Sub-basin .....                           | 42  |
| Figure 11. Locations of domestic WWTFs in the Suwannee River BMAP area .....                    | 49  |
| Figure 12. Groundwater and surface water stations sampled in the Suwannee River Basin.....      | 58  |
| Figure D-1. OSTDS locations in the Lower Suwannee River Sub-basin PFA.....                      | 81  |
| Figure D-2. OSTDS locations in the Middle Suwannee River Sub-basin PFA.....                     | 82  |
| Figure D-3. OSTDS locations in the Withlacoochee River Sub-basin PFA.....                       | 83  |
| Figure F-1. Composite of agricultural lands in the Suwannee River Basin BMAP area.....          | 97  |
| Figure F-2. Composite of agricultural lands in the Withlacoochee River Springshed .....         | 98  |
| Figure F-3. Composite of agricultural lands in the Middle Suwannee River Springshed .....       | 99  |
| Figure F-4. Composite of agricultural lands in the Lower Suwannee River Springshed .....        | 100 |
| Figure F-5. BMP enrollment in the Suwannee River Basin as of December 31, 2016 .....            | 103 |
| Figure F-6. BMP enrollment in the Withlacoochee River Springshed as of December 31, 2016.....   | 104 |
| Figure F-7. BMP enrollment in the Middle Suwannee River Springshed as of December 31, 2016..... | 105 |
| Figure F-8. BMP enrollment in the Middle Suwannee River Springshed as of December 31, 2016..... | 106 |

## List of Tables

|                                                                                                                                               |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------|----|
| Table A-1. Suwannee River Basin stakeholders .....                                                                                            | 2  |
| Table ES-1. WWTF effluent standards .....                                                                                                     | 15 |
| Table 1. Restoration targets for the impaired river and OFS in the Suwannee River Basin .....                                                 | 18 |
| Table 2. Acreage for each sub-basin in the BMAP area .....                                                                                    | 22 |
| Table 3. OFS for each sub-basin in the BMAP area .....                                                                                        | 22 |
| Table 4. Land uses for each sub-basin in the BMAP area .....                                                                                  | 22 |
| Table 5. BMPs and BMP manuals adopted by rule as of June 2017 .....                                                                           | 29 |
| Table 6. Estimated nitrogen load to groundwater by source in the three springsheds .....                                                      | 31 |
| Table 7. Total reduction required to meet the TMDLs inside springsheds .....                                                                  | 36 |
| Table 8. Total reduction required to meet the TMDLs outside springsheds .....                                                                 | 36 |
| Table 9. Nitrogen reduction schedule (lb-N/yr) .....                                                                                          | 37 |
| Table 10. Summary of potential credits for the Suwannee River BMAP to meet the TMDL .....                                                     | 38 |
| Table 11. Current project credits to reduce UTF loading to groundwater .....                                                                  | 43 |
| Table 12. Maximum UTF load reductions based on existing public education credit policies .....                                                | 44 |
| Table 13. Estimated acreages for additional agricultural projects and practices .....                                                         | 46 |
| Table 14. Potential for additional load reductions to groundwater .....                                                                       | 47 |
| Table 15. Maximum load reductions from STF improvements based on existing credit policies .....                                               | 48 |
| Table 16. Wastewater effluent standards for the BMAP area .....                                                                               | 50 |
| Table 17. SRWMD conservation land purchases through the Florida Forever Program .....                                                         | 52 |
| Table 18. Core water quality indicators .....                                                                                                 | 55 |
| Table 19. Supplemental water quality indicators and field parameters .....                                                                    | 55 |
| Table 20. Biological response measures for spring runs .....                                                                                  | 56 |
| Table B-1. Stakeholder projects to reduce nitrogen sources .....                                                                              | 62 |
| Table D-1. Estimated reduction credits for additional OSTDS enhancement or sewer* .....                                                       | 79 |
| Table E-1. Distribution of property values and the probability of fertilization within the three<br>springsheds .....                         | 86 |
| Table E-2. Daily waste factors for dairy cattle .....                                                                                         | 87 |
| Table E-3. Daily waste factors for beef cattle .....                                                                                          | 88 |
| Table E-4. Daily waste factors for miscellaneous livestock .....                                                                              | 88 |
| Table E-5. Summary of crop types and assumed nitrogen application rates .....                                                                 | 89 |
| Table E-6. Estimated nitrogen inputs to the land surface by source category and recharge area<br>within the three springsheds (lb-N/yr) ..... | 89 |
| Table E-7. Range of environmental attenuation of nitrogen from a detailed literature review .....                                             | 90 |
| Table E-8. Estimated nitrogen load to groundwater by source category and recharge area within<br>the three springsheds (lb-N/yr) .....        | 91 |
| Table F-1. Fertilized croplands in the Suwannee River Basin BMAP area .....                                                                   | 94 |
| Table F-2. Livestock lands in the Suwannee River Basin BMAP area .....                                                                        | 96 |

|                                                                                                                              |     |
|------------------------------------------------------------------------------------------------------------------------------|-----|
| Table F-3. Agricultural acreage and BMP enrollment in the Suwannee River Basin BMAP area<br>as of December 31, 2016.....     | 107 |
| Table F-4. Agricultural acreage and BMP enrollment in the Suwannee River Basin by springshed<br>as of December 31, 2016..... | 107 |
| Table F-5. Beyond BMP implementation.....                                                                                    | 110 |

## **List of Acronyms and Abbreviations**

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|         |                                                           |
|---------|-----------------------------------------------------------|
| ac      | Acre                                                      |
| AWT     | Advanced Wastewater Treatment                             |
| ATU     | Aerobic Treatment Unit                                    |
| BAF     | Biochemical Attenuation Factor                            |
| BMAP    | Basin Management Action Plan                              |
| BMPs    | Best Management Practices                                 |
| CAFO    | Concentrated Animal Feeding Operation                     |
| CARES   | County Alliance for Responsible Environmental Stewardship |
| CASTNET | Clean Air Status and Trends Network                       |
| cfs     | Cubic Feet per Second                                     |
| CMAQ    | Community Multiscale Air Quality                          |
| DEP     | Florida Department of Environmental Protection            |
| DMR     | Discharge Monthly Report                                  |
| DO      | Dissolved Oxygen                                          |
| EPA     | Environmental Protection Agency (U.S.)                    |
| F.A.C.  | Florida Administrative Code                               |
| F.A.R.  | Florida Administrative Register                           |
| F.S.    | Florida Statutes                                          |
| FDACS   | Florida Department of Agriculture and Consumer Services   |
| FDOH    | Florida Department of Health                              |
| FDOT    | Florida Department of Transportation                      |
| FF      | Farm Fertilizer                                           |
| FFB     | Florida Farm Bureau                                       |
| FGS     | Florida Geological Survey                                 |
| FLUCCS  | Florida Land Use Cover and Forms Classification System    |
| FLWMI   | Florida Water Management Inventory                        |
| FOWA    | Florida Onsite Wastewater Association                     |
| FPS     | Florida Park Service                                      |
| FSAID   | Florida Statewide Agricultural Irrigation Demand          |
| FY      | Fiscal Year                                               |
| FYN     | Florida Yards and Neighborhoods                           |
| GIS     | Geographic Information System                             |
| gpd     | Gallons Per Day                                           |
| HA      | Habitat Assessment                                        |
| HDPE    | High-Density Polyethylene                                 |
| IA      | Implementation Assurance                                  |
| ILG     | Irrigated Lands Geodatabase                               |
| IV      | Implementation Verification                               |
| in/yr   | Inch Per Year                                             |
| lb-N/yr | Pounds of Nitrogen Per Year                               |
| LVS     | Linear Vegetation Survey                                  |

|        |                                                                 |
|--------|-----------------------------------------------------------------|
| LW     | Livestock Waste                                                 |
| MFL    | Minimum Flow and Level                                          |
| mgd    | Million Gallons Per Day                                         |
| mg/L   | Milligrams Per Liter                                            |
| NA     | Not Applicable                                                  |
| NADP   | National Atmospheric Deposition Program                         |
| NASS   | National Agricultural Statistics Service                        |
| 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                          |
| NTN    | National Trends Network                                         |
| OAWP   | Office of Agricultural Water Policy (FDACS)                     |
| OFS    | Outstanding Florida Spring                                      |
| OSTDS  | Onsite Sewage Treatment and Disposal System                     |
| PBTS   | Performance-based Treatment System                              |
| PFA    | Priority Focus Area                                             |
| PSA    | Public Service Announcement                                     |
| QA/QC  | Quality Assurance/Quality Control                               |
| RFA    | Restoration Focus Area                                          |
| RIB    | Rapid Infiltration Basin                                        |
| RIVER  | Regulatory Initiative Valuing Environmental Resources (Program) |
| RPS    | Rapid Periphyton Survey                                         |
| SAV    | Submerged Aquatic Vegetation                                    |
| SBIO   | DEP Statewide Biological Database                               |
| SCC    | Suwannee Country Club                                           |
| SCI    | Stream Condition Index                                          |
| SOP    | Standard Operating Procedure                                    |
| SRWMD  | Suwannee River Water Management District                        |
| STF    | Sports Turfgrass Fertilizer                                     |
| STORET | Florida Storage and Retrieval System                            |
| SWFWMD | Southwest Florida Water Management District                     |
| SWIM   | Surface Water Improvement and Management                        |
| TBD    | To Be Determined                                                |
| TDEP   | Total Atmospheric Deposition Model                              |
| TMDL   | Total Maximum Daily Load                                        |
| TN     | Total Nitrogen                                                  |
| 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. Geologic Survey                                              |
| UTF     | Urban Turfgrass Fertilizer                                        |
| WAFR    | Wastewater Facility Regulation (Database)                         |
| WBID    | Waterbody Identification (Number)                                 |
| WIN     | Florida Watershed Information Network (Database)                  |
| WMD     | Water Management District                                         |
| WWTF    | Wastewater Treatment Facility                                     |

## **Executive Summary**

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### **Suwannee River Basin**

The Florida Springs and Aquifer Protection Act (Chapter 373, Part VIII, Florida Statutes [F.S.]), provides for the protection and restoration of Outstanding Florida Springs (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. Seven springs in the Suwannee River Basin are impaired OFS: Fanning Springs, Manatee Spring, Falmouth Spring, Troy Spring, Lafayette Blue Spring, Madison Blue Spring, and Peacock Springs.

The Suwannee River Basin Management Action Plan (BMAP) area (**Figure ES-1**) comprises three sub-basins (Lower Suwannee River, Middle Suwannee River, and Withlacoochee River) and encompasses 1,323,662 acres in eastern Dixie, eastern Madison, western Hamilton, northeast and eastern Lafayette, western Levy, western Gilchrist, small pockets of Taylor and Columbia counties, and the majority of Suwannee County. Population centers include Live Oak and Branford in Suwannee County, Mayo in Lafayette County, Bell and Trenton in Gilchrist County, Fanning Springs in Gilchrist and Levy counties, Chiefland in Levy County, and Madison, and Lee and Madison County.

### **Suwannee River Priority Focus Areas (PFAs)**

PFAs totaling 839,681 acres are delineated for the OFS in each sub-basin (see **Appendix C**). The Lower Suwannee River Sub-basin comprises 431,722 acres, of which 199,928 acres are designated as a PFA for Fanning and Manatee Springs. The Middle Suwannee River Sub-basin covers an area of 704,802 acres, of which 554,965 acres are designated as a combined PFA for Troy, Peacock, Lafayette Blue, and Falmouth Springs. The Withlacoochee River Sub-basin comprises 187,138 acres, of which 84,788 acres are designated as a PFA for Madison Blue Spring.

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

DEP set nitrate water quality restoration targets of 0.35 milligrams per liter (mg/L) for the Suwannee River and associated springs. The seven OFS addressed by this BMAP have the same water quality restoration target.

In the springsheds and basins for the OFS, farm fertilizer (FF) represents 60 % and livestock waste (LW) represents 22 % of the total nitrogen loading to groundwater, based on the results of the Nitrogen Source Inventory Loading Tool (NSILT) developed by DEP.

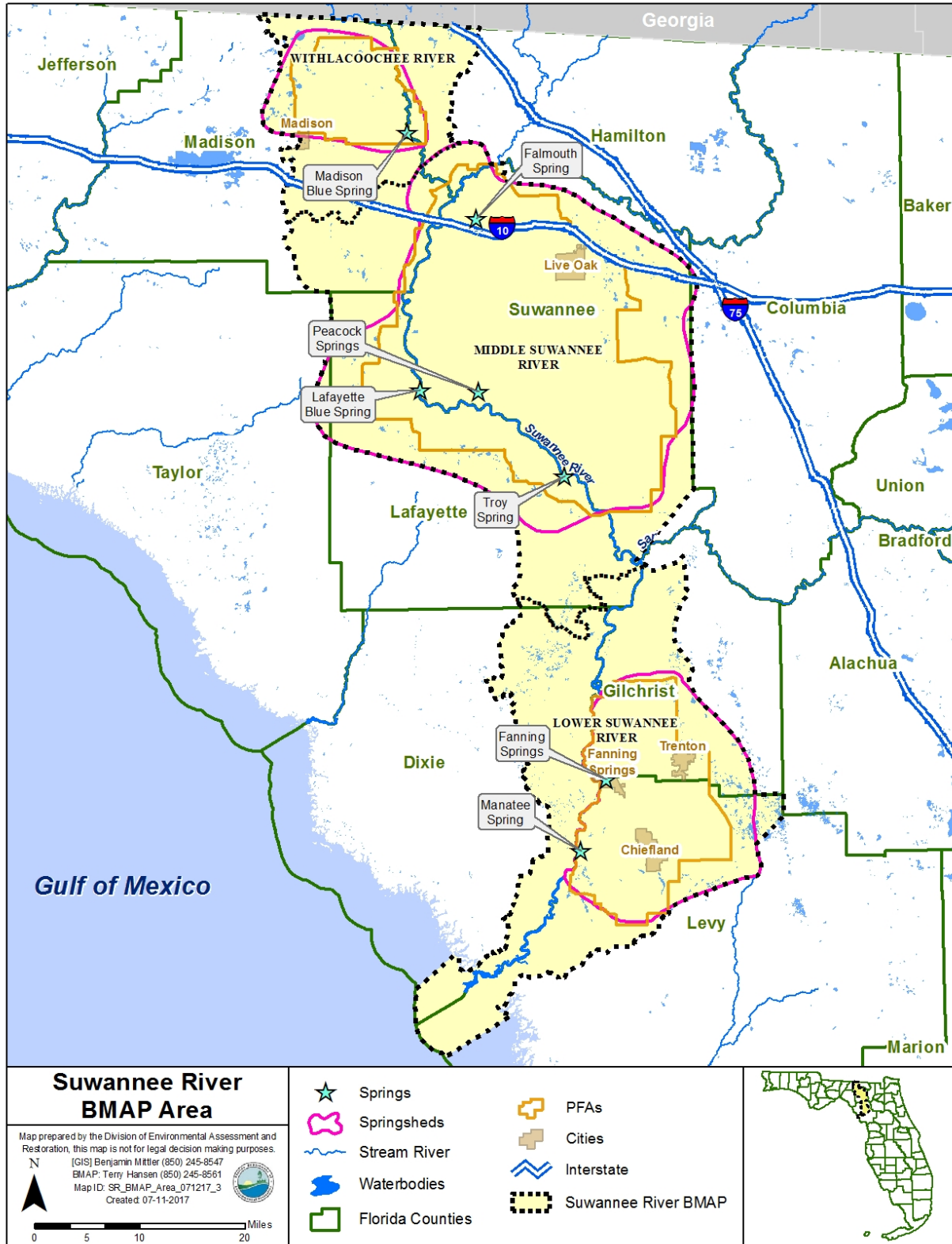


Figure ES-1. Suwannee River BMAP and PFA boundaries



The total load reduction required to meet the total maximum daily loads (TMDLs) at the spring vents is 4,075,935 pounds of nitrogen per year (lb-N/yr). To measure progress towards achieving the necessary load reduction, DEP has established the following milestones:

- Initial reduction of 1,222,781 lb-N/yr (30 %) within 5 years.
- An additional 2,037,968 lb-N/yr (50 %) within 10 years.
- The remaining 815,187 lb-N/yr (20 %) within 15 years.
- For a total of 4,075,935 lb-N/yr within 20 years.

The policies and submitted projects included within this BMAP are estimated to achieve a reduction of 2,541,035 to 4,859,027 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 above. The BMAP is designed to achieve 80 % of the load reductions needed for the spring vents within 10 years of adoption and 100 % within 15 years. Projects and strategies are designed to achieve nitrogen reductions in the Suwannee Basin but are expected to provide benefits to all springs vents within the springshed/contributing area. DEP will evaluate progress towards these milestones and will report to the Governor and Florida Legislature. DEP will adjust management strategies to ensure the target concentrations are achieved.

For the list of projects to improve water quality, see **Appendix B**. Possible load reductions include projects resulting from policies for owner-implemented best management practices (BMPs) for FF, dairy waste, and other LW; wastewater treatment facility (WWTF) upgrades; policies to reduce urban turfgrass fertilizer (UTF) application; and voluntary onsite sewage treatment and disposal system (OSTDS) enhancements or 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, water management districts (WMDs), Florida Department of Health (FDOH), and Florida Department of Agriculture and Consumer Services (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.

## **Restoration Approaches**

Load reduction to the aquifer is needed to achieve the load reductions requirements at the spring vent. To ensure that load reductions are achieved at the spring vent, the following restoration actions are being established. These actions are designed to reduce the amount of nutrients to the

aquifer, which will reduce the load at the vent and ultimately achieve the necessary reductions. Monitoring of the vent 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 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. The OSTDS remediation plan is incorporated as **Appendix D**.
- **Wastewater Treatment Facilities (WWTFs)** – The effluent standards listed in **Table ES-1** will apply to all new and existing WWTFs in the BMAP (inside and outside the PFAs).

**Table ES-1. WWTF effluent standards**

gpd = Gallons per day

| 95% of the Permitted Capacity<br>(gpd) | Nitrogen Concentration Limits<br>for Rapid Infiltration Basins<br>(RIBs) and Absorption Fields<br>(mg/L) | Nitrogen Concentration Limits<br>for All Other Land Disposal<br>Methods, Including Reuse<br>(mg/L) |
|----------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Greater than 100,000                   | 3                                                                                                        | 3                                                                                                  |
| 20,000 to 100,000                      | 3                                                                                                        | 6                                                                                                  |
| Less than 20,000                       | 6                                                                                                        | 6                                                                                                  |

- **Urban Turfgrass Fertilizer (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.
- **Sports Turfgrass Fertilizer (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 and 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 reductions achieved through BMP implementation.

- **Dairies** – Permitted dairies with an approved nutrient management plan receive a 15% reduction to groundwater for owner-implemented BMPs. Additional credits could be achieved through better documentation of reductions achieved through BMP implementation.

## Section 1: Background

---

### 1.1 Legislation

Chapter 373, Part VIII, Florida Statutes (F.S.), the Florida Springs and Aquifer Protection Act, provides for the protection and restoration of Outstanding Florida Springs (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. Seven springs in the Suwannee River Basin are impaired OFS: Fanning Springs and Manatee Spring in the Lower Suwannee River Sub-basin; Falmouth Spring, Lafayette Blue Spring, Peacock Springs, and Troy Spring in the Middle Suwannee River Sub-basin; and Madison Blue Spring in the Withlacoochee River Sub-basin. Development of the basin management action plan (BMAP) to meet the new requirements of the Florida Springs and Aquifer Protection Act for the Suwannee River Basin was initiated in 2016.

### 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. The Suwannee River and impaired springs addressed in this BMAP are Class III waterbodies with a designated use of recreation, propagation, and the maintenance of a healthy, well-balanced population of fish and wildlife. These waters are impaired by nitrate nitrogen, which in excess has been demonstrated to adversely affect flora or fauna through the excessive growth of algae. Excessive algal growth results in ecological imbalances in the springs and river and can produce human health problems, foul beaches, inhibit navigation, and reduce the aesthetic value of the resources.

DEP adopted nutrient TMDLs for certain waters in the Suwannee River Basin in 2008, including the Suwannee River, Fanning Springs, Manatee Spring, Falmouth Spring, and Troy Spring (**Table 1**). The TMDLs established a monthly average nitrate target of 0.35 milligrams per liter (mg/L) of nitrate to be protective of the aquatic flora or fauna in the Lower and Middle Suwannee River and the associated springs. The period of record for water quality data evaluated for the TMDLs was June 1, 2000 through June 30, 2007.

Lafayette Blue Spring, Peacock Springs, and Madison Blue Spring were not included in the 2008 TMDL document, but are also impaired for nitrate. A monthly average of 0.35 mg/L of nitrate (as nitrogen) is also an appropriate water quality target for these springs, and the same target is applied in this BMAP.

**Table 1** lists the nitrate (as nitrogen) restoration targets for Fanning Springs, Manatee Spring, Falmouth Spring, Troy Spring, Lafayette Blue, Peacock Springs, Madison Blue Spring, Middle Suwannee River, and Lower Suwannee River. The TMDL targets are listed as monthly averages instead of daily values because changes in aquatic vegetation biomass do not respond instantaneously to changes in nutrient concentrations. A yearly average was not appropriate

because algal growth responds to seasonal changes. The percent reductions are the load reductions needed to attain the numeric nutrient criteria (NNC) through the implementation of this BMAP.

Total phosphorus (TP) concentrations rose in the Suwannee River Basin until they peaked in 1983 and have been generally declining since then. During the TMDL process, DEP could not link the impairments with either phosphorus load or concentration and, therefore, is targeting nitrate as nitrogen to achieve standards. Monitoring and evaluation for TP continues as the nitrate TMDLs are implemented.

**Table 1. Restoration targets for the impaired river and OFS in the Suwannee River Basin**

| <b>Waterbody or Spring Name</b> | <b>Basin</b>        | <b>Waterbody Identification (WBID) Number</b> | <b>Parameter</b>         | <b>TMDL (mg/L)</b> |
|---------------------------------|---------------------|-----------------------------------------------|--------------------------|--------------------|
| <b>Fanning Springs</b>          | Lower Suwannee      | 3422S                                         | Nitrate, monthly average | 0.35               |
| <b>Manatee Spring</b>           | Lower Suwannee      | 3422R                                         | Nitrate, monthly average | 0.35               |
| <b>Falmouth Spring</b>          | Middle Suwannee     | 3422Z                                         | Nitrate, monthly average | 0.35               |
| <b>Lafayette Blue Spring</b>    | Middle Suwannee     | 3528Z                                         | Nitrate, monthly average | 0.35               |
| <b>Peacock Springs</b>          | Middle Suwannee     | 3483                                          | Nitrate, monthly average | 0.35               |
| <b>Troy Spring</b>              | Middle Suwannee     | 3422T                                         | Nitrate, monthly average | 0.35               |
| <b>Madison Blue Spring</b>      | Withlacoochee River | 3315Z                                         | Nitrate, monthly average | 0.35               |
| <b>Middle Suwannee River</b>    | Middle Suwannee     | 3422J,3422L,3422T,3422U,3422Z                 | Nitrate, monthly average | 0.35               |
| <b>Lower Suwannee River</b>     | Lower Suwannee      | 3422,3422R,3422S                              | Nitrate, 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 BMAP area (**Figure 1**) comprises three sub-basins and encompasses 1,323,662 acres in eastern Dixie, eastern Madison, western Hamilton, northeast and eastern Lafayette, western Levy, western Gilchrist, small pockets of Taylor and Columbia counties, and the majority of Suwannee County. Urban areas include Live Oak and Branford in Suwannee County, Mayo in Lafayette County, Bell and Trenton in Gilchrist County, Fanning Springs in Gilchrist and Levy counties, Chiefland in Levy County, and Madison, Lee, and Greenville in Madison County.

The BMAP area contains seven OFS and hundreds of other springs. This area includes the surface water basin as well as the groundwater contributing areas for the springs (or springsheds). Springsheds for the OFS were delineated or reviewed by Suwannee River Water Management District (SRWMD) with input from the Florida Geological Survey (FGS). A springshed is the area of land that contributes water to a spring or group of springs, mainly via groundwater flow. **Tables 2, 3, and 4** list the acreage, number of designated OFS, and land uses associated with the three sub-basins comprising the BMAP area.

## **1.5 Priority Focus Areas (PFAs)**

In compliance with the Florida Springs and Aquifer Protection Act, this BMAP delineates three PFAs in the Suwannee River BMAP area: Lower Suwannee River (Manatee and Fanning Springs), Middle Suwannee River (Troy, Lafayette Blue, Peacock, and Falmouth Springs), and Withlacoochee River (Madison Blue Spring). A PFA is defined as the area(s) 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 documents that describe the delineation process for each PFA are on the DEP website. The link to the PFA document is provided in **Appendix C**.

### ***1.5.1 Description***

Nitrogen sources are more likely to influence groundwater quality under certain conditions. For example, where soils are sandy and well drained, less nitrogen is converted to gas and released into the atmosphere or taken up by plants, compared with other soil types. Therefore, local soils play a role in how much nitrogen travels from the land surface to groundwater in a specific springshed. Also, the underlying geologic material influences the vulnerability of the underlying aquifers and the rate of lateral movement within the Floridan aquifer toward the springs and river. These conditions, and others, were considered in the delineation of the Lower Suwannee River, Middle Suwannee River, and Withlacoochee River PFAs (see **Appendix C**).

The PFA boundaries delineated in **Figure 2**, **Figure 3**, and **Figure 4** were developed by overlaying geographic information system (GIS) coverages of groundwater recharge rates, aquifer vulnerability, soil types, conservation lands, and potential nitrogen source information. A description of each PFA follows each figure.

Following BMAP adoption, DEP will ensure that the GIS files associated with the PFA boundary are available to the public on the DEP Map Direct webpage.

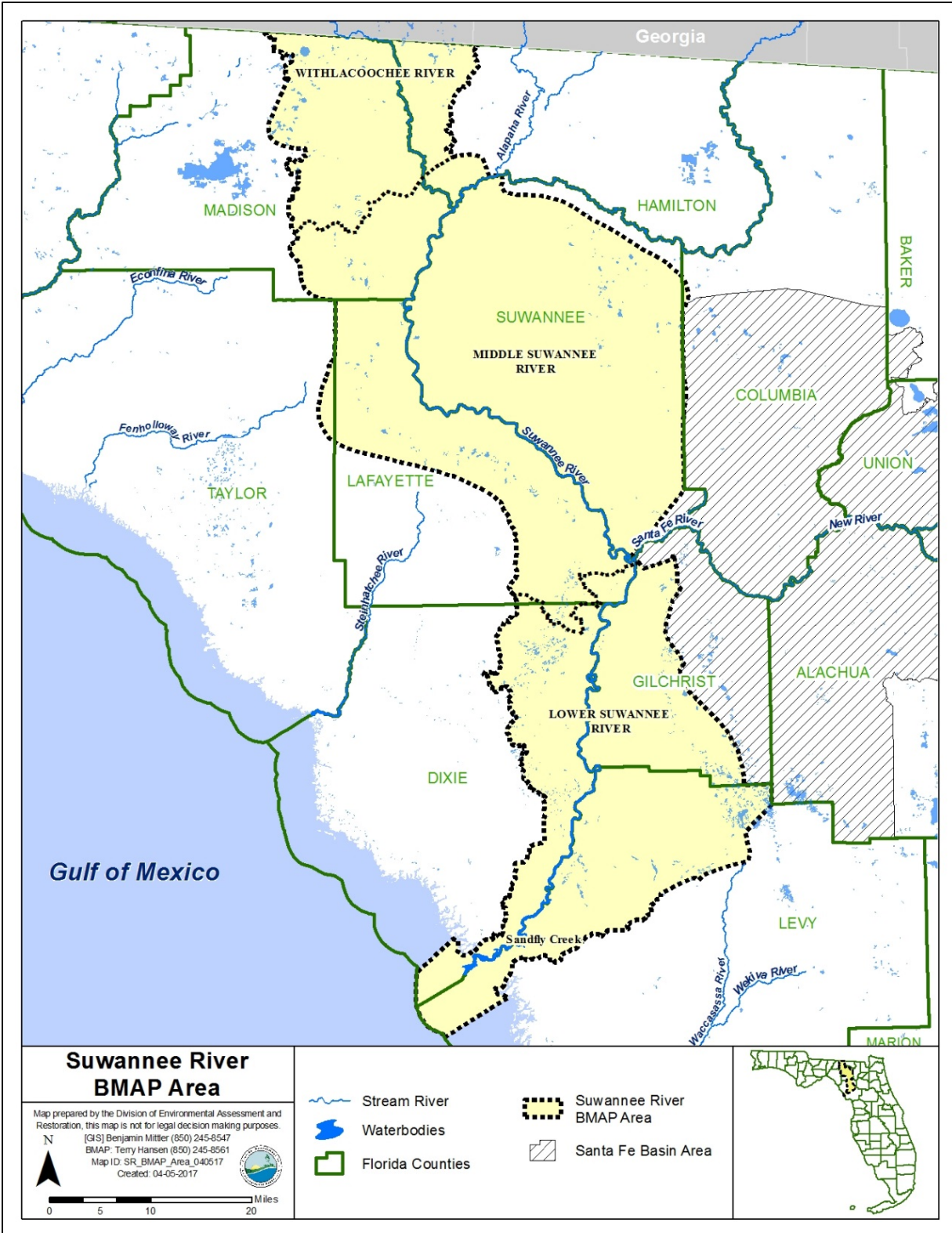


Figure 1. Suwannee River BMAP area



**Table 2. Acreage for each sub-basin in the BMAP area**

| Characteristic | Lower Suwannee River Sub-basin | Middle Suwannee River Sub-basin | Withlacoochee River Sub-basin |
|----------------|--------------------------------|---------------------------------|-------------------------------|
| <b>Acreage</b> | 431,722 acres                  | 704,802 acres                   | 187,138 acres                 |

**Table 3. OFS for each sub-basin in the BMAP area**

| Springs    | Spring Name (County Where Located)              | Spring Name (County Where Located)                                                                                       | Spring Name (County Where Located) |
|------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <b>OFS</b> | Fanning Springs (Levy)<br>Manatee Spring (Levy) | Falmouth Spring (Suwannee)<br>Lafayette Blue Spring (Lafayette)<br>Peacock Springs (Suwannee)<br>Troy Spring (Lafayette) | Madison Blue Spring (Madison)      |

**Table 4. Land uses for each sub-basin in the BMAP area**

| Land Use           | % of Total Land Uses in the Lower Suwannee River Sub-basin | % of Total Land Uses in the Middle Suwannee River Sub-basin | % of Total Land Uses in the Withlacoochee River Sub-basin |
|--------------------|------------------------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------|
| <b>Forest</b>      | 42                                                         | 47                                                          | 49                                                        |
| <b>Agriculture</b> | 34                                                         | 27                                                          | 31                                                        |
| <b>Urban</b>       | 10                                                         | 10                                                          | 7                                                         |
| <b>Wetlands</b>    | 11                                                         | 9                                                           | 7                                                         |
| <b>Rangeland</b>   | 3                                                          | 6                                                           | 5                                                         |
| <b>Water</b>       | 0                                                          | 1                                                           | 1                                                         |

The Lower Suwannee River Sub-basin comprises 431,722 acres, of which 199,928 acres are designated as the PFA for Fanning and Manatee Springs. The PFA covers most of the combined springshed for these and several smaller springs, including areas with high groundwater recharge/vulnerability conditions and soil conditions that tend to leach nitrogen. It includes potential areas of higher nitrogen loading from agriculture and urban land uses, as well as an area where groundwater travel to the springs could occur rapidly. It also includes interconnected areas of agricultural land use, areas of urban development, areas with onsite sewage treatment and disposal systems (OSTDS or septic systems, the terms are used interchangeably through this document), domestic wastewater facilities, and concentrated animal feeding operations (CAFOs). All of these have the potential to contribute to nitrogen enrichment in the aquifer and springs.

The Lower Suwannee River PFA includes parts of Gilchrist and Levy counties. It includes the Cities of Fanning Springs, Chiefland, and Trenton, in addition to Fanning Springs State Park, Manatee Springs State Park, Hart Springs Park, a corridor along the Suwannee River of SRWMD-managed state land and conservation easements, and state wildlife management areas. Conservation land boundaries, natural features, political boundaries, roads, and survey boundaries in the area were also considered in the development of a readily identifiable boundary.

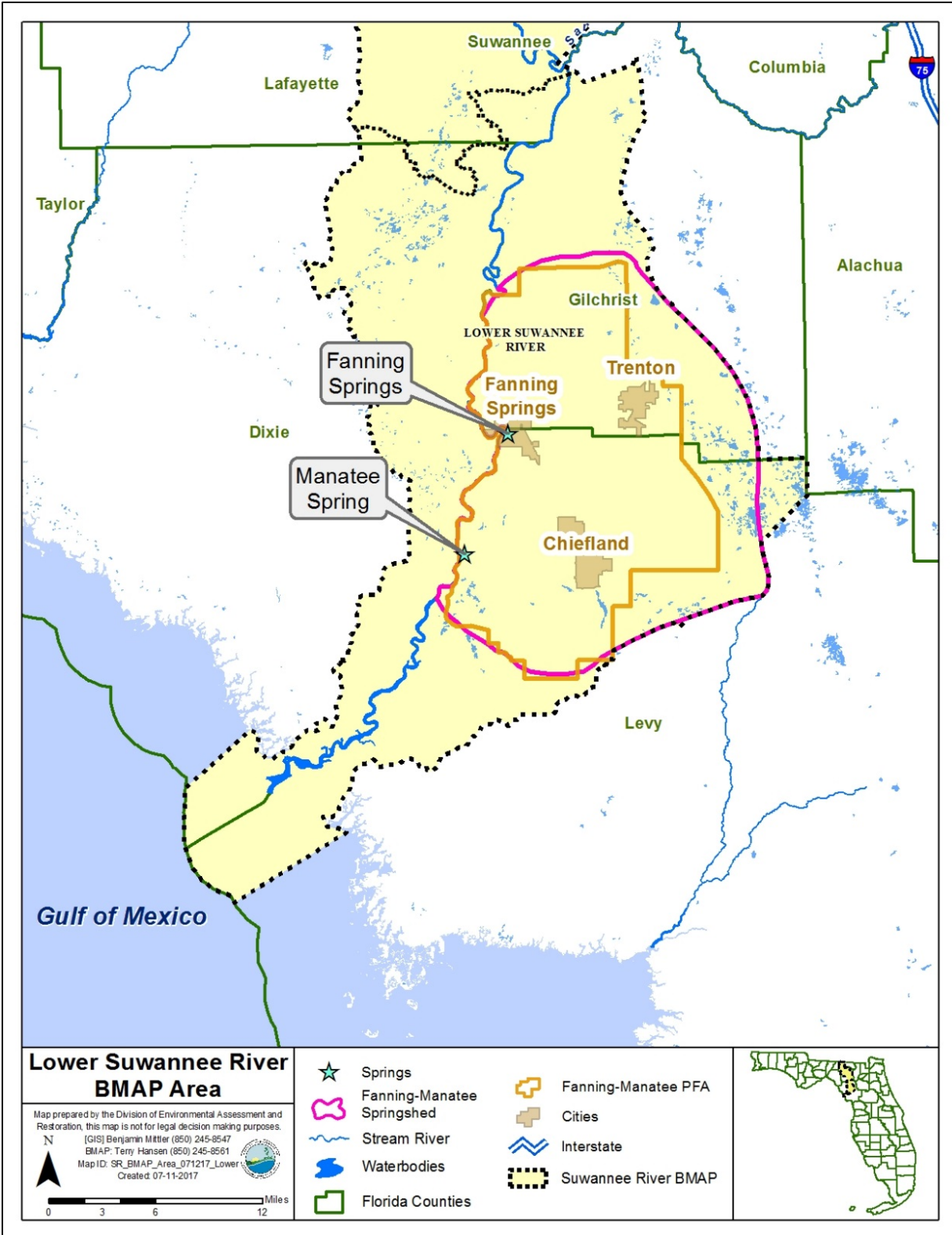


Figure 2. Lower Suwannee River PFA and sub-basin boundary

The Middle Suwannee River Sub-basin comprises an area of 704,802 acres, of which 554,965 acres are designated as the combined PFA for Troy, Lafayette Blue, Peacock, and Falmouth Springs. The PFA covers most of the combined springshed for these and numerous other springs along the Suwannee River, including areas with high groundwater recharge/vulnerability conditions and soil conditions that tend to leach nitrogen. It includes potential areas of higher nitrogen loading from agriculture and urban land uses, as well as an area where groundwater travel to the springs could occur rapidly. It also includes interconnected areas of agricultural land use, areas of urban development, areas with OSTDS, domestic wastewater facilities, and CAFOs. All of these have the potential to contribute to nitrogen enrichment in the aquifer and springs.

The Middle Suwannee River PFA is mainly located in Suwannee County, with smaller portions in Lafayette, Madison, and Hamilton counties. It includes the City of Live Oak, portions of the Towns of Branford and Mayo, and part of the community of Day, in addition to Troy Spring State Park, Peacock Springs State Park, Lafayette Blue Spring State Park, Suwannee River State Park, and a corridor along the Suwannee River of SRWMD-managed state land and conservation easements. Conservation land boundaries, natural features, political boundaries, roads, and survey boundaries in the area were all considered in the development of a readily identifiable PFA boundary.

The Withlacoochee River Sub-basin comprises an area of 187,138 acres, of which 84,788 acres are designated as the PFA for Madison Blue Spring. The PFA covers most of the combined springshed. The area contains several important springs along the Withlacoochee River, including Madison Blue, Rossiter, Pot, Tanner, and several other named springs that contribute flow to the system and share the same springshed. This area has high groundwater recharge/vulnerability conditions and soil conditions that tend to leach nitrogen. It includes potential areas of higher nitrogen loading from agriculture and urban land uses, as well as an area where groundwater travel to the springs could occur rapidly. It also includes interconnected areas of agricultural land use and larger areas of urban development, which have the potential to contribute to nitrogen enrichment in the aquifer and springs.

The Withlacoochee River PFA is mainly located in Madison County, with a smaller portion along the Withlacoochee River in Hamilton County. It includes Madison Blue Spring State Park and a part of the Withlacoochee State Forest that occurs as a corridor along the Withlacoochee River. Conservation land boundaries, natural features, political boundaries, roads, and major survey boundaries in the area were used in the development of a readily identifiable boundary.

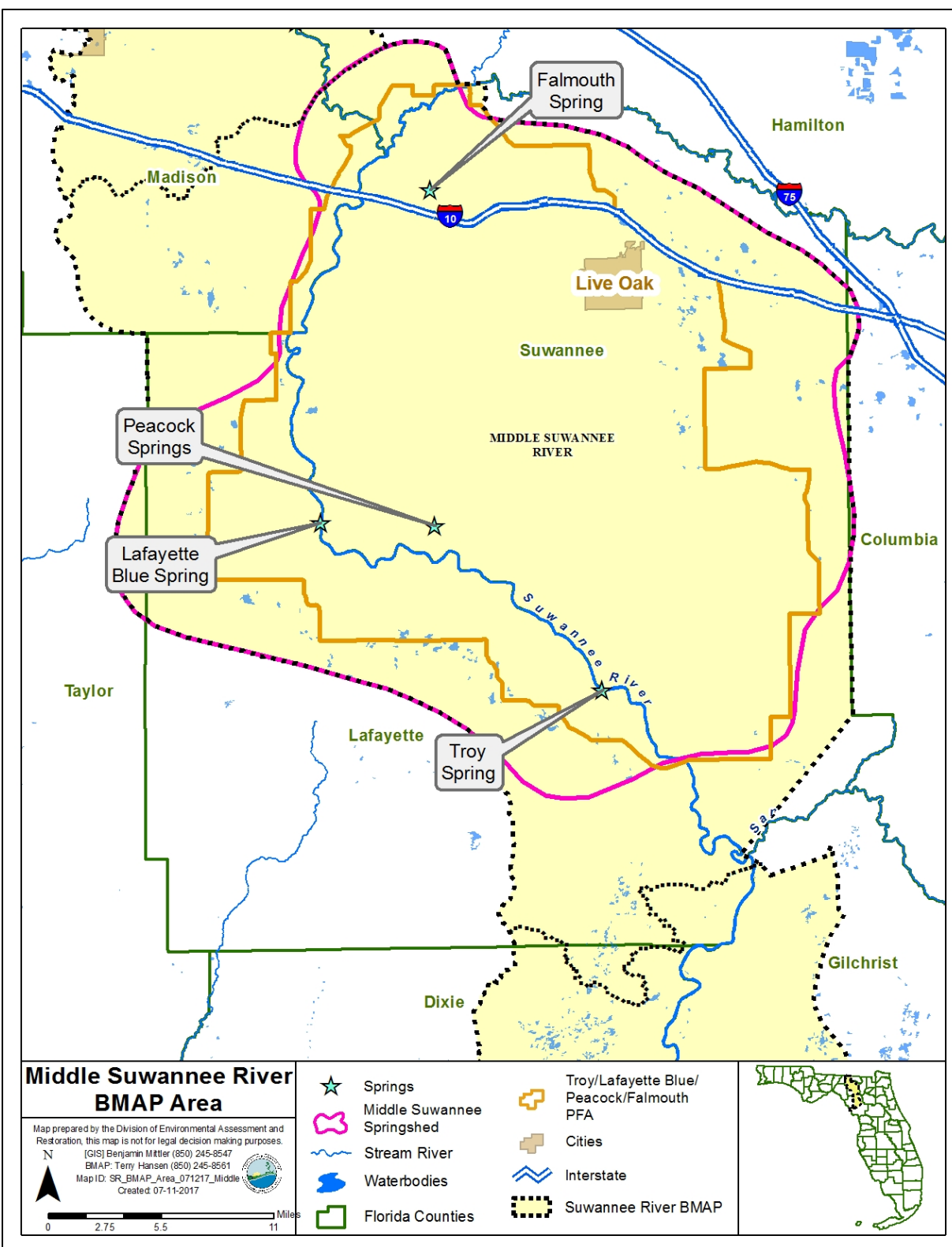


Figure 3. Middle Suwannee River PFA and sub-basin boundary

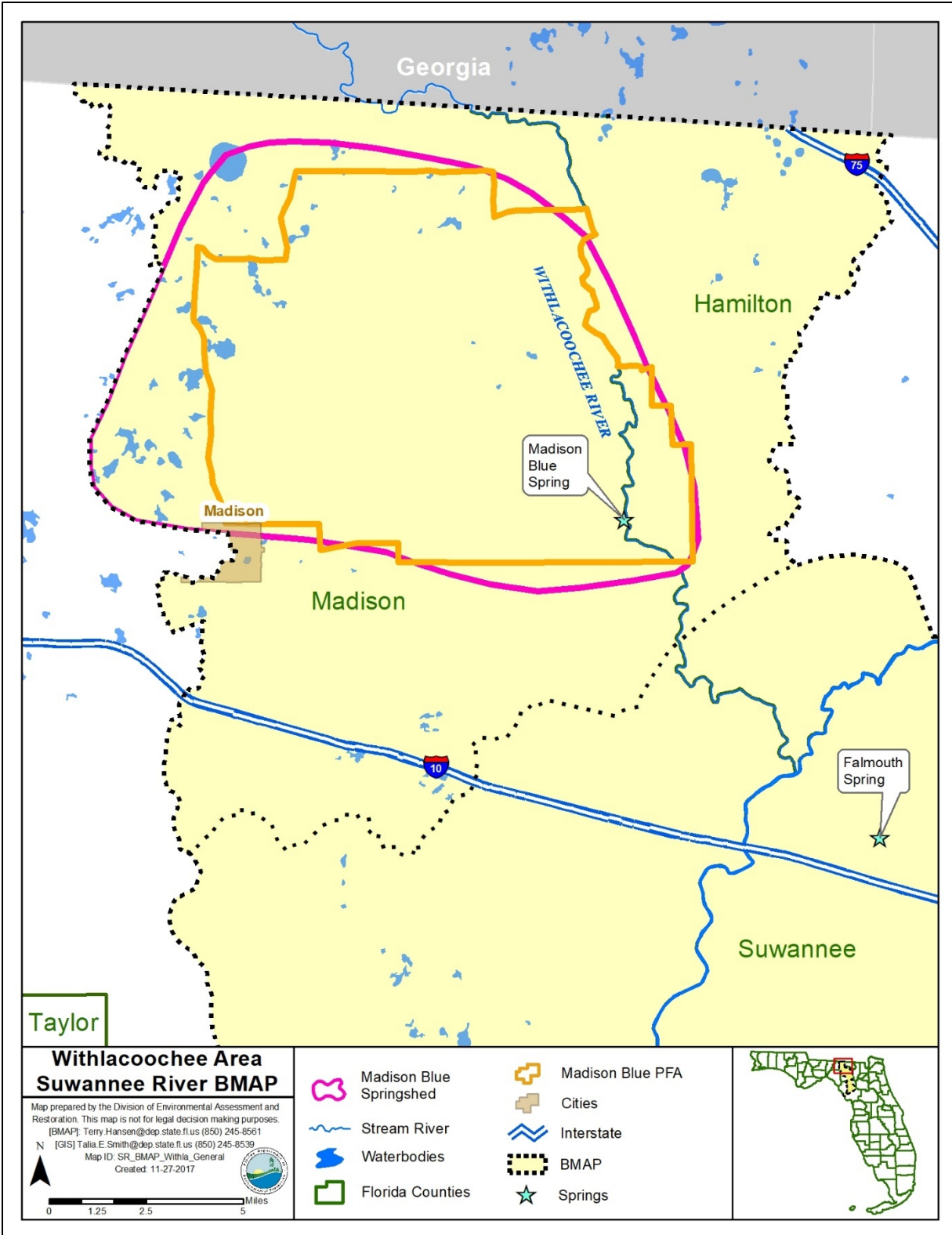


Figure 4. Withlacoochee River PFA and sub-basin boundary

### **1.5.2 Additional Requirements**

In accordance with Section 373.811, F.S., the following activities are prohibited in each PFA in the Suwannee River BMAP:

- New domestic wastewater disposal facilities, including rapid infiltration basins (RIBs), with permitted capacities of 100,000 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 BMPs, measures necessary to achieve pollution reduction levels established by DEP, or groundwater monitoring plans approved by a water management district or DEP.

#### **1.5.2.1 Biosolids and Septage Application Practices**

In the PFA, the aquifer contributing to the springs 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 permitted application of biosolids and septage in the PFA, 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 within 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 PFA 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 springs systems. Some of the information collected is specific to the Suwannee River Basin, while other references provided information on related knowledge for restoring springs, such as nitrogen-reducing technologies, the treatment performance of OSTDS, and runoff following fertilizer applications.

## **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 Suwannee 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 meetings were open to the public and noticed in the *Florida Administrative Register* (F.A.R.). Additionally, a public meeting on the current BMAP was held on November 14, 2017, and was noticed in the 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 5** lists the adopted BMPs and BMP manuals relevant to this BMAP.

**Table 5. BMPs and BMP manuals adopted by rule as of June 2017**

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



## Section 2: Implementation to Achieve the TMDLs

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### 2.1 Allocation of Pollutant Loads

DEP collected and evaluated credible scientific information on the effect of nutrients, particularly forms of nitrogen, on the seven OFS, 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 for the OFS in the three sub-basins. In addition, this 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 in the NSILT is the attenuation of nitrogen as it moves from its source through the environment, before it reaches the Upper Floridan aquifer (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 in estimating the loading to groundwater is the geologic features in the springshed and the related "recharge rate." Water movement between the shallow groundwater (surficial aquifer, where present) and the deeper aquifer (UFA) is slowed by a low permeability layer of clay, silt, and fine sand that retards the vertical movement of infiltrating water from the surface. The UFA occurs in limestone that can be prone to dissolving, and, over geologic time, the development of numerous karst features (sinkholes, caves, and conduits). 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 estimated the recharge rate ranges and grouped them into three rate categories, which were applied in the NSILT:

- Low recharge (0 to 3 inches per year [in/yr]).
- Medium recharge (3.01 to 10 in/yr).
- High recharge (greater than 10 in/yr).

In the NSILT, 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 Lower Suwannee River, Middle Suwannee River, and Withlacoochee River 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, 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. Historical TP concentrations rose in the Suwannee River Basin, peaked in 1983, and have generally declined since then. During the TMDL development process, DEP could not link impairments with either phosphorus load or concentration. The monitoring and evaluation of TP and its influence on the springs continues as the nitrate TMDLs are implemented.

### 2.1.2 *Estimated Nitrogen Loads*

**Table 6** lists the estimated nitrogen loads to groundwater by source. Note that urban stormwater loads are included in urban turfgrass fertilizer (UTF) estimates, while agricultural stormwater loads are included in farm fertilizer (FF) and livestock waste (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 6. Estimated nitrogen load to groundwater by source in the three springsheds**

| <b>Nitrogen Source</b>        | <b>Total Nitrogen Load to Groundwater<br/>(pounds of nitrogen per year [lb-N/yr])</b> | <b>% Contribution</b> |
|-------------------------------|---------------------------------------------------------------------------------------|-----------------------|
| <b>OSTDS</b>                  | 301,234                                                                               | 3                     |
| <b>UTF</b>                    | 293,157                                                                               | 3                     |
| <b>Atmospheric Deposition</b> | 807,819                                                                               | 8                     |
| <b>FF</b>                     | 5,794,980                                                                             | 60                    |
| <b>STF</b>                    | 12,819                                                                                | <1                    |
| <b>Permitted Dairies</b>      | 339,182                                                                               | 3.5                   |
| <b>LW</b>                     | 2,087,394                                                                             | 21.5                  |
| <b>WWTFs</b>                  | 89,745                                                                                | <1                    |
| <b>Total</b>                  | <b>9,726,330</b>                                                                      | <b>100</b>            |

### 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, census 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 lb-N/yr was used to calculate loading from OSTDS. The average household contribution was estimated based on 2010 U.S. Census Bureau data on the weighted average number of people per household for the counties in the area and additional information on the time spent away from home by the school-age population and labor force.
- **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.

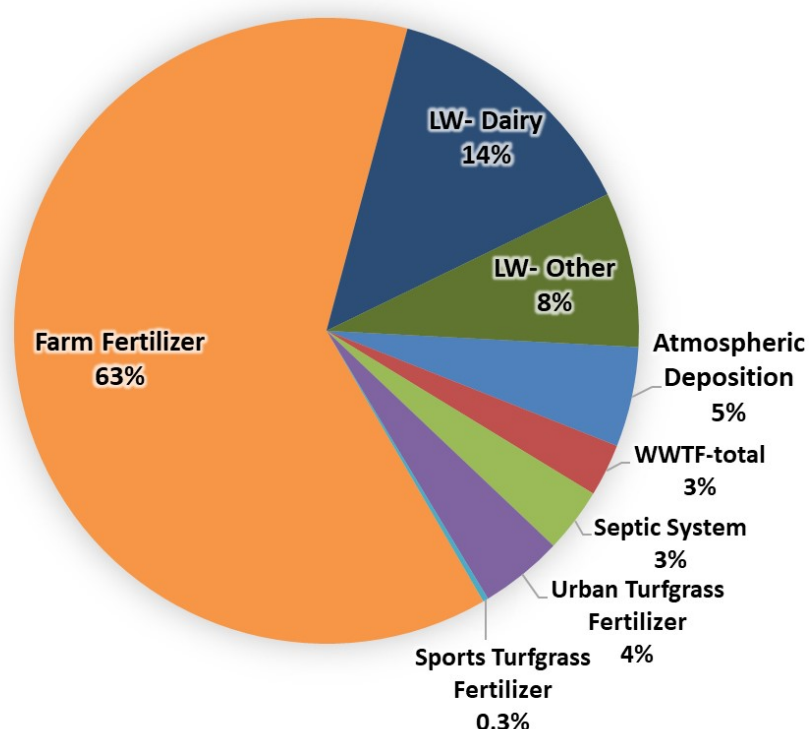
Other assumptions and considerations for BMAP implementation include the following:

- **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 at a later date and assigned to these activities.
- **Atmospheric Deposition** – Atmospheric sources of nitrogen are local, national, and international. Atmospheric sources are generally of 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 need to be re-evaluated periodically.

- **OSTDS Inventory and Loading Calculations** – The total number of OSTDS in the basin is estimated based on local information and Florida Department of Health (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.
- **PFA** – The PFA provides a guide for focusing strategies where science suggests efforts will best benefit the springs. The PFA boundaries may be adjusted in the future 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 in the springshed after January 2007, 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 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 (50 %), and 15-year (20 %) implementation, so that the TMDLs will be met no later than the 20-year goal (see **Section 2.1.6** for further 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 of concentration 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 specific springs address water flows and levels. To maximize efforts between 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 **Figure 5**, **Figure 6**, and **Figure 7** depict the estimated percentage of nitrogen loading to groundwater by source in the springshed for each sub-basin. FF and LW (mainly from dairies and beef cattle cow-calf operations) are responsible for more than 85 % of the nitrogen sources in each springshed. Stormwater loading to groundwater is incorporated into the various source categories.



**Figure 5. Loading to groundwater by source in the Lower Suwannee River Springshed**

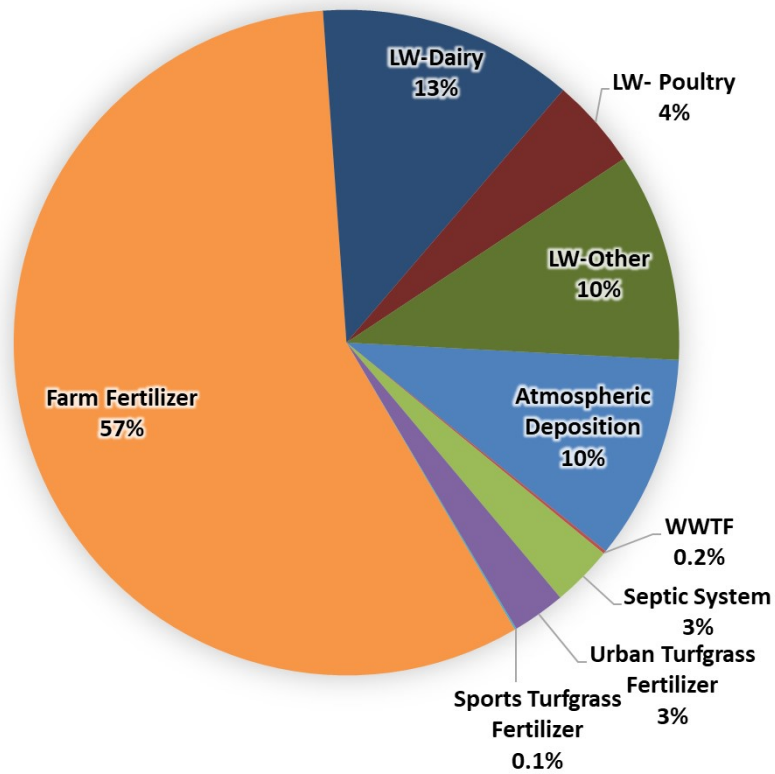


Figure 6. Loading to groundwater by source in the Middle Suwannee River Springshed

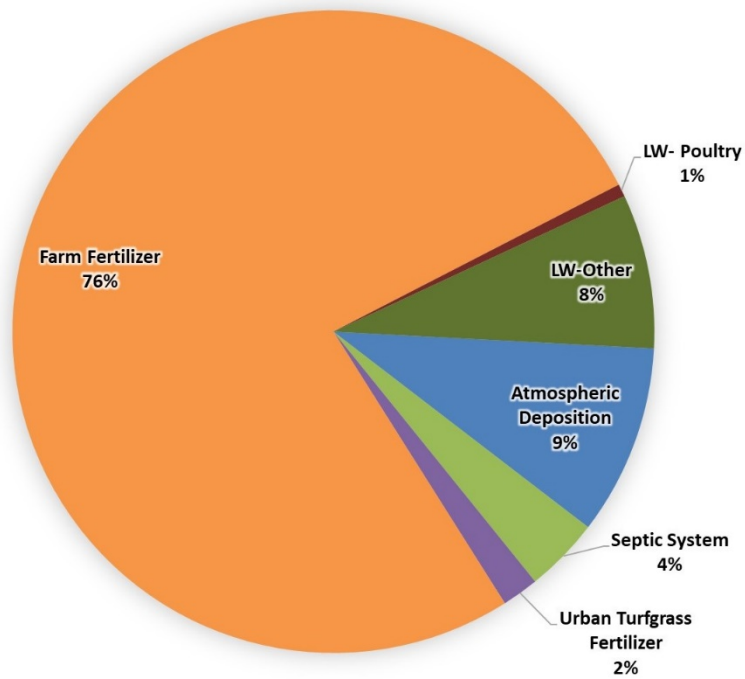


Figure 7. Loading to groundwater by source in the Withlacoochee River Springshed

### 2.1.5 Loading Allocation

The nitrogen source reductions are based on the measured nitrate concentrations and flows at the vent, along with the TMDL target nitrate concentration. **Table 7** lists the measured nitrate (as nitrogen) loads at the spring vents compared with the TMDL loading based on a target nitrate concentration of 0.35 mg/L. The difference between the spring vent loading and the TMDL loading estimates is the required reduction to meet the TMDLs. The total load that is required to be reduced in the 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.

Load reductions were also calculated for the areas outside the springshed but inside the BMAP area boundary, based on the average load per acre inside the springshed and the total acres outside the springshed but in the BMAP area (**Table 8**).

**Table 7. Total reduction required to meet the TMDLs inside springsheds**

| Area          | Load at Spring Vents (lb-N/yr) | TMDL Load (lb-N/yr) | Required Reduction to Meet TMDL (lb-N/yr) |
|---------------|--------------------------------|---------------------|-------------------------------------------|
| Lower         | 1,276,822                      | 145,500             | 1,131,322                                 |
| Middle        | 1,489,907                      | 693,663             | 796,244                                   |
| Withlacoochee | 361,000                        | 79,300              | 281,700                                   |
|               |                                | <b>Subtotal</b>     | <b>2,209,266</b>                          |

**Table 8. Total reduction required to meet the TMDLs outside springsheds**

| Area                           | Required Reduction to Meet TMDL (lb-N/yr) |
|--------------------------------|-------------------------------------------|
| Lower                          | 1,311,640                                 |
| Middle                         | 214,981                                   |
| Withlacoochee                  | 340,048                                   |
| <b>Subtotal</b>                | <b>1,866,669</b>                          |
| <b>Totals (Tables 7 and 8)</b> | <b>4,075,935</b>                          |

The total load at the Madison Blue Spring vent in the Withlacoochee River Sub-basin was estimated using the 95th percentile of nitrate concentrations and flows at Madison Blue Spring from 2001 through 2016.

The total loads at the spring vents for the Middle Suwannee River Sub-basin (including the OFS) were estimated using the 95th percentile of nitrate concentrations and periods of base flow for the Suwannee River from 2013 through 2016.

The total loads at the OFS spring vents for the Lower Suwannee River Sub-basin were estimated using the 95th percentile of nitrate concentrations and flows at Fanning and Manatee Springs from 2003 through 2016.

### 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, 80 % 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.

**Table 9** 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 2.3** describes detailed source reduction strategies.

**Table 9. Nitrogen reduction schedule (lb-N/yr)**

| 5-Year<br>Milestone<br>(30% of Total) | 10-Year<br>Milestone<br>(50% of Total) | 15-Year<br>Milestone<br>(20% of Total) | Total Nitrogen<br>Reduction<br>(100%) |
|---------------------------------------|----------------------------------------|----------------------------------------|---------------------------------------|
| 1,222,781                             | 2,037,968                              | 815,187                                | 4,075,935                             |

## 2.2 Prioritization of Management Strategies

The management strategies listed in **Appendix B** are ranked with a priority of high, medium, or low. In 2016, the Florida Legislature amended the Watershed Restoration Act (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 their 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 the project status "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.

## 2.3 Load Reduction Strategy

A precise total load reduction to groundwater needed to meet the TMDL is unknown and dependent on a number of complex factors. Ultimately there must be a reduction at the spring vent of at least 4,075,935 lb-N/yr. Based on the totals of all the credits from BMAP actions and policies, the range of total reductions to groundwater is between 2,541,035 and 4,859,027 lb-N/yr (see **Table 10**). However, due to the proximity of these reductions to the springs and the



uncertainties of fate and transport in the karst geology, additional actions may be necessary to ensure that the loading at the vent 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 but have not been planned. Other efforts could be pursued to further reduce the nitrogen load to groundwater in the Suwannee River Basin.

**Table 10. Summary of potential credits for the Suwannee River BMAP to meet the TMDL**

Note: No reductions are estimated for atmospheric deposition sources.

| <b>Nitrogen Source</b>                                         | <b>Credits to Load to Groundwater Based on Project Tables (lb-N/yr)</b> | <b>Description</b>                                                                                                                                                  |
|----------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OSTDS</b>                                                   | 52,822                                                                  | Credits identified for stakeholder OSTDS projects (enhancement or sewer).                                                                                           |
| <b>UTF</b>                                                     | 17,658                                                                  | DEP approved credits (6%) for public education activities as well as credits identified for stakeholder stormwater projects.                                        |
| <b>FF Projects</b>                                             | 534,760                                                                 | Credits identified for stakeholder farm fertilizer projects.                                                                                                        |
| <b>FF</b>                                                      | 869,247                                                                 | 15% BMP credit on farm fertilizer load to groundwater, assuming 100% owner-implemented and verified BMPs on all fertilized lands.                                   |
| <b>Permitted Dairies Projects</b>                              | 167,000                                                                 | Credits identified for stakeholder dairy projects.                                                                                                                  |
| <b>Permitted Dairies</b>                                       | 50,877                                                                  | 15% BMP credit on permitted dairy load to groundwater, assuming 100% owner-implemented and verified BMPs at permitted dairies.                                      |
| <b>LW</b>                                                      | 208,739                                                                 | 10% BMP credit on load to groundwater, assuming 100% owner-implemented BMPs and verified at all livestock facilities.                                               |
| <b>STF</b>                                                     | 1,051                                                                   | 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. |
| <b>WWTF</b>                                                    | 17,533                                                                  | Achieved by BMAP WWTF policy (achieving 3 or 6 mg/L).                                                                                                               |
| <b>Other</b>                                                   | 41,850                                                                  | Credit identified for the Madison Blue Spring Aquifer Recharge Project that DEP provided cost-share funding.                                                        |
| <b>Total Credits from BMAP Policies and Submitted Projects</b> | <b>1,961,537</b>                                                        |                                                                                                                                                                     |
| <b>Advanced Agricultural Practices and Procedures</b>          | 579,498- 2,897,490                                                      | Includes 10%-50% reduction from 100% of fertilized acres with a change in practice.                                                                                 |
| <b>Total Credits</b>                                           | <b>2,541,035 - 4,859,027</b>                                            | <b>Load reduction to meet the TMDL at the spring vents is 4,075,935 lb-N/yr.</b>                                                                                    |

## **2.4 OSTDS Management Strategies**

Overall, there are currently more than 6,000 OSTDS in the PFAs on lots less than one acre, based on FDOH estimates. This BMAP lists six specific projects (**Appendix B**) that reduce nitrogen loading from existing OSTDS on variably sized parcels by a total of 52,822 lb-N/yr. **Figure 8, Figure 9, and Figure 10** show the locations of all OSTDS in each sub-basin.

In addition to the six listed projects, 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 assessments, DEP has determined that for the Suwannee River BMAP area, OSTDS contribute less than 20 % of nonpoint source nitrogen pollution to the OFS. Per the Suwannee River Basin NSILTs, septic systems contribute 3 % pollutant loading in the springshed areas and 3 % of the nitrogen loading in the PFAs. Irrespective of the percent contribution, nitrogen loading from OSTDS contribute to the significant degradation of the groundwater, and 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. Accordingly, the OSTDS remediation plan prohibits the installation of new conventional systems on lots less than 1 acre within the PFA. The OSTDS remediation plan is incorporated as **Appendix D**.

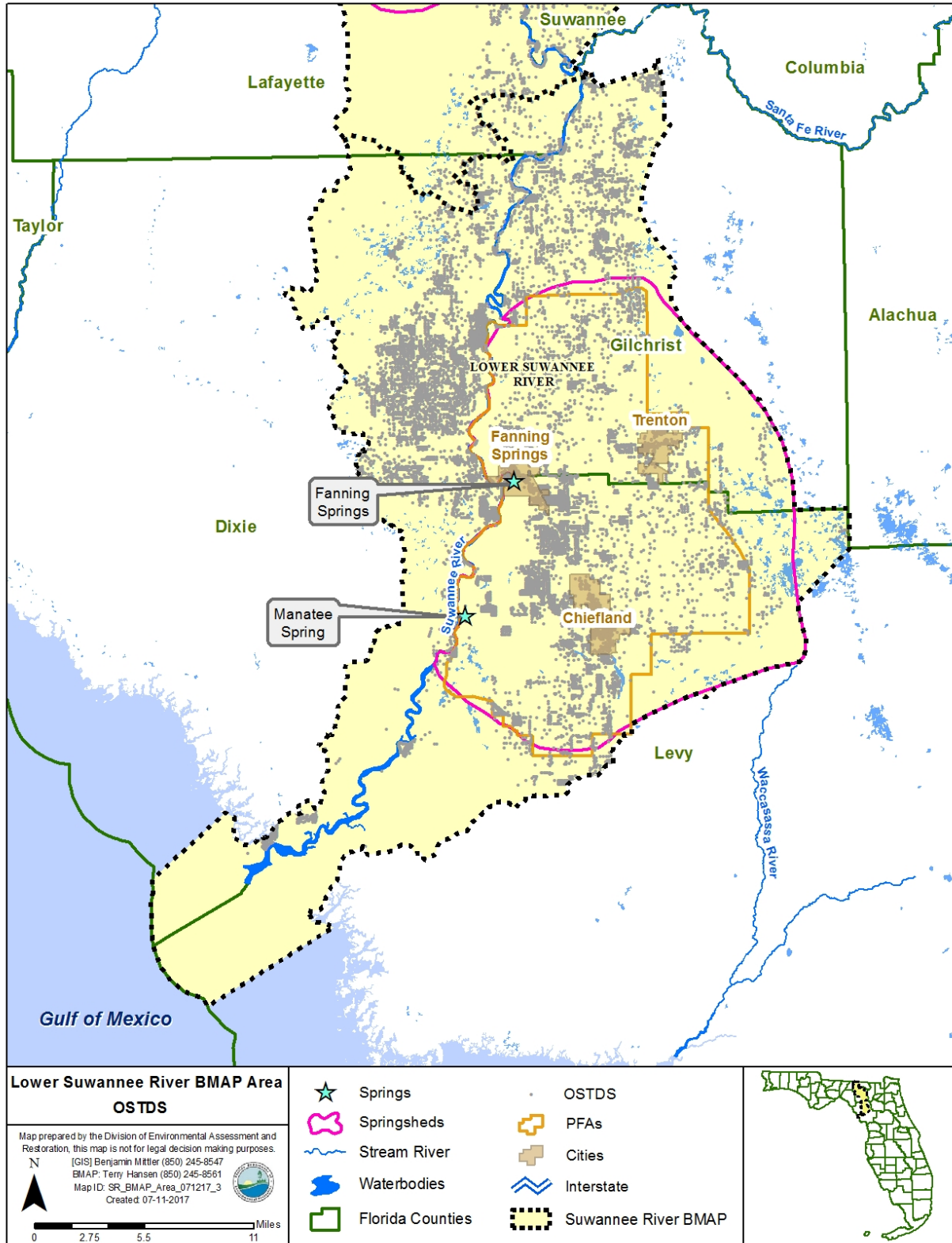


Figure 8. OSTDS locations in the Lower Suwannee River Sub-basin

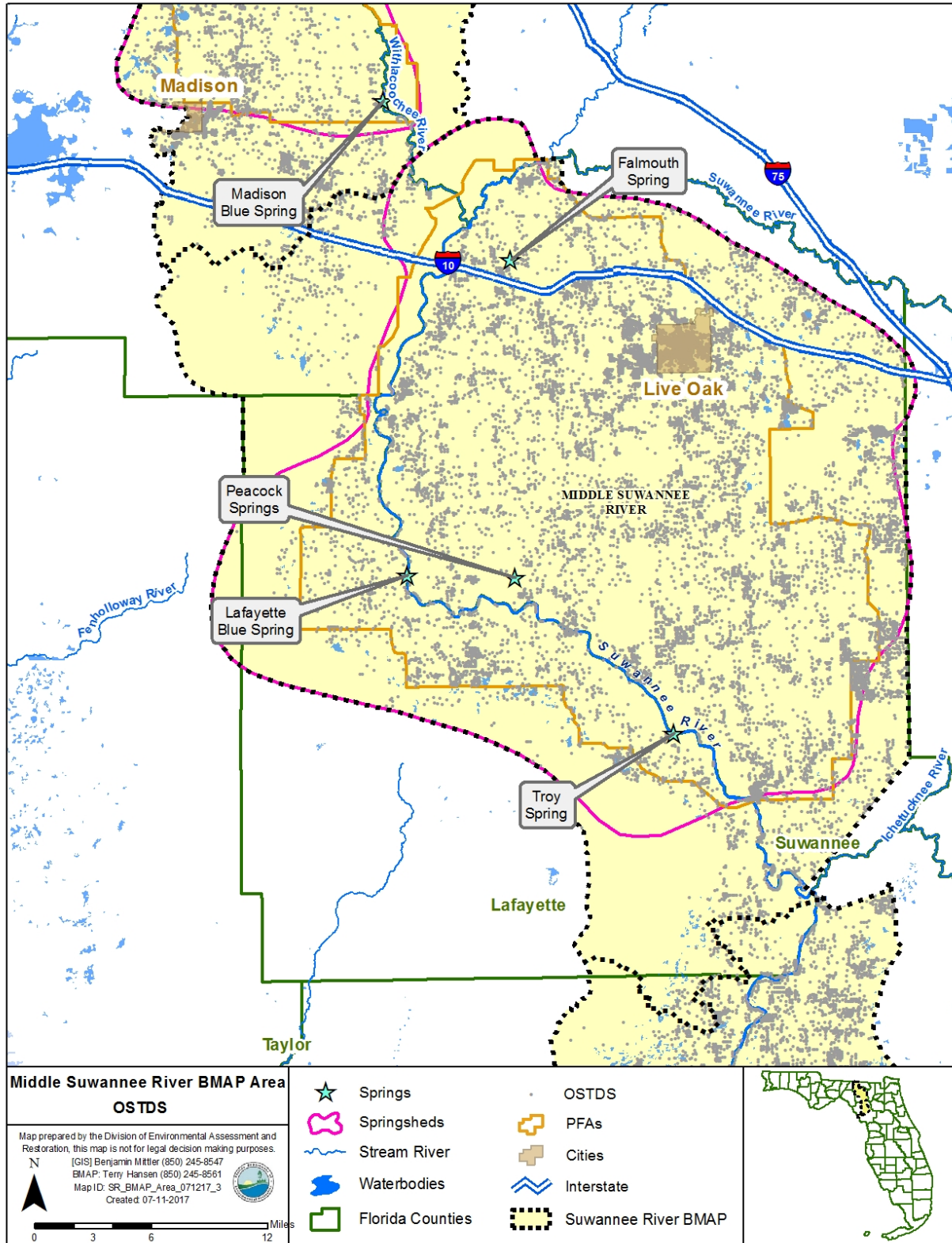


Figure 9. OSTDS locations in the Middle Suwannee River Sub-basin



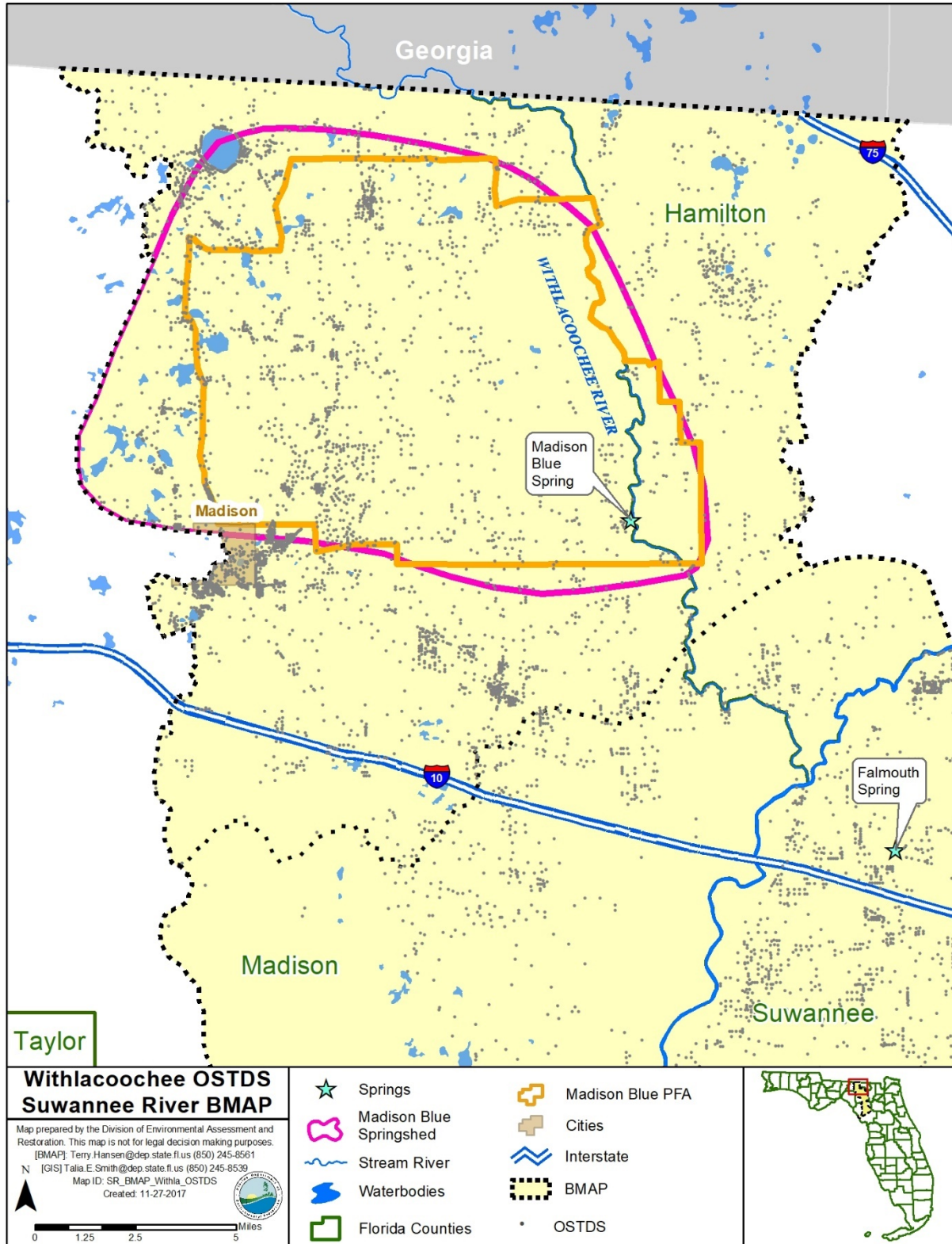


Figure 10. OSTDS locations in the Withlacoochee River Sub-basin

## 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 PFA 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 in place at the time of BMAP adoption, the associated credits for UTF reductions to groundwater are 1,466 lb-N/yr (see **Table 11**). Additional environmental benefits could be credited if the counties and municipalities implement other public education efforts and source control ordinances (see **Table 12**).

Local stormwater projects that treat urban runoff, including nitrogen from urban fertilizer, are also in place (see **Appendix B**), for a total estimated reduction to groundwater of 69 lb-N/yr.

**Table 11. Current project credits to reduce UTF loading to groundwater**

| Project Category                     | Project Credits Based on Management Actions in Appendix B (lb-N/yr) |
|--------------------------------------|---------------------------------------------------------------------|
| Fertilizer Ordinances (all entities) | 1,466                                                               |
| Stormwater Improvements              | 69                                                                  |
| <b>Total Project Credits</b>         | <b>1,535</b>                                                        |

Since there is uncertainty about the data used in the NSILT estimates to calculate the UTF loading to groundwater, DEP will work toward collecting better data by documenting reductions with the stakeholders. Also, DEP will work with the stakeholders to develop additional measures to reduce fertilizer application.

### 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 (**Table 12**).

**Table 12. Maximum UTF load reductions based on existing public education credit policies**

| <b>UTF<br/>Source Control Measures</b> | <b>Credit, Based on<br/>Estimated Load to<br/>Groundwater<br/>(%)</b> | <b>Possible Nitrogen<br/>Credits<br/>(lb-N/yr)</b> |
|----------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------|
| <b>Fertilizer Ordinance</b>            | 0.50                                                                  | 1,466                                              |
| <b>Pet Waste Ordinance</b>             | 0.50                                                                  | 1,466                                              |
| <b>Landscape Ordinance</b>             | 0.50                                                                  | 1,466                                              |
| <b>Irrigation Ordinance</b>            | 0.50                                                                  | 1,466                                              |
| <b>FYN Program</b>                     | 3.00                                                                  | 8,795                                              |
| <b>Public Education Program</b>        | 1.00                                                                  | 2,932                                              |
| <b>Total Possible Credits</b>          | <b>6.00</b>                                                           | <b>17,589</b>                                      |

If all the local governments were to implement the full suite of public education measures, a 17,589 lb-N/yr reduction could be achieved. Currently, it is assumed that all local governments have or will adopt the required fertilizer ordinance for a reduction credit of 1,466 lb-N/yr. Thus, an additional 16,123 lb-N/yr reduction could be achieved through public education and source control efforts.

## **2.6 Agricultural Sources Management Strategies and Additional Reduction Options**

Based on data including Florida Statewide Agriculture Irrigation Demand III geodatabase land use, FDACS identified agricultural acreage within the BMAP. An estimated 359,896 agricultural acres in the basin of land in the springshed area are considered agricultural, of which: 198,638 acres are identified as crop fertilizer lands, 155,135 acres are livestock lands, and 6,123 acres are identified as both fertilizer croplands and livestock lands.

### **2.6.1 FF Loading**

Nitrogen in agricultural fertilizer is applied at varying rates, depending on the crop and individual farm practices. The NSILT estimated total nitrogen load to groundwater from FF is 5,794,980 lb-N/year, approximately 60 % of the total nitrogen load to groundwater in the BMAP area. FF includes commercial inorganic fertilizer applied to row crops, field crops, pasture, and hay fields. Some of the FF application sites are associated with dairies.

### **2.6.2 LW Loading**

Agricultural practices specific to LW management were obtained through meetings with University of Florida Institute of Food and Agricultural Sciences (UF-IFAS) extension staff, FDACS field representatives, agricultural producers, and stakeholders. The NSILT estimated total nitrogen load to groundwater from LW is 2,087,394 lb-N/year, or 21.5 % of the total nitrogen load to groundwater.

### **2.6.3 Permitted Dairies**

The loading from LW at DEP-permitted dairies was estimated separately from other LW because specific permit information was available to account for loads, waste management practices, and nutrient management plans. The NSILT estimated total nitrogen load to groundwater from animal waste at permitted dairies is 339,182 lb-N/yr, or 3.5 % of the total nitrogen load to groundwater in the BMAP area. Commercial fertilizer applied to hay and silage at dairies is accounted for in the FF category.

### **2.6.4 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 conduct water quality monitoring prescribed by DEP or SRWMD that demonstrates compliance with water quality standards. Further, based on 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 within the BMAP area to implement BMPs. As of December 31, 2016, NOIs covered 187,312 agricultural acres in the Suwannee River Basin BMAP area. No producers are conducting water quality monitoring in lieu of implementing BMPs at this time. **Appendix B** lists project information. **Appendix F** provides detailed information on BMPs and agricultural practices in the BMAP area.

With crop-specific BMP enrollment or monitoring for FF areas, an estimated 869,247 lb-N/yr reduction to groundwater can be achieved, based on an average reduction of 15 % in the nitrogen load to groundwater. While DEP has listed larger percentage reductions in nitrogen from agricultural BMPs in estimating benefits to surface waters, the best data available on benefits to groundwater from BMPs indicate a 15 % reduction in the load to groundwater where owner-implemented BMPs are in place. In addition to groundwater reductions from owner-implemented BMPs on fertilized lands, an additional 534,760 lb-N/yr in reductions are estimated from specific stakeholder projects on fertilized lands. This number could increase as more data are collected on the impact of BMPs to groundwater.

For DEP-permitted dairies, the estimated load reductions from owner-implemented BMPs are 15 % in the nitrogen load to groundwater, or 50,877 lb-N/yr, assuming 100 % BMP implementation at these dairies. Additionally, stakeholder projects are estimated to achieve 167,000 lb-N/yr in reductions, for a total estimated permitted dairy reduction of 217,877 lb-N/yr.

For all livestock operations not included in the DEP-permitted dairies category, owner-implemented BMPs are expected to achieve a reduction of 208,739 lb-N/yr, using an estimated



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 of all agricultural sources is 1,830,623 lb-N/yr.

### **2.6.5 Additional Agricultural Reduction Options**

Further reductions may be achieved through implementing additional agricultural projects or practices, including land acquisition and conservation easements. SRWMD is implementing projects to encourage low input agriculture and water quality improvement technologies. Examples of these projects 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 and data collection. Basin-specific studies are underway to evaluate and demonstrate the effectiveness of BMPs on a site-specific basis.

**Table 13** identifies possible these projects and practices with the estimated acreages. FDACS used the Florida Statewide Agricultural Lands Irrigated Database (FSAID) III to identify crop types and acreages where projects and practices could potentially be implemented.

**Table 13. Estimated acreages for additional agricultural projects and practices**

| Action                        | Acreage |
|-------------------------------|---------|
| Precision Irrigation          | 88,940  |
| Precision Fertilization       | 51,296  |
| Soil Moisture Probes          | 95,845  |
| Controlled Release Fertilizer | 17,261  |
| Rotational Production         | 50,048  |
| Cover Crops                   | 87,208  |
| Line Five Storage Waste Ponds | 0       |

The projects and practices listed in **Table 13** are a component of the reductions to groundwater that could be achieved through changes in practices (**Table 14**). For example, a 75 % reduction of fertilizer loss to groundwater on 25 % of the fertilized lands would result in an estimated reduction of 1,086,559 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 14. Potential for additional load reductions to groundwater**

| <b>% of Fertilized Acres with a Change in Practice</b> | <b>Number of Fertilized Acres with a Change in Practice</b> | <b>100% Reduction in Load to Groundwater (lb-N/yr reduced)</b> | <b>75% Reduction in Load to Groundwater (lb-N/yr reduced)</b> | <b>50% Reduction in Load to Groundwater (lb-N/yr reduced)</b> | <b>25% Reduction in Load to Groundwater (lb-N/yr reduced)</b> | <b>10% Reduction in Load to Groundwater (lb-N/yr reduced)</b> |
|--------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------|
| <b>100</b>                                             | 204,761                                                     | 5,794,980                                                      | 4,346,235                                                     | 2,897,490                                                     | 1,448,745                                                     | 579,498                                                       |
| <b>75</b>                                              | 153,571                                                     | 4,346,235                                                      | 3,259,676                                                     | 2,173,118                                                     | 1,086,559                                                     | 434,624                                                       |
| <b>50</b>                                              | 102,831                                                     | 2,897,490                                                      | 2,173,118                                                     | 1,448,745                                                     | 724,373                                                       | 289,749                                                       |
| <b>25</b>                                              | 51,190                                                      | 1,448,745                                                      | 1,086,559                                                     | 724,373                                                       | 362,186                                                       | 144,875                                                       |
| <b>10</b>                                              | 20,476                                                      | 579,498                                                        | 434,624                                                       | 289,749                                                       | 144,875                                                       | 57,950                                                        |

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 the springshed. 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.

## **2.7 STF Management Strategies**

STF areas fall into two main categories that are evaluated separately: golf courses and sporting facilities (such as baseball, football, soccer, and other fields). There is only one golf course in the entire BMAP area, and thus other types of sports fields are the main source of the load to groundwater in this source category.

### ***2.7.1 Prioritized Management Strategies and Milestones***

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

Sports field managers can assist by reducing fertilizer use, using products that reduce leaching, and more efficiently irrigating their 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 calculation of reductions from STF sources is 1,051 lb-N/yr, as listed in **Table 15**.

**Table 15. Maximum load reductions 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                                                | 705                                 |
| Sports Fields BMPs             | 6                                                 | 346                                 |
| <b>Total Possible Credits</b>  |                                                   | <b>1,051</b>                        |

## 2.8 WWTF Management Strategies

In the Suwannee River BMAP area, treated effluent containing nitrogen is discharged to sprayfields, RIBs, and percolation ponds, and is reused for irrigation water. The estimated nitrogen load from WWTFs is 89,745 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 addressing loadings to groundwater. Additionally, addressing the nitrogen loading from OSTDS could increase the volume of effluent treated and disposed of by WWTFs.

### 2.8.1 Summary of Facilities

There are several WWTFs located in the Suwannee River Basin BMAP area, including 6 domestic WWTFs permitted to discharge more than 100,000 gallons of treated effluent per day (or 0.1 million gallons per day [mgd]). **Figure 11** shows the locations of domestic WWTFs in the Suwannee River Basin with discharges greater than 0.1 mgd and those with discharges less than 0.1 mgd.

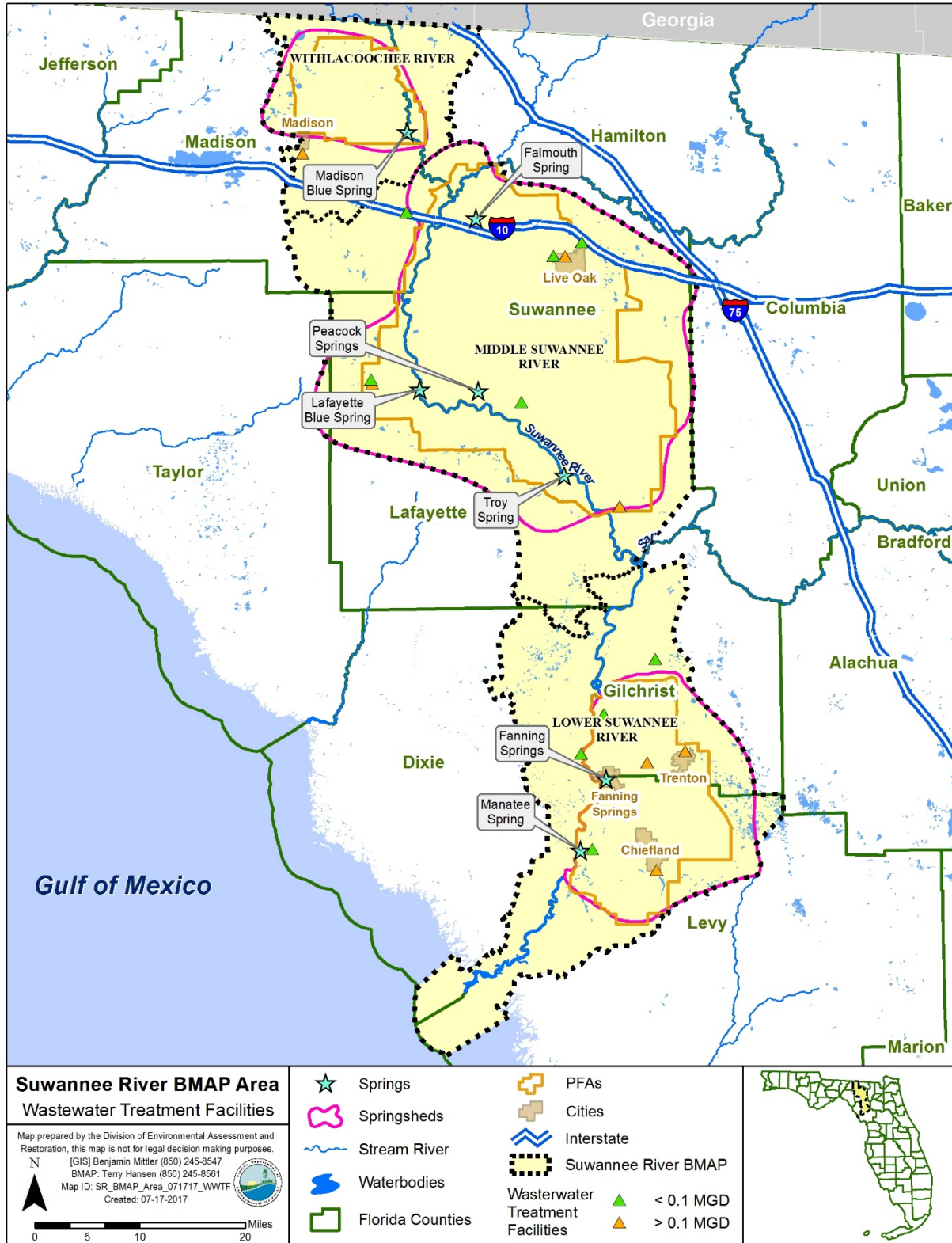


Figure 11. Locations of domestic WWTFs in the Suwannee River BMAP area

### 2.8.2 Wastewater Management Standards and Reuse Management

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

DEP requires the nitrogen effluent limits listed below in any new or existing wastewater permit in the BMAP area, 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 Suwannee River Basin TMDLs. 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 vents. 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.

The nitrogen effluent limits listed in **Table 16** will be applied as an annual average to all new and existing WWTFs with a DEP-permitted discharge. New effluent standards will take effect at the time of permit renewal or no later than five years after BMAP adoption, whichever is sooner.

**Table 16. Wastewater effluent standards for the BMAP area**

| 95% of the Permitted Capacity (gpd) | TN Concentration Limits for RIBs and Absorption Fields (mg/L) | TN Concentration Limits for All Other Land Disposal Methods, Including Reuse (mg/L) |
|-------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Greater than 100,000                | 3                                                             | 3                                                                                   |
| 20,000 to 100,000                   | 3                                                             | 6                                                                                   |
| Less than 20,000                    | 6                                                             | 6                                                                                   |

Additionally, new or existing wastewater permits in the BMAP area 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.

### ***2.8.3 Prioritized Management Strategies and Milestones***

Based on the current volumes of discharge and effluent concentrations, the estimated reductions to be achieved through the implementation of these revised wastewater standards are 17,533 lb-N/yr. **Appendix B** contains detailed information on projects that have either been completed, are underway, or are planned to reduce nitrogen loading from WWTFs.

## **2.9 Atmospheric Deposition Management Strategies**

### ***2.9.1 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 the total atmospheric deposition model or "TDEP." Deposition data from several monitoring networks—including Clean Air Status and Trends Network (CASTNET), the National Atmospheric Deposition Program (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.

### ***2.9.2 Description of Approach***

Atmospheric sources of nitrogen are local, national, and international. Atmospheric sources are generally of 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.

## **2.10 Future Growth Management Strategies**

New development primarily falls into 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 2.6**), or must conduct water quality monitoring that demonstrates compliance with water quality standards. The associated increased load to groundwater from increases in irrigated farmland must also be addressed in

addition to the current loads. Future development must connect to central sewer, if available; or include nitrogen-reducing OSTDS as described in **Appendix D**.

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

## 2.11 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 that can help reduce water quality impacts in the Suwannee River Basin. **Table 17** identifies fee acquisitions and conservation easements acquired by SRWMD since Fiscal Year (FY) 2007–08 through the Florida Forever Program. These acquisitions are for the entire SRWMD jurisdiction, including the Suwannee River Basin.

**Table 17. SRWMD conservation land purchases through the Florida Forever Program**

\* Land acquisition costs incurred during fiscal year but no acres acquired.

| FY           | Fee Acquisition Expenditures | Fee Acres Acquired | Conservation Easement Expenditures | Conservation Easement Acres Acquired |
|--------------|------------------------------|--------------------|------------------------------------|--------------------------------------|
| 2007–08      | \$4,041,930                  | 493                | \$6,379,514                        | 3,294                                |
| 2008–09      | \$10,965,200                 | 2,171              |                                    |                                      |
| 2009–10      | \$494,000                    | 84                 | \$1,789,725                        | 786                                  |
| 2010–11      | \$5,426,437                  | 1,201              | \$1,557,593                        | 682                                  |
| 2011–12      |                              |                    | \$250,710                          | 167                                  |
| 2012–13      |                              |                    |                                    |                                      |
| 2013–14      |                              |                    |                                    |                                      |
| 2014–15      | \$628,145                    | 85                 | \$707,850                          | 35                                   |
| 2015–16      | \$6,720                      | *                  |                                    |                                      |
| <b>Total</b> | <b>\$21,562,432</b>          | <b>4,034</b>       | <b>\$10,685,392</b>                | <b>4,964</b>                         |

## 2.12 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, water management districts (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.



## **Section 3: Monitoring and Reporting**

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### **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 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 Suwannee River Basin TMDLs.

### **3.2 Adaptive Management Measures**

Adaptive management involves making adjustments in 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 are to share information and expertise include tracking plan implementation, monitoring water quality and pollutant loads, and holding periodic meetings.

### **3.3 Water Quality and Biological Monitoring**

#### ***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.

#### **Primary objectives:**

- Measure the water quality and biological response in the impaired springs, river, and/or groundwater at the beginning of the BMAP period and during implementation.
- Document nutrient trends in the Suwannee River Basin and associated springs and groundwater.
- Focus BMP efforts by using water quality results combined with appropriate project information and land use in conjunction with statistical and spatial analysis tools.

#### **Secondary objectives:**

- Identify areas where groundwater data and modeling might help in understanding the hydrodynamics of the system.

- Confirm and refine nutrient removal efficiencies of agricultural and/or urban BMPs.
- Develop an advanced BMP implementation plan.
- Identify and implement more effective nutrient reduction strategies.
- Use nitrogen isotope and tracer sampling for evaluating nitrogen contributions from organic and inorganic sources.

### **3.3.2 Water Quality Parameters, Frequency, and Network**

To achieve the objectives listed above, the monitoring strategy focuses on two types of indicators to track improvements in water quality: core and supplemental (**Table 18** and **Table 19**, respectively). The core indicators are directly related to the parameters causing impairment in the river or associated springs. Supplemental indicators are monitored primarily to support the interpretation of core water quality parameters. The monitoring network is established for a variety of purposes.

For this BMAP, nitrate is considered to be the key core parameter measured, to track progress in decreasing nitrogen concentrations in groundwater and the water surfacing at the spring vent. The other parameters are considered supplementary parameters for the BMAP, as they build information about groundwater and the spring 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 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 18. Core water quality indicators**

| Core Parameters             |
|-----------------------------|
| Chloride                    |
| Sulfate                     |
| Potassium                   |
| Ammonia as Nitrogen         |
| Total Kjeldahl Nitrogen     |
| Nitrate/Nitrite as Nitrogen |

**Table 19. Supplemental water quality indicators and field parameters**

| Supplemental Parameters |
|-------------------------|
| Specific Conductance    |
| Dissolved Oxygen (DO)   |
| pH                      |
| Temperature             |

| Supplemental Parameters      |
|------------------------------|
| Total Suspended Solids (TSS) |
| Nitrate and Oxygen Isotopes  |

Initially, data from the ongoing sampling effort being conducted by SRWMD will be used to determine progress towards the primary objectives. Surface water and groundwater monitoring network locations were selected to track changes in water quality and allow the annual evaluation of progress toward achieving the TMDL. **Figure 12** shows the locations of the river and spring stations currently being sampled that will be used for the BMAP monitoring in the Suwannee River Basin.

The secondary (research) objectives will be developed based on the results of the actions occurring in the adjoining Santa Fe Basin Restoration Focus Area (RFA). The number and location of the monitoring wells to be sampled or installed will be determined after the initial effort in the Santa Fe Basin RFA provides information on the state of the system and where additional monitoring might be most effective. DEP and SRWMD will be responsible for activities to satisfy secondary monitoring objectives.

### **3.3.3 Biological Monitoring**

Biological resource responses represent improvements in the overall ecological health of the Suwannee River Basin (see **Table 20**).

**Table 20. Biological response measures for spring runs**

| Biological Response Measures         |
|--------------------------------------|
| Chlorophyll <i>a</i>                 |
| Stream Condition Index (SCI) score   |
| Linear Vegetation Survey (LVS) score |
| Rapid Periphyton Survey (RPS) score  |
| Key fish populations                 |

An RPS will be conducted to assess the abundance and variety of algae in the river. An LVS will be conducted to assess the types and density of vegetation present in the river and to identify the native versus non-native species. An SCI will be conducted to measure the number of different organisms present in the river. In addition, habitat assessments (HAs) will be conducted to assess the river conditions and habitat present to support the SCI evaluation. Water quality samples will also be collected with the biological monitoring.

### **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). DEP pulls water quality data directly from WIN and U.S. Geological Survey (USGS) databases 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 data 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.

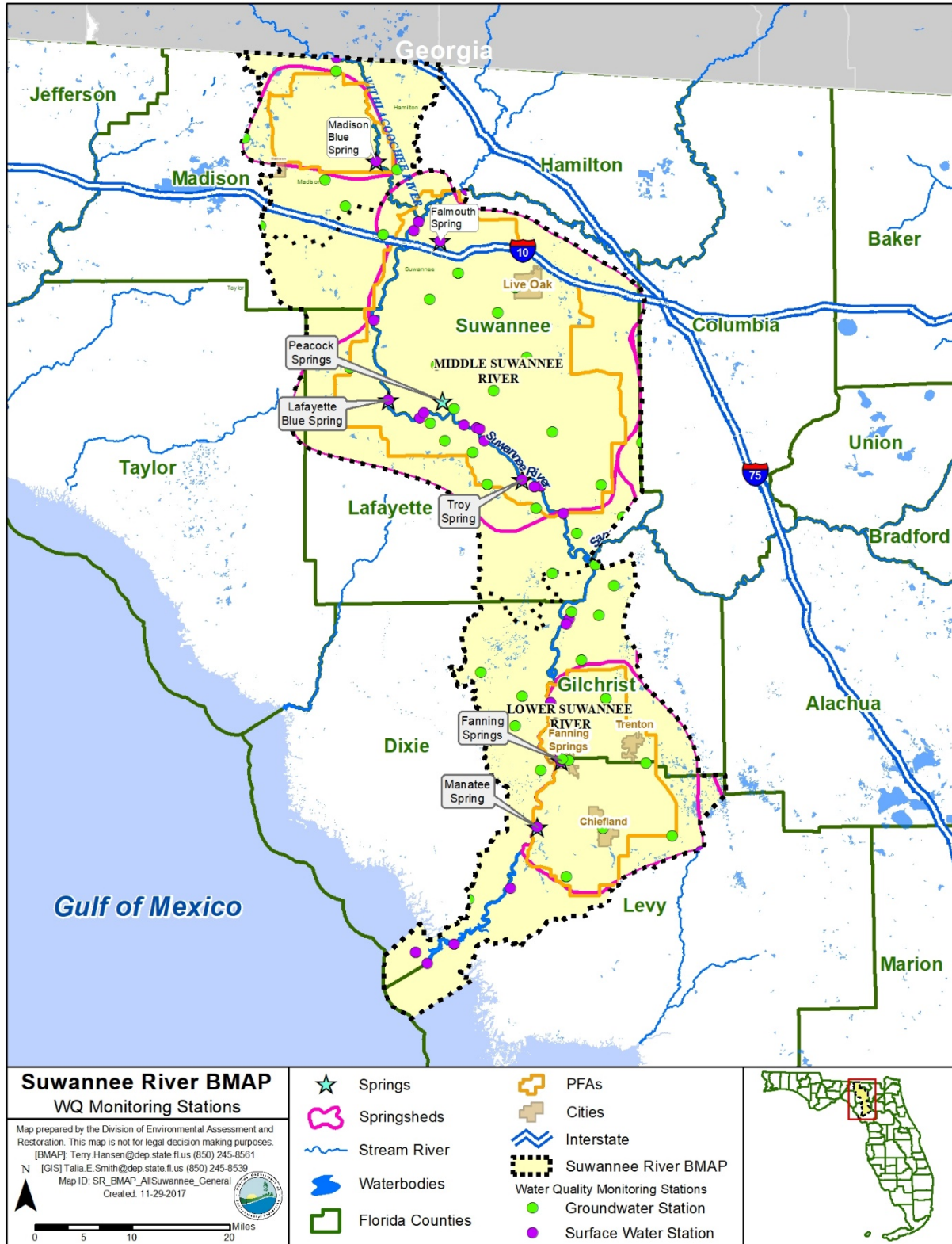


Figure 12. Groundwater and surface water stations sampled in the Suwannee River Basin

### ***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 the 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 DEP SOPs.

## **Appendices**

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### **Appendix A. 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 are 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.)
- 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](http://fyn.ifas.ufl.edu/fert_ordinances.html)
- DEP Standard Operating Procedures for Water Quality Samples:  
<http://www.dep.state.fl.us/water/sas/sop/sops.htm>
- NELAC NELAP: <https://fldeploc.dep.state.fl.us/aams/index.asp>
- FDACS BMPs: to <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/>
- SRWMD Surface Water Improvement and Management (SWIM) Plans:  
<http://www.srwmd.state.fl.us/index.aspx?NID=447>
- SRWMD 2017 Consolidated Annual Report:  
<http://www.srwmd.state.fl.us/DocumentCenter/View/11712>
- UF–IFAS Research: <http://research.ifas.ufl.edu/>

## **Appendix B. Projects to Reduce Nitrogen Sources**

### **Prioritization of Management Strategies**

The management strategies in **Table B-1** are ranked with a priority of high, medium, or low. In 2016, the Florida Legislature amended the Watershed Restoration Act (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 their 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 the project status "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.

### **Description of the Management Strategies**

Responsible entities submitted these management strategies to the department 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 the department. 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 2036, projects completed since July 1, 2007, 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. Agriculture load reductions (FDACS-01 and FDACS-02) assume 100 % enrollment and verification. Projects with a designation of TBD (to be determined) denotes 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 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.



**Table B-1. Stakeholder projects to reduce nitrogen sources**

| Lead Entity       | Location                    | Project Number | Project Name                                                  | Project Description                                                                                                                                                                                                                                                                                               | Project Type           | Project Status | Start Date   | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source     | Funding Amount                                            |
|-------------------|-----------------------------|----------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------|--------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|--------------------|-----------------------------------------------------------|
| Alliance Dairy    | Lower Suwannee River Basin  | AD-01          | Rotational Grazing and Aerobic Digester Pilot Project         | Not Provided.                                                                                                                                                                                                                                                                                                     | BMPs                   | Underway       | Not Provided | Not Provided              | LW                                   | Not Provided                                | Not Provided  | Not Provided       | Not Provided                                              |
| Town of Branford  | Middle Suwannee River Basin | BRAN-01        | Advanced WWTF                                                 | Upgrade WWTF from secondary to advanced water treatment.                                                                                                                                                                                                                                                          | WWTF Upgrade           | Planned        | 2017         | 2018                      | WWTF                                 | TBD                                         | \$1,500,000   | DEP/ SRWMD         | TBD                                                       |
| Town of Branford  | Middle Suwannee River Basin | BRAN-02        | Branford Wastewater Effluent Pond Failure Repairs             | Replace effluent pond at WWTP with tanks.                                                                                                                                                                                                                                                                         | WWTF Upgrade           | Underway       | 2015         | 2018                      | WWTF                                 | TBD                                         | \$368,868     | Town/ SRWMD        | SRWMD: \$231,500<br>Town: \$137,368                       |
| City of Chiefland | Lower Suwannee River Basin  | CH-01          | Biosolids Treatment Unit Replacement                          | Reconstruct the City's aged biosolids treatment unit (digester). The project includes two new tanks and other equipment to better treat the biosolids.                                                                                                                                                            | WWTF Upgrade           | Underway       | 2016         | 2018                      | WWTF                                 | TBD                                         | \$418,400     | City/DEP           | DEP: \$376,560<br>City: \$41,840                          |
| Dixie County      | Lower Suwannee River Basin  | DC-01          | Lower Suwannee River Springs Restoration and Aquifer Recharge | Restore ~500 acres of sand ponds and rehydrate ~1,250 acres of wetlands by re-establishing N/natural flow through N/natural recharge features and an aquifer recharge well. The project will conserve ~3.26 mgd in water supporting water supply and spring flow of Fanning Springs and the Lower Suwannee River. | Hydrologic Restoration | Underway       | 2016         | 2018                      | Other                                | TBD                                         | \$2,406,359   | County/ DEP/ SRWMD | DEP: \$2,200,000<br>SRWMD: \$106,359<br>County: \$100,000 |

| Lead Entity                                            | Location                   | Project Number | Project Name                                           | Project Description                                                                                                                                                                                                                                      | Project Type           | Project Status | Start Date   | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate                                             | Funding Source     | Funding Amount                                          |
|--------------------------------------------------------|----------------------------|----------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------|--------------|---------------------------|--------------------------------------|---------------------------------------------|-----------------------------------------------------------|--------------------|---------------------------------------------------------|
| Dixie County                                           | Lower Suwannee River Basin | DC-02          | Cow Pond Drainage Basin Aquifer Recharge Project       | Re-establish Natural drainage patterns and use natural recharge features and aquifer recharge wells to restore approx. 300 acres of sand ponds and rehydrate approx. 1,750 acres of wetlands while conserving 1.69 mgd of water and support spring flow. | Hydrologic Restoration | Underway       | 2016         | 2018                      | Other                                | TBD                                         | \$1,600,000                                               | County/ DEP/ SRWMD | DEP: \$1,500,000<br>SRWMD: \$50,000<br>County: \$50,000 |
| FDACS                                                  | Basinwide                  | FDACS-01       | BMPs Implementation and Verification - Farm Fertilizer | Implementation of existing BMPs on applicable acreage. Up to 15% reduction in load to groundwater.                                                                                                                                                       | BMPs                   | Underway       | Not Provided | Not Provided              | FF                                   | 869,247                                     | \$10,084,985 for BMP Implementation; BMP Verification TBD | FDACS              | TBD                                                     |
| FDACS                                                  | Basinwide                  | FDACS-02       | BMPs Implementation and Verification - Livestock Waste | Implementation of existing BMPs at applicable facilities. Up to 10% reduction in load to groundwater.                                                                                                                                                    | BMPs                   | Underway       | Not Provided | Not Provided              | LW                                   | 208,739                                     | \$7,909,822 for BMP Implementation; BMP Verification TBD  | FDACS              | TBD                                                     |
| Florida Department of Transportation (FDOT) District 2 | Basinwide                  | FDOT-01        | Fertilizer Elimination                                 | Eliminate fertilizer in rights-of way.                                                                                                                                                                                                                   | Fertilizer Cessation   | Completed      | Not Provided | Not Provided              | UTF                                  | TBD                                         | Not Provided                                              | Not Provided       | Not Provided                                            |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity                    | Location                    | Project Number | Project Name                                                      | Project Description                                                                                                                                      | Project Type                      | Project Status | Start Date   | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source   | Funding Amount                                        |
|--------------------------------|-----------------------------|----------------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------|--------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|------------------|-------------------------------------------------------|
| FDOT Central Office            | Lower Suwannee River Basin  | FDOT-02        | FDOT Water Quality Pilot Project                                  | Comparison of the nutrient removal effectiveness of two different types of biosorptive activated media in a roadside swale just east of Fanning Springs. | Study                             | Underway       | 2015         | 2018                      | Other                                | N/A                                         | \$180,101     | SRWMD            | SRWMD: \$180,101                                      |
| Florida Farm Bureau (FFB)      | Basinwide                   | FFB-01         | Agricultural Producer Workshops                                   | Workshops with agricultural producers in the basin.                                                                                                      | BMPs                              | Underway       | Not Provided | Not Provided              | FF                                   | TBD                                         | Not Provided  | Not Provided     | Not Provided                                          |
| FFB                            | Basinwide                   | FFB-02         | County Alliance for Responsible Environmental Stewardship (CARES) | Stewardship program active within the basin.                                                                                                             | BMPs                              | Underway       | Not Provided | Not Provided              | FF                                   | TBD                                         | Not Provided  | Not Provided     | Not Provided                                          |
| DEP Florida Park Service (FPS) | Lower Suwannee River Basin  | FPS-01         | Fanning Springs State Park Restoration                            | Replant submerged aquatic vegetation (SAV) in spring run of Fanning and Little Fanning Springs.                                                          | SAV Planting                      | Planned        | TBD          | TBD                       | Other                                | TBD                                         | TBD           | DEP              | TBD                                                   |
| FPS                            | Lower Suwannee River Basin  | FPS-02         | Manatee Spring State Park Restoration                             | Replant SAV in spring run.                                                                                                                               | SAV Planting                      | Planned        | TBD          | TBD                       | Other                                | TBD                                         | TBD           | DEP              | TBD                                                   |
| FPS                            | Middle Suwannee River Basin | FPS-03         | Troy Spring State Park Restoration                                | Shoreline stabilization at spring run.                                                                                                                   | Shoreline Stabilization           | Planned        | TBD          | TBD                       | Other                                | TBD                                         | TBD           | DEP              | TBD                                                   |
| City of Fanning Springs        | Lower Suwannee River Basin  | FS-01          | Fanning Springs Water Quality Improvement Project, Phase I        | Expansion of wastewater collection and transmission system to convert septic to sewer in Areas 1-4 (65 septic systems).                                  | Wastewater Service Area Expansion | Completed      | 2014         | 2015                      | OSTDS                                | 1,300                                       | \$1,276,360   | City/ DEP/ SRWMD | City: \$662,000<br>DEP: \$492,960<br>SRWMD: \$121,440 |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity             | Location                   | Project Number | Project Name                                                                                                     | Project Description                                                                                                                                                      | Project Type                      | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source    | Funding Amount                       |
|-------------------------|----------------------------|----------------|------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|-------------------|--------------------------------------|
| City of Fanning Springs | Lower Suwannee River Basin | FS-02          | Fanning Springs Water Quality Improvement Project, Phase II                                                      | Expansion of wastewater collection and transmission system to convert septic to sewer in Area 10 (60 septic systems).                                                    | Wastewater Service Area Expansion | Underway       | 2015       | 2018                      | OSTDS                                | 4,300                                       | \$2,120,000   | DEP/ SRWMD / City | DEP: \$2,000,000<br>SRWMD: \$120,000 |
| City of Fanning Springs | Lower Suwannee River Basin | FS-03          | Fanning Springs Water Quality Improvement Project, Phase III                                                     | Expansion of wastewater collection and transmission system to convert 198 septic systems to sewer in Areas 5-9.                                                          | Wastewater Service Area Expansion | Underway       | 2016       | 2018                      | OSTDS                                | 4,554                                       | \$3,395,100   | City/ DEP/ SRWMD  | DEP: \$3,355,100<br>City: \$40,000   |
| City of Fanning Springs | Lower Suwannee River Basin | FS-04          | AWT System Expansion, Phase 6                                                                                    | Construction of a new AWT facility that will have capacity for wastewater flows from Lancaster Prison and a portion of Alliance Dairy to benefit Hart and Otter Springs. | WWTF Upgrade                      | Planned        | TBD        | TBD                       | WWTF                                 | TBD                                         | \$7,000,000   | City/ DEP/ SRWMD  | TBD                                  |
| City of Fanning Springs | Lower Suwannee River Basin | FS-05          | Lancaster Prison/ Alliance Dairy/ City of Fanning Springs Wastewater Treatment Improvements and Aquifer Recharge | Convey wastewater from Lancaster Prison and Alliance Dairy (both facilities are secondary treatment) to City's advanced WWTF for treatment and recharge wetlands.        | Wastewater Service Area Expansion | Planned        | TBD        | TBD                       | WWTF                                 | TBD                                         | #####         | City/ DEP/ SRWMD  | TBD                                  |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity       | Location                                        | Project Number | Project Name                                                   | Project Description                                                                                                                                                                 | Project Type                      | Project Status | Start Date   | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source | Funding Amount                       |
|-------------------|-------------------------------------------------|----------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------|--------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|----------------|--------------------------------------|
| Gilchrist County  | Lower Suwannee River Basin                      | GC-01          | Hart and Otter Springs Water Quality Improvement Project       | A three-phase project to decommission septic systems at Otter and Hart Springs and to decommission the wastewater package plant at Hart Springs to connect to Fanning Springs WWTP. | Wastewater Service Area Expansion | Underway       | 2016         | 2020                      | OSTDS                                | 1,724                                       | \$5,979,740   | DEP            | DEP: \$1,829,890 (Phase I)           |
| Golf Courses      | Lower Suwannee and Middle Suwannee River Basins | GC-01          | Golf Course Reduction Credits                                  | 6% BMP credit on golf course load to groundwater, assuming 100% BMP implementation by golf course owners.                                                                           | BMPs                              | Planned        | TBD          | TBD                       | STF                                  | 705                                         | TBD           | TBD            | TBD                                  |
| Lafayette County  | Middle Suwannee River Basin                     | LC-01          | County Road 300 Stormwater Improvement Project                 | Design and construction of a stormwater collection and conveyance system that will increase stormwater storage.                                                                     | Stormwater System Upgrade         | Underway       | 2016         | 2018                      | UTF                                  | TBD                                         | \$152,550     | SRWMD / County | SRWMD: \$142,550<br>County: \$10,000 |
| Local Governments | Basinwide                                       | LG-01          | Public Education                                               | Adopted fertilizer ordinance.                                                                                                                                                       | Education Efforts                 | Planned        | TBD          | TBD                       | UTF                                  | 1,466                                       | TBD           | TBD            | TBD                                  |
| City of Live Oak  | Middle Suwannee River Basin                     | LO-01          | Stormwater, Drainage, and Aquifer Recharge Well Rehabilitation | Installation of 60 wells for aquifer recharge.                                                                                                                                      | Groundwater Management            | Underway       | Not Provided | Not Provided              | Other                                | TBD                                         | \$7,200,000   | City/ SRWMD    | Not Provided                         |
| City of Live Oak  | Middle Suwannee River Basin                     | LO-02          | Suwannee Country Club (SCC) Reuse Connection                   | Connect the SCC golf course to the City of Live Oak reuse line and install a pump station.                                                                                          | BMPs                              | Underway       | 2014         | 2018                      | STF                                  | TBD                                         | \$129,344     | SRWMD          | SRWMD: \$129,344                     |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity      | Location                    | Project Number | Project Name                                                          | Project Description                                                                                                                                                                                                                                                                                                           | Project Type                      | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source   | Funding Amount                   |
|------------------|-----------------------------|----------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|------------------|----------------------------------|
| City of Live Oak | Middle Suwannee River Basin | LO-03          | Live Oak 49/90 Lift Station Improvements                              | Install a mixer in the lift station to eliminate sewage spills and improve water quality.                                                                                                                                                                                                                                     | WWTF Upgrade                      | Completed      | 2016       | 2017                      | WWTF                                 | TBD                                         | \$15,363      | City/ SRWMD      | SRWMD: \$12,690<br>City: \$2,673 |
| City of Live Oak | Middle Suwannee River Basin | LO-04          | 9th and Scriven Regional Stormwater Management Facility               | Reduce flooding by increasing runoff treatment in stormwater facility.                                                                                                                                                                                                                                                        | Stormwater System Upgrade         | Underway       | 2017       | 2018                      | UTF                                  | TBD                                         | \$92,000      | Not Provided     | Not Provided                     |
| City of Live Oak | Middle Suwannee River Basin | LO-05          | Stormwater, Drainage, and Aquifer Recharge Well Pretreatment Retrofit | Identification of a minimum of five existing, high priority stormwater drainage/aquifer drainage wells not within FDOT right of-way to retrofit wells with a pretreatment method that may include: detention/retention, biological nutrient removal, skimmers, or biological activated material for advanced water treatment. | Stormwater System Upgrade         | Planned        | TBD        | TBD                       | Other                                | TBD                                         | \$866,800     | City/ DEP/ SRWMD | TBD                              |
| City of Live Oak | Middle Suwannee River Basin | LO-06          | 2nd Street and Evelyn Avenue Wastewater System Extensions, Phase 1    | Extend the City's wastewater collection system to serve approximately 30 homes.                                                                                                                                                                                                                                               | Wastewater Service Area Expansion | Planned        | TBD        | TBD                       | OSTDS                                | 1,050                                       | \$1,089,300   | City/ DEP/ SRWMD | TBD                              |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity       | Location                    | Project Number | Project Name                              | Project Description                                                                                                                                                                                                                                               | Project Type              | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source                                              | Funding Amount                                                                           |
|-------------------|-----------------------------|----------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|-------------------------------------------------------------|------------------------------------------------------------------------------------------|
| City of Madison   | Withlacoochee River Basin   | MAD-01         | Lake Frances Sediment Control             | This project will improve the quality of stormwater discharged to Lake Frances, which receives most stormwater in the city, a 61-acre watershed.                                                                                                                  | Stormwater System Upgrade | Underway       | 2017       | 2018                      | UTF                                  | TBD                                         | \$77,525      | SRWMD                                                       | SRWMD: \$42,850<br>City: \$34,675                                                        |
| Madison County    | Withlacoochee River Basin   | MC-01          | Madison Blue Spring Aquifer Recharge      | Rehabilitate or replace up to six existing drainage wells to improve aquifer recharge rates. Recharge benefits are estimated up to 3.4 mgd.                                                                                                                       | Groundwater Management    | Underway       | 2017       | 2020                      | Other                                | 41,850                                      | \$2,500,000   | DEP / Nestle Waters / Madison Co. / SRWMD / City of Madison | DEP: \$2,150,000<br>Nestle Waters: \$225,000<br>Madison Co.: \$75,000<br>SRWMD: \$50,000 |
| Various           | Basinwide                   | 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       | 2018       | N/A                       | OSTDS                                | TBD                                         | TBD           | DEP                                                         | TBD                                                                                      |
| Permitted Dairies | Middle Suwannee River Basin | PD-01          | Dairy Reduction Credits                   | 15% BMP credit on dairy load to groundwater assuming 100% owner implemented BMPs on all dairy lands.                                                                                                                                                              | BMPs                      | Planned        | TBD        | TBD                       | Dairy                                | 50,877                                      | TBD           | TBD                                                         | TBD                                                                                      |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity     | Location                                        | Project Number | Project Name                                                          | Project Description                                                                                                                        | Project Type                      | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source | Funding Amount                                              |
|-----------------|-------------------------------------------------|----------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|----------------|-------------------------------------------------------------|
| Suwannee County | Middle Suwannee River Basin                     | SC-01          | WWTF at I-75/CR 136 Interchange                                       | Construction of new WWTF at an interchange in proximity to the Suwannee River. 32 commercial septic systems will be converted to the WWTF. | Wastewater Service Area Expansion | Underway       | 2017       | Not Provided              | OSTDS                                | 39,894                                      | \$3,330,000   | DEP / County   | DEP: \$2,780,000<br>County: \$550,000                       |
| Sports Fields   | Lower Suwannee and Middle Suwannee River Basins | SF-01          | Sports Field Reduction Credits                                        | 10% BMP credit on sports field load to groundwater, assuming 100% BMP implementation by sports field owners.                               | BMPs                              | Planned        | TBD        | TBD                       | STF                                  | 346                                         | TBD           | TBD            | TBD                                                         |
| SRWMD           | Basinwide                                       | SRWMD-01       | Suwannee River SWIM Plan                                              | Implementation and periodic review and update of the Suwannee River SWIM Plan.                                                             | Study                             | Underway       | 2015       | 2017                      | Other                                | N/A                                         | \$238,563     | SRWMD          | SRWMD: \$238,563                                            |
| SRWMD           | Basinwide                                       | SRWMD-02       | Advanced Nutrient Management Through Center Pivots                    | Fertigation system installation and center pivot retrofits.                                                                                | BMPs                              | Underway       | 2014       | 2018                      | FF                                   | 272,760                                     | \$1,190,700   | DEP/ SRWMD     | DEP: \$915,000<br>SRWMD: \$33,150<br>Producers: \$242,500   |
| SRWMD           | Middle Suwannee River Basin                     | SRWMD-03       | Improved Nutrient Application Practices in Dairy Operations - Phase 2 | To date, nine agreements with dairies to install screen separators to reduce wastewater solids.                                            | BMPs                              | Underway       | 2015       | 2018                      | Dairy                                | 95,000                                      | \$2,670,000   | DEP/ SRWMD     | DEP: \$2,120,000<br>SRWMD: \$20,000<br>Producers: \$530,000 |



*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity | Location                    | Project Number | Project Name                                                                   | Project Description                                                                                                                                                                                                                                                 | Project Type | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source               | Funding Amount                                                                 |
|-------------|-----------------------------|----------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|------------------------------|--------------------------------------------------------------------------------|
| SRWMD       | Middle Suwannee River Basin | SRWMD-04       | Dairy Wastewater System Improvement                                            | Cost-share projects with dairies to invest in advanced treatment technologies (bioreactors), additional wastewater storage, and advanced manure solid separation.                                                                                                   | BMPs         | Underway       | 2016       | 2019                      | Dairy                                | 10,000                                      | \$1,800,000   | DEP/ SRWMD                   | DEP: \$1,500,000<br>SRWMD: \$300,000                                           |
| SRWMD       | Middle Suwannee River Basin | SRWMD-05       | Dairy Wastewater Conservation and Nutrient Optimization Project                | Improve the management of dairy wastewater by increasing storage pond sizes to achieve greater nutrient uptake and irrigation efficiencies.                                                                                                                         | BMPs         | Underway       | 2014       | 2018                      | Dairy                                | 62,000                                      | \$1,885,590   | DEP/ FDACS/ SRWMD/ Producers | DEP: \$920,000<br>FDACS: \$250,000<br>SRWMD: \$298,004<br>Producers: \$417,586 |
| SRWMD       | Basinwide                   | SRWMD-06       | Sustainable Suwannee Springs Agriculture Pilot Program - Low Input Agriculture | Agriculture operators are invited to submit proposals to transition to less intensive cropping systems, change the type of cropping system, or change the land use to fallow or native landscape for a certain amount of time or a permanent conservation easement. | BMPs         | Underway       | 2016       | 2019                      | FF                                   | 225,000                                     | \$3,000,000   | DEP                          | DEP: \$3,000,000                                                               |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity | Location  | Project Number | Project Name                                                                                             | Project Description                                                                                                                                                                                                                                                                                                                                    | Project Type | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate        | Funding Source | Funding Amount                           |
|-------------|-----------|----------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|----------------------|----------------|------------------------------------------|
| SRWMD       | Basinwide | SRWMD-07       | Sustainable Suwannee Springs Agriculture Pilot Program - Advanced Water Quality Improvement Technologies | Agriculture operators, landowners, local governments, private companies, other entities may submit proposals for advanced technologies that can cost-effectively reduce nitrogen in groundwater that contributes to spring flow.                                                                                                                       | BMPs         | Underway       | 2017       | 2019                      | FF                                   | 32,700                                      | \$1,234,626          | DEP/Producers  | DEP: \$1,000,000<br>Producers: \$234,626 |
| SRWMD       | Basinwide | SRWMD-08       | Regional Initiative Valuing Environmental Resources (RIVER) Program                                      | Benefits of the annual cost-share projects include: improving wastewater facilities serving hundreds of residents and commercial entities, preventing potential discharge of wastewater into receiving waters during various flood events, and significantly reducing nutrient leaching through the removal of a substantial number of septic systems. | WWTF Upgrade | Underway       | 7/4/1905   | Annual                    | WWTF                                 | TBD                                         | \$1,500,000/annually | SRWMD          | SRWMD: \$1,500,000                       |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity | Location                    | Project Number | Project Name                                                                                     | Project Description                                                                                                                                                                                                                                                             | Project Type           | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source            | Funding Amount                                                 |
|-------------|-----------------------------|----------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|---------------------------|----------------------------------------------------------------|
| SRWMD       | Basinwide                   | SRWMD-09       | Precision Agricultural Practices                                                                 | Provide cost-share funds to agricultural producers within the BMAP area to implement precision nutrient and irrigation management technology.                                                                                                                                   | BMPs                   | Underway       | 2017       | Not Provided              | FF                                   | TBD                                         | \$2,500,000   | SRWMD                     | SRWMD: \$2,500,000                                             |
| SRWMD       | Middle Suwannee River Basin | SRWMD-10       | Middle Suwannee River Springs Restoration and Aquifer Recharge Project                           | Installation of hydraulic structures in southeast Lafayette and northeast Dixie counties with the objective of restoring natural water drainage patterns. The project will recharge the aquifer with ~ 10 mgd of water over ~ 1,500 acres of ponds and 4,000 acres of wetlands. | Hydrologic Restoration | Underway       | 2015       | 2020                      | Other                                | TBD                                         | \$1,900,000   | SRWMD/ Dixie County / DEP | DEP: \$1,548,000<br>SRWMD: \$277,000<br>Dixie County: \$75,000 |
| SRWMD       | Middle Suwannee River Basin | SRWMD-11       | Middle Suwannee River Springs Restoration and Aquifer Recharge Project, Phase II (Mallory Swamp) | Phase II is over 6,000 acres and will rehydrate natural systems along and adjacent to the southeastern margin of Mallory Swamp; thereby increasing available surface water for wetland hydration and groundwater recharge, which will enhance springs restoration.              | Hydrologic Restoration | Planned        | TBD        | TBD                       | Other                                | TBD                                         | TBD           | SRWMD/ DEP                | TBD                                                            |

| Lead Entity | Location                    | Project Number | Project Name                            | Project Description                                                                                                                                                                                                                                                                                                                                                               | Project Type            | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source            | Funding Amount                      |
|-------------|-----------------------------|----------------|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|---------------------------|-------------------------------------|
| SRWMD       | Lower Suwannee River Basin  | SRWMD-12       | Otter Springs Restoration               | Replace or fix deteriorating retaining walls, stabilize the springs banks to control further erosion, and construct access points to the spring and spring run. It is anticipated this project will benefit the spring by removing nutrients, sediments, and debris from the spring vents and spring runs, and restoring the flow of the original head spring to historic levels. | Shoreline Stabilization | Completed      | 2016       | 2018                      | Other                                | Not Provided                                | \$140,000     | SRWMD                     | SRWMD: \$140,000                    |
| SRWMD       | Lower Suwannee River Basin  | SRWMD-13       | Hart Springs Restoration                | Improve water quality and spring flows.                                                                                                                                                                                                                                                                                                                                           | Hydrologic Restoration  | Completed      | 2014       | 2015                      | Other                                | Not Provided                                | \$76,500      | SRWMD                     | SRWMD: \$76,500                     |
| SRWMD       | Middle Suwannee River Basin | SRWMD-14       | Pot Spring Restoration Project          | The main goal of this project is to stabilize the shoreline along the spring run to prevent sediment from entering the Withlacoochee River.                                                                                                                                                                                                                                       | Shoreline Stabilization | Underway       | 2016       | 2020                      | UTF                                  | 69                                          | \$183,600     | DEP                       | DEP: \$183,600                      |
| SRWMD       | Middle Suwannee River Basin | SRWMD-15       | Little River Spring Restoration Project | The main goal of this project was to stabilize the shoreline along the spring run to prevent sediment from entering the Suwannee River.                                                                                                                                                                                                                                           | Shoreline Stabilization | Completed      | 2015       | 2016                      | Other                                | Not Provided                                | \$104,587     | SRWMD/<br>Suwannee County | SRWMD: \$90,000<br>County: \$14,587 |

*Suwannee River Basin Management Action Plan (BMAP), June 2018*

| Lead Entity     | Location                    | Project Number | Project Name                                                      | Project Description                                                                                                                                                                                          | Project Type            | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source         | Funding Amount                      |
|-----------------|-----------------------------|----------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|------------------------|-------------------------------------|
| SRWMD           | Middle Suwannee River Basin | SRWMD-16       | Charles Spring Restoration Project                                | Improve water quality through the replacement of a failing seawall along the bank of the spring which will reduce sediment loads washing into the spring.                                                    | Shoreline Stabilization | Completed      | 2013       | 2016                      | Other                                | Not Provided                                | \$112,378     | County/ SRWMD          | SRWMD: \$105,000<br>County: \$7,378 |
| SRWMD           | Middle Suwannee River Basin | SRWMD-17       | Gornto Springs Restoration Project                                | Construction of ~300 foot retaining wall, removal of sediment within spring run, and removal of man-made earthen dam and culvert.                                                                            | Shoreline Stabilization | Underway       | 2014       | 2018                      | Other                                | Not Provided                                | \$152,985     | County/ SRWMD          | SRWMD: \$145,985<br>County: \$7,000 |
| SRWMD           | Middle Suwannee River Basin | SRWMD-18       | Ravine and Convict Springs Nutrient Capture and Treatment Program | Install interceptor wells to capture high nitrate groundwater. A denitrifying system will be installed at each spring basin that will reduce nutrient loads and return the groundwater at the two locations. | BMPs                    | Underway       | 2016       | 2020                      | FF                                   | 4,300                                       | \$630,000     | DEP/ SRWMD             | DEP: \$600,000<br>SRWMD: \$30,000   |
| City of Trenton | Lower Suwannee River Basin  | T-01           | WWTF Improvements                                                 | Improvements to City's WWTF to provide advanced wastewater treatment.                                                                                                                                        | WWTF Upgrade            | Planned        | TBD        | TBD                       | WWTF                                 | TBD                                         | \$6,200,000   | City/ DEP/ SRWMD/ USDA | TBD                                 |
| City of Trenton | Lower Suwannee River Basin  | T-02           | Trenton Lift Station #7 Rehabilitation                            | Rehabilitate existing lift station.                                                                                                                                                                          | WWTF Upgrade            | Completed      | 2014       | 2017                      | WWTF                                 | Not Provided                                | \$207,800     | City/ SRWMD            | SRWMD: \$150,000<br>City: \$57,800  |

| Lead Entity          | Location                                        | Project Number | Project Name                                    | Project Description                                                      | Project Type | Project Status | Start Date | Estimated Completion Date | Nitrogen Source Addressed by Project | Estimated Nitrogen Load Reduction (lb-N/yr) | Cost Estimate | Funding Source | Funding Amount |
|----------------------|-------------------------------------------------|----------------|-------------------------------------------------|--------------------------------------------------------------------------|--------------|----------------|------------|---------------------------|--------------------------------------|---------------------------------------------|---------------|----------------|----------------|
| Wastewater Utilities | Lower Suwannee and Middle Suwannee River Basins | WU-01          | Wastewater Treatment Facility Reduction Credits | Achieved by WWTF policy if implemented BMAP-wide, achieving 3 or 6 mg/L. | WWTF Upgrade | Planned        | TBD        | TBD                       | WWTF                                 | 17,533                                      | TBD           | TBD            | TBD            |

## **Appendix C. PFAs**

A PFA (Fanning and Manatee Springs, March 2017; Madison Blue Spring, August 2017; Troy, Peacock, Lafayette Blue and Falmouth Springs, January 2017) is defined as the area(s) 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. As required by the Florida Springs and Aquifer Protection Act, DEP delineated PFAs for the Lower Suwannee River, Middle Suwannee River, and Withlacoochee River Sub-basins. These PFAs are adopted and incorporated by reference into this BMAP. Detailed information on the PFAs is available in report format at the following link: <http://publicfiles.dep.state.fl.us/dear/PFAs>.

## **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 TMDL, the BMAP shall include an OSTDS remediation plan. Based on the Suwannee River NSILT estimates and GIS coverages, OSTDS contribute approximately 3 % of the pollutant loading in the PFAs. 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.

### **D.1 Plan Elements**

#### ***D.1.1 Installation of New OSTDS***

Per statute, new OSTDS on lots of less than one acre are prohibited within 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 one acre within the PFAs, unless the OSTDS includes enhanced treatment of nitrogen or unless the OSTDS permit applicant demonstrates that sewer connections will be available within 5 years. 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 address locations.

FDOH permits the installation of new OSTDS pursuant to Chapter 64E-6, F.A.C., which includes not only systems installed on a property where one has not previously been 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 pursuant to 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 International (NSF) Standard 245 nitrogen removal rate before disposing the wastewater in the drain field, such as aerobic treatment units (ATU) and performance-based treatment systems (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.

### ***D.1.2 Modification or Repair of Existing OSTDS***

At this time, this remediation plan does not require the addition of nitrogen reducing enhancements upon modification or repair of existing OSTDS.

### ***D.1.3 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 NSILT, a planning tool that provides estimation of nitrogen loading sources to groundwater based on the best available scientific data for a particular geographic area. The NSILT estimates prepared for the Suwannee River Basin were obtained through separate evaluations of the Withlacoochee River, Middle Suwannee River, and Lower Suwannee River Sub-basins. The results were peer reviewed by SRWMD, FDOH, and

FDACS. Additional technical support information concerning the NSILT can be found in **Appendix E**.

### D.3 Remediation Options

The NSILT estimates that OSTDS contribute approximately 3 % of the pollutant loading to groundwater in the PFAs. **Table D-1** lists the number of existing OSTDS in the PFAs and the estimated nitrogen reductions associated with enhancement or connection to sewer.

**Table D-1. Estimated reduction credits for additional OSTDS enhancement or sewer\***

\*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 Sewer (lb-N/yr) | Credit for Enhancement (lb-N/yr) | OSTDS Parcels One Acre and Greater in PFAs | Credit for Sewer (lb-N/yr) | Credit for Enhancement (lb-N/yr) |
|---------------|------------------------------------------|----------------------------|----------------------------------|--------------------------------------------|----------------------------|----------------------------------|
| High          | 6,290                                    | 62,307                     | 42,631                           | 13,523                                     | 133,955                    | 91,653                           |
| Medium        | 0                                        | 0                          | 0                                | 0                                          | 0                          | 0                                |
| <b>Total</b>  | <b>6,290</b>                             | <b>62,307</b>              | <b>42,631</b>                    | <b>13,523</b>                              | <b>104,127</b>             | <b>71,672</b>                    |

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 ATU or PBTS capable of meeting or exceeding the NSF Standard 245 nitrogen removal rate before disposing wastewater in the drain field.

Nitrogen impacts from new development could also be reduced through prohibiting new conventional OSTDS on all lots in the PFAs, 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. Although upgrading existing OSTDS to include nitrogen reducing features is not required by this BMAP, upgrades would be beneficial within the PFAs and throughout the BMAP area. The funding program will be designed to prioritize OSTDS where it is most economical and efficient to add nutrient reducing features (i.e., systems needing a permit for a repair or modification, within the PFA, and on lots of less than one acre).

To facilitate 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 installation of passive remediation systems, including but not limited to systems featuring liners, nitrogen reducing material, or both underneath the drain field.

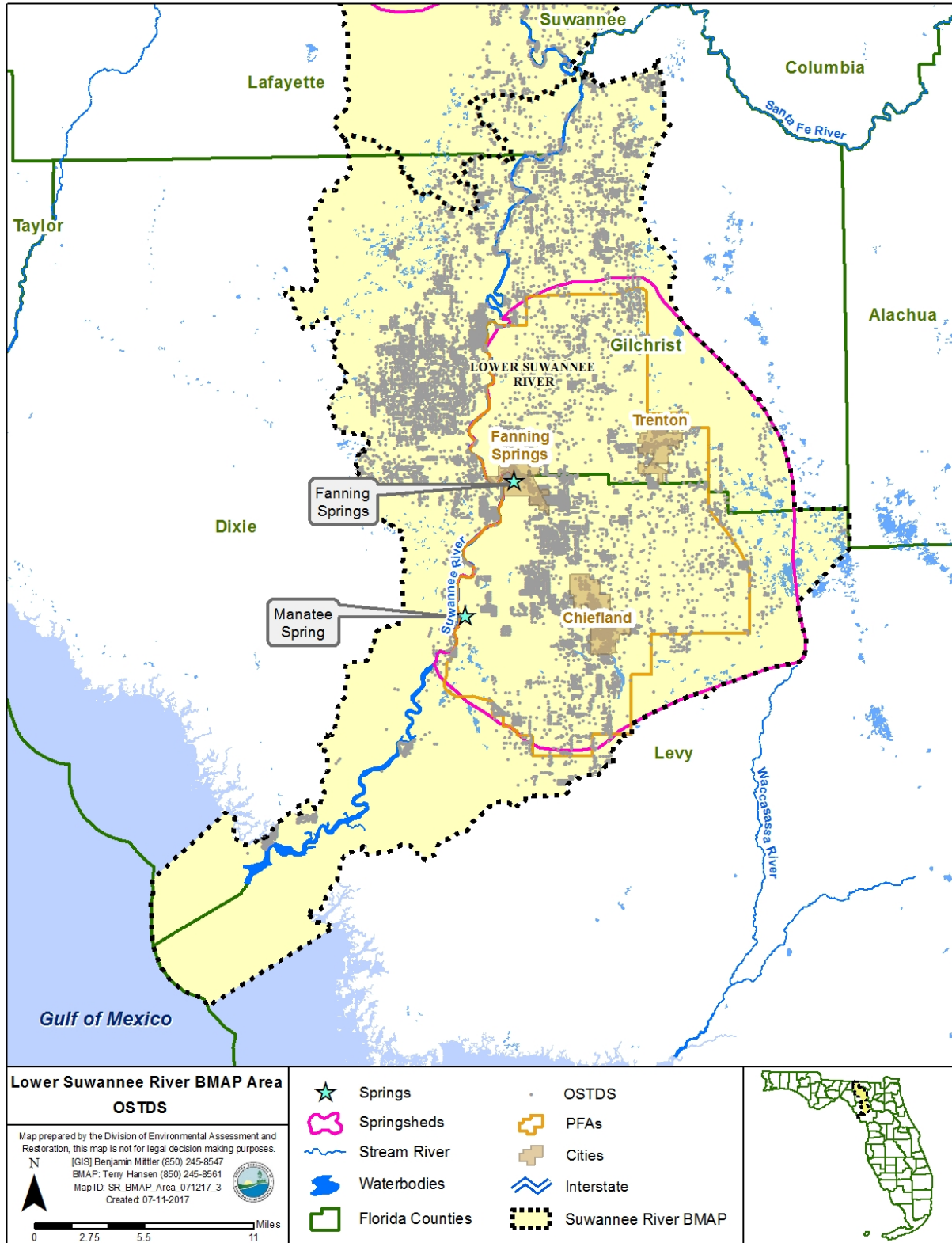


Figure D-1. OSTDS locations in the Lower Suwannee River Sub-basin PFA

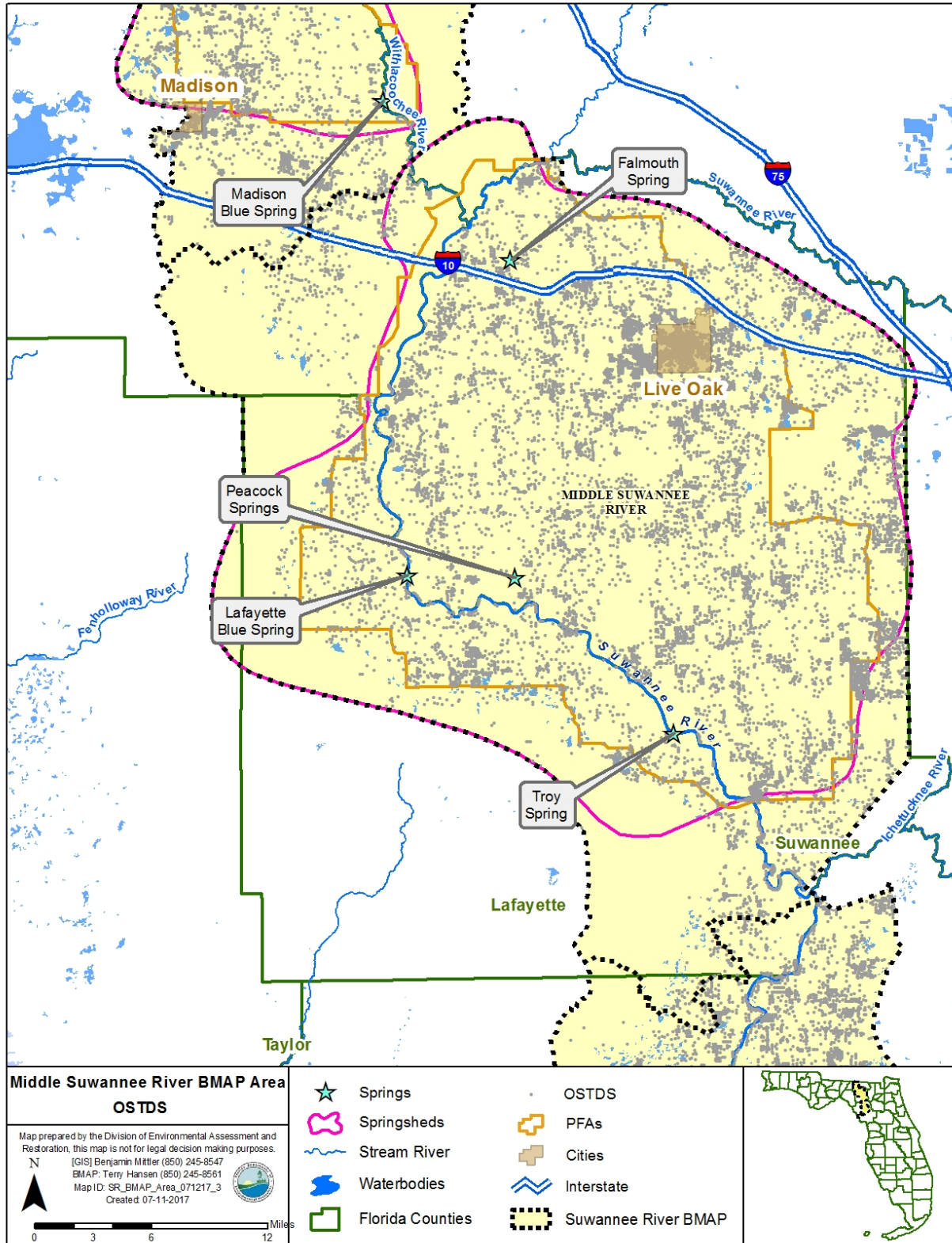
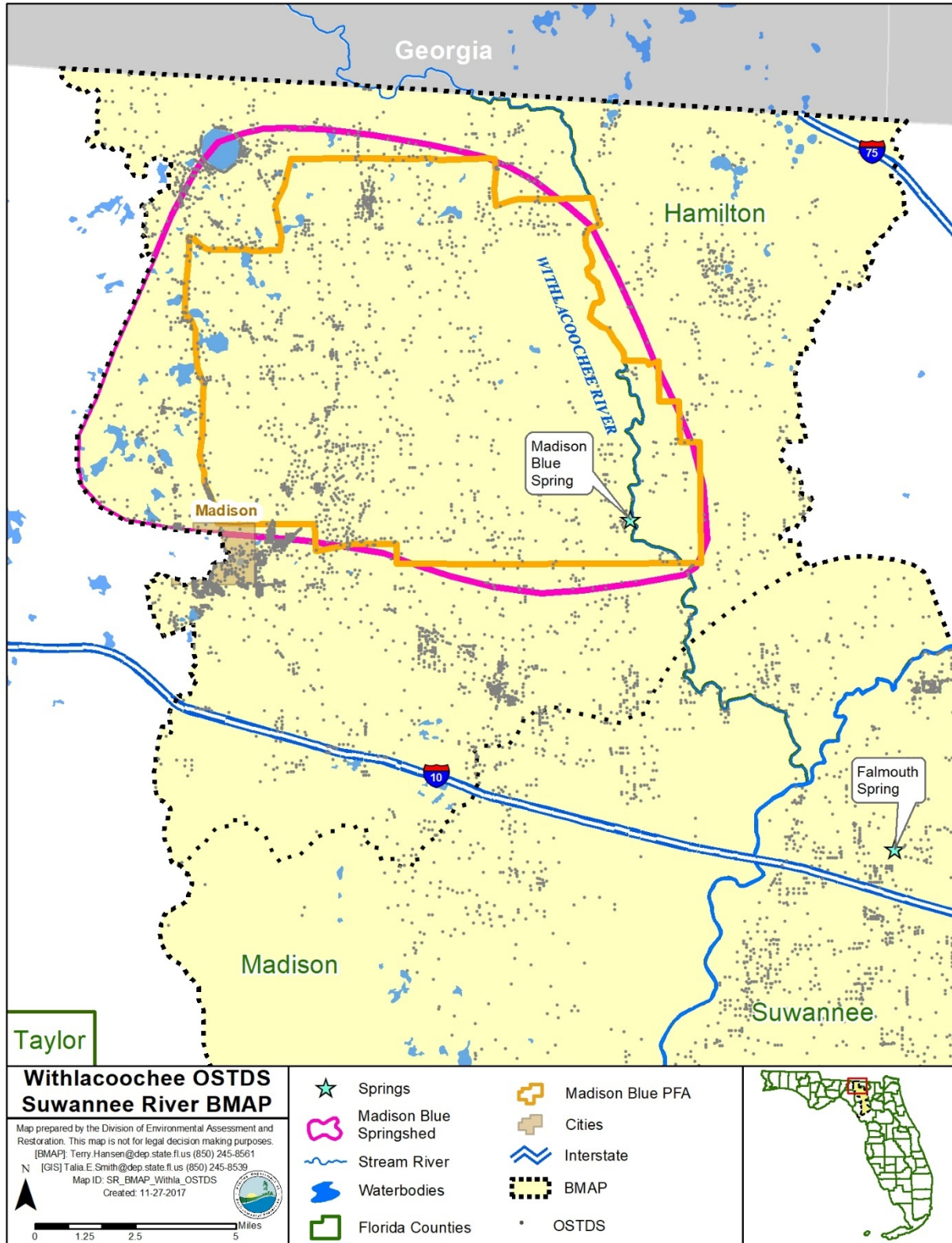


Figure D-2. OSTDS locations in the Middle Suwannee River Sub-basin PFA





**Figure D-3. OSTDS locations in the Withlacoochee River Sub-basin PFA**

#### **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 Florida Home Builders Association and the Florida Onsite Wastewater Association (FOWA).

## **Appendix E. Technical Support Information**

### **E.1. NSILT Data**

An NSILT workbook was completed for each of the three springsheds in the Suwannee River Basin BMAP: Lower Suwannee River, Middle Suwannee River, and Withlacoochee River. This technical support information identifies the data sources relied upon during NSILT development and documents the major assumptions used by DEP when applying the NSILT approach to the springsheds in the Suwannee River Basin BMAP.

The general NSILT approach involves estimating the nitrogen load to the surface for various source categories based on land use. The NSILT subjects 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 online at <http://publicfiles.dep.state.fl.us/DEAR/NSILT/>.

#### ***E.1.1 General Data Inputs***

##### ***Hydrogeology and Aquifer Recharge***

Aquifer recharge information is based on a merged layer that combines the 2002 USGS recharge layer for the intermediate and Floridan aquifer systems, and the 2009 aquifer recharge layer produced by USGS for the Florida Natural Area Inventory.

##### ***Land Use***

Land use information is from SRWMD based on the 2011 Florida Land Use Cover and Forms Classification System (FLUCCS) and 2016–2017 property appraiser data for Suwannee, Gilchrist, Madison, Levy, Columbia, Lafayette, and Hamilton Counties.

#### ***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 data set is comprised of data from 2011 to 2013.

##### ***WWTFs***

The average annual input of nitrogen to the land surface was estimated for each effluent land application site in the BMAP area using TN concentration and discharge volume data available in the DEP Wastewater Facility Regulation (WAFR) database. The range of years for which data were available varied with the individual WWTFs; however, the majority of the data were from 2015 to 2016.



### 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 method 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.

The population served by the OSTDS was estimated using the 2010 U.S. Census Bureau data. Data were used to estimate the effective population and OSTDS usage. Several literature sources have reported a per capita contribution of 9.012 lb-N/yr, and this value was multiplied by the number of people using septic tanks within the different regions of the BMAP area (U.S. Environmental Protection Agency [EPA] 2002; Toor et al. 2011; Viers et al. 2012).

### UTF

Urban turfgrass areas fertilization rates are derived from a 2008 SWFWMD study (Martin 2008). The results provided input data on percent of the population that fertilize, the applicator (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 at a rate of 21.78 lb-N/acre (ac). Residential parcels are evaluated by estimating the percentage of the property fertilized and the probability of fertilization, listed below in **Table E-1**. For residential parcels, these factors are determined by utilizing property values (higher valued properties fertilize more often and in greater amounts) and parcel type (single-family residences fertilize more frequently than other residence types).

**Table E-1. Distribution of property values and the probability of fertilization within the three springsheds**

| <b>Springshed</b>            | <b>Property Value Label</b> | <b>Property Value</b> | <b>Probability of Fertilization (%)</b> |
|------------------------------|-----------------------------|-----------------------|-----------------------------------------|
| <b>Middle Suwannee River</b> | Low                         | < \$50,000            | 10                                      |
|                              | Medium                      | \$50,001 - \$125,000  | 75                                      |
|                              | High                        | > \$125,001           | 90                                      |
| <b>Lower Suwannee River</b>  | Low                         | < \$55,000            | 10                                      |
|                              | Medium                      | \$55,001 - \$145,000  | 75                                      |
|                              | High                        | > \$145,001           | 90                                      |
| <b>Withlacoochee River</b>   | Low                         | < \$50,000            | 10                                      |
|                              | Medium                      | \$50,001 - \$125,000  | 75                                      |

| <b>Springshed</b> | <b>Property Value Label</b> | <b>Property Value</b> | <b>Probability of Fertilization (%)</b> |
|-------------------|-----------------------------|-----------------------|-----------------------------------------|
|                   | High                        | > \$125,001           | 90                                      |

### STF

Sports turfgrass areas include golf courses and sporting facilities. Golf course input is estimated utilizing the statewide fertilizer application rate of 4.5 lb-N/1,000 square feet/yr.

Sporting facilities are assessed based on property appraiser data. Acreage of sports turfgrass is verified using aerial imagery. The commercial lawn service fertilizer application rate for nonresidential parcels is used (21.78 lb-N/ac).

### Dairies

DEP permits and industry feedback are used to obtain herd size and characteristics for both permitted and non-permitted dairies. The nitrogen waste factor for each cattle type is based on published literature values (see **Table E-2**; Ruddy et al. 2006; Cabrera et al. 2006). The confinement and grazing times; waste management and disposal methods; and herd characteristics are assessed individually for each dairy when detailed information is provided.

**Table E-2. Daily waste factors for dairy cattle**

| <b>Livestock</b>           | <b>Waste Factor (lb-N/day)</b> |
|----------------------------|--------------------------------|
| <b>Lactating Dairy Cow</b> | 0.794                          |
| <b>Dry Dairy Cow</b>       | 0.397                          |
| <b>Heifer/Springer</b>     | 0.243                          |
| <b>Springers</b>           | 0.198                          |
| <b>Bulls</b>               | 0.375                          |
| <b>Calves- Dairy</b>       | 0.088                          |

### Poultry

Poultry operations are identified using SRWMD land use, property appraiser data, and FDACS detailed information on the annual number of birds and litter and manure management practices. For the Suwannee River Basin, an average cycle bird factor of 0.154 lb-N/day is applied to the annual number of birds to account for 8-week rotations throughout a given year. Input is calculated based on the amount of waste generated and storage and application practices; 0.159 lb-N/day for broiler chickens and 0.003 lb-N/day for layer chickens (Ruddy et al. 2006). For all poultry operations, FDACS indicated that 50% of the litter is sold and applied to buyers outside of the springsheds; therefore, only 50% of the nitrogen from litter is included in the total input.

### Cow-Calf Operations

For cow-calf operations, population numbers are derived from the 2016 U.S. Department of Agriculture (USDA) Survey of Agriculture and the estimated quantity of pasture acreage is

based on SRWMD land use. The nitrogen waste factor for each animal type is based on published literature values (see **Table E-3**; Goolsby et al. 1999; Chelette et al. 2002; Ruddy et al. 2006).

**Table E-3. Daily waste factors for beef cattle**

| Livestock         | Waste Factor (lb-N/day) |
|-------------------|-------------------------|
| Beef Cows         | 0.337                   |
| Other Beef Cattle | 0.311                   |
| Calves-Beef       | 0.068                   |

#### Miscellaneous LW

Populations of other livestock animals (goats, sheep, hogs, etc.) are estimated from the USDA census of agriculture and SRWMD land use coverage adjusted by percent of land likely to contain livestock in the springsheds. The nitrogen waste factor for each animal type is based on published literature values and subdivided into locations and recharge area. The nitrogen waste factors per animal are listed in **Table E-4** (Goolsby et al. 1999; Chelette et al. 2002; Ruddy et al. 2006; Meyer 2012; Sprague and Gronberg 2013).

**Table E-4. Daily waste factors for miscellaneous livestock**

| Livestock         | Waste Factor (lb-N/day) |
|-------------------|-------------------------|
| Chicken, broilers | 0.002                   |
| Chicken, layers   | 0.003                   |
| Equine            | 0.273                   |
| Goats             | 0.035                   |
| Hogs              | 0.19                    |
| Sheep             | 0.198                   |
| Turkeys           | 0.006                   |

#### FF

Crop acreage was identified by using a composite land use coverage. The FDACS FSAID III Irrigated Lands Geodatabase (ILG), SRWMD land use, and the Cropscape dataset produced by the National Agricultural Statistics Service (NASS) were used to assign and classify crop types grown on identified agricultural acreages.

Agricultural fertilizer is applied at varying rates, depending on crop type and farm practices. Estimated applications rates are based on UF-IFAS recommendations and adjusted rates based on producer feedback. The rates are listed below in **Table E-5**. Application rates are applied to the calculated acreages for the corresponding crop types to estimate FF input. Input calculated for poultry operations is subtracted out from the total FF input to account for poultry manure that is used as fertilizer.

**Table E-5. Summary of crop types and assumed nitrogen application rates**

| Crop                     | Application Rate (lb-N/ac/yr) | Crop                    | Application Rate (lb-N/ac/yr) |
|--------------------------|-------------------------------|-------------------------|-------------------------------|
| Blueberries              | 50                            | Pasture                 | 80                            |
| Carrots                  | 300                           | Pasture_Rye             | 110                           |
| Carrots_Corn             | 550                           | Pasture_Rye_Watermelons | 340                           |
| Carrots_Rye              | 300                           | Peaches                 | 90                            |
| Container Nursery        | 90                            | Peanuts                 | 20                            |
| Corn                     | 250                           | Peanuts_Oats            | 50                            |
| Corn_Oats                | 250                           | Peanuts_Pasture         | 100                           |
| Corn_Rye                 | 250                           | Peanuts_Rye             | 50                            |
| Corn_SmallGrains         | 250                           | Peas                    | 60                            |
| Cotton                   | 125                           | Pecans                  | 90                            |
| Cropland and Pastureland | 60                            | Potatoes                | 200                           |
| Field Corn               | 250                           | Row Crops               | 106                           |
| Field Crops              | 90                            | Rye                     | 100                           |
| Field Nursery            | 90                            | SmallVeg                | 151                           |
| Green Beans              | 120                           | Sod                     | 50                            |
| Hay                      | 240                           | Sod Farms               | 50                            |
| Hay AFO                  | 370                           | Soybeans                | 35                            |
| Hay Fields               | 240                           | Soybeans_Carrots        | 335                           |
| Hay_Bermuda              | 320                           | Soybeans_DryBeans       | 75                            |
| Hay_Oats                 | 230                           | SweetCorn               | 250                           |
| Improved Pastures        | 100                           | SweetCornCoverCrop      | 250                           |
| Melons                   | 175                           | SweetPotatoes           | 60                            |
| Millet_Rye               | 165                           | Tree Nurseries          | 90                            |
| Nurseries and Vineyards  | 90                            | Vegetables              | 151                           |
| Oats                     | 100                           | Vegetables_SpringOnion  | 301                           |
| Ornamentals              | 90                            | Watermelon              | 175                           |
| Other Groves             | 90                            |                         |                               |

Estimated Nitrogen Inputs to Land Surface

Table E-6 identifies the estimated input from each source category by recharge area.

**Table E-6. Estimated nitrogen inputs to the land surface by source category and recharge area within the three springsheds (lb-N/yr)**

| Spring-shed           | Recharge     | Atm Dep          | WWTF          | OSTDS          | UTF            | STF           | FF                | LW-Dairy         | LW-Poultry       | LW-Other         | Total             |
|-----------------------|--------------|------------------|---------------|----------------|----------------|---------------|-------------------|------------------|------------------|------------------|-------------------|
| Middle Suwannee River | High         | 3,761,876        | 13,834        | 222,174        | 318,743        | 10,511        | 11,115,156        | 1,660,365        | 1,664,826        | 3,864,295        | 22,631,780        |
|                       | Medium       | 454,722          | 2,447         | 32,572         | 53,281         | 46            | 894,073           | -                | 213,399          | 442,478          | 2,093,019         |
|                       | Low          | 13,325           | -             | 22             | -              | -             | -                 | -                | -                | 20               | 13,367            |
|                       | <b>TOTAL</b> | <b>4,229,923</b> | <b>16,282</b> | <b>254,768</b> | <b>372,024</b> | <b>10,557</b> | <b>12,009,230</b> | <b>1,660,365</b> | <b>1,878,224</b> | <b>4,306,793</b> | <b>24,738,166</b> |
|                       | High         | 1,047,349        | 134,474       | 137,302        | 289,328        | 18,902        | 6,421,877         | 1,867,342        | -                | 1,636,122        | 11,552,696        |

| Spring-shed          | Recharge     | Atm Dep          | WWTF           | OSTDS          | UTF            | STF           | FF               | LW-Dairy         | LW-Poultry    | LW-Other         | Total             |
|----------------------|--------------|------------------|----------------|----------------|----------------|---------------|------------------|------------------|---------------|------------------|-------------------|
| Lower Suwannee River | Medium       | 24,766           | -              | 146            | 9,017          | -             | 4,071            | -                | -             | 20,360           | 58,361            |
|                      | <b>TOTAL</b> | <b>1,072,115</b> | <b>134,474</b> | <b>137,448</b> | <b>298,346</b> | <b>18,902</b> | <b>6,425,949</b> | <b>1,867,342</b> | <b>-</b>      | <b>1,656,482</b> | <b>11,611,057</b> |
| Withlacoochee River  | High         | 468,215          | -              | 36,916         | 30,359         | -             | 1,864,694        | -                | 31,536        | 384,177          | 2,815,897         |
|                      | Medium       | 12,110           | -              | 883            | 324            | -             | 53,309           | -                | -             | 1,259            | 67,885            |
|                      | <b>TOTAL</b> | <b>480,325</b>   | <b>-</b>       | <b>37,799</b>  | <b>30,684</b>  | <b>-</b>      | <b>1,918,003</b> | <b>-</b>         | <b>31,536</b> | <b>385,436</b>   | <b>2,883,782</b>  |

### E.1.3 Nitrogen Attenuation and Loading to Groundwater

The two types of attenuation that are evaluated are biochemical attenuation factors (BAFs) and hydrogeological attenuation (i.e., 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. The BAFs in **Table E-7** 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 the groundwater.

The environmental attenuation of nitrogen from specific sources within the categories can vary substantially, both spatially and with depth in the subsurface, and will affect 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, volatilization of ammonia to the atmosphere, uptake by vegetation, denitrification, and other removal processes. The potential range in nitrogen attenuation for each source is shown in **Table E-7**.

**Table E-7. Range of environmental attenuation of nitrogen from a detailed literature review**

\* Dairies showed a range of attenuation based on practices. Permitted dairies exhibit practices that result in higher attenuation.

| N Source Category      | Low-Level Attenuation (%) | Attenuation Used for This Analysis (%) | High-Level Attenuation (%) |
|------------------------|---------------------------|----------------------------------------|----------------------------|
| Atmospheric Deposition | 85                        | 90                                     | 95                         |
| WWTFs-RIBs             | 10                        | 25                                     | 40                         |
| WWTFs-Sprayfield       | 50                        | 60                                     | 75                         |
| WWTF-Reuse             | 50                        | 75                                     | 85                         |
| Septic Tanks           | 40                        | 50                                     | 75                         |
| Livestock Operations   | 80                        | 90                                     | 95                         |
| Dairies                | 30                        | 50 and 85*                             | 90                         |
| Farm Fertilizers       | 50                        | 80                                     | 90                         |
| Urban Fertilizers      | 50                        | 70                                     | 85                         |

### Hydrogeological Attenuation (i.e., Recharge)

Most of the nitrogen in a given year does not reach groundwater due to hydrogeologic nitrogen attenuation processes and variations in the rate of aquifer recharge. In areas of the Suwannee River Basin BMAP where recharge rates are categorized as medium (3.01 to 10 in/yr) or high (greater than 10 in/yr), the UFA is more vulnerable to contamination than in areas where recharge rates are low (0 to 3 in/yr).

The recharge rate for the area where the surface input is calculated is based on the composite recharge map previously described. To account for variations in recharge rates to the UFA, non-attenuated 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 Loads 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. The estimated loads for each springshed are identified in **Table E-8**.

**Table E-8. Estimated nitrogen load to groundwater by source category and recharge area within the three springsheds (lb-N/yr)**

| Springshed            | Recharge     | Atm Dep        | WWTF          | OSTDS          | UTF           | STF          | FF               | LW-Dairy       | LW-Poultry     | LW-Other       | Total            |
|-----------------------|--------------|----------------|---------------|----------------|---------------|--------------|------------------|----------------|----------------|----------------|------------------|
| Middle Suwannee River | High         | 338,569        | 4,618         | 99,978         | 86,061        | 2,838        | 2,000,728        | 452,734        | 149,834        | 347,787        | 3,483,146        |
|                       | Medium       | 22,736         | 854           | 8,143          | 7,992         | 7            | 89,407           | -              | 10,670         | 22,124         | 161,933          |
|                       | Low          | 1,332          | -             | 1              | -             | -            | -                | -              | -              | 0              | 1,334            |
|                       | <b>TOTAL</b> | <b>362,637</b> | <b>5,472</b>  | <b>108,122</b> | <b>94,053</b> | <b>2,845</b> | <b>2,090,135</b> | <b>452,734</b> | <b>160,504</b> | <b>369,911</b> | <b>3,646,414</b> |
| Lower Suwannee River  | High         | 94,261         | 50,173        | 61,786         | 78,119        | 5,104        | 1,155,938        | 252,091        | -              | 147,251        | 1,844,723        |
|                       | Medium       | 1,238          | -             | 36             | 1,353         | -            | 407              | -              | -              | 1,018          | 4,053            |
|                       | <b>TOTAL</b> | <b>95,500</b>  | <b>50,173</b> | <b>61,822</b>  | <b>79,471</b> | <b>5,104</b> | <b>1,156,345</b> | <b>252,091</b> | <b>-</b>       | <b>148,269</b> | <b>1,848,776</b> |
| Withlacoochee River   | High         | 42,139         | -             | 16,612         | 8,197         | -            | 335,645          | -              | 2,838          | 34,576         | 440,008          |
|                       | Medium       | 605            | -             | 221            | 49            | -            | 5,331            | -              | -              | 63             | 6,269            |
|                       | <b>TOTAL</b> | <b>42,745</b>  | <b>-</b>      | <b>16,833</b>  | <b>8,246</b>  | <b>-</b>     | <b>340,976</b>   | <b>-</b>       | <b>2,838</b>   | <b>34,639</b>  | <b>446,276</b>   |

## 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 or SRWMD. 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, SRWMD, or others to defray partially the costs of implementation. Through the 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.

FDACS identified potential land that could be enrolled in the BMP Program in the Suwannee River Basin by creating a composite agricultural land use coverage. The acreage for irrigated areas was derived from the FSAID ILG III, which provides crop and associated irrigation system information. The acreage for nonirrigated lands was derived from SRWMD 2013 to 2014 land use data for agricultural areas not included in the FSAID ILG III. Acreages for livestock lands were estimated using SRWMD land use data.

**Table F-1** summarizes the composite land use data for agriculture in the Suwannee River Basin BMAP area. The total agricultural lands in the BMAP area comprise 359,896 acres. **Table F-2** provides detail on acreages for each of the crop types assumed to be fertilized, by springshed. Crop fertilizer lands total 198,638 acres, with hayfields making up 24 % of this acreage. Hayfields are the largest crop coverage in the basin as well as in each springshed. However, outside the springsheds, peanuts are the most common crop.

**Table F-3** lists land uses for the livestock lands, by springshed. There are 155,135 livestock acres in the basin, with improved pastures being the dominant land use, accounting for 63 % of these lands. Improved pasture is also the dominant land use in each of the springsheds and outside the springsheds. It is important to note that 6,123 acres are classified as both fertilized croplands and livestock lands, resulting in some acreage being identified in both **Table F-2** and **Table F-3**.

**Figure F-1** summarizes agricultural lands by nutrient source in the BMAP area. **Figure F-2**, **Figure F-3**, and **Figure F-4** provide closer views of the distribution of agricultural lands by nutrient source in the three springsheds.



**Table F-1. Composite agricultural land use by nutrient source in the Suwannee River Basin BMAP area**

| <b>Agricultural Nitrogen Loading Category</b> | <b>Acres Outside Springsheds</b> | <b>Springshed Acres Lower Suwannee River</b> | <b>Springshed Acres Withlacoochee River</b> | <b>Springshed Acres Middle Suwannee River</b> | <b>Acres in BMAP Area</b> |
|-----------------------------------------------|----------------------------------|----------------------------------------------|---------------------------------------------|-----------------------------------------------|---------------------------|
| <b>Crop Fertilizer Lands Only</b>             | 43,906                           | 42,372                                       | 17,580                                      | 94,780                                        | 198,638                   |
| <b>Livestock Lands Only</b>                   | 40,320                           | 29,285                                       | 11,091                                      | 74,438                                        | 155,135                   |
| <b>Crop Fertilizer and Livestock Lands</b>    | 1,211                            | 1,507                                        | 145                                         | 3,260                                         | 6,123                     |
| <b>Total BMAP Agricultural Acres</b>          | <b>85,438</b>                    | <b>73,164</b>                                | <b>28,816</b>                               | <b>172,477</b>                                | <b>359,896</b>            |

**Table F-1. Fertilized croplands in the Suwannee River Basin BMAP area**

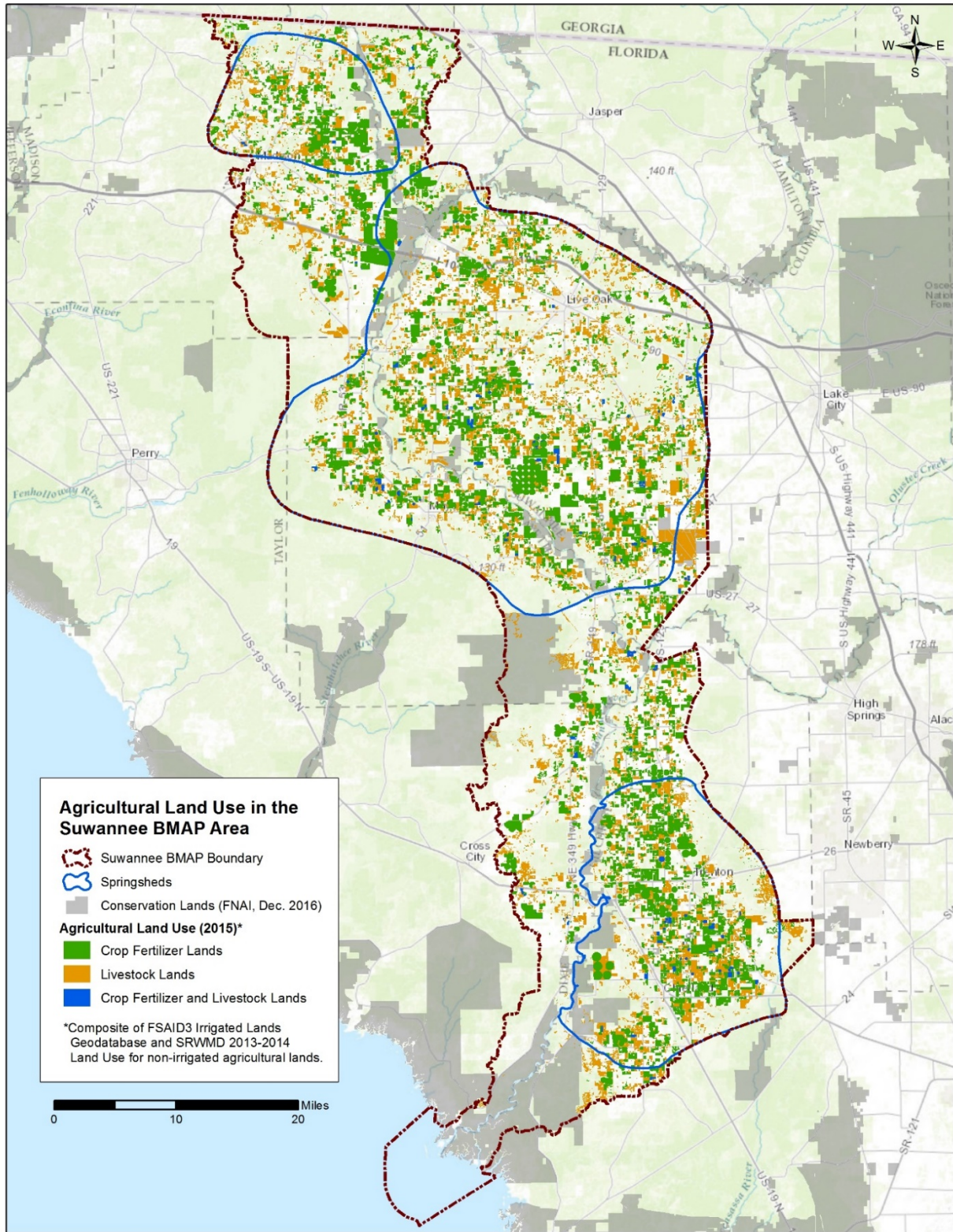
| <b>Crop Type</b>                | <b>Acres Outside Springsheds</b> | <b>Springshed Acres Lower Suwannee River</b> | <b>Springshed Acres Withlacoochee River</b> | <b>Springshed Acres Middle Suwannee River</b> | <b>Total Acres</b> |
|---------------------------------|----------------------------------|----------------------------------------------|---------------------------------------------|-----------------------------------------------|--------------------|
| <b>Blueberries</b>              | 26                               |                                              | 11                                          | 99                                            | 136                |
| <b>Cabbage</b>                  | 39                               |                                              |                                             |                                               | 39                 |
| <b>Carrots</b>                  | 168                              |                                              | 131                                         | 273                                           | 573                |
| <b>Carrots_Corn</b>             | 132                              |                                              | 201                                         | 641                                           | 974                |
| <b>Carrots_Rye</b>              | 262                              |                                              |                                             | 142                                           | 404                |
| <b>ContainerNursery</b>         | 468                              | 862                                          | 28                                          | 598                                           | 1,957              |
| <b>Corn</b>                     | 144                              | 1,766                                        | 195                                         | 1,159                                         | 3,265              |
| <b>Corn_Oats</b>                | 80                               |                                              | 101                                         | 77                                            | 258                |
| <b>Corn_Rye</b>                 | 275                              | 273                                          |                                             | 708                                           | 1,255              |
| <b>Corn_SmallGrains</b>         |                                  |                                              | 22                                          |                                               | 22                 |
| <b>Corn_SnapBeans</b>           | 70                               |                                              |                                             |                                               | 70                 |
| <b>Cotton</b>                   | 33                               |                                              | 27                                          | 832                                           | 893                |
| <b>Cropland and Pastureland</b> | 6,921                            | 7,743                                        | 2,940                                       | 12,071                                        | 29,675             |
| <b>Field Crops</b>              | 64                               | 24                                           | 20                                          | 65                                            | 174                |
| <b>FieldCorn</b>                | 4,484                            | 2,446                                        | 666                                         | 3,306                                         | 10,902             |
| <b>FieldCrops</b>               |                                  |                                              |                                             | 1,138                                         | 1,138              |
| <b>FieldNursery</b>             | 18                               | 172                                          |                                             | 114                                           | 303                |
| <b>GreenBeans</b>               | 166                              |                                              | 76                                          |                                               | 243                |
| <b>Hay</b>                      | 1,080                            | 2,734                                        | 813                                         | 9,843                                         | 14,470             |
| <b>Hay Fields</b>               | 8,252                            | 12,857                                       | 3,642                                       | 24,899                                        | 49,650             |
| <b>Hay_ImprovedPastures</b>     |                                  | 75                                           |                                             | 40                                            | 115                |
| <b>Hay_Oats</b>                 |                                  |                                              |                                             | 244                                           | 244                |
| <b>HayAFO</b>                   | 103                              |                                              |                                             | 532                                           | 636                |
| <b>ImprovedPastures</b>         |                                  |                                              |                                             | 181                                           | 181                |

| <b>Crop Type</b>                                          | <b>Acres<br/>Outside<br/>Springsheds</b> | <b>Springshed<br/>Acres<br/>Lower<br/>Suwannee River</b> | <b>Springshed<br/>Acres<br/>Withlacoochee<br/>River</b> | <b>Springshed<br/>Acres<br/>Middle<br/>Suwannee<br/>River</b> | <b>Total Acres</b> |
|-----------------------------------------------------------|------------------------------------------|----------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------|--------------------|
| Melons                                                    | 158                                      |                                                          |                                                         | 559                                                           | 718                |
| Millet_Rye                                                |                                          |                                                          |                                                         | 153                                                           | 153                |
| Nurseries and Vineyards                                   | 65                                       | 15                                                       |                                                         | 53                                                            | 133                |
| Oats                                                      |                                          |                                                          |                                                         | 165                                                           | 165                |
| Ornamentals                                               | 129                                      | 77                                                       | 162                                                     | 378                                                           | 746                |
| Other Groves (Pecan,<br>Avocado, Coconut, Mango,<br>etc.) | 91                                       | 240                                                      | 100                                                     | 942                                                           | 1,373              |
| Pasture                                                   | 4,005                                    | 2,130                                                    | 361                                                     | 7,959                                                         | 14,456             |
| Pasture_Rye                                               |                                          | 30                                                       |                                                         | 191                                                           | 222                |
| Pasture_Rye_Watermelons                                   |                                          | 39                                                       |                                                         |                                                               | 39                 |
| Peaches                                                   |                                          | 59                                                       |                                                         |                                                               | 59                 |
| Peanuts                                                   | 9,314                                    | 4,406                                                    | 3,431                                                   | 13,940                                                        | 31,091             |
| Peanuts_Oats                                              |                                          | 150                                                      |                                                         |                                                               | 150                |
| Peanuts_Pasture                                           |                                          | 220                                                      |                                                         | 190                                                           | 410                |
| Peanuts_Rye                                               | 598                                      | 524                                                      | 384                                                     | 170                                                           | 1,675              |
| Peas                                                      |                                          |                                                          | 31                                                      |                                                               | 31                 |
| Pecans                                                    | 34                                       |                                                          | 71                                                      | 432                                                           | 537                |
| Potatoes                                                  |                                          |                                                          |                                                         | 48                                                            | 48                 |
| Row Crops                                                 | 5,449                                    | 4,179                                                    | 3,627                                                   | 10,958                                                        | 24,214             |
| Rye                                                       | 268                                      | 285                                                      | 223                                                     | 252                                                           | 1,028              |
| SmallVeg                                                  |                                          |                                                          |                                                         | 32                                                            | 32                 |
| SnapBeans_Rye                                             | 107                                      |                                                          |                                                         |                                                               | 107                |
| Sod                                                       | 131                                      |                                                          | 103                                                     | 80                                                            | 313                |
| Sod Farms                                                 |                                          |                                                          |                                                         | 9                                                             | 9                  |
| Sorghum                                                   | 184                                      |                                                          |                                                         |                                                               | 184                |
| Soybeans                                                  | 137                                      |                                                          | 54                                                      | 369                                                           | 560                |
| Soybeans_Carrots                                          |                                          |                                                          |                                                         | 102                                                           | 102                |
| Soybeans_DryBeans                                         |                                          |                                                          |                                                         | 21                                                            | 21                 |
| Soybeans_Rye                                              | 26                                       |                                                          |                                                         |                                                               | 26                 |
| SweetCorn                                                 |                                          |                                                          | 37                                                      | 295                                                           | 332                |
| SweetCornCoverCrop                                        |                                          |                                                          |                                                         | 134                                                           | 134                |
| SweetPotatoes                                             | 9                                        |                                                          | 145                                                     | 580                                                           | 733                |
| Tree Nurseries                                            | 165                                      | 555                                                      | 20                                                      | 246                                                           | 986                |
| Vegetables                                                | 1,394                                    | 1,523                                                    | 100                                                     | 2,457                                                         | 5,474              |
| Vegetables_Rye                                            | 69                                       |                                                          |                                                         |                                                               | 69                 |
| Vegetables_SpringOnion                                    |                                          |                                                          |                                                         | 148                                                           | 148                |
| Watermelon                                                |                                          | 494                                                      |                                                         | 213                                                           | 707                |
| <b>Total</b>                                              | <b>45,118</b>                            | <b>43,879</b>                                            | <b>17,725</b>                                           | <b>98,040</b>                                                 | <b>204,761</b>     |

**Table F-2. Livestock lands in the Suwannee River Basin BMAP area**

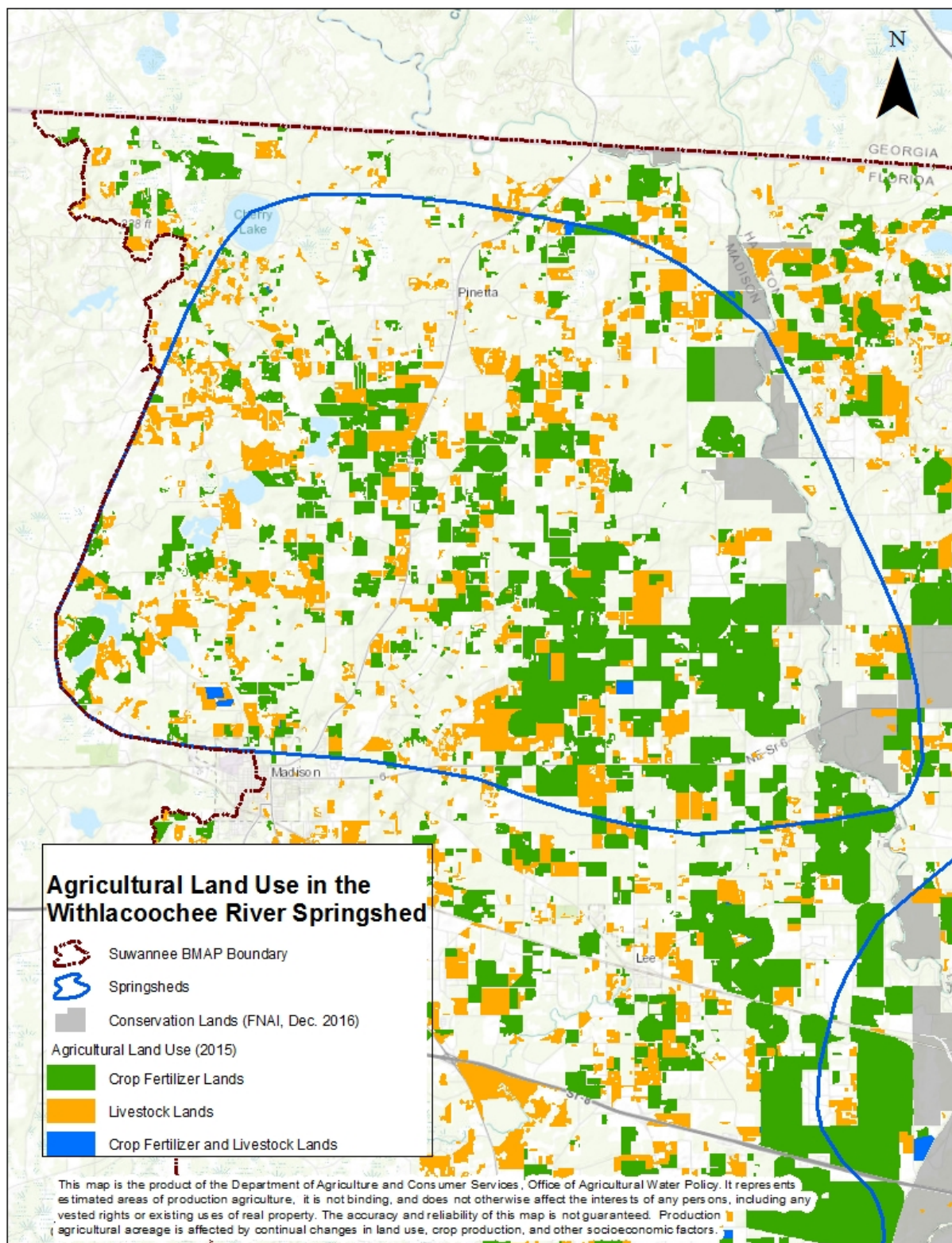
| <b>Land Use Description</b>                     | <b>Acres<br/>Outside<br/>Springsheds</b> | <b>Springshed<br/>Acres<br/>Lower<br/>Suwannee<br/>River</b> | <b>Springshed<br/>Acres<br/>Withlacoochee<br/>River</b> | <b>Springshed<br/>Acres<br/>Middle<br/>Suwannee<br/>River</b> | <b>Total Acres</b> |
|-------------------------------------------------|------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------|--------------------|
| <b>Cattle Feeding Operations</b>                | 26                                       | 161                                                          | 10                                                      | 155                                                           | 352                |
| <b>Dairies</b>                                  | 162                                      | 543                                                          |                                                         | 460                                                           | 1,165              |
| <b>Horse Farms</b>                              | 720                                      | 1,147                                                        | 25                                                      | 893                                                           | 2,785              |
| <b>Improved Pastures</b>                        | 22,894                                   | 22,771                                                       | 7,851                                                   | 47,772                                                        | 101,288            |
| <b>Poultry Feeding<br/>Operations</b>           | 186                                      |                                                              | 15                                                      | 1,227                                                         | 1,428              |
| <b>Range Land, Herbaceous<br/>(Dry Prairie)</b> | 12,930                                   | 3,694                                                        | 2,316                                                   | 20,277                                                        | 39,217             |
| <b>Specialty Farms</b>                          | 20                                       | 4                                                            |                                                         | 60                                                            | 85                 |
| <b>Unimproved Pastures</b>                      | 1,710                                    | 898                                                          | 414                                                     | 2,421                                                         | 5,443              |
| <b>Woodland Pastures</b>                        | 2,884                                    | 1,576                                                        | 605                                                     | 4,432                                                         | 9,497              |
| <b>Total</b>                                    | <b>41,532</b>                            | <b>30,792</b>                                                | <b>11,236</b>                                           | <b>77,698</b>                                                 | <b>161,258</b>     |

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 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 inappropriate analysis of the photo imagery. There is also 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 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.



**Figure F-1. Composite of agricultural lands in the Suwannee River Basin BMAP area**





**Figure F-2. Composite of agricultural lands in the Withlacoochee River Springshed**



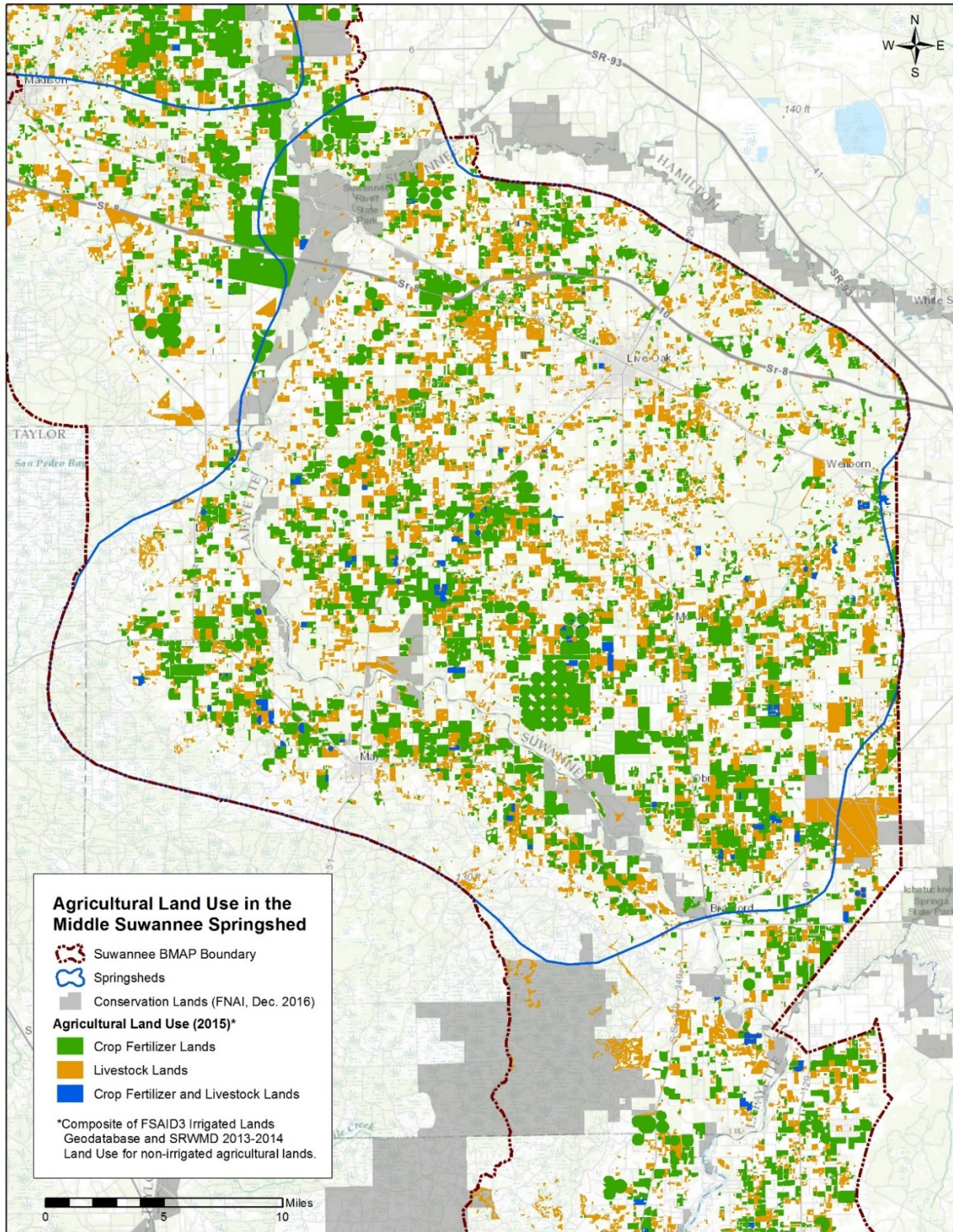


Figure F-3. Composite of agricultural lands in the Middle Suwannee River Springshed



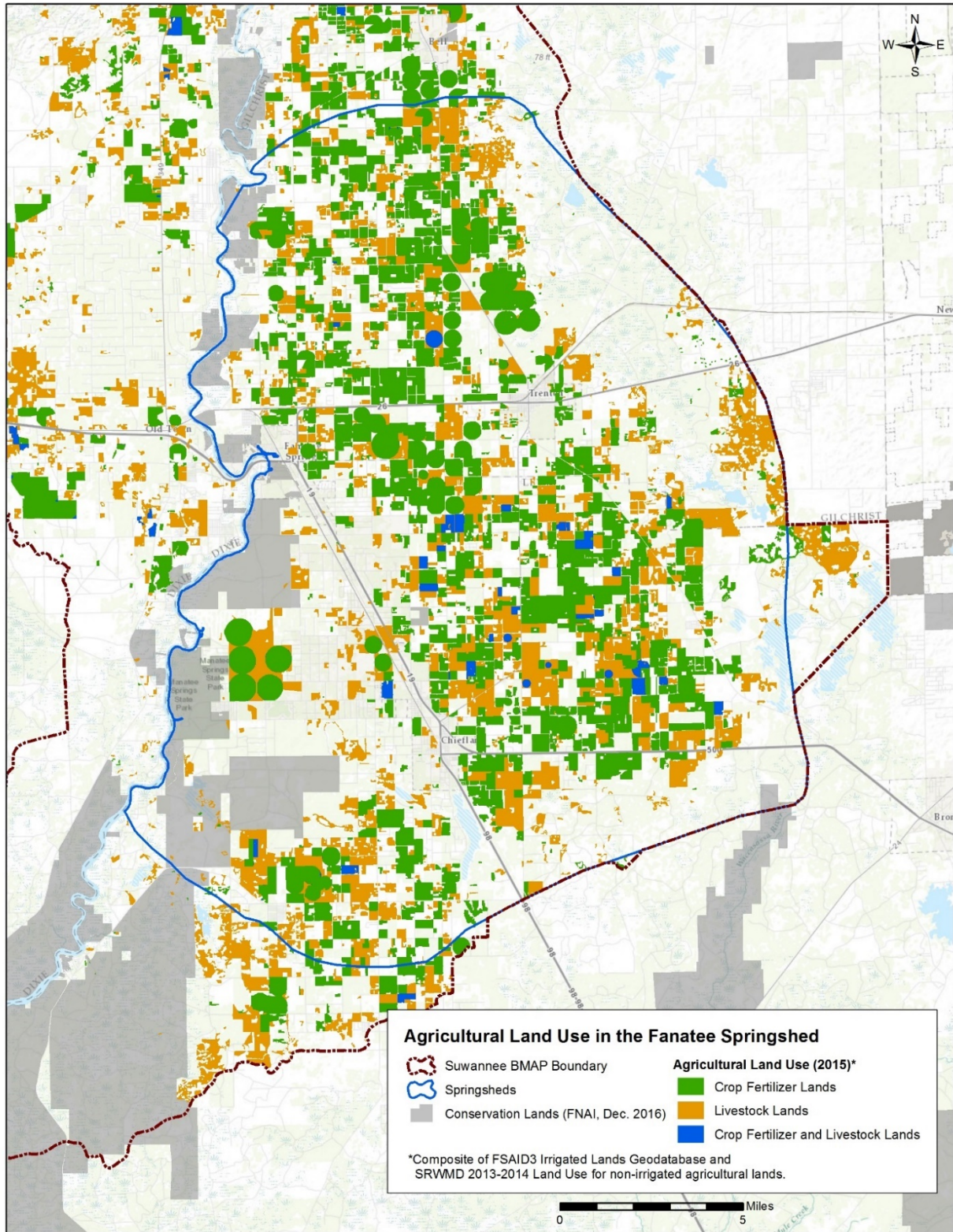


Figure F-4. Composite of agricultural lands in the Lower Suwannee River Springshed

## **F.2 Agricultural BMPs**

Through the Office of Agricultural Water Policy, 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 [TP]) 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 Notice of Intent to Implement (NOI) 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

**Figure F-5** shows the acres enrolled in the FDACS BMP Program in the Suwannee River Basin as of December 31, 2016. **Figure F-6**, **Figure F-7**, and **Figure F-8** are maps focused on BMP enrollment in the three watersheds. **Table F-3** lists the acres enrolled in the FDACS BMP Program by manual and the number of NOIs associated with those acres. Given that the enrolled acres on which BMPs are implemented can contain nonproduction acres (such as buildings, parking lots, and fallow acres), the only enrollment for the land classified as agriculture based on the composite land use is included in **Table F-3**. **Table F-4** lists the acreage of production agriculture enrolled in each of the BMP programs by springshed.

As of December 31, 2016, there are NOIs that cover 187,312 agricultural acres in the Suwannee River Basin BMAP area. The Lower Suwannee River and Middle Suwannee River Sub-basin springsheds each have close to 66,000 agricultural acres enrolled, respectively, while the Withlacoochee River Sub-basin Watershed has over 41,000 agricultural acres. Outside the springsheds, 41,000 agricultural acres are enrolled. No producers are conducting water quality monitoring in lieu of implementing BMPs at this time.

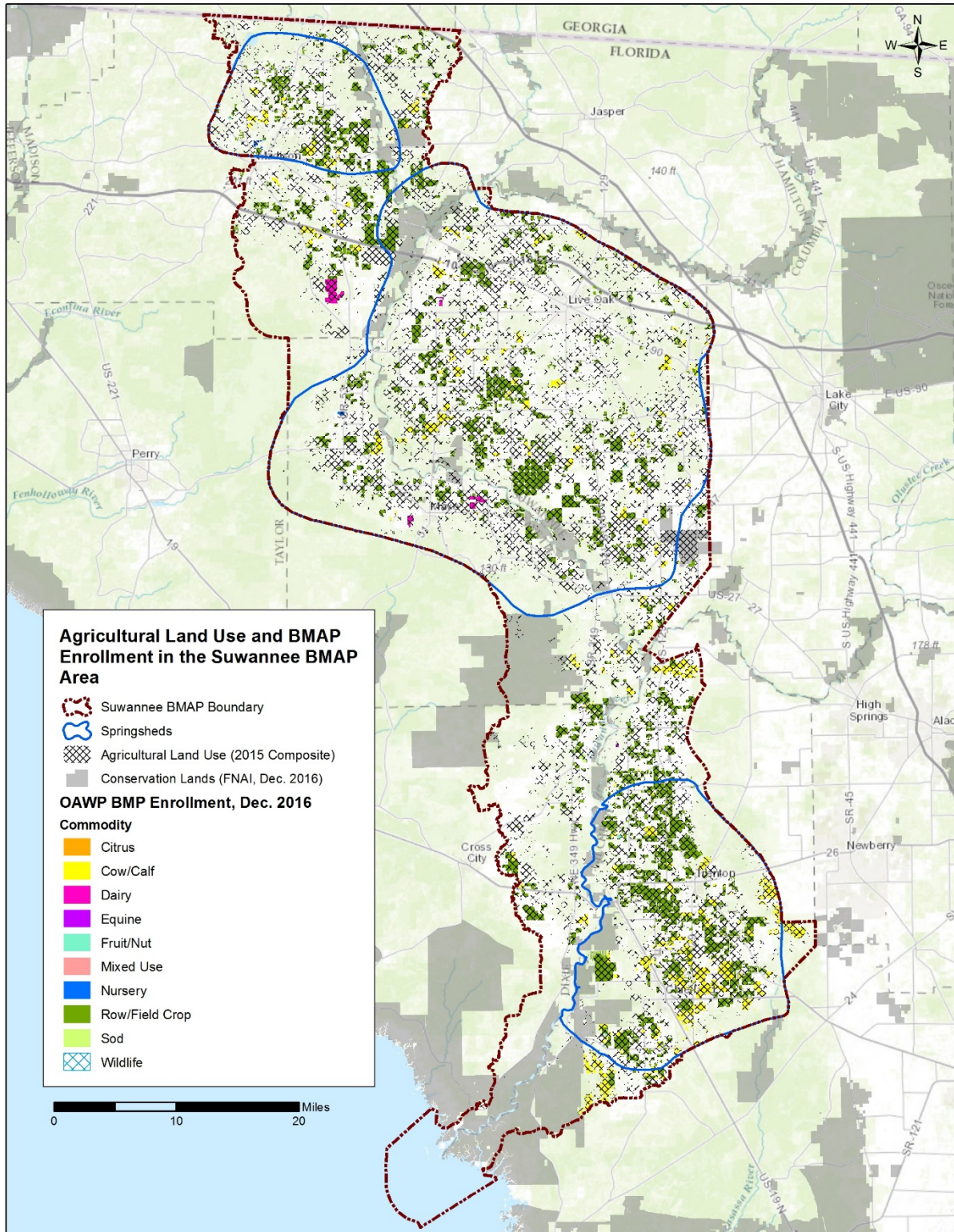
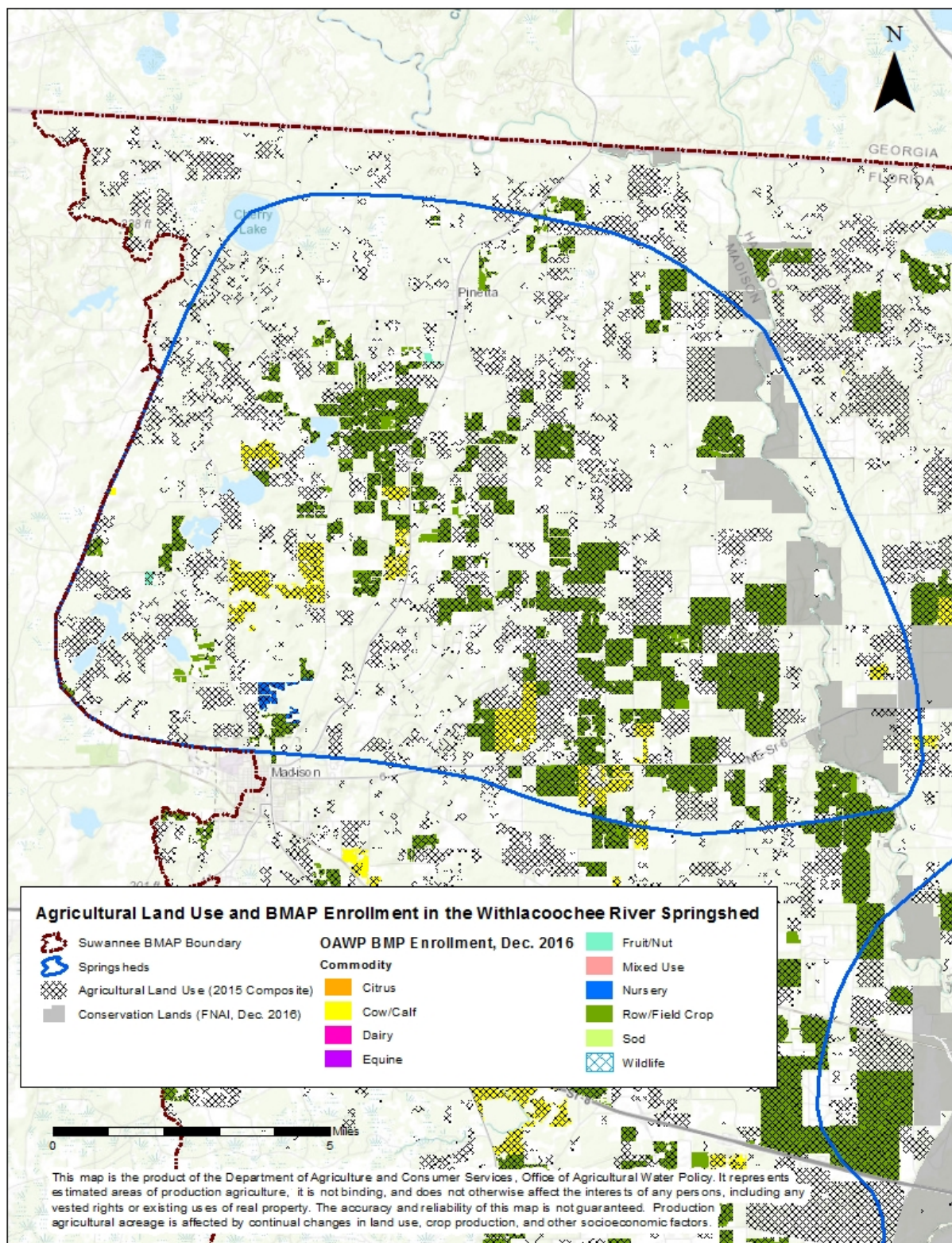


Figure F-5. BMP enrollment in the Suwannee River Basin as of December 31, 2016





**Figure F-6. BMP enrollment in the Withlacoochee River Springshed as of December 31, 2016**



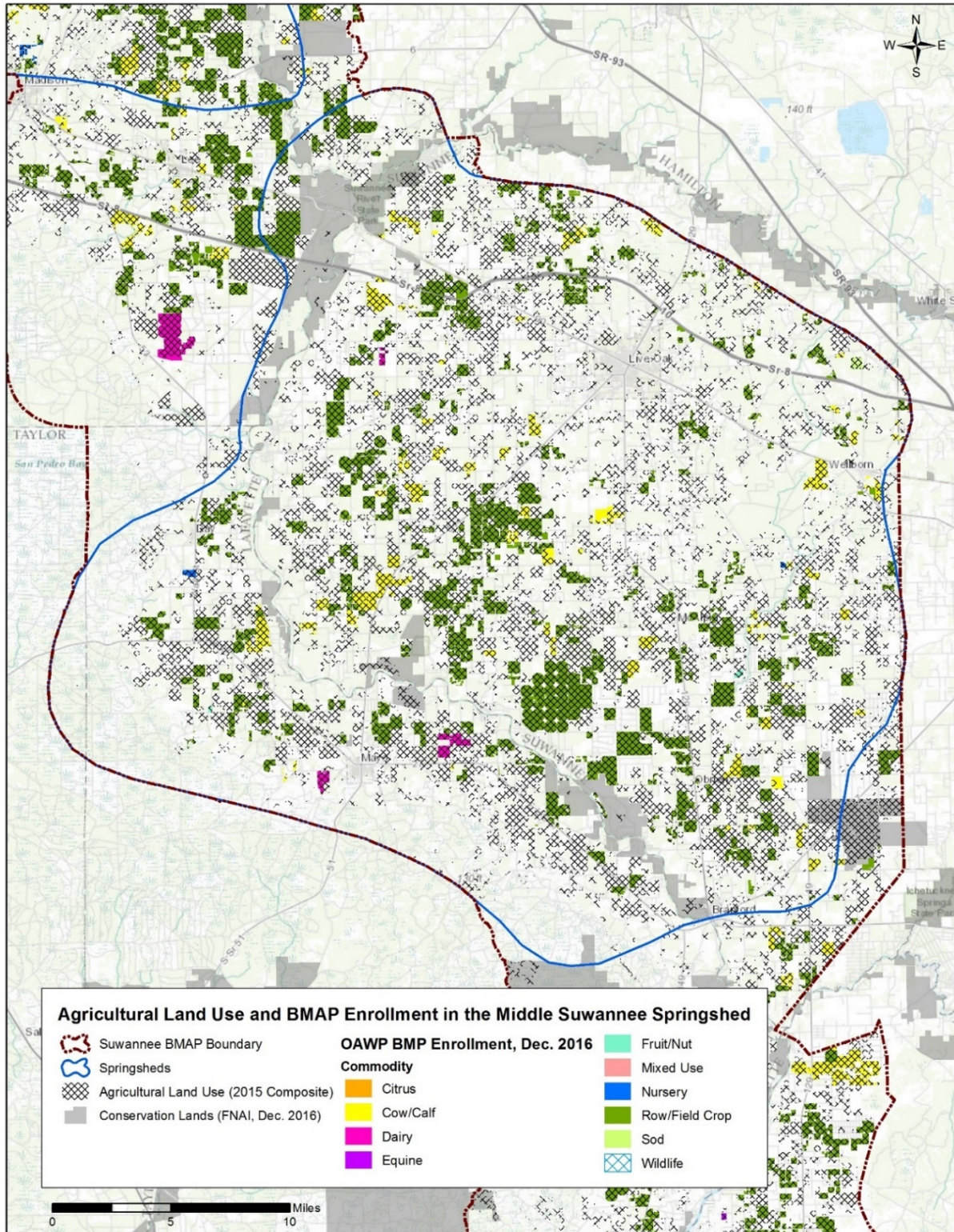


Figure F-7. BMP enrollment in the Middle Suwannee River Springshed as of December 31, 2016



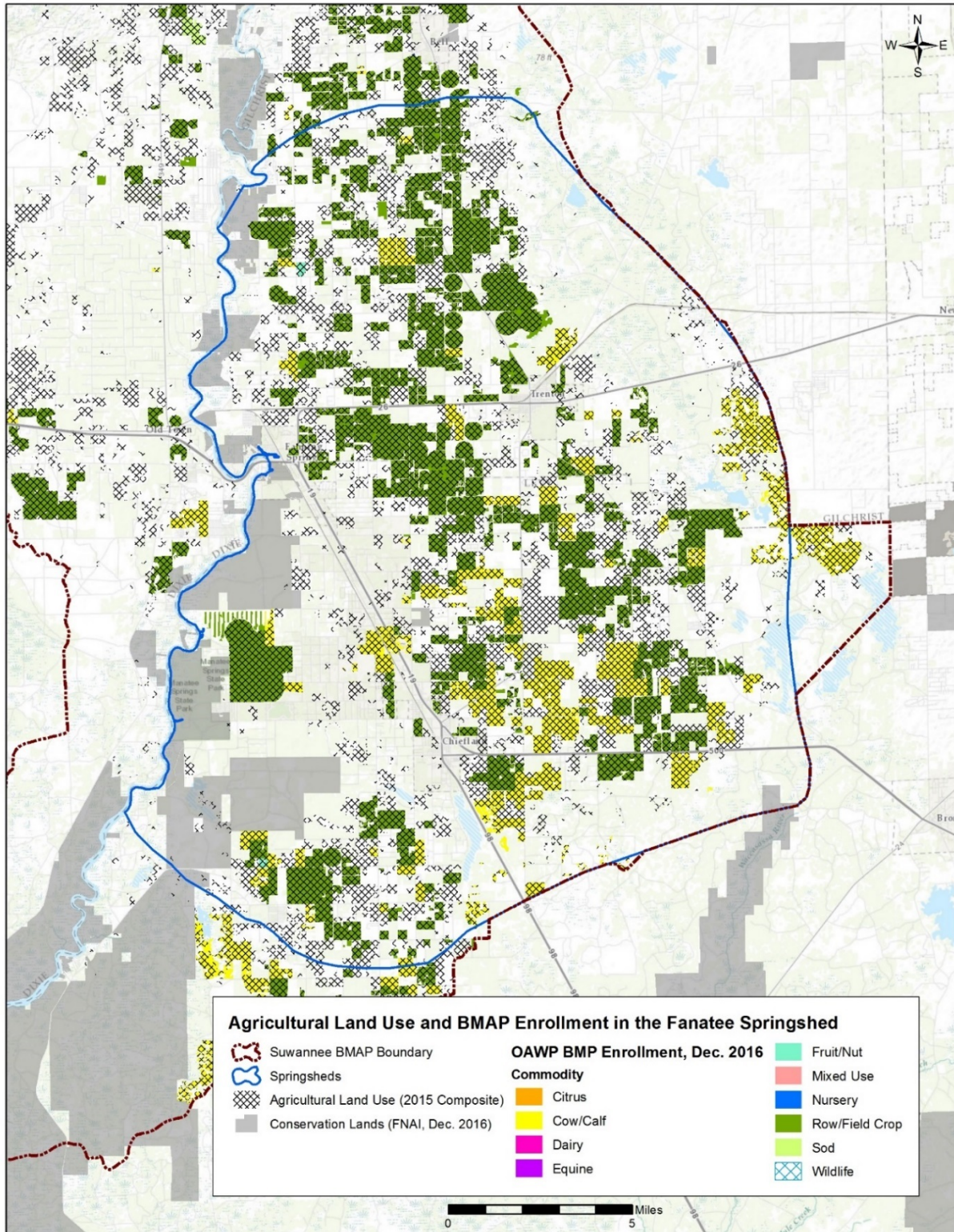


Figure F-8. BMP enrollment in the Middle Suwannee River Springshed as of December 31, 2016

**Table F-3. Agricultural acreage and BMP enrollment in the Suwannee River Basin BMAP area as of December 31, 2016**

| <b>FDACS BMP Program</b>              | <b>NOI Enrolled Acres</b> | <b>Agricultural Land Use Acres with NOIs</b> |
|---------------------------------------|---------------------------|----------------------------------------------|
| <b>Dairy Operations</b>               | 3,113                     | 1,990                                        |
| <b>Florida Container Nursery</b>      | 469                       | 268                                          |
| <b>Specialty Fruit and Nut</b>        | 259                       | 203                                          |
| <b>Statewide Cow/Calf</b>             | 70,500                    | 46,848                                       |
| <b>Statewide Equine</b>               | 58                        | 49                                           |
| <b>Statewide Sod</b>                  | 694                       | 335                                          |
| <b>Vegetables and Agronomic Crops</b> | 184,286                   | 137,620                                      |
| <b>Total</b>                          | <b>259,380</b>            | <b>187,312</b>                               |

**Table F-4. Agricultural acreage and BMP enrollment in the Suwannee River Basin by springshed as of December 31, 2016**

| <b>FDACS BMP Program</b>              | <b>Acres Outside Springsheds</b> | <b>Springshed Acres Lower Suwannee River</b> | <b>Springshed Acres Withlacoochee River</b> | <b>Springshed Acres Middle Suwannee River</b> | <b>Total Acres</b> |
|---------------------------------------|----------------------------------|----------------------------------------------|---------------------------------------------|-----------------------------------------------|--------------------|
| <b>Dairy Operations</b>               | 1,237                            |                                              |                                             | 753                                           | 1,990              |
| <b>Florida Container Nursery</b>      | 3                                |                                              | 137                                         | 127                                           | 268                |
| <b>Specialty Fruit and Nut</b>        |                                  | 84                                           | 36                                          | 82                                            | 203                |
| <b>Statewide Cow/Calf</b>             | 10,357                           | 22,845                                       | 2,012                                       | 11,634                                        | 46,848             |
| <b>Statewide Equine</b>               | 49                               |                                              |                                             |                                               | 49                 |
| <b>Statewide Sod</b>                  | 196                              |                                              |                                             | 138                                           | 335                |
| <b>Vegetables and Agronomic Crops</b> | 29,254                           | 43,061                                       | 12,276                                      | 53,029                                        | 137,620            |
| <b>Total</b>                          | <b>41,096</b>                    | <b>65,990</b>                                | <b>14,461</b>                               | <b>65,764</b>                                 | <b>187,312</b>     |

## **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 cost-assisted field- or regional-level treatment options that remove nutrients from farms and other nonpoint sources. In that case, FDACS will work with DEP and SRWMD 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 and SRWMD activities. If a reevaluation of the BMPs is needed, FDACS will also include SRWMD 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 the springshed. 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 of 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 designs based on specific information, such as actual applicable acreages and willing landowners. **Table F-5** summarizes these efforts.



**Table F-5. Beyond BMP implementation**

| Category         | Name                                                                                  | Description                                                                                                                                                                                                                                               |
|------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Practices</b> | Soil Moisture Probes                                                                  | Deployment, training, technical support, and use of soil moisture probes to manage irrigation systems.                                                                                                                                                    |
| <b>Practices</b> | Precision Fertilization                                                               | Deployment of equipment, procedures, and training to improve formulations, delivery methods, and timing to match fertilization more precisely to crop needs.                                                                                              |
| <b>Practices</b> | Precision Irrigation                                                                  | Deployment of equipment, procedures, and training to improve location, volume, and timing of irrigation to match crop needs more precisely.                                                                                                               |
| <b>Practices</b> | Controlled Release Fertilizer                                                         | Application of new and developing fertilizer products that become available to crops via dissolution over longer periods in growing season.                                                                                                               |
| <b>Practices</b> | Cover Crops                                                                           | Planting of cover crops between production cycles to increase soil organic content, improve nutrient retention, and reduce erosion.                                                                                                                       |
| <b>Projects</b>  | Lined Dairy Waste Storage Ponds                                                       | Installation of high-density polyethylene (HDPE) liners and ancillary equipment (such as solids separation systems) for liquid waste storage ponds.                                                                                                       |
| <b>Projects</b>  | Bioreactors/Denitrification Walls and Onsite Capture and Reuse of High-Nutrient Water | Installation and operation of surface (bioreactor) and subsurface (denitrification walls) systems to remove nitrate by contact with carbon source. Installation and operation of network of capture wells and reuse of water onsite in irrigation system. |
| <b>Research</b>  | Rotational Production                                                                 | Conversion of conventional production operations to planned rotational production incorporating grass and cover crops. May include cattle.                                                                                                                |
| <b>Research</b>  | Soil Moisture Sensor Deployment and Calibration                                       | Research into potential use of soil moisture sensors to assist in nutrient management.                                                                                                                                                                    |
| <b>Research</b>  | Effectiveness of Controlled-Release Fertilizer                                        | Focused research on use of controlled-release fertilizer for other crop types.                                                                                                                                                                            |
| <b>Research</b>  | Regional Capture and Reuse of High-Nutrient Water                                     | Study of potential regional capture/reuse systems, including sources of high nutrient value water, potential beneficial reuse sites, legal and regulatory obstacles, and costs.                                                                           |