



Florida Department of Environmental Protection

Santa Fe River Basin Management Action Plan (BMAP)

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Water Quality Framework

Monitor and report progress annually

Adapt and change – new statewide annual report

Collect data

Analyze and verify

List “impaired” waters

REPEAT

Measure success and adapt

Set water quality standards

Monitor water quality

Determine pollution problems

Develop and implement restoration plans (BMAPs)

Work with community leaders

Establish restoration goals (TMDLs)

Allocate responsibilities

Identify projects

- Infrastructure
- Best Management Practices (BMPs)

Establish schedules

Identify success criteria

Excessive nutrients

Bacteria, Metals, and Other Impairments

Gather additional data

Evaluate water quality

Adopt pollutant reduction targets

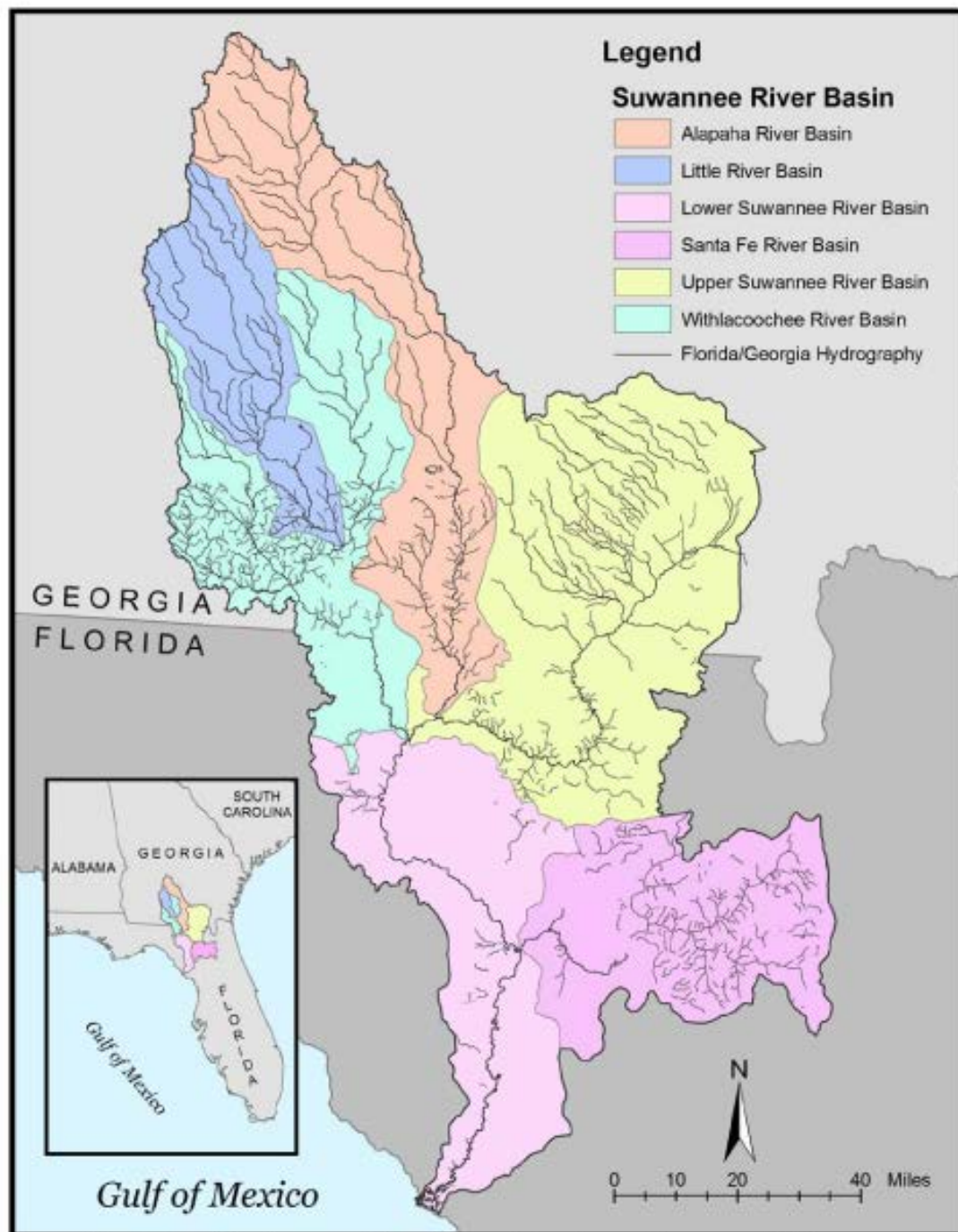


Figure 1-1. Basins of the Suwannee River System (Hornsby and Raulston, 2000).



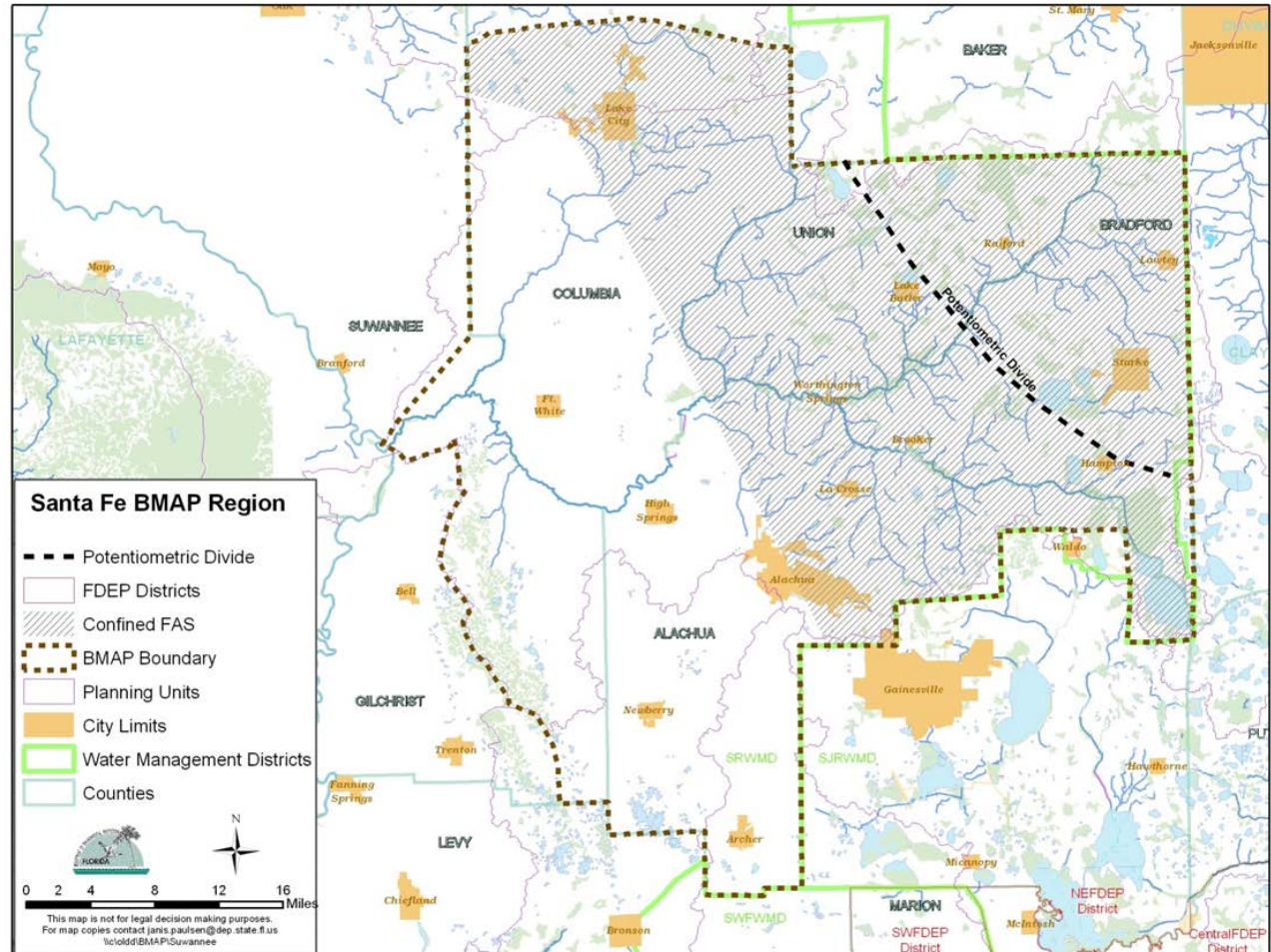
Santa Fe BMAP Area

BMAP planning area,
nearly 1.1 million
acres

Outstand Florida
Springs (OFS) included

- Ichetucknee
- Devils Complex
- Hornsby
- Poe
- Treehouse
- Columbia

Both agricultural and
urban BMPs are being
implemented.





Santa Fe River Basin Total Maximum Daily Loads (TMDLs)

- TMDL Data Period of Record:
 - June 1, 2000 through June 30, 2007
- TMDL Study Results:
 - Nitrate shown to be primary factor in causing algal blooms
- TMDL:
 - 0.35 milligrams per liter (mg/L) nitrate monthly average concentration (or lower) will not cause an imbalance in the flora or fauna





Santa Fe River Nitrate Total Maximum Daily Loads (TMDLs)

Planning Unit	Parameter	TMDL	WLANPDES wastewater	WLANPDES stormwater	LA*	MOS
Middle Suwannee (WBIDs 3422J, 3422L, 3422T, 3422U, 3422Z)	Nitrate, monthly average	0.35 mg/L	N/A	N/A	51%**	Implicit
Lower Suwannee (WBIDs 3422, 3422R, 3422S)	Nitrate, monthly average	0.35 mg/L	N/A	N/A	58%**	Implicit
Lower Santa Fe (WBIDs 3605A, 3605B, 3605C)	Nitrate, Monthly average	0.35 mg/L	N/A	35%**	35%**	Implicit

WBID: Waterbody identification area.



Regulatory Framework

The process for preparing BMAPs is found in:

- Section 403.067, Florida Statutes (F.S.), known as the “Florida Watershed Restoration Act”
- The 2016 Florida Springs and Aquifer Protection Act lists requirements for BMAPs for OFS
- Requirement is to achieve TMDL in 20 years
 - Plan is to achieve:
 - 30 % reduction in 5 years
 - 80 % in 10 years
 - 100 % in 15 years





2016-1 Requirements

INCLUDE:

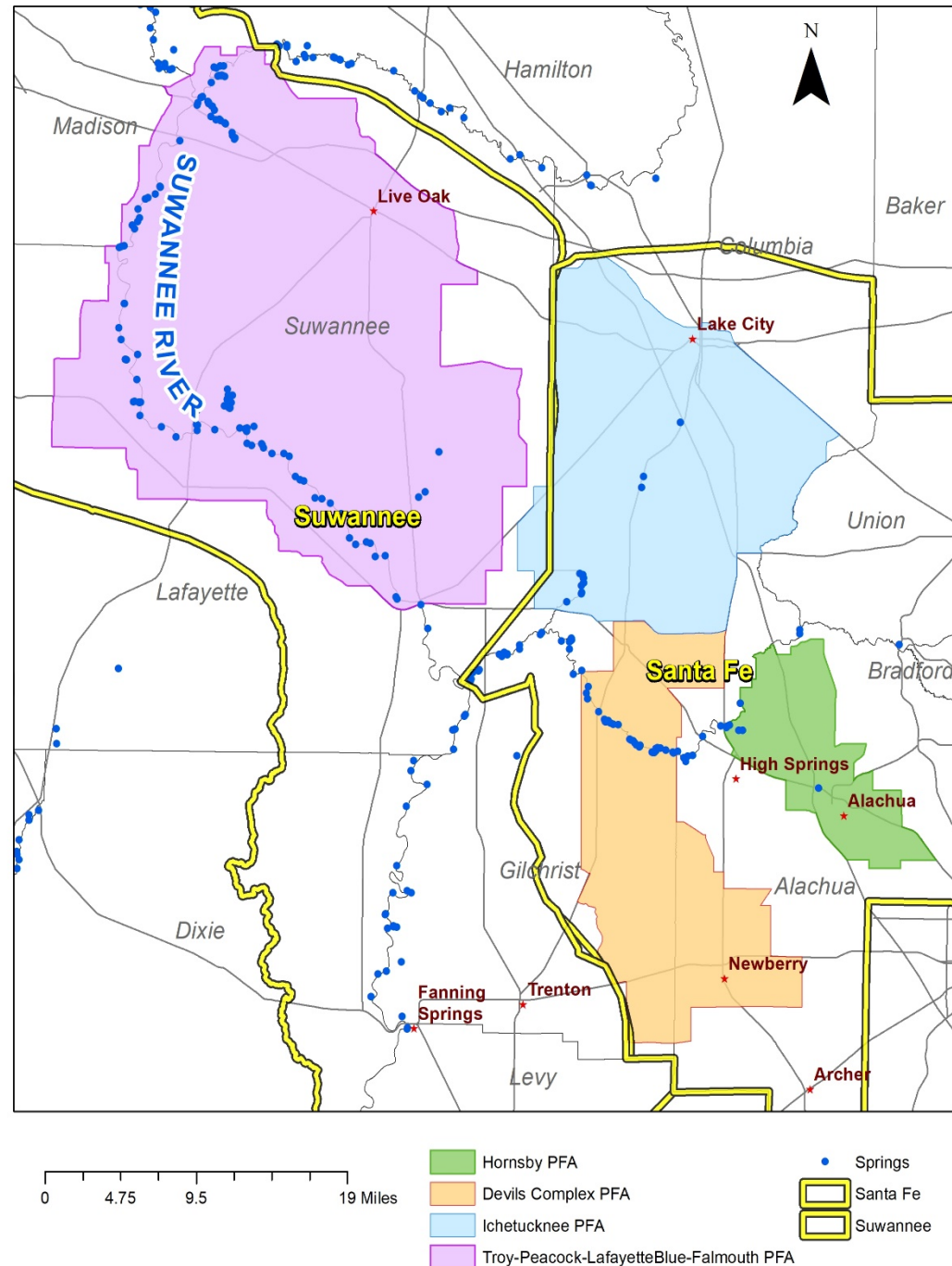
- Priority Focus Area (PFA) delineation
Area(s) of basin where Floridan Aquifer is generally most vulnerable
- Identification of point source or category of nonpoint sources with the estimated allocation of the load for each.
 - Nitrogen Source Inventory Loading Tool (NSILT)



PFA/NSILT

- **Priority Focus Area (PFA)** – developed for OFS(s) and used to focus restoration efforts
- **Nitrogen Source Inventory Loading Tool (NSILT)** – developed for OFS springsheds to estimate sources of nitrogen to groundwater

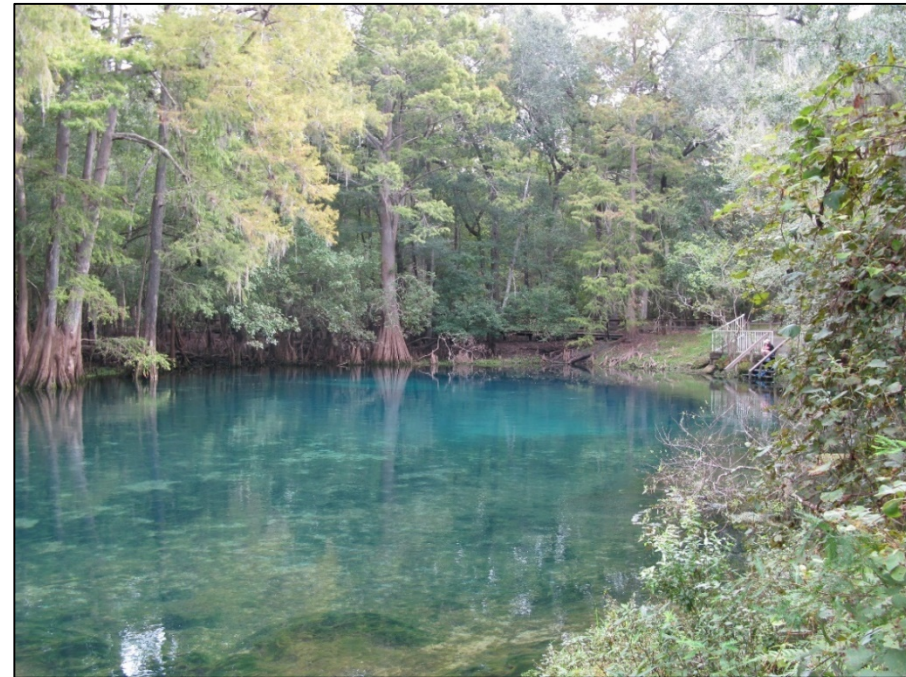
Used to determine if >20% load is from OSTDS





Santa Fe River Basin PFAs and NSILTs

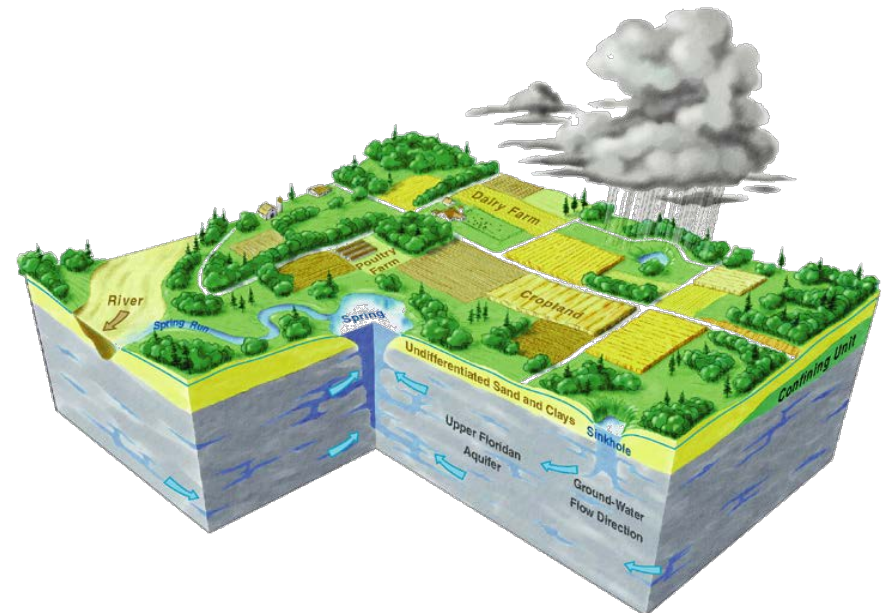
- PFAs and NSILTs completed for the following impaired OFS:
 - Devil's Spring System
 - Hornsby Spring
 - Ichetucknee Spring





Nitrate-Impaired Spring Waters

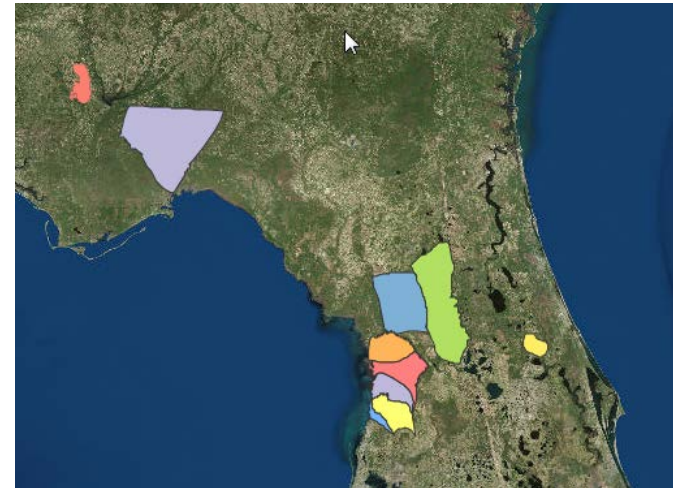
- The water quality in several Outstanding Florida Springs in the Suwannee River Basin is impaired due to elevated nitrate concentrations
- Many sources contribute nitrogen in each springshed:
 - atmospheric deposition
 - fertilizers (farm and non-farm)
 - septic tanks
 - land application of wastewater
 - livestock manure





Nitrogen Source Inventory and Loading Tool

- Quantifies nitrogen sources and loading to ground water, and highlights source categories where reductions in N loading could help achieve restoration of impaired waters
- Customized inventory for each spring basin or BMAP area to account for hydrogeologic and land use differences
- Inventories have been completed for impaired Outstanding Florida Springs





Outstanding Florida Springs

Impaired Outstanding Florida Springs (OFS) in this BMAP area were aggregated into three general springshed areas to more efficiently organize information and implement restoration actions:

- **Ichetucknee Spring Group** (and associated springs of Ichetucknee River)
- **Devil's Complex** combined springshed
- **Hornsby-Treehouse** (not impaired) combined Springshed

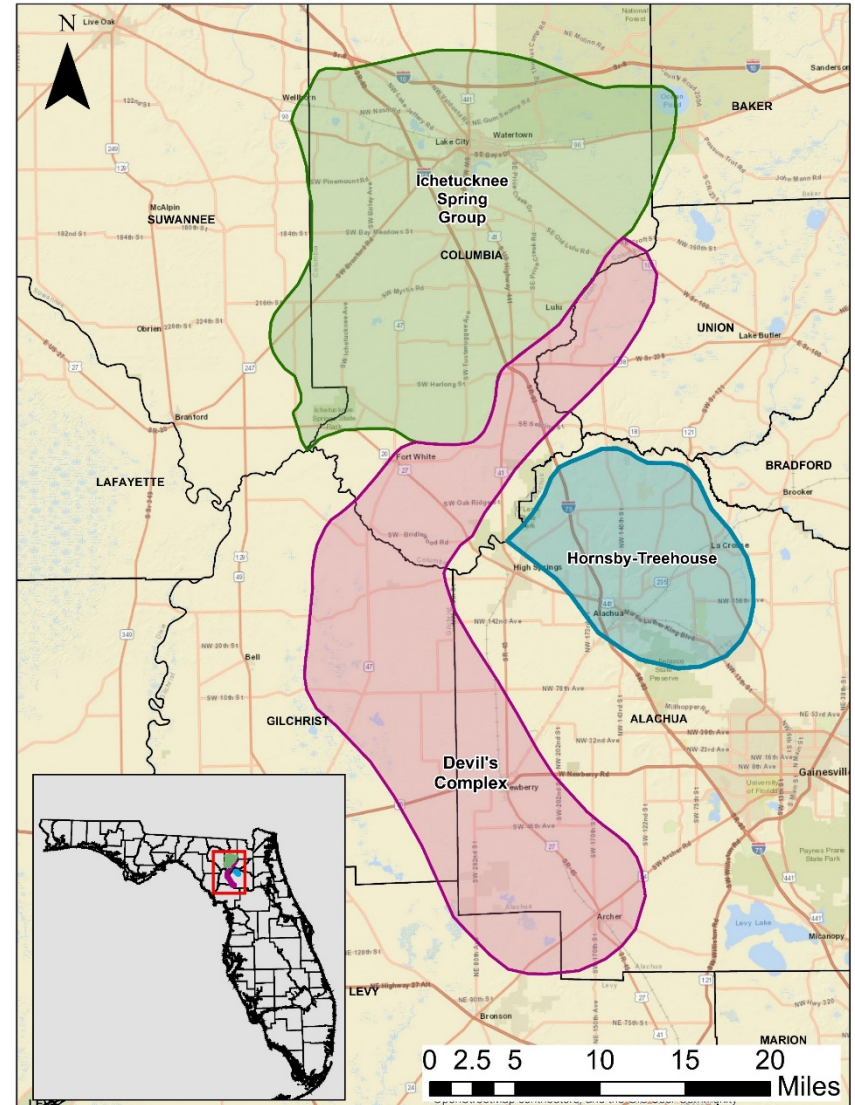
Additional not impaired OFS in BMAP

- **Columbia**
- **Poe**



Inventories Conducted for 3 Springshed Areas

Springshed Area	County	Acres
Devil's Complex	Gilchrist	78,922
Devil's Complex	Alachua	72,982
Devil's Complex	Union	21,126
Devil's Complex	Columbia	43,853
Devil's Complex	Levy	11,781
Ichetucknee	Baker	3,817
Ichetucknee	Suwannee	13,621
Ichetucknee	Union	48
Ichetucknee	Columbia	227,927
Hornsby	Alachua	77,520
Hornsby	Columbia	31

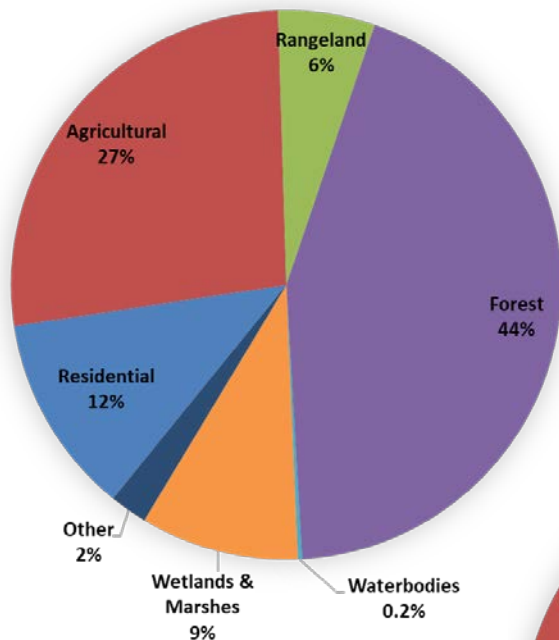


Evaluation included portions of 7 counties

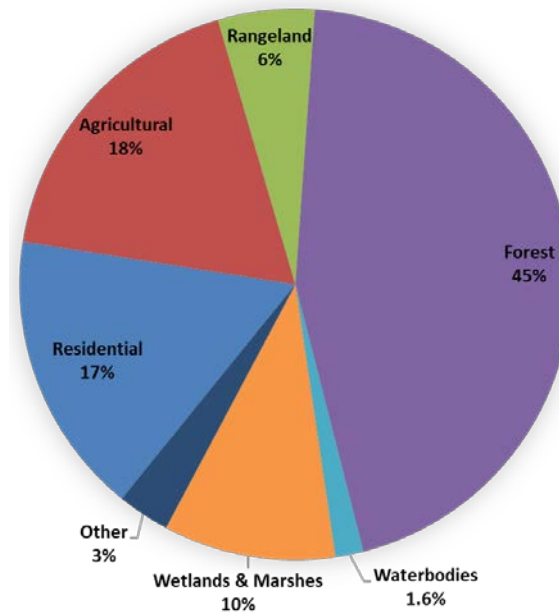


Land Use

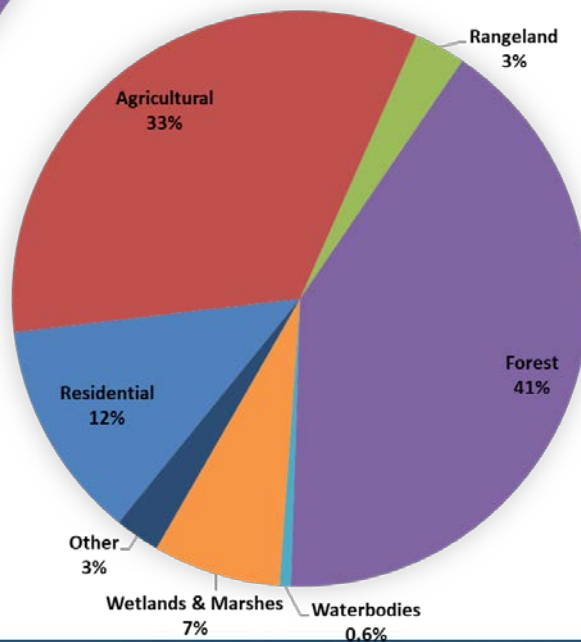
Devil's Complex



Ichetucknee



Hornsby



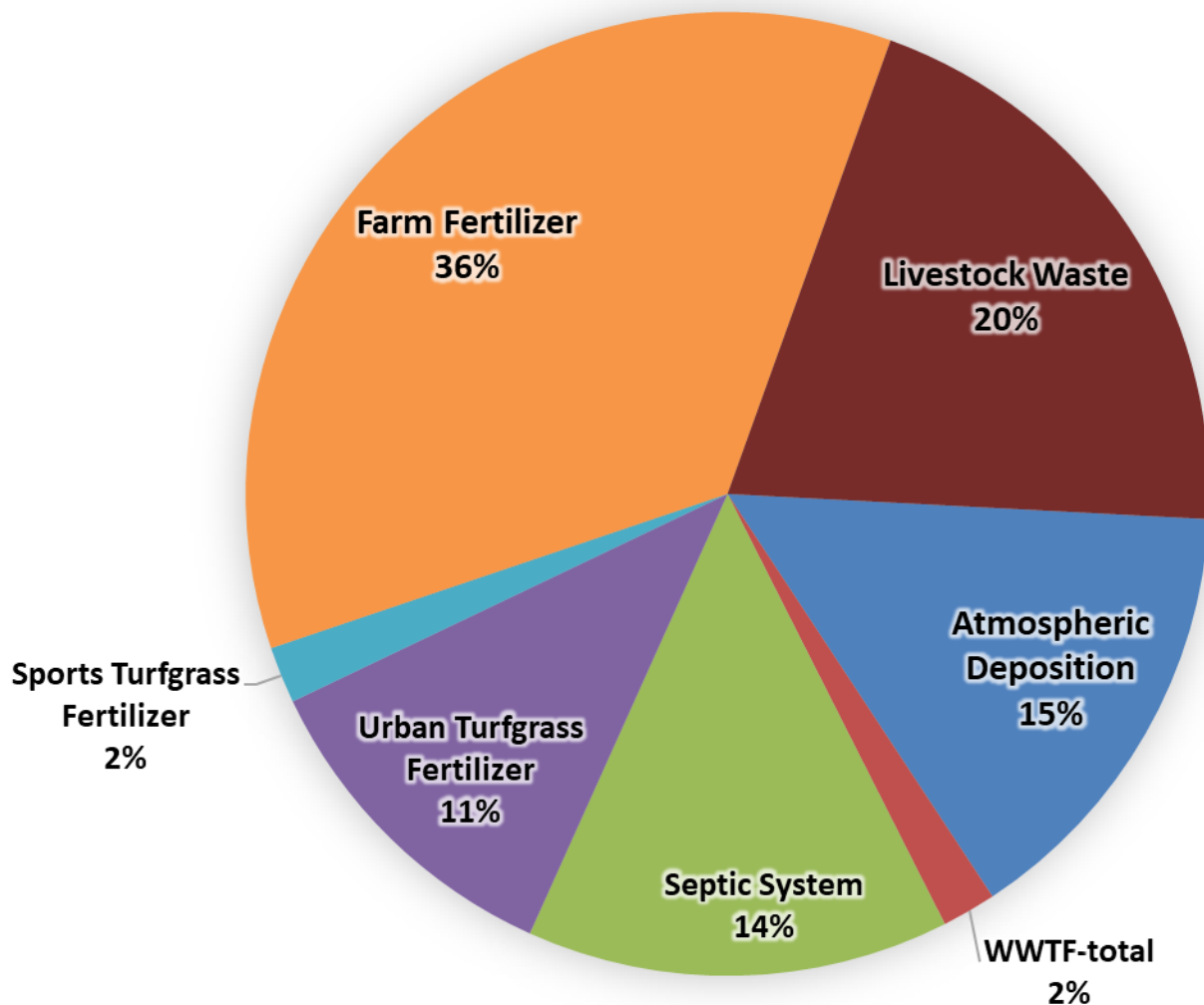


Source Categories

- Land Use evaluation provides potential groundwater sources of nitrate
 - Farm Fertilizer (FF)
 - Livestock Waste (LW)
 - Dairies
 - Urban Turfgrass Fertilizer (UTF)
 - Sports Turfgrass Fertilizer (STF)
 - Atmospheric Deposition (AD)
 - Wastewater Treatment Facilities (WWTP)
 - Onsite Treatment and Disposal Systems (OSTDS)

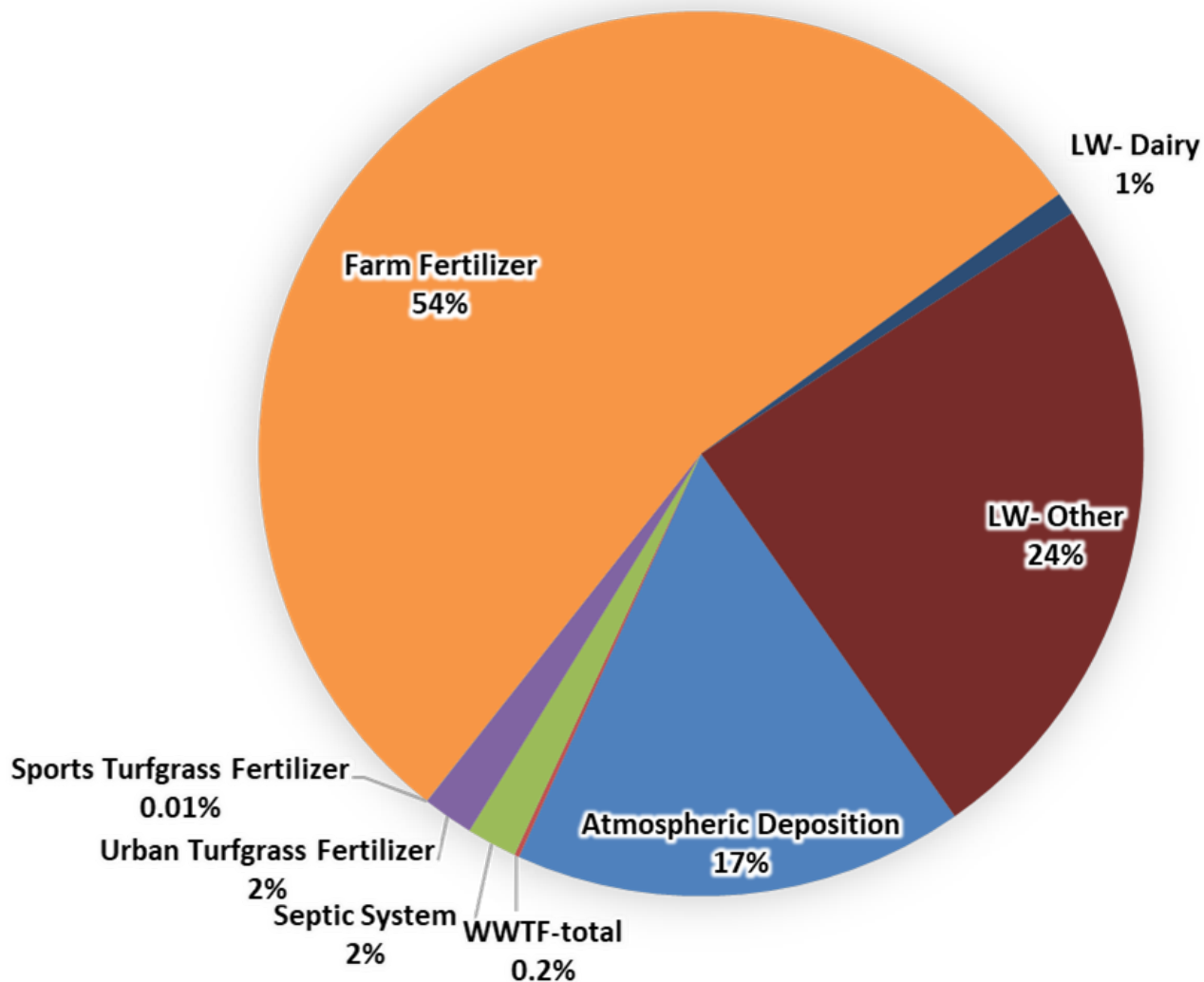


Ichetucknee- Nitrogen Load to Groundwater



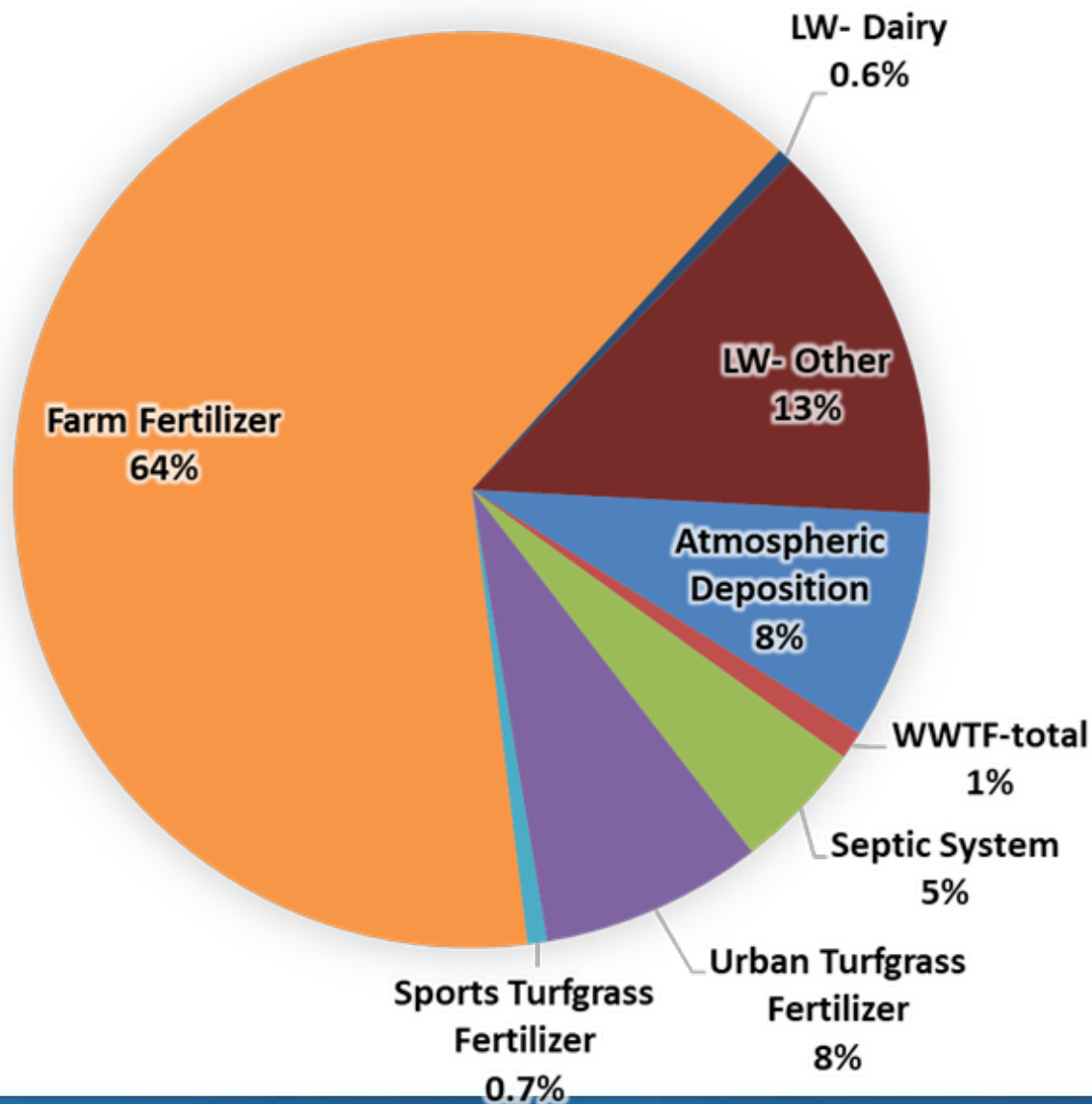


Devil's Complex- Nitrogen Load to Groundwater





Hornsby-Treehouse- Nitrogen Load to Groundwater



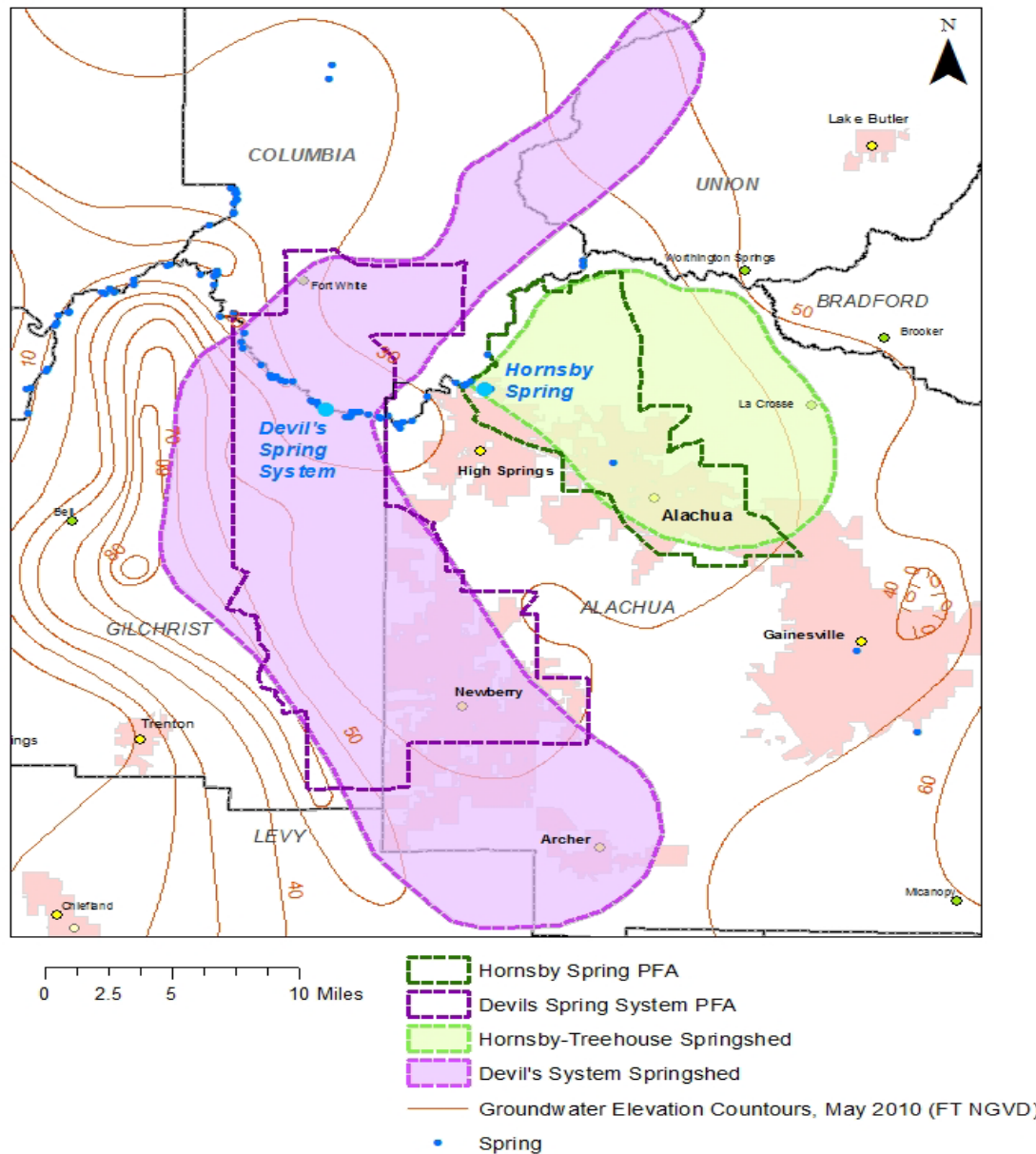


Source Categories

- Load to Groundwater evaluation provides comparison of potential groundwater sources of nitrate
 - Farm Fertilizer (FF)
 - Livestock Waste (LW)
 - Dairies
 - Urban Turfgrass Fertilizer (UTF)
 - Sports Turfgrass Fertilizer (STF)
 - Atmospheric Deposition (AD)
 - Wastewater Treatment Facilities (WWTP)
 - Onsite Treatment and Disposal Systems (OSTDS)



PFA – Boundaries





PFA Delineation

- Sub-Section 373.802, F.S.:
 - Definition: Area or areas of a basin where the Floridan Aquifer is generally most vulnerable to pollutant inputs where there is a known connectivity between groundwater pathways and an OFS
- Sub-Section 373.803, F.S.:
 - Delineation considers factors that may lead to degradation of an OFS, such as:
 - Groundwater travel time to the spring
 - Hydrogeology
 - Nutrient load, etc.



PFA Requirements

- Prohibitions

- Wastewater treatment facilities greater than 100,000 gallons per day (GPD), UNLESS advanced wastewater treatment (AWT) is used.
- New conventional OSTDS on less than one-acre lots.
- Ban on land application of Class A or B biosolids w/o approved NMP.
- New Hazardous waste facilities.

- Additional Requirements for Biosolids and Septage Application Practices

- Requirements for newly permitted sites or at renewal
- Verified BMPs for agricultural operations
- Effective nutrient management practices
- Groundwater monitoring requirements

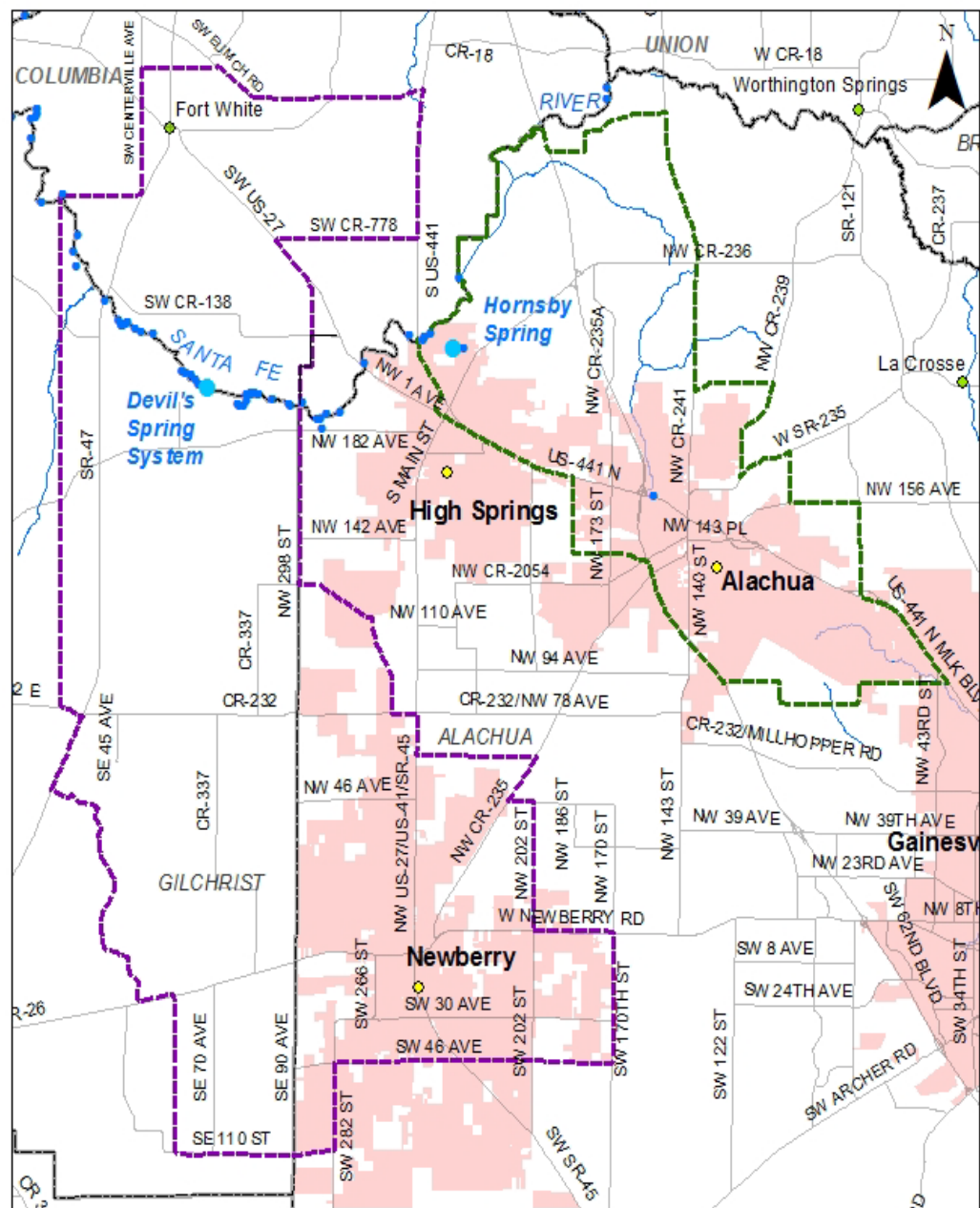


PFA Delineation

- Evaluate
 - Aquifer Recharge
 - Aquifer Vulnerability
 - Soil Leaching Potential
 - Land Elevation
 - Land Use
 - Conservation Lands
 - WWTP and OSTDS



PFA – Boundaries

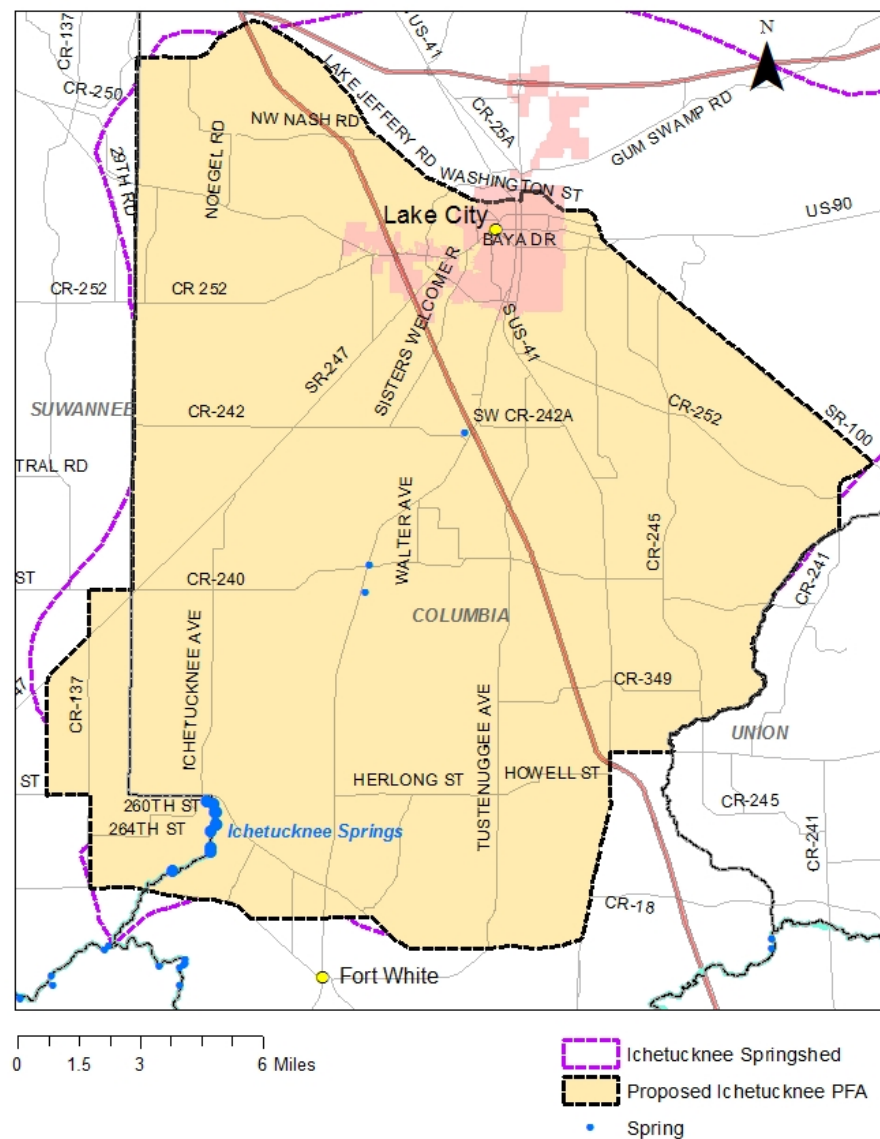


0 1.5 3 6 Miles

- Hornsby Spring PFA
- Devil's Spring System PFA
- Spring

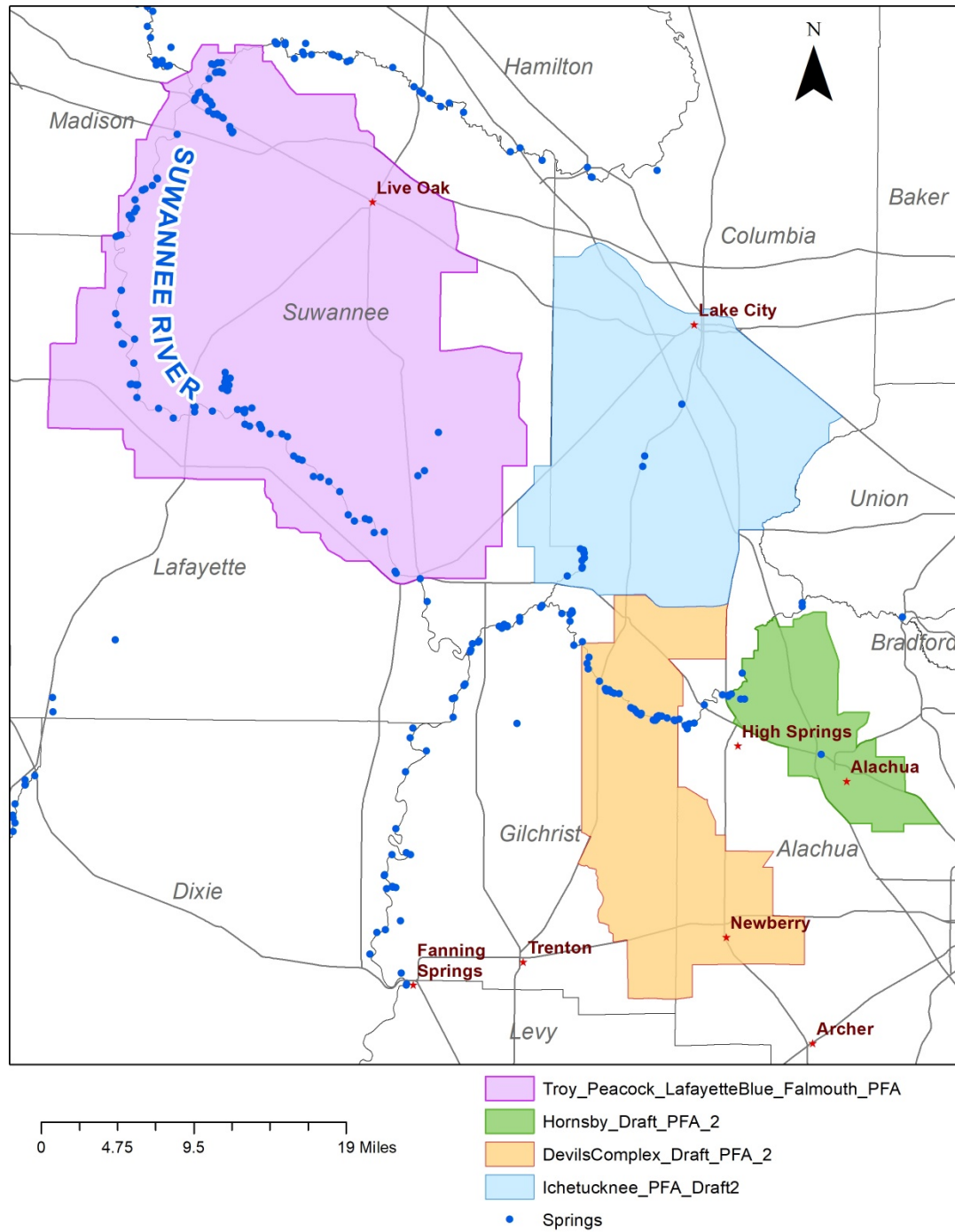


Ichetucknee PFA



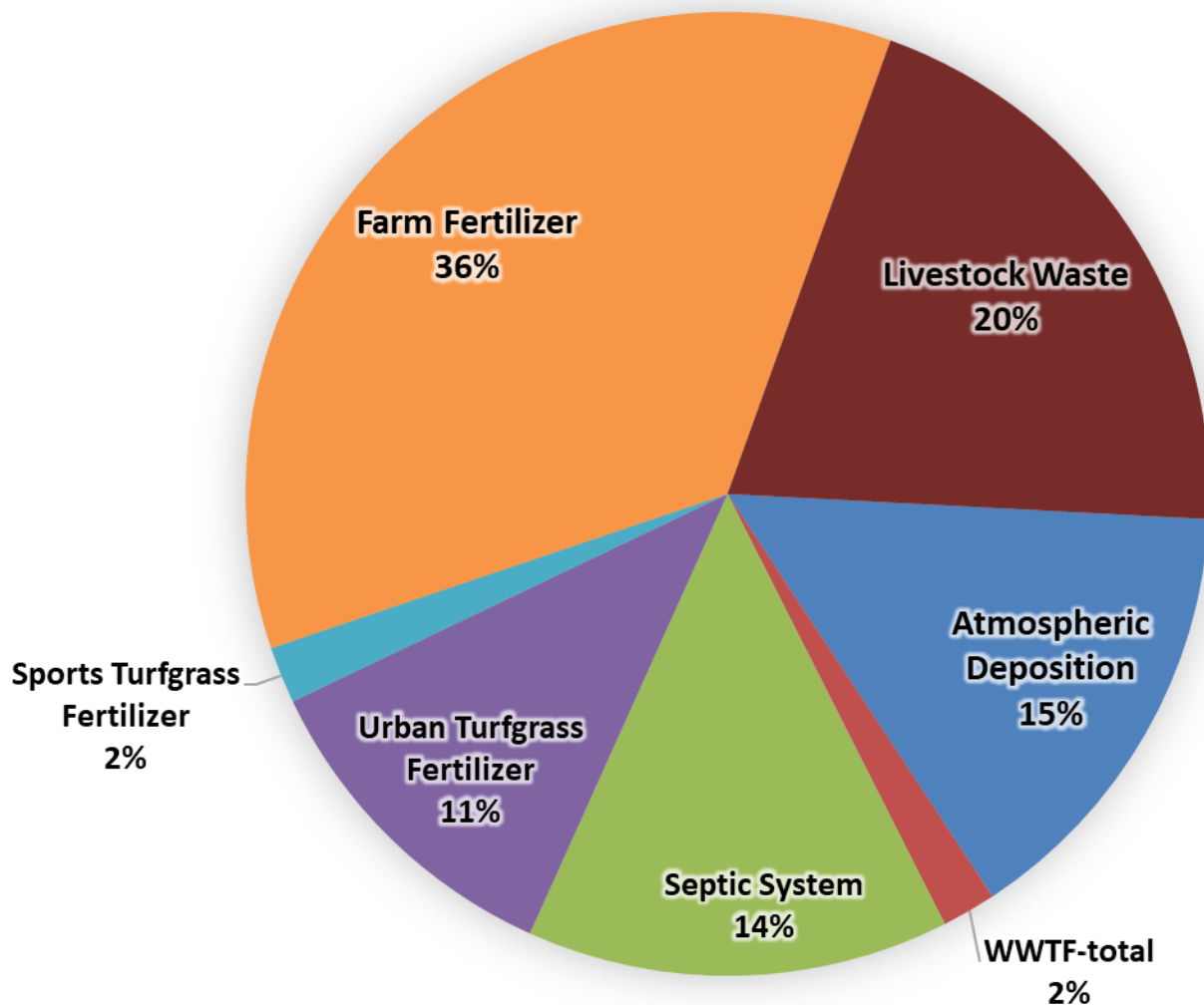


PFAs



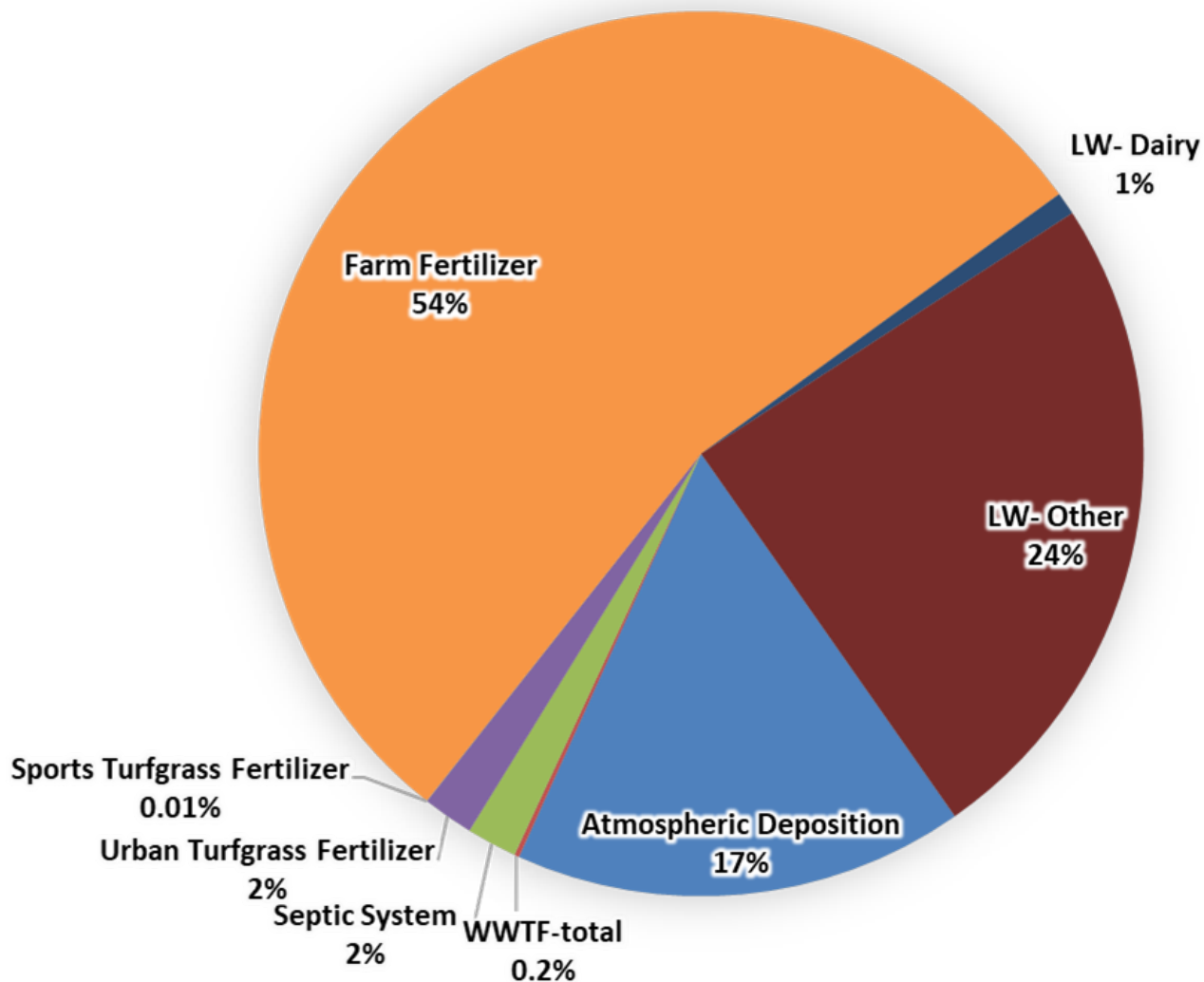


Ichetucknee- Nitrogen Load to Groundwater



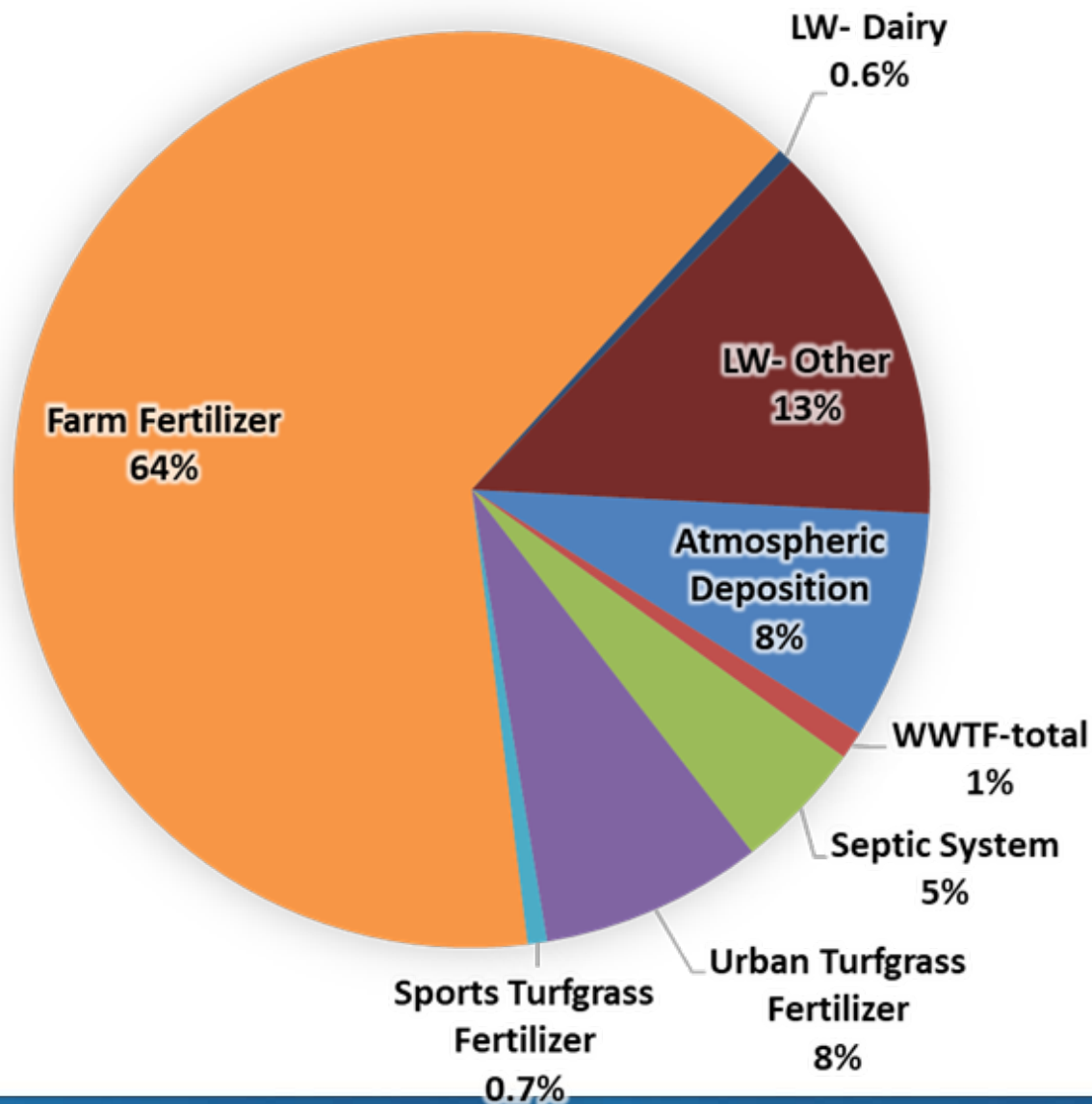


Devil's Complex- Nitrogen Load to Groundwater





Hornsby-Treehouse- Nitrogen Load to Groundwater



Project Credit Analysis		
Nitrogen Source	Credits to Load to Groundwater (lb-N/yr)	Description
Onsite Sewage Treatment and Disposal Systems (OSTDS)	12,000	Credits identified for stakeholder OSTDS projects (onsite enhancement or sewer)
Urban Turfgrass Fertilizer (UTF)	19,000	DEP approved credits (up to 6 %) for public education activities as well as credits identified for stakeholder stormwater projects
Atmospheric Deposition (AD)	-	No reduction
Farm Fertilizer Reductions	330,400	15 % BMP credit on FF load to groundwater, assuming 100 % owner-implemented verified BMPs on all fertilized lands (includes 98,000 from projects)
Sports Turfgrass Fertilizer (STF)	2,300	6 % BMP credit for sports fields and 10 % BMP credit for golf courses (where applicable) on STF load to groundwater, assuming 100 % BMP implementation on golf courses and sports fields
Permitted Dairy	7,400	15 % BMP credit on permitted dairy load to groundwater, assuming 100% owner-implemented verified BMPs at permitted dairies.(includes 200 from projects)
Livestock Waste	51,500	10 % BMP credit on load to groundwater, assuming 100 % owner-implemented verified BMPs at all livestock facilities
Wastewater Treatment Facilities (WWTF)	21,500	Achieved by BMAP WWTF policy if BMAP-wide (achieving 3 or 6 mg/L total nitrogen concentration at discharge)
Total Credits	444,000	



Total Santa Fe River BMAP Nitrogen Reductions

Total Reduction Required to Meet the TMDLs			
	Total Load at Spring Vents (lb-N/yr)	TMDL Load (lb-N/yr)	Required Reduction to Meet TMDL (lb-N/yr)
In Springsheds			
Ichetucknee	308,107	107,867	200,269
Devils Complex	1,899,233	664,731	1,234,501
Hornsby	435,385	152,385	152,385
Subtotal			1,717,771
Outside Springsheds and in BMAP Area			
West			62,454
East			73,148
Subtotal			135,602
Total			1,853,372
Project Credits			444,000
Remaining Load			1,410,000



Additional Potential Reductions

Existing OSTDS in PFAs (lb-N/yr)				
	High Recharge Area		Med. Recharge Area	
	Tanks	Credit	Tanks	Credit
Parcels <1 ac	5,162	27,000 lbs.	718	2,100 lbs.
Parcels >1ac	13,353	71,000 lbs.	2,712	7,900 lbs.



Additional Potential Reductions

Additional Ag Practices Estimated Reduction Credit (lb-N/yr)

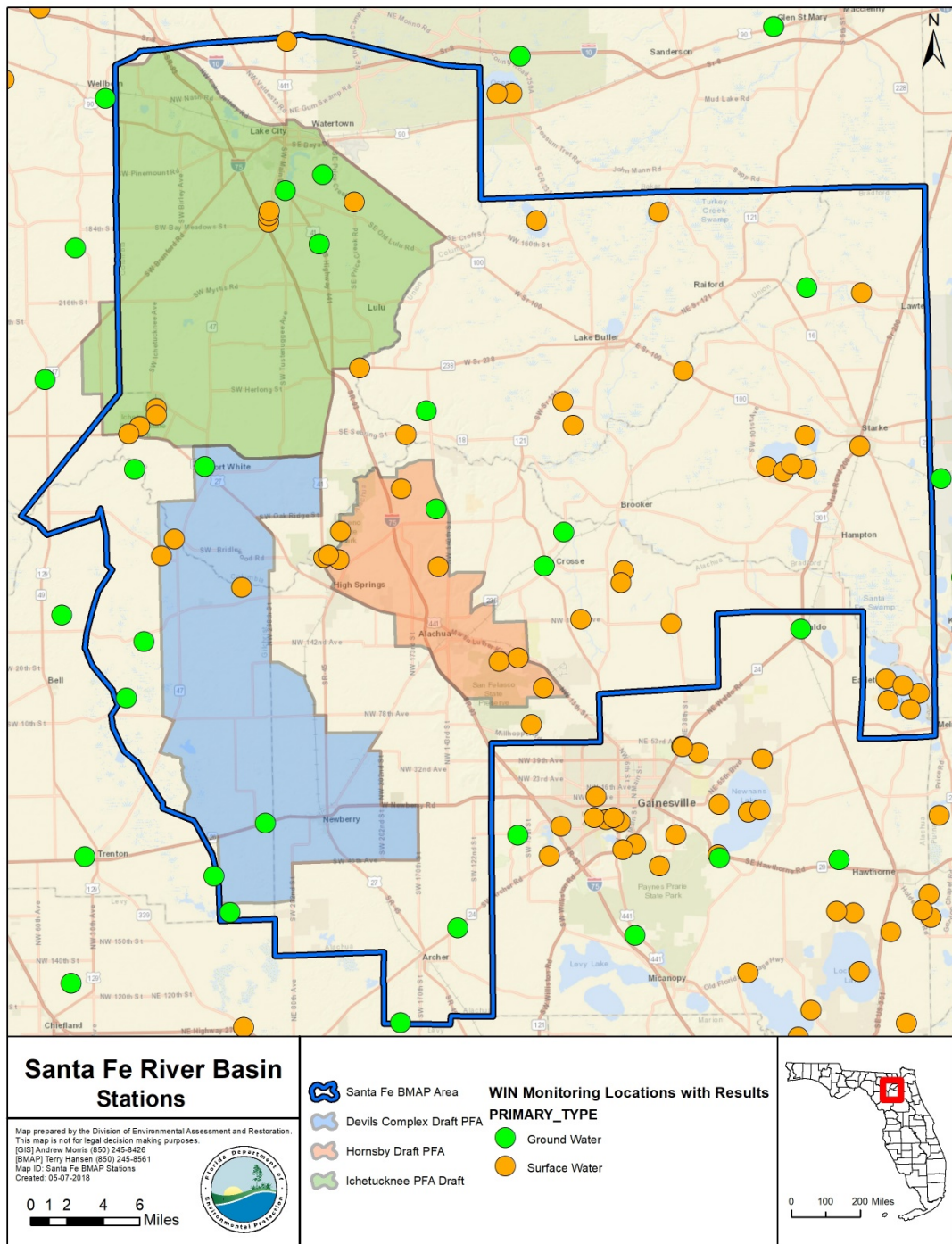
Action	High Recharge Area (100%)	Med. Recharge Area (100%)
Precision Irrigation	25,530	13,072
Precision Fertilization	184,751	102,640
Soil Moisture Probes	278,046	154,470
Controlled Release Fert.	47,714	26,508
Cover Crops	410,508	228,060
Banders	371,974	206,652

Additional Potential Reductions

	50% reduction in FF	10% Reduction in FF
100% Acreage (104,757 ac)	774,244 lbs	154,849 lbs



Monitoring





Statewide TMDL, BMAP, Minimum Flows and Levels (MFLs) Annual Report

- 403.0675(1), F.S. – requires a report that will include status of MFLs, TMDLs, and BMAPs
- Replacement of individual BMAP annual progress reports
- Annual meetings will continue
- Calendar year reporting
- Report will contain project information: funding, proposed priority ranking for implementation
- Progress made towards restoration goals
- Information will be requested in late November, due by the end of January
- Info. needed will include: entity activities, compliance, project information, and milestones
- Report is due to the Governor and Florida Legislature July 1, 2018 and every year thereafter

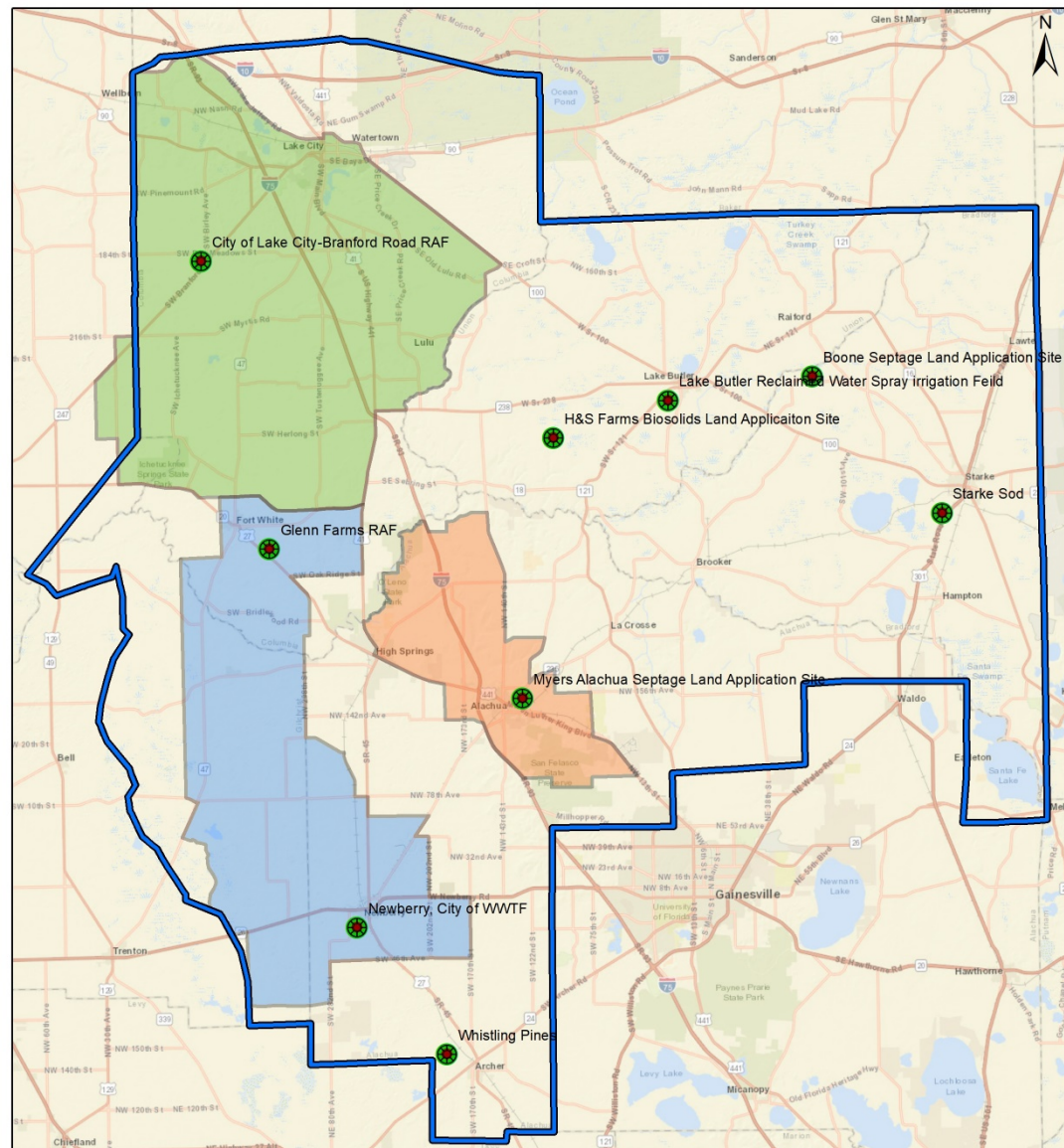


Questions?





Biosolids



Santa Fe River Basin BioSolids

Map prepared by the Division of Environmental Assessment and Restoration.
This map is not for legal decision making purposes.
[GIS] Andrew Morris (850) 245-8426
[BMAP] Terry Hansen (850) 245-8561
Map ID: Santa Fe BMAP BioSolids
Created: 05-07-2018

0 1 2 4 6
Miles



- Residual Application Sites from WAFR IMS
- Devils Complex PFA
- Santa Fe BMAP Area
- Hornsby PFA
- Ichetucknee PFA

