



Florida Department of Environmental Protection

Weeki Wachee Basin Management Action Plan (BMAP)

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Weeki Wachee Springs State Park





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

Monitor water
quality

Determine
pollution
problems

Excessive nutrients

*Bacteria, Metals, and
Other Impairments*

Develop and
implement
restoration
plans
(BMAPs)

Work with
community
leaders

Establish
restoration
goals
(TMDLs)

Gather additional data

Evaluate water quality

Adopt pollutant reduction targets

Allocate responsibilities

Identify projects

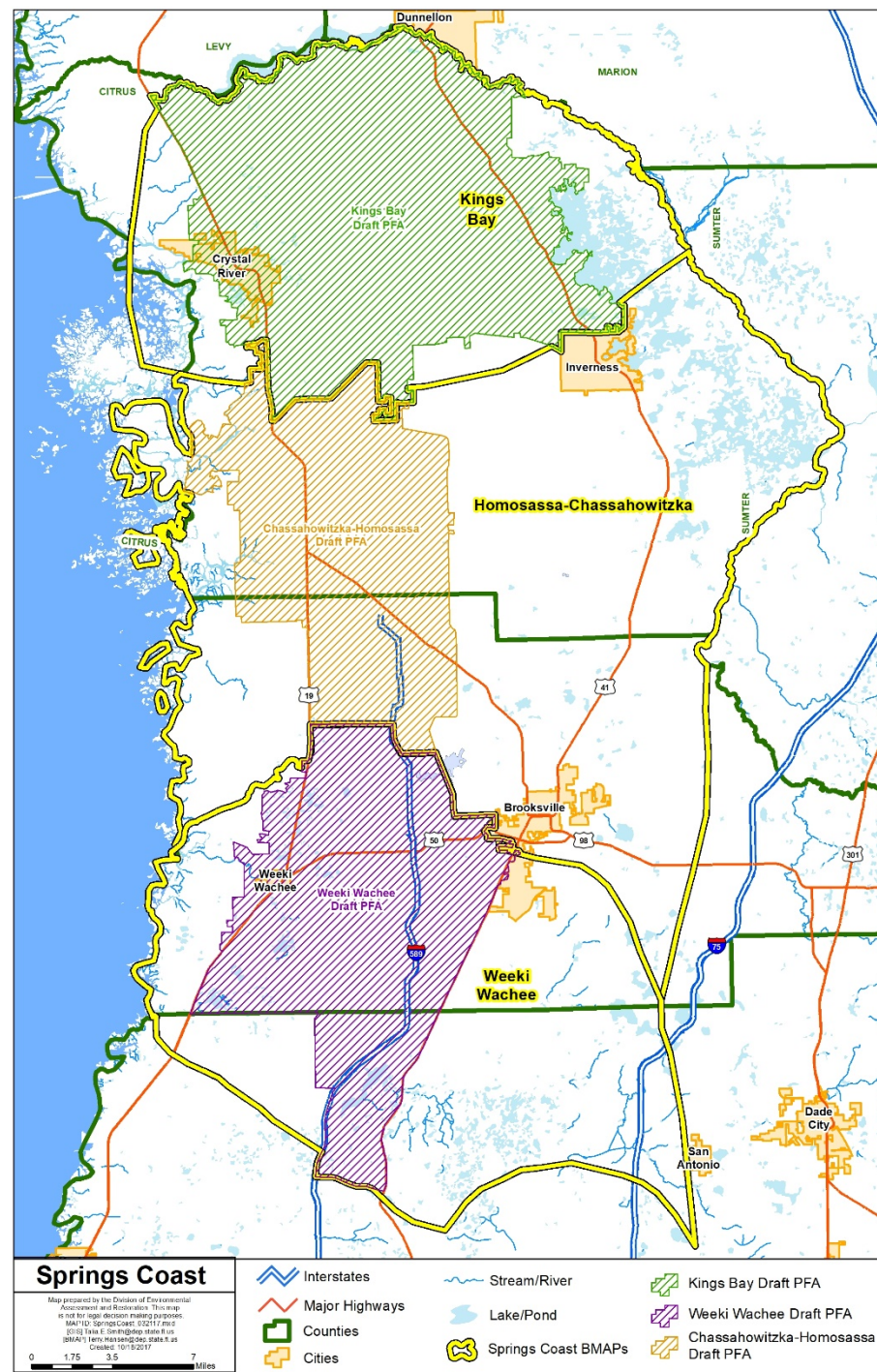
- Infrastructure
- Best Management Practices (BMPs)

Establish schedules

Identify success criteria

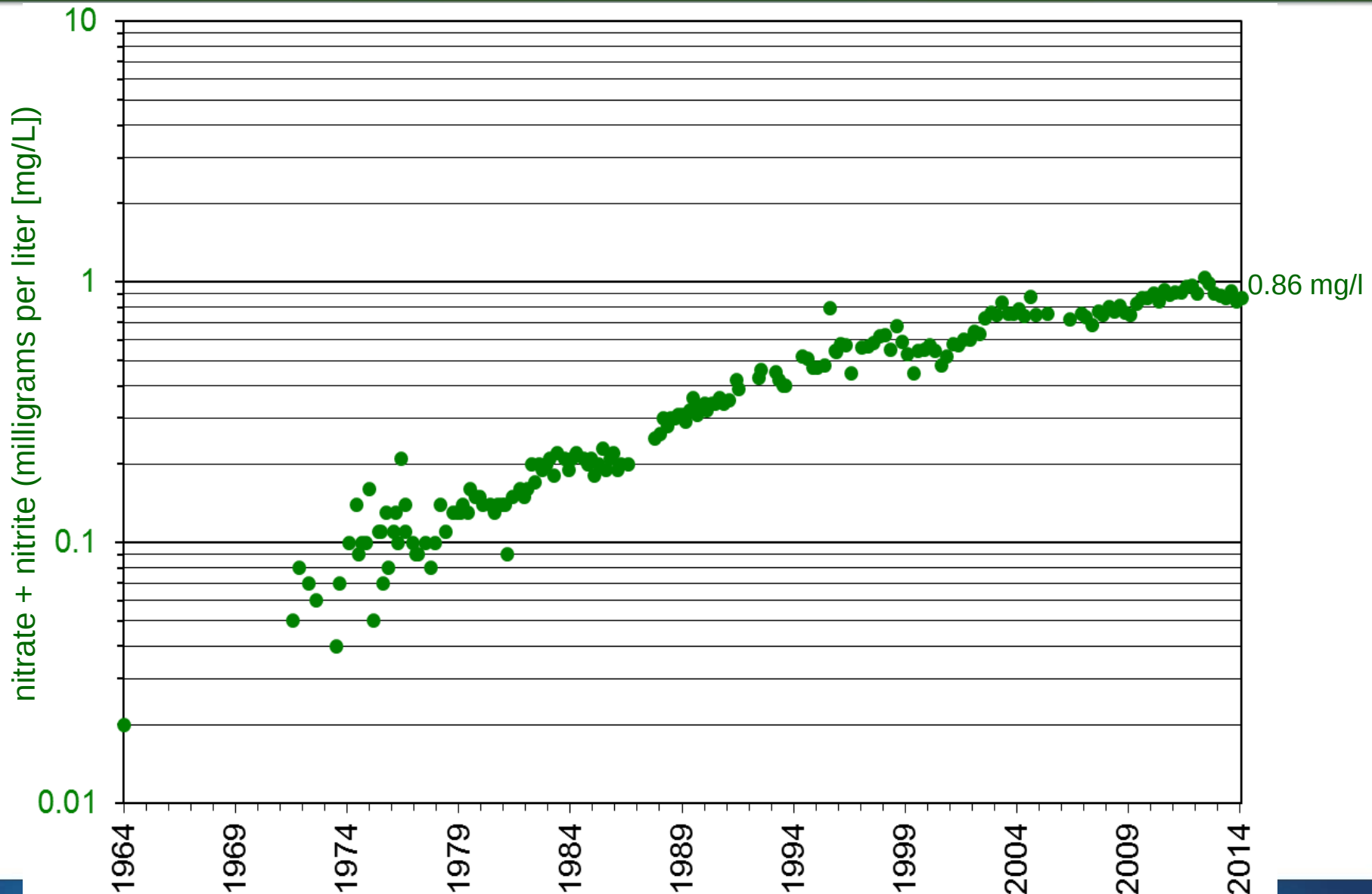


Springs Coast BMAP Study Areas and Priority Focus Areas (PFAs)





Nitrate Concentrations at Weeki Wachee Spring, 1964 to 2014 (Sources: U.S. Geological Survey [USGS] and Southwest Florida Water Management District [SWFWMD])





Weeki Wachee BMAP Nitrate Total Maximum Daily Loads (TMDLs)

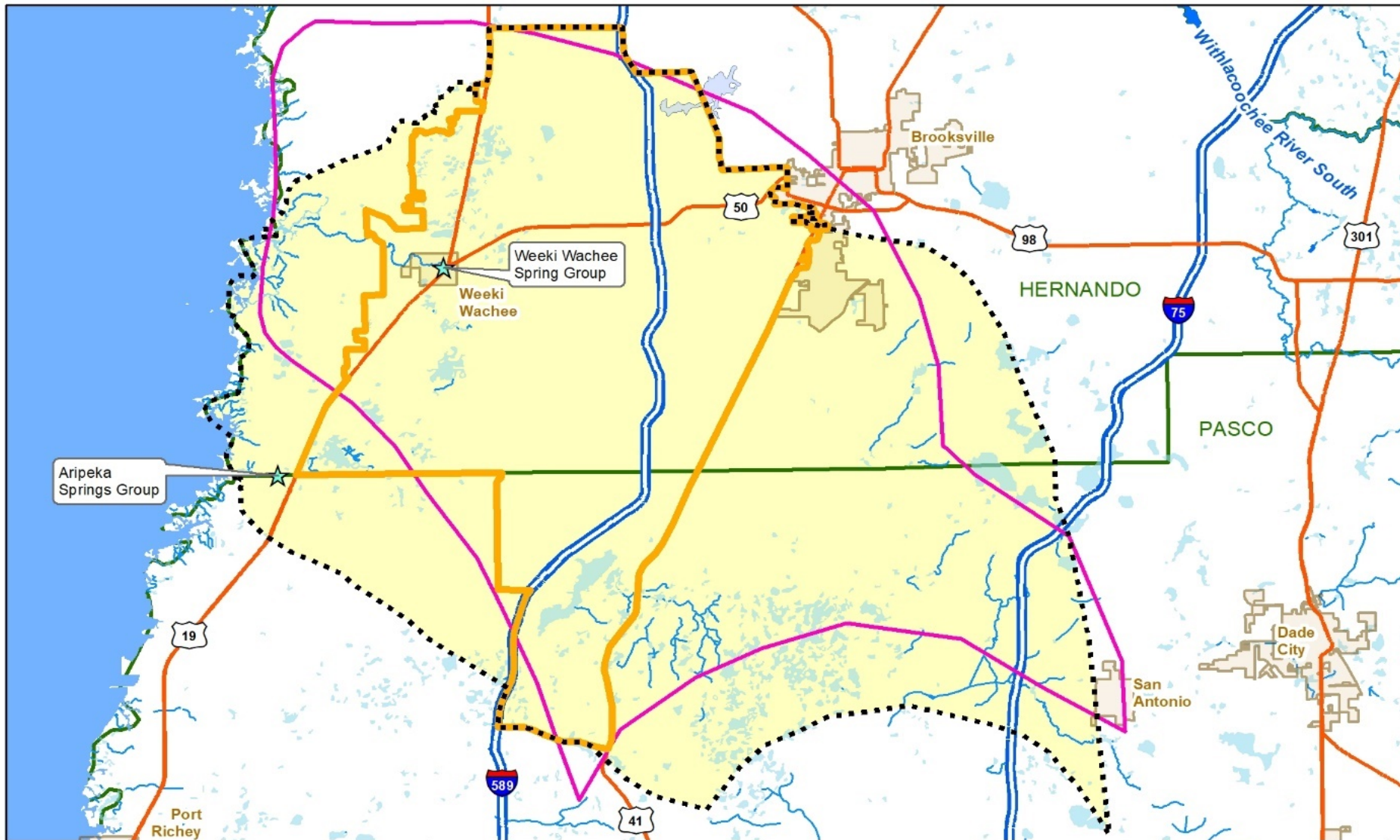
Waterbody or Spring Name	Waterbody Identification (WBID) Number	Parameter	TMDL (mg/L)
Weeki Wachee Spring	1382B	Nitrate, annual average	0.28
Weeki Wachee River	1382F	Nitrate, annual average	0.28
Magnolia-Aripeka Springs Group	1391B	Nitrate, annual average	0.23
Wilderness-Mud-Salt Springs Group	1382G	Nitrate, annual average	0.23
Jenkins Creek Spring	1389	Nitrate, annual average	0.23



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 Outstanding Florida Springs (OFS)
- PFA Report and Nitrogen Source Inventory Loading Tool (NSILT) developed by the Florida Department of Environmental Protection (DEP) for the Weeki Wachee Spring Group



Weeki Wachee BMAP

Map prepared by Division of Environmental Assessment and Restoration.
This map is not for legal decision making purposes.
MAP ID: Weeki_Wachee_Overview.mxd
[BMAP] Terry.Hansen@dep.state.fl.us (850) 245-8561
[GIS] Talia E Smith (850) 245-8539
Created: 09-22-17



0 1.75 3.5 7 Miles



Springs



Springsheds



Stream River



Waterbodies



Florida Counties



PFA



Cities



Interstate



Primary and US Highways



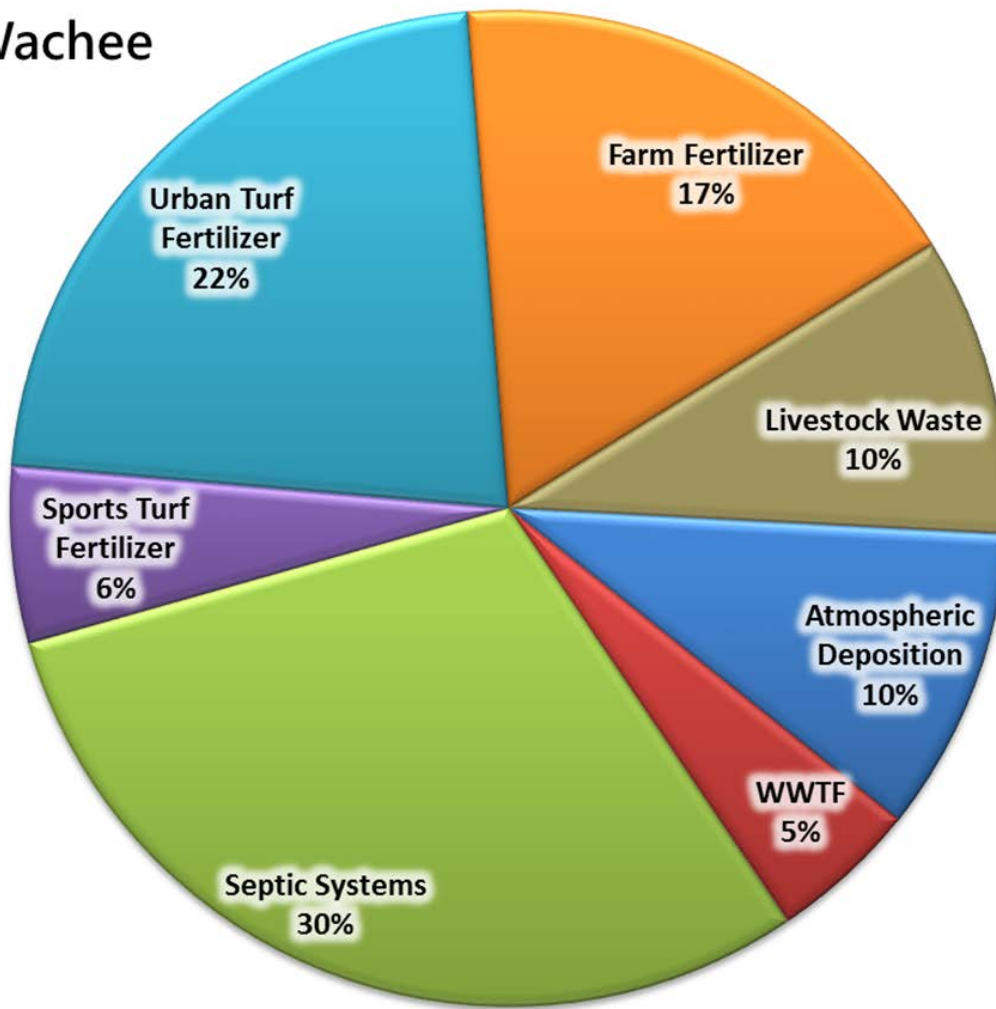
Weeki Wachee BMAP





Weeki Wachee Nitrogen Loading to Groundwater in Springshed

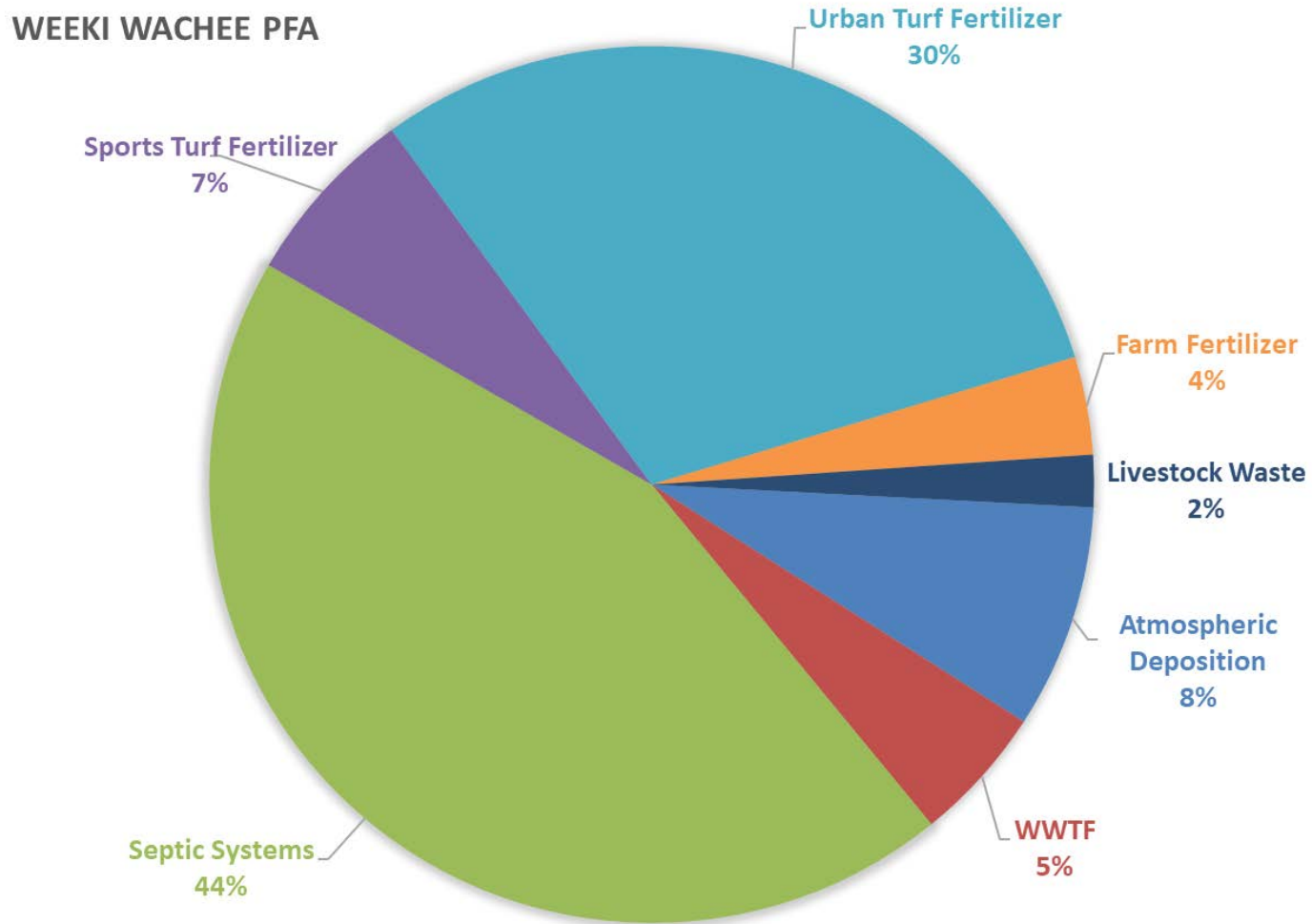
Weeki Wachee



Estimated Load to Groundwater in Springshed: 940,144 pounds of nitrogen per year (lb-N/yr)



Weeki Wachee Nitrogen Loading to Groundwater in PFA

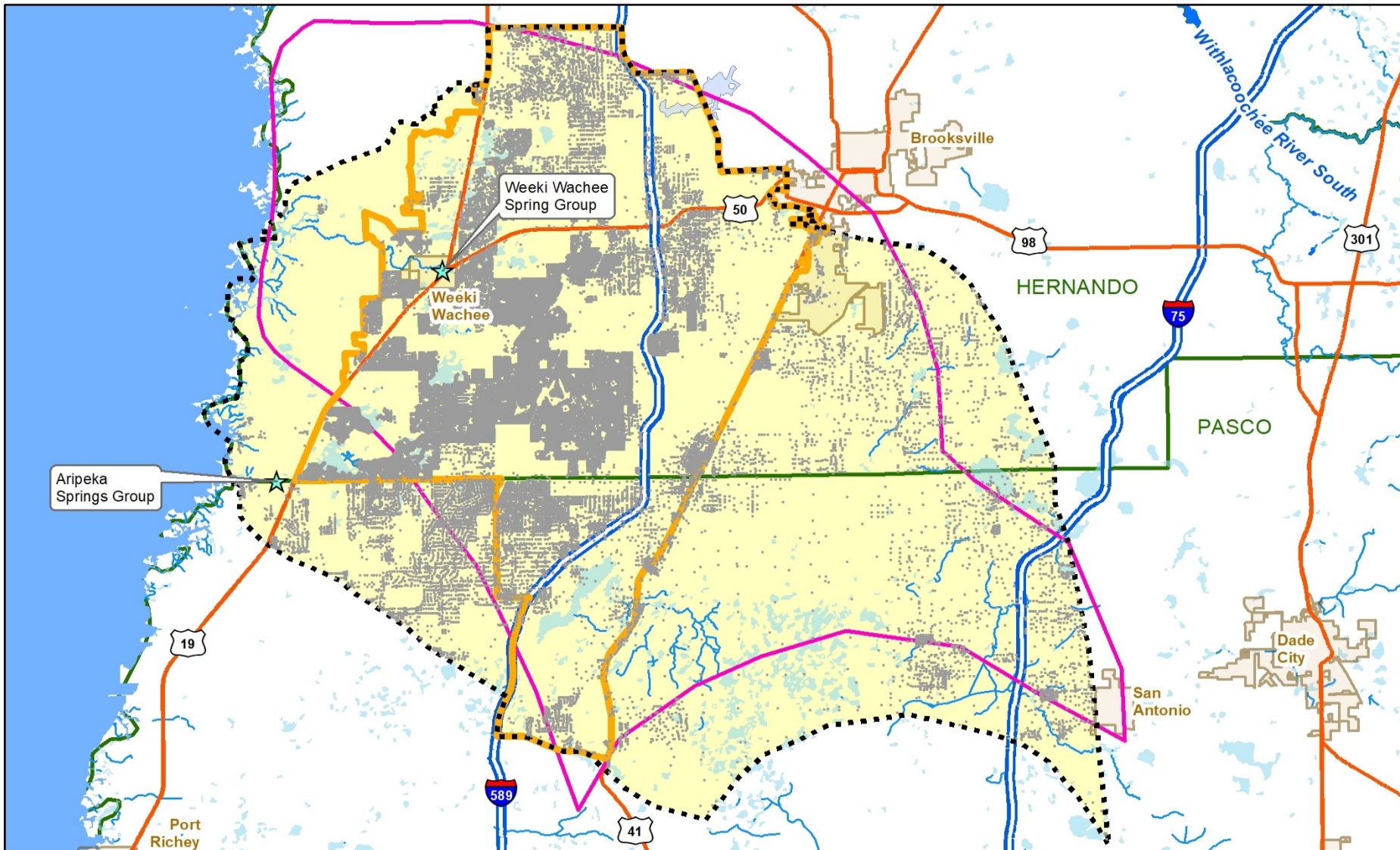


Estimated Load to Groundwater in PFA: 654,209 lb-N/yr



Weeki Wachee Onsite Sewage Treatment and Disposal System (OSTDS) Remediation Plan

- The Florida Springs and Aquifer Protection Act mandates that a BMAP with OSTDS contributing at least 20 % of nonpoint source load within a PFA include an OSTDS Remediation Plan (here, 44 %)
- The Weeki Wachee OSTDS Remediation Plan includes:
 - Public education plan
 - Scientific information on effect of nutrients on springs
 - Projects designed to reduce nutrient impacts from OSTDS
- The OSTDS Remediation Plan is included as an appendix in the BMAP



Weeki Wachee BMAP OSTDS

Map prepared by Division of Environmental Assessment and Restoration.
This map is not for legal decision making purposes.
MAP ID: Weeki_Wachee_OSTDS.mxd
[BMAP] Terry.Hansen@dep.state.fl.us (850) 245-8561
[GIS] Talia E Smith (850) 245-8539
Created: 09-22-17



0 1.75 3.5 7 Miles

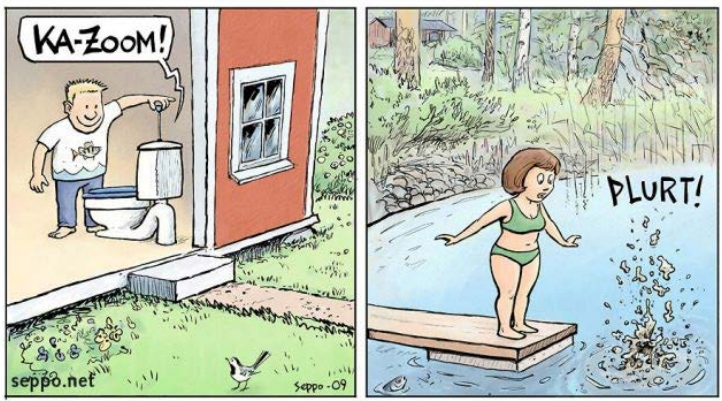
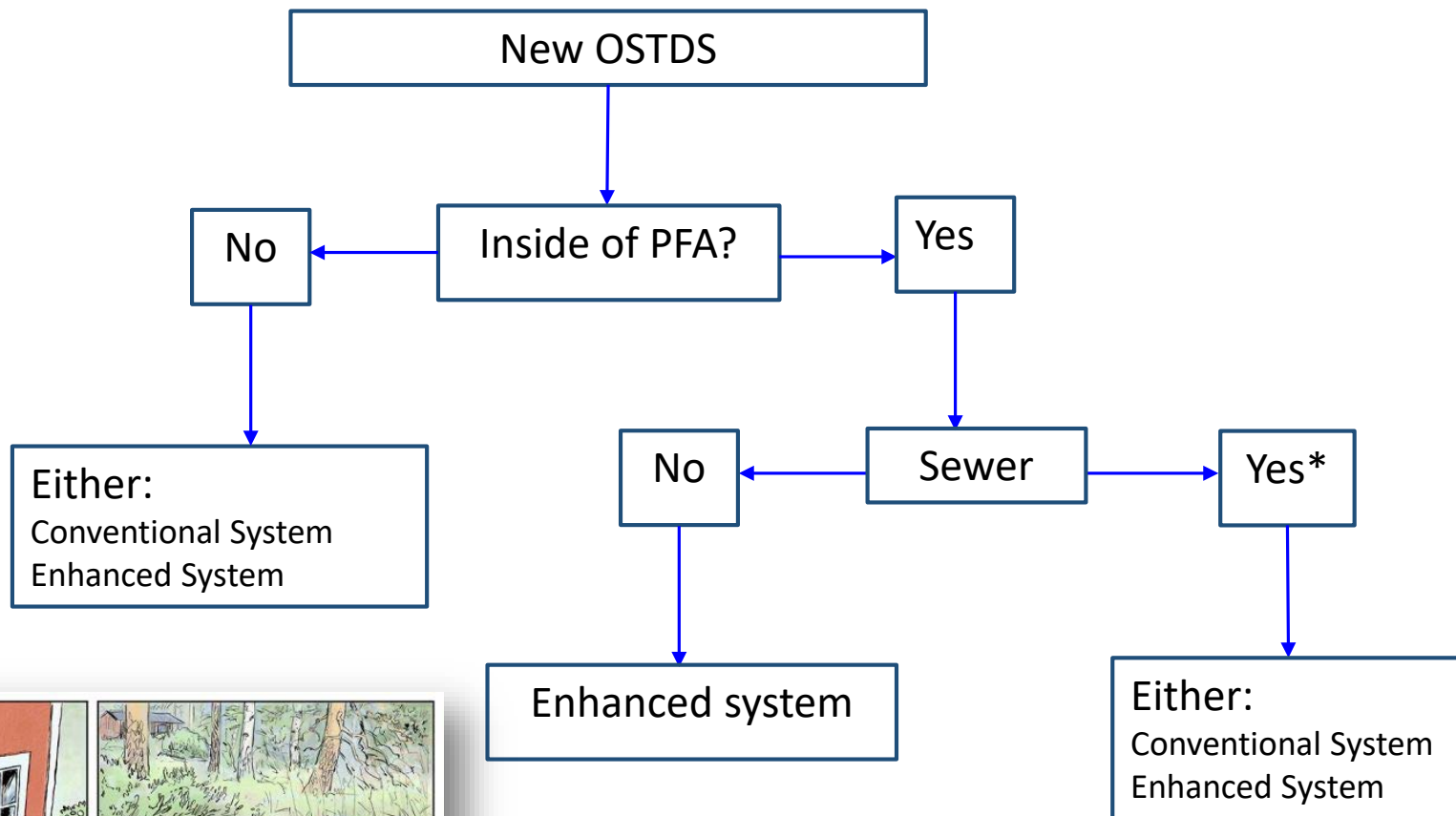
-  Springs
-  Springsheds
-  Stream River
-  Waterbodies
-  Florida Counties

-  OSTDS
-  PFA
-  Cities
-  Interstate
-  Primary and US Highways
-  Weeki Wachee BMAP





BMAP Policies – OSTDS



*Must connect to sewer when available



TMDLs / BMAP

- To achieve the TMDLs, BMAP implementation will be a 20-year process
- Plan will define nitrogen reduction milestones:
 - 30% reduction within 5 years
 - 50% reduction within 10 years
 - 20% reduction within 15 years
 - Use last 5 years to finish up and see results





Nitrogen Load to Groundwater (NSILT) in Springshed

Nitrogen Source	Estimated Total Nitrogen Load to Groundwater (lb-N/yr)	Percent Contribution
OSTDS	282,875	30%
Urban Turfgrass Fertilizer	209,833	22%
Atmospheric Deposition	93,208	10%
Farm Fertilizer	163,935	17%
Sports Turfgrass Fertilizer	53,841	6%
Livestock Waste	91,347	10%
Wastewater Treatment Facilities	45,105	5%
Total	940,144	100%



Reduction to Meet the TMDLs

Required Reduction to Meet the TMDLs		
Description	Nitrogen Loads (lb-N/yr)	Notes Regarding Data Used
Total Load at Spring Vents	289,000	Upper 95% confidence interval - nitrate data and flow data from 2000 to 2017 (170 cfs)
TMDL Load	93,800	TMDL target is 0.28 mg/L and using the same flow data from 2000 to 2017
Required Reduction	195,200	

cfs = cubic feet per second

mg/L = milligrams per liter



BMAP Gap Analysis

Nitrogen Source	Credits Based on Project Tables (lb-N/yr)	Description
OSTDS	27,538	Credits identified for stakeholder OSTDS projects (enhancement or sewer)
Urban Turf Fertilizer	5,230	DEP approved credits (up to 6%) for public education activities as well as credits identified for stakeholder stormwater projects
Atmospheric Deposition	–	No reduction
Farm Fertilizer (FF)	24,590	15% BMP credit on FF load to groundwater, assuming 100% owner-implemented BMPs on all fertilized lands
Sports Turf Fertilizer (STF)	5,342	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
Livestock	9,135	10% BMP credit on load to groundwater, assuming 100% owner-implemented BMPs at all livestock facilities
Wastewater Treatment Facility (WWTF)	33,058	Achieved by BMAP WWTF policy (achieving 3 or 6 mg/L)
Total Credits	158,164	(Includes 53,272 lb-N/yr from Pasco County Restoration Project FY17/18)
Required Reduction	195,200	Load Remaining: 37,036



Closing the OSTDS Gap

- BMAP will contain an OSTDS remediation plan.
- DEP & FDOH will work together to implement it.
- To be most successful, local funding needs to be available to homeowners:
 - For example: grant programs for assisting homeowners, with costs administered by county.
 - Best if administered at the local level.
 - State funding for such grant programs is available.



OSTDS Options

- **OSTDS enhancement** (defined as 65+ % nitrogen reduction).
- FDOH approved options in Florida:
 - Aerobic Treatment Units (ATU) meeting the NSF 245 standard.
 - Passive nitrogen-reducing, in-tank systems tested by FDOH study:
Florida Onsite Sewage Passive Nitrogen Reduction Strategies Study
- FDOH innovative system testing process is evaluating more options, such as:
 - Performance based treatment systems (PBTS).
 - Media filter systems
 - <http://www.floridahealth.gov/environmental-health/onsite-sewage/products/documents/pbts-components.pdf>
- **OSTDS sewerage.**
 - BMAP has new wastewater disposal requirements for nitrogen.



OSTDS Remediation Plan

- Which systems must be enhanced or sewerer?
- What is the deadline for enhancing or sewerer?
 - Upon needing a permit for new, modified, or repaired OSTDS.
 - Unless sewer is available or described as becoming available in a BMAP project.
 - Backstop: In areas where enhancement or sewer is required, all OSTDS loads must be reduced no later than 20 years after BMAP adoption.
- When does this start?
 - As soon as the BMAP is adopted.
 - By law, BMAP must be adopted before July 1, 2018.



Options to Reduce Remaining Load

Estimated Reduction Credits for Additional OSTDS Enhancement OR Sewer

Recharge Area	BMAP Policy: OSTDS Parcels Less Than One Acre in PFAs	Credit for Enhancement (lb-N/yr)	Credit for Sewer (lb- N/yr)	OSTDS Parcels One Acre and Greater in PFAs	Credit for Enhancement (lb-N/yr))	Credit for Sewer (lb- N/yr)
High	29,840	158,152	229,768	5,847	30,989	45,022
Medium	0	0	0	0	0	0
Total	29,840	158,152	229,768	5,847	30,989	45,022

OSTDS That Could Be Converted to Sewer

Project #	OSTDS #	Estimated Reduction (lb-N/yr)
COB-2	75	578
COB-3	300	2,310
HC-3	30,000	231,000
Total	30,375	233,888



Ag Options to Reduce Remaining Load

Estimated Reduction Credits for Advanced Agricultural Practices

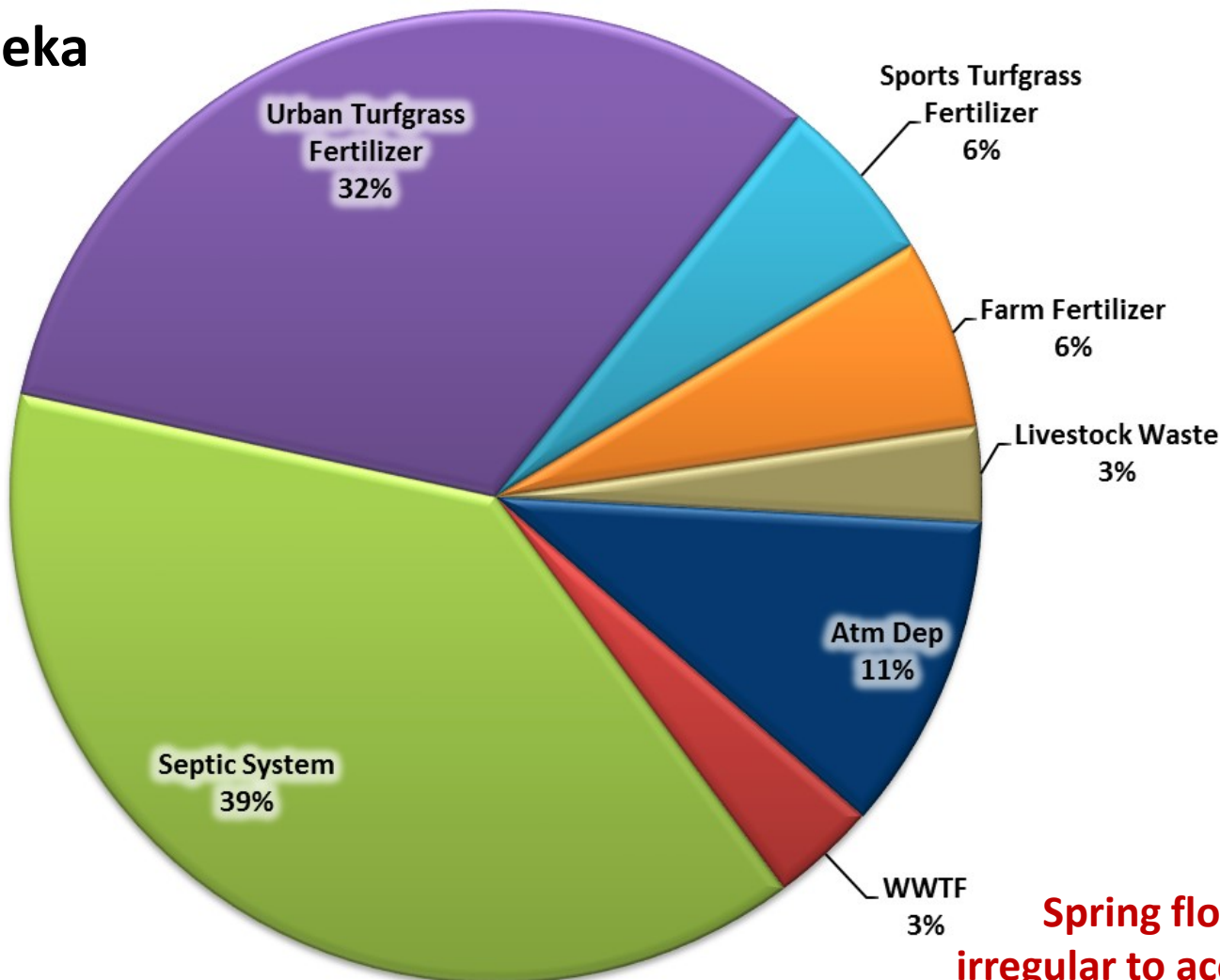
Action	Estimated Reduction Credit (lb-N/yr) High Recharge	Estimated Reduction Credit (lb-N/yr) Medium Recharge
Precision Irrigation	3,129	1,739
Soil Moisture Probes	41,545	20,773
Cover Crops	38,394	21,330
Total	83,068	43,842





Magnolia-Aripeka Springs Nitrogen Loading to Groundwater

Magnolia-Aripeka Springs



Spring flow is too irregular to accurately calculate TMDL load.

Estimated Load to Groundwater: 138,000 lb-N/yr



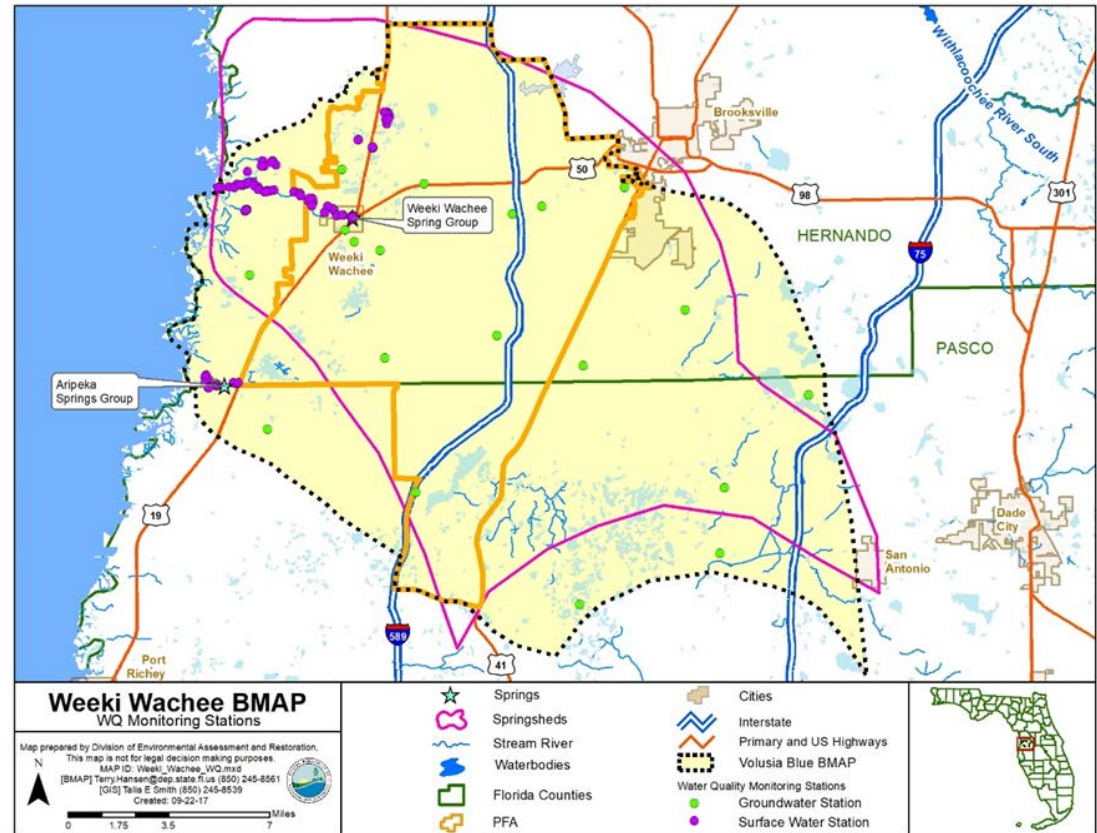
Suggested Magnolia-Aripeka Springs Nitrogen Reduction Guidelines by Source

Source	Estimated Portion of Total Load (%)	Estimated Total Nitrogen Load to Groundwater (lb-N/yr)
OSTDS	39%	53,129
Urban Turfgrass Fertilizer	32%	43,719
Atmospheric Deposition	11%	14,550
Farm Fertilizer	6%	8,710
Sports Turfgrass Fertilizer	6%	8,710
Livestock Waste	3%	4,358
WWTF	3%	4,824
Totals	100%	138,000



Next Steps

- Comments deadline is January 26, 2018
- BMAP adoption in February 2018
- Water quality monitoring to determine improvements
- Annual review of project accomplishments and adherence to schedule
- Five-year revisions of BMAP and NSILT





QUESTIONS??



Photo: SWFWMD



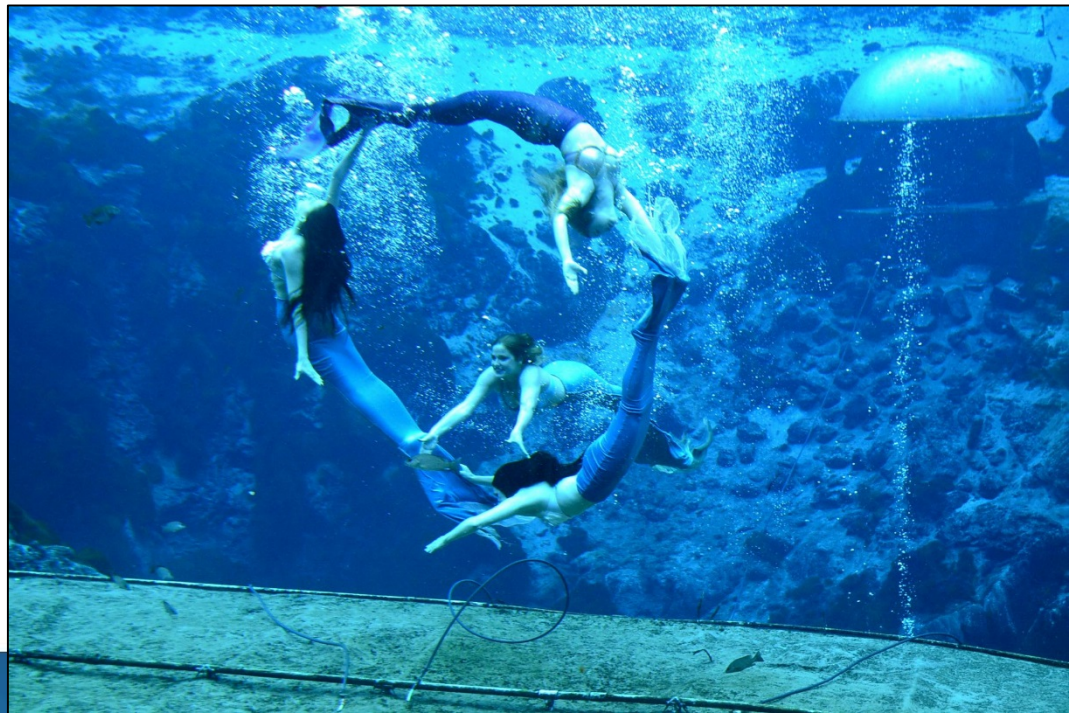
Basin Management Action Plan

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<http://www.dep.state.fl.us/water/>

<http://publicfiles.dep.state.fl.us/DEAR/BMAP/Springs Coast/Weeki Wachee/>





OSTDS Options

The Springs Coast BMAPs basically requires OSTDS systems to have a minimum nitrogen-reducing efficiency of 65%. In Florida, the following systems have been approved and have more than 65% of nitrogen-reducing efficiency (plus the drainfield attention).

1. Aerobic Treatment Units (ATU) technologies that meet the NSF 245 standard. The following are systems that fall within this categories:
 - Cajun Aire Advanced 500 (Acquired Wastewater Technologies, LLC)
 - MicroFast 0.5 (Bio-Microbics, Inc.)
 - Ecopod-N E50-N (Delta Environmental Products, Inc.)
 - Fuji Clean CEN 5 (Fuji Clean USA)
 - Singulair TNT (Norweco, Inc.)
 - Hydro-Kinetic 600 FEU (Norweco, Inc.)
 - Advantex AX20N Model (Orenco Systems)
2. A set of performance based treatment systems (PBTS) and media filter systems that are being tested by FDOH through the innovative system testing processes. <http://www.floridahealth.gov/environmental-health/onsite-sewage/products/documents/pbts-components.pdf>.
3. Passive nitrogen-reducing in-tank systems tested through the Florida Onsite Sewage Passive Nitrogen Reduction Strategies Study.



OSTDS Options Costs

- For ATUs that meet the NSF 245 Standard, PBTS, and media filter systems, the estimated construction cost is about \$13,000. The life cycle (30 years) operation and maintenance cost is about \$12,000, with about \$1,500 for permit and compliance.
- For passive nitrogen-reducing in-tank systems, the estimated construction cost is about \$19,000. The life cycle (30 years) operation and maintenance cost is about \$9,000, with about \$4,000 for permit and compliance.