



Florida Department of Environmental Protection

Basin Management Action Plan (BMAP) Weeki Wachee and Aripeka Springs

September 29, 2016

Terry Hansen P.G., Basin Coordinator

850-245-8561

terry.hansen@dep.state.fl.us





Topics

- Priority Focus Area (PFA)
- Nitrogen Source Inventory Loading Tool (NSILT)
(Updated)
 - Necessary reductions
 - Additional nitrogen source reduction measures
- Septic System Testing Data
- Fertilizer Ordinance Updates



PFA



PFA Requirements

- Sub-Section 373.802, Chap. 2016-1 Laws of Florida:
 - 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 ground water pathways and an Outstanding Florida Spring (OFS).



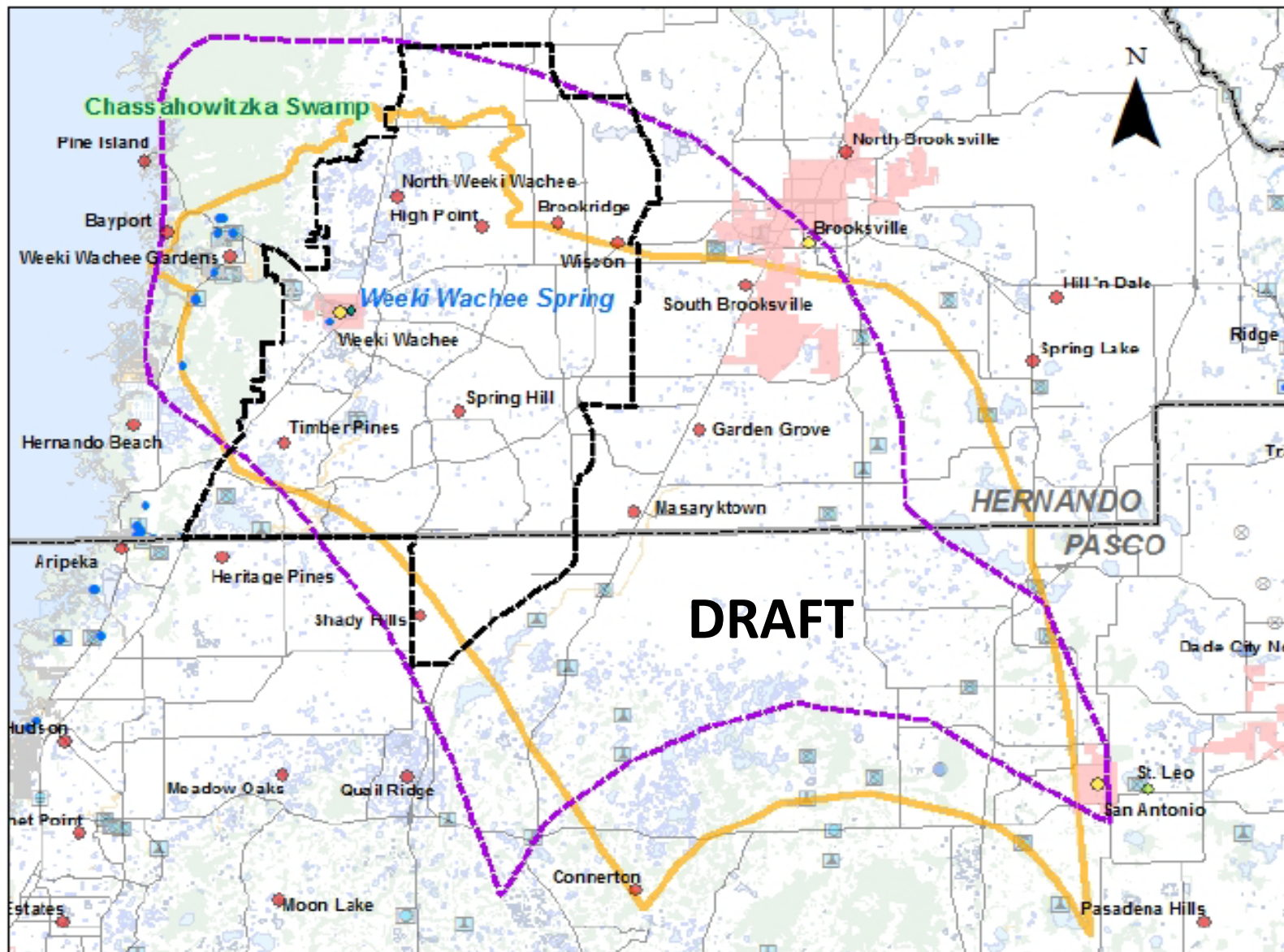
PFA Requirements

- Sub-Section 373.803, Chap. 2016-1 Laws of Florida:
 - To be delineated considering factors that may lead to degradation of an OFS, such as:
 - Groundwater travel time to spring
 - Hydrogeology
 - Nutrient load to spring
 - Additional factors
 - Soil types
 - Pollutant sources
 - Identifiable boundaries



PFA Determination

- Establish groundwater **contributing area (CA)** for the spring.
- Identify regions within the CA where greatest **recharge** occurs.
- Identify regions within the CA where Floridan Aquifer is most **vulnerable**.
- Consider **nitrogen loading and travel time**.
- Consider groundwater travel time.
- Identify regions within CA to exclude or include based on **land use** and **potential occurrence of pollutant sources**.
- Create PFA boundary that corresponds with identifiable boundaries.





PFA Determination

Questions on Draft PFA
Process?



NSILT *(Updated)*



NSILT

Nitrogen Source Inventory

fdep.maps.arcgis.com/apps/MapJournal/index.html?appid=e71ecaa35bdd4caaba7a0c41169

Florida DEP

Nitrogen Source Inventory and Loading Tool (NSILT)

Nitrogen (N) concentrations in Florida springs have been increasing over the past several decades as a result of anthropogenic inputs. This has led to water quality and ecosystem degradation.

The Groundwater Management Section has developed the Nitrogen Source Inventory and Loading Tool (NSILT) to provide quantitative information on the significant sources of nitrogen in the groundwater contribution areas for nutrient impaired springs. This tool also is being used to estimate nitrogen loads to groundwater in spring areas covered by Basin Management Action Plans (BMAP).

Each BMAP area is evaluated individually and customized based on local practices, land use information, and available data.



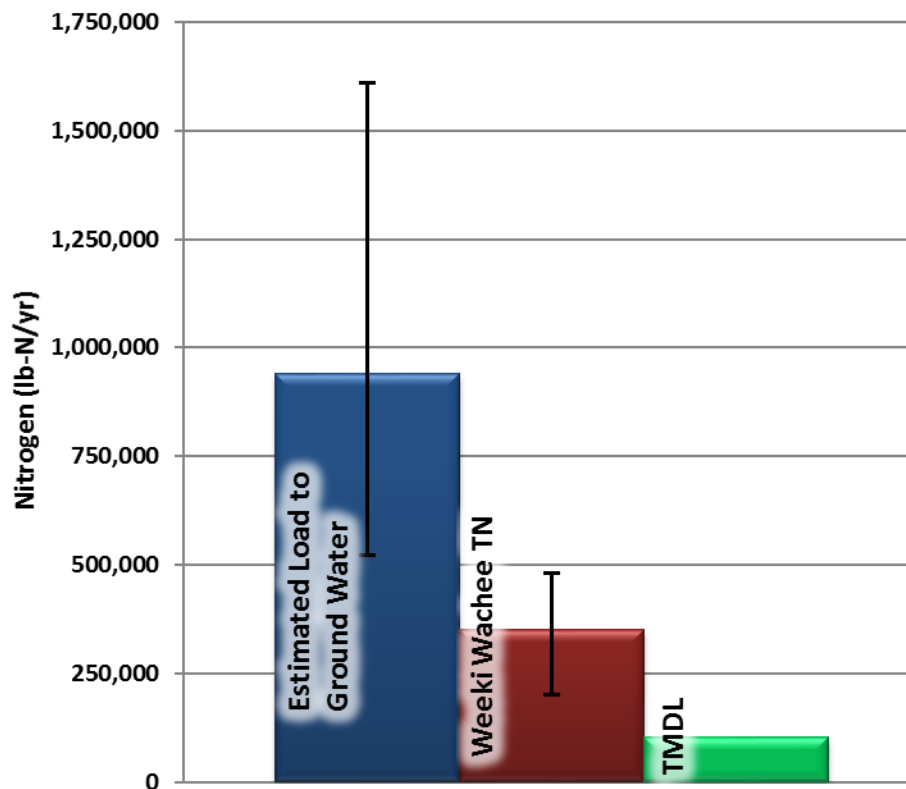
The diagram illustrates the NSILT tool's components. It shows a 3D cross-section of the landscape with various nitrogen sources: "Rivers", "Sewer", "Agriculture", "Industry", "Landfills", "Roads", "Urban", "Suburban", and "Rural". Arrows indicate the flow of nitrogen from these sources into the "Groundwater" and "Surface Water" systems. The diagram also shows the "Upper Floridan Aquifer" and "Lower Floridan Aquifer" with arrows indicating the flow of water and nutrients between them. The "NSILT" logo is prominently displayed at the top of the diagram.

[Click here to navigate to Final Results](#)

<http://fdep.maps.arcgis.com/apps/MapJournal/index.html?appid=e71ecaa35bdd4caaba7a0c411691dfa7>



NSILT



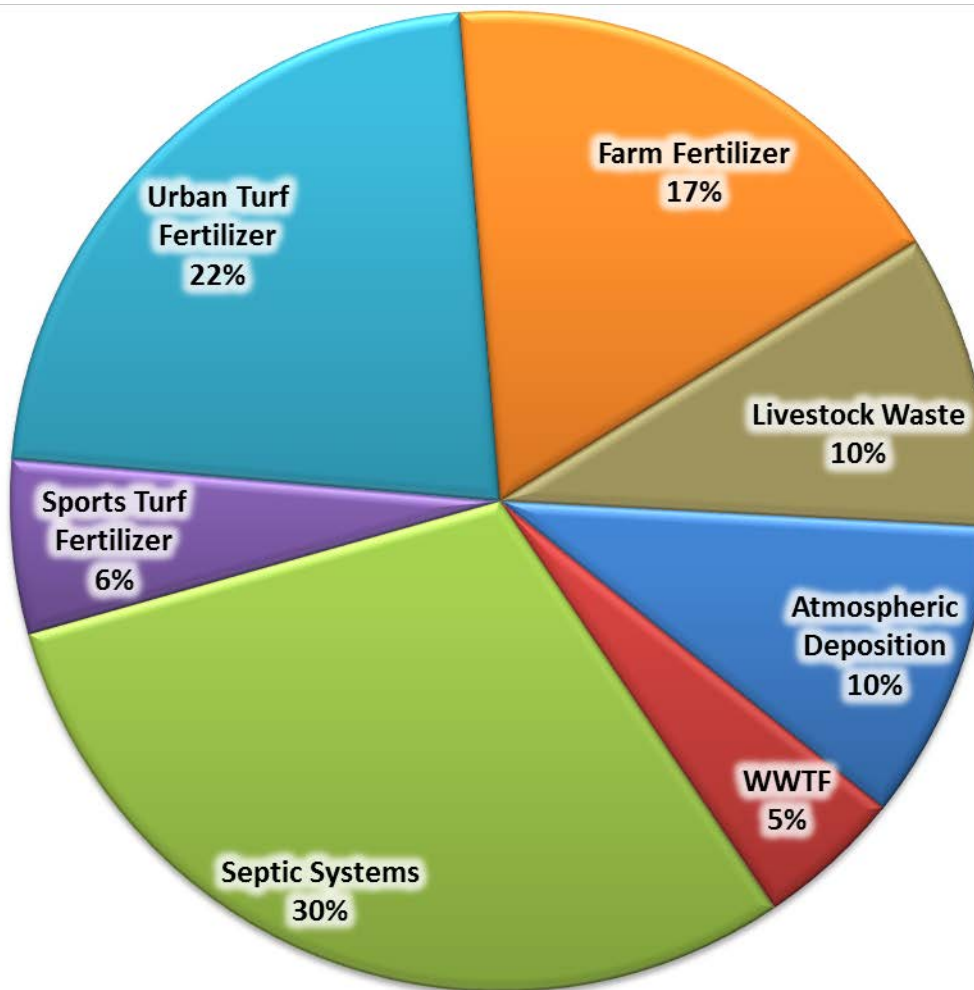
Estimated Load to Groundwater: 900,000 lb-N/yr
(Range 500,00 lb-N/yr to 1,650,000 lb-N/yr)

Estimated TMDL Load: 102,178 lb-N/yr



NSILT Load to Ground Water

Weeki Wachee



Load to Groundwater: 900,000 lb-N/yr

TMDL Load: 102,178 lb-N/yr



Nitrogen Source Reduction Strategy

Source	Total TN load %	Total <u>estimated</u> pounds/year TN from source	Total <u>estimated</u> reduction [groundwater load – TMDL] (x) %
Septic Systems	28 30	281,303 270,000	239,247
Urban Turfgrass Fertilizer	29 22	291,350 198,000	175,521
Sports Turfgrass Fertilizer	4 6	40,186 54,000	47,869
Farm Fertilizer	16 17	160,745 153,000	135,630
Livestock Waste	9 10	90,419 90,000	79,782
WWTF	4 5	40,186 45,000	39,891
Atmospheric Deposition	9 10	90,419 90,000	79,782
Total:	100%	900,000	797,722

Load Reduction Targets:

- 5 years – 30% of total
- 10 years – Additional 50% (80% total)
- 15 years – Remaining 20% (100% total)



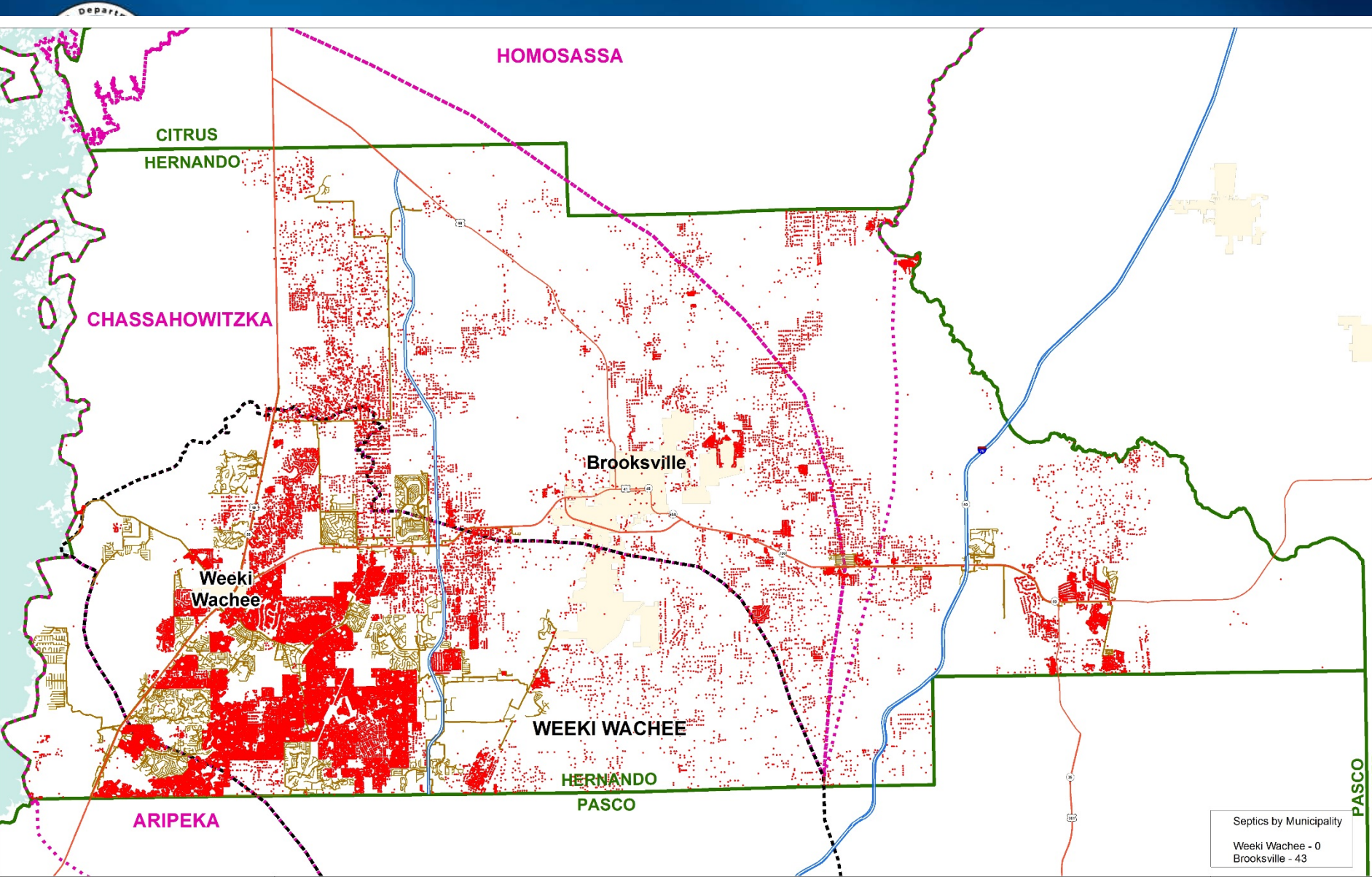
Septic Systems



Septic Systems

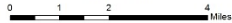
BMAP	Hernando	Pasco	Citrus
Kings Bay/ CR			28,578
WW	30,450	3,277	
Aripeka	2,781	4,022	
Homosassa	1,263		12,100
Chaz.	6,875		297
TOTAL	44,408	108,827	41,472

FROM: DOH Florida Water Management Inventory



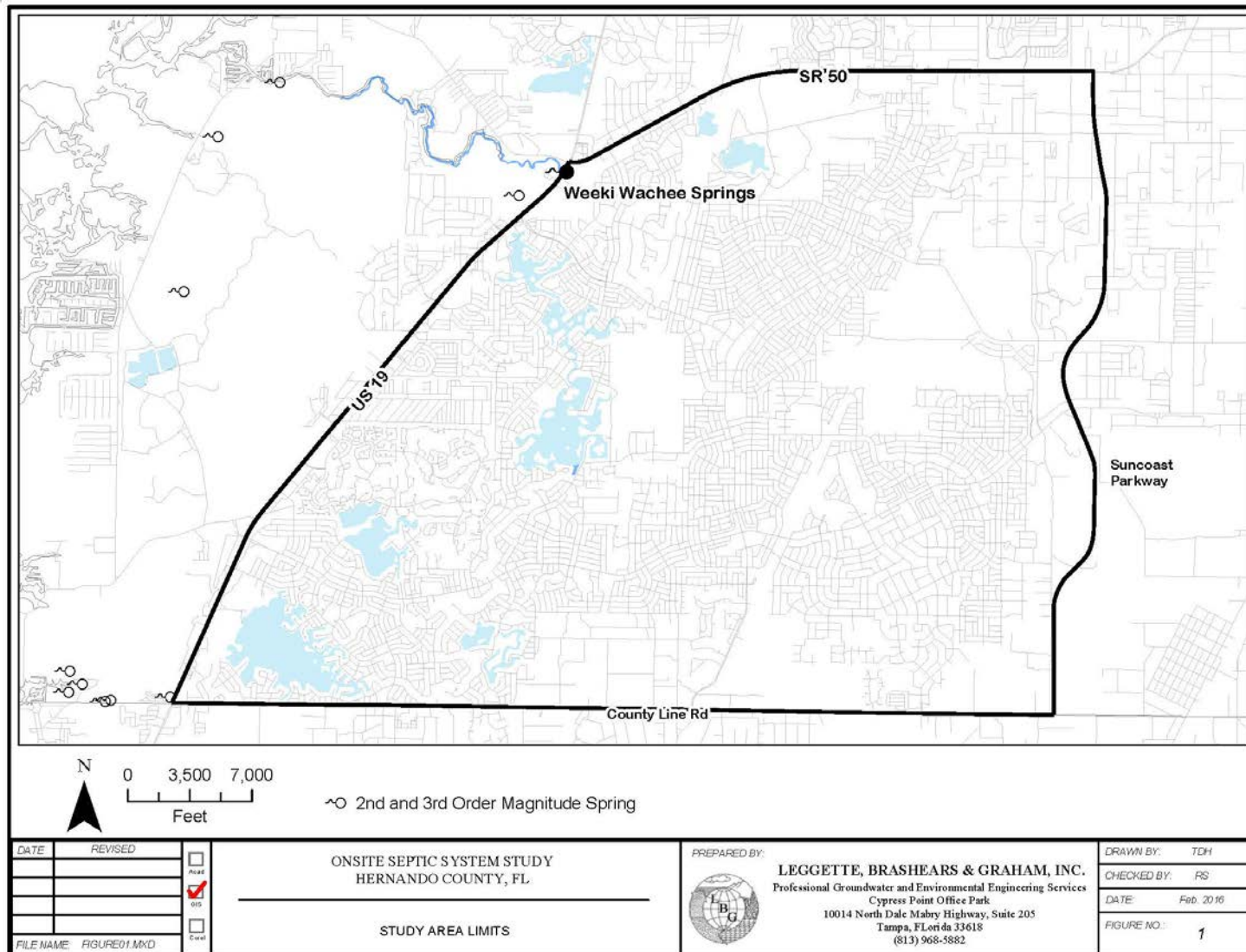
Hernando County

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.
MAP ID: hernando_septic_munic.mod
[BMAP] Terry Hansen@dep.state.fl.us
Created: 09-26-16





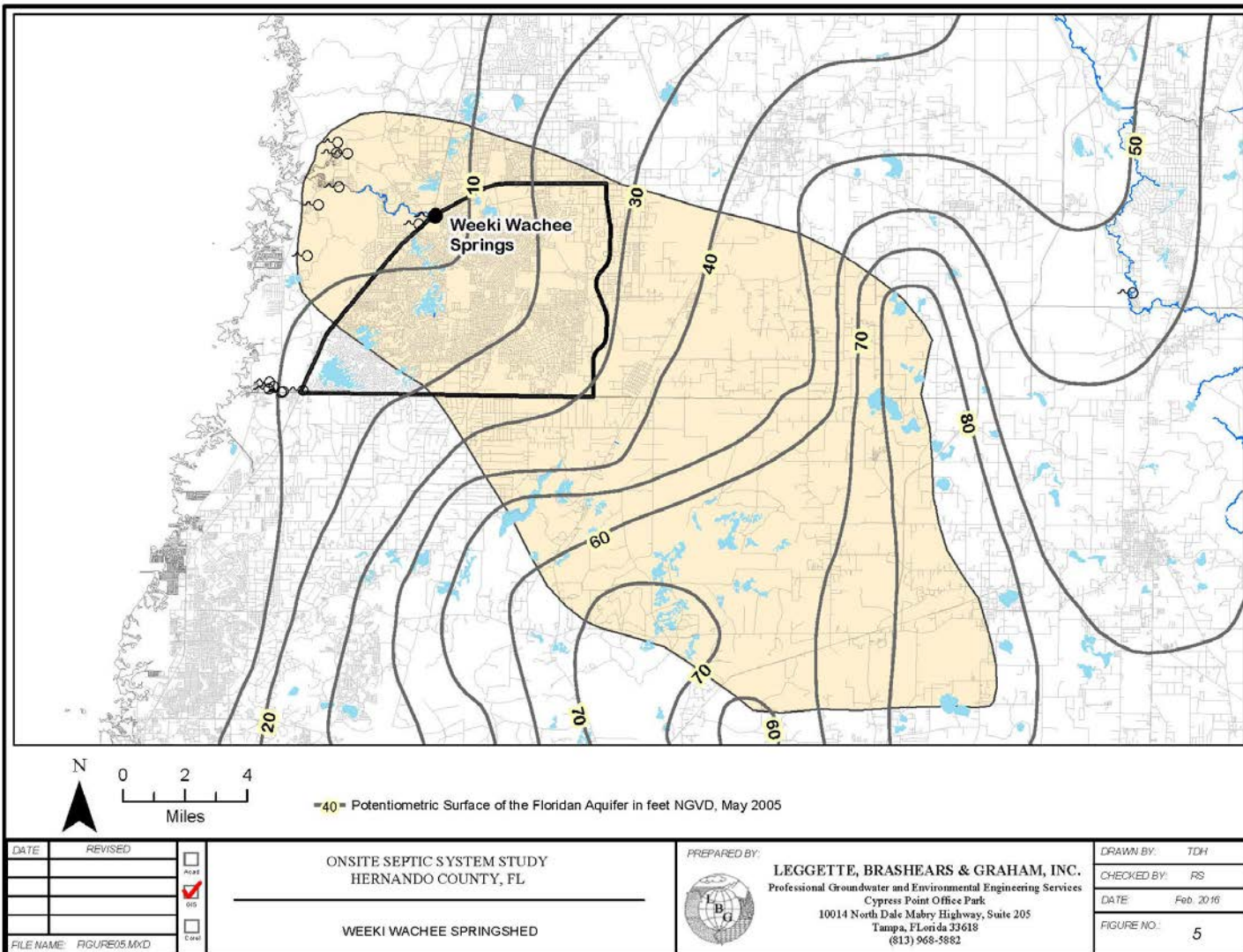
Septic Systems



Source: Hernando County Septic to Sewer Study, February 2016



Septic Systems

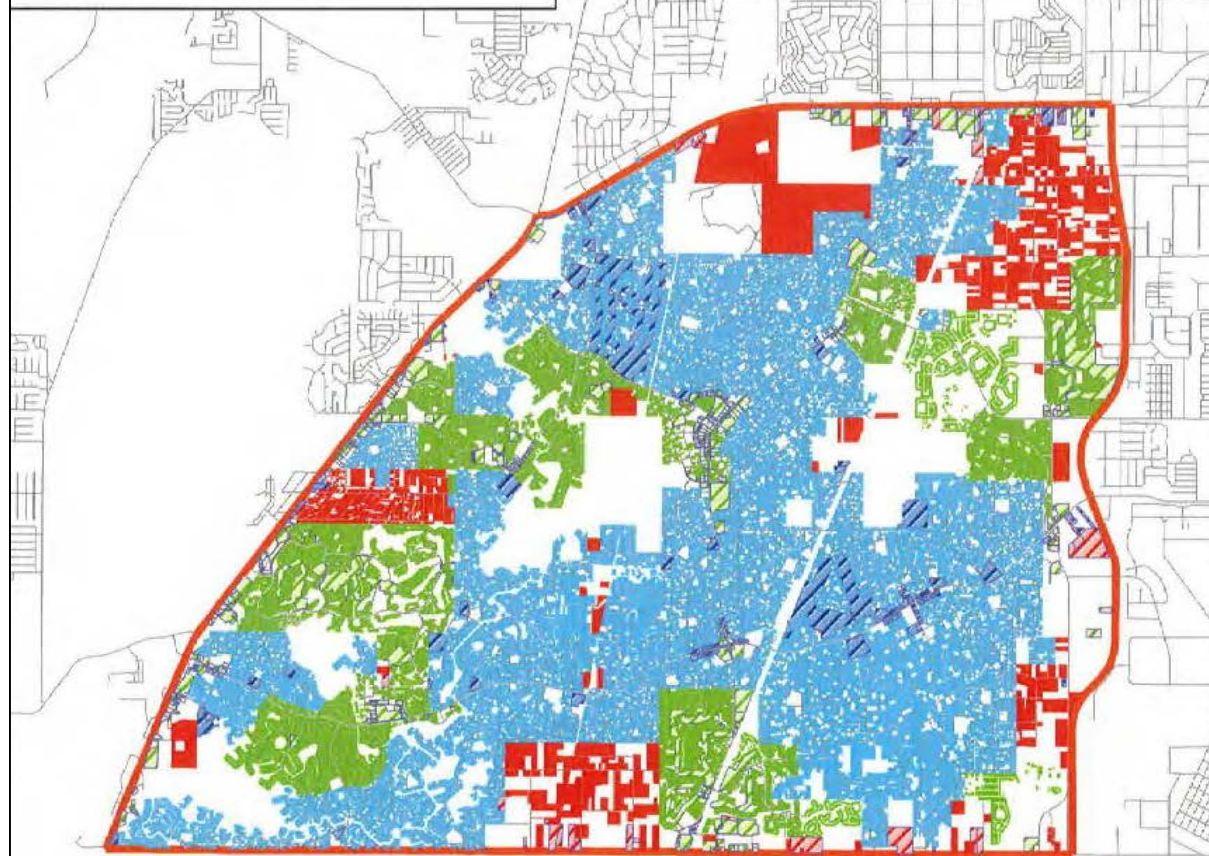


Source: Hernando County Septic to Sewer Study, February 2016



Legend

- Residential w/Water&Sewer (14,008)
- Residential w/Water&SEPTIC (26,238)
- Residentail w/WELL&SEPTIC (1,222)
- Comm w/Water&Sewer (437)
- Comm w/Water&SEPTIC (188)
- Comm w/WELL&SEPTIC (29)
- Primary_Study_Area



0 1.5 3 Miles



Septic Systems

- Determine when & which enhancement options are permissible
- Identify areas of “responsibility”
- Identify areas of likely septic enhancement
 - Quantify # of systems in these areas
 - Estimate load reductions likely to be achieved
 - Determine options for septic enhancement
 - Determine realistic time frames 5/10/15 year goals
- Identify areas of likely septic conversions
 - Quantify # of systems in these areas
 - Estimate load reductions likely to be achieved
 - Determine what WWTP upgrades need to occur to address load transfer
 - Determine realistic time frames 5/10/15 year goals



Urban Turfgrass Fertilizer



Urban Turfgrass Fertilizer

Example: Surface Water Credit Available for Urban Turfgrass Fertilizer Reduction through Education Activities in other BMAPs

Activity	Credit	Activity Details
Fertilizer local code/ordinance	0.50%	
Total Credit for Education Activities	0.50%	



Urban Turfgrass Fertilizer

Examples: Calculation of an Entity's Urban Turfgrass Fertilizer Reduction Credit based on Education Activities

City of Jacksonville

Credit for Urban Fertilizer Education Activities (%)	Loading Reduction Requirement (lb-N/yr)	Total Credit (lb-N/yr)
0.50%	324,328	1,297

Formula:

$$\% \text{ credit (x) total loading reduction requirement} = \text{total credit}$$
$$[0.50\% \text{ (x) } 324,328 = 1,297]$$

Lee County

Credit for Urban Fertilizer Education Activities (%)	Loading Reduction Requirement (lb-N/yr)	Total Credit (lb-N/yr)
0.50%	371,728	1,859

Formula:

$$\% \text{ credit (x) total loading reduction requirement} = \text{total credit}$$
$$[0.50\% \text{ (x) } 371,728 = 1,859]$$



Urban Turfgrass Fertilizer

Total Urban Turfgrass Fertilizer Reduction Requirement for Weeki Wachee and Aripeka Springs

Years	Percentage of Total	Amount (lb-N/yr)
5	30%	52,656
10	50%	87,761
15	20%	35,104
Total:	100%	175,521

Weeki Wachee and Aripeka Springs

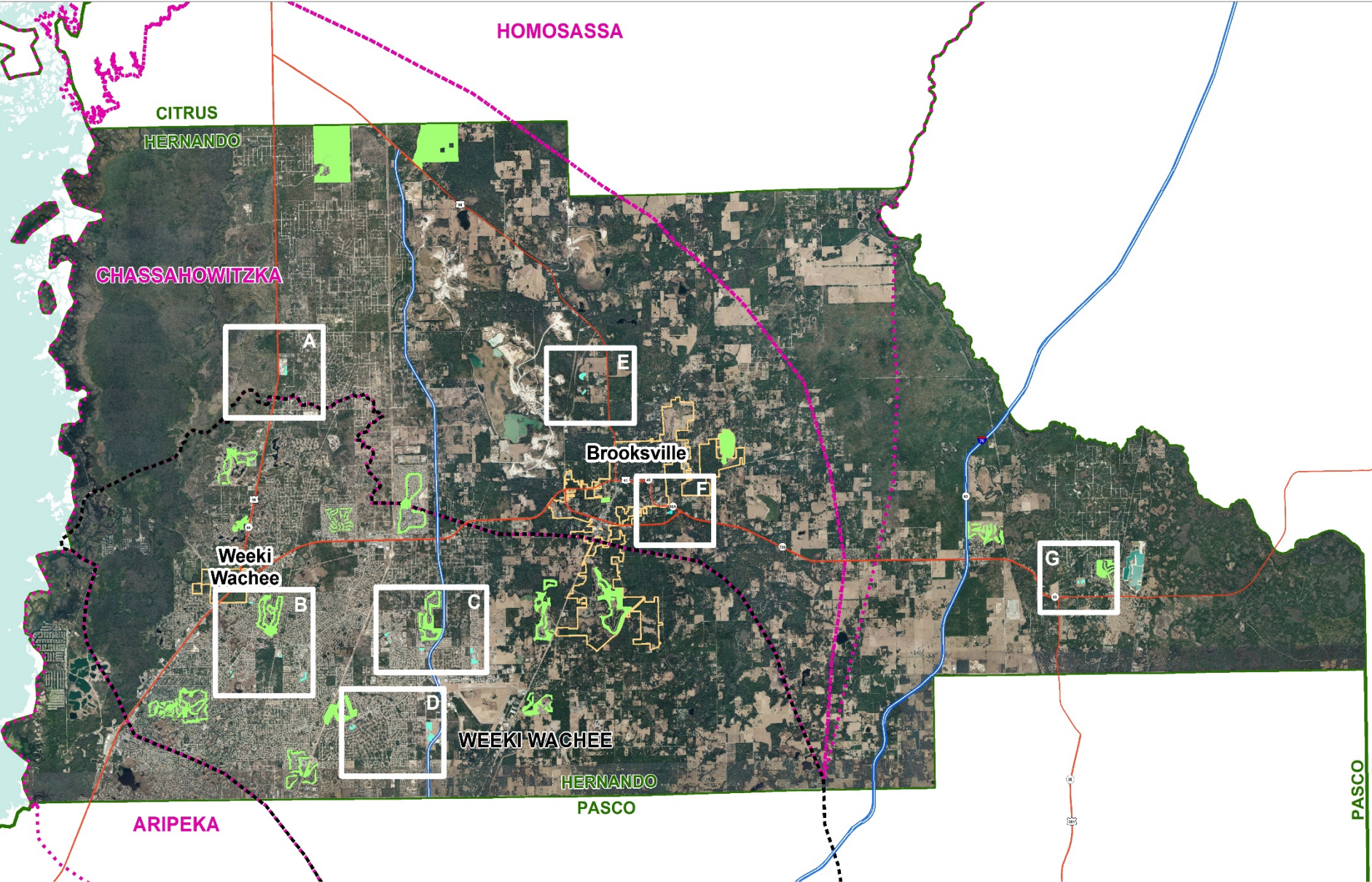
Credit for Urban Fertilizer Education Activities (%)	Loading Reduction Requirement (lb-N/yr)	Total Credit (lb-N/yr)
0.50%	175,521	878

Formula:

$$\% \text{ credit (x) total loading reduction requirement} = \text{total credit}$$
$$[0.50\% \text{ (x) } 175,521 = 878]$$



Sports Turfgrass Fertilizer



Hernando County

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.
Map ID: Hernando_Turf.mxd
[BMAP] Terry.Hansen@dep.state.fl.us
Created: 09-14-16



- Interstates
- Major Highways

- Proposed BMAP
- BMAP Activities in Progress

- Cities
- Counties

- Sports turf
- Golf Courses



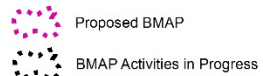
A

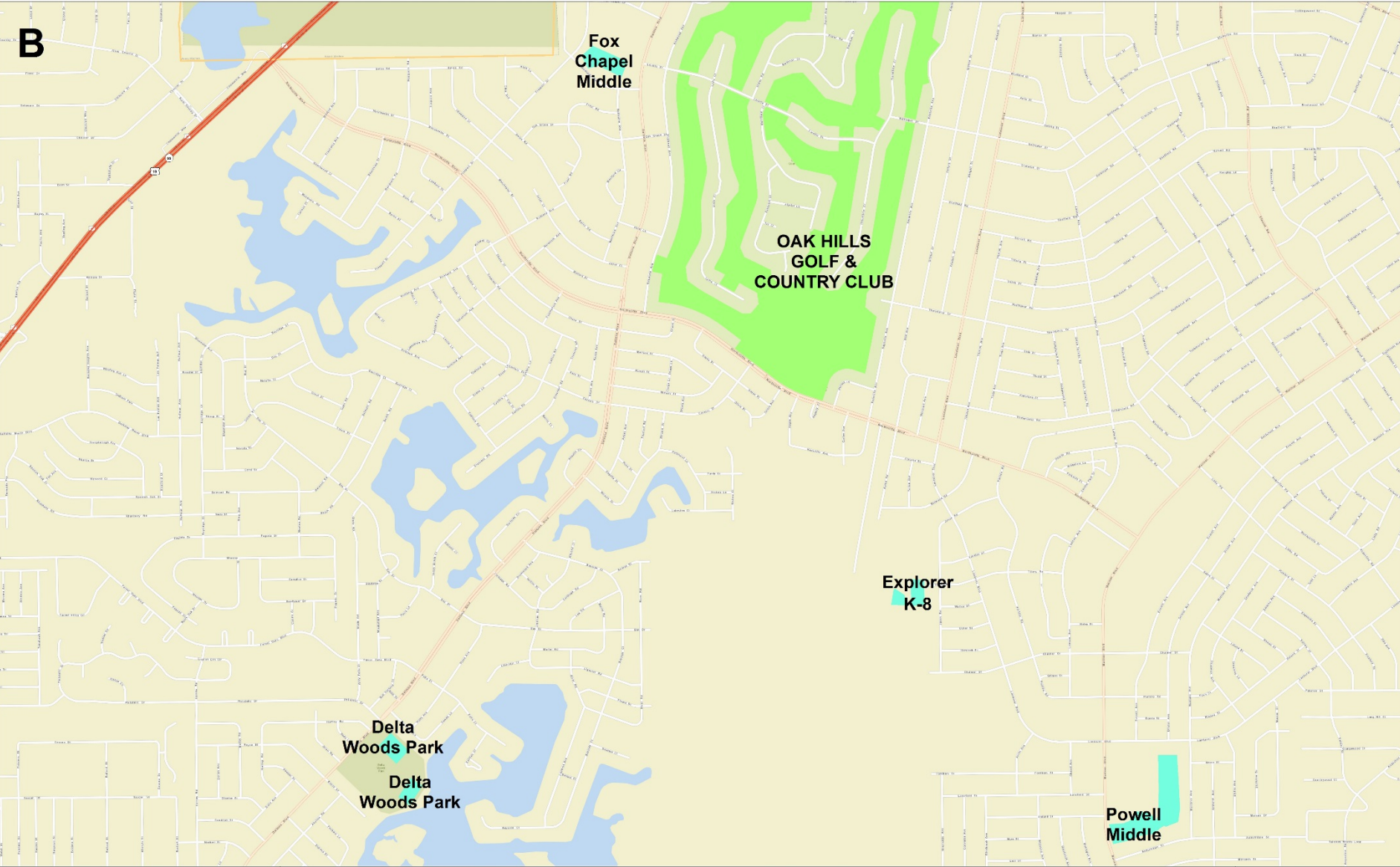
Winding
Waters
K-8

Hernando County

Map prepared by the Division of Environmental
Assessment and Restoration. This map
is not for legal decision making purposes.
Map ID: Hernando_Turf.mxd
[BMAP] Terry Hansen@dep.state.fl.us
Created: 08-14-16

0 0.075 0.15 0.3
Miles

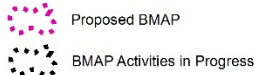


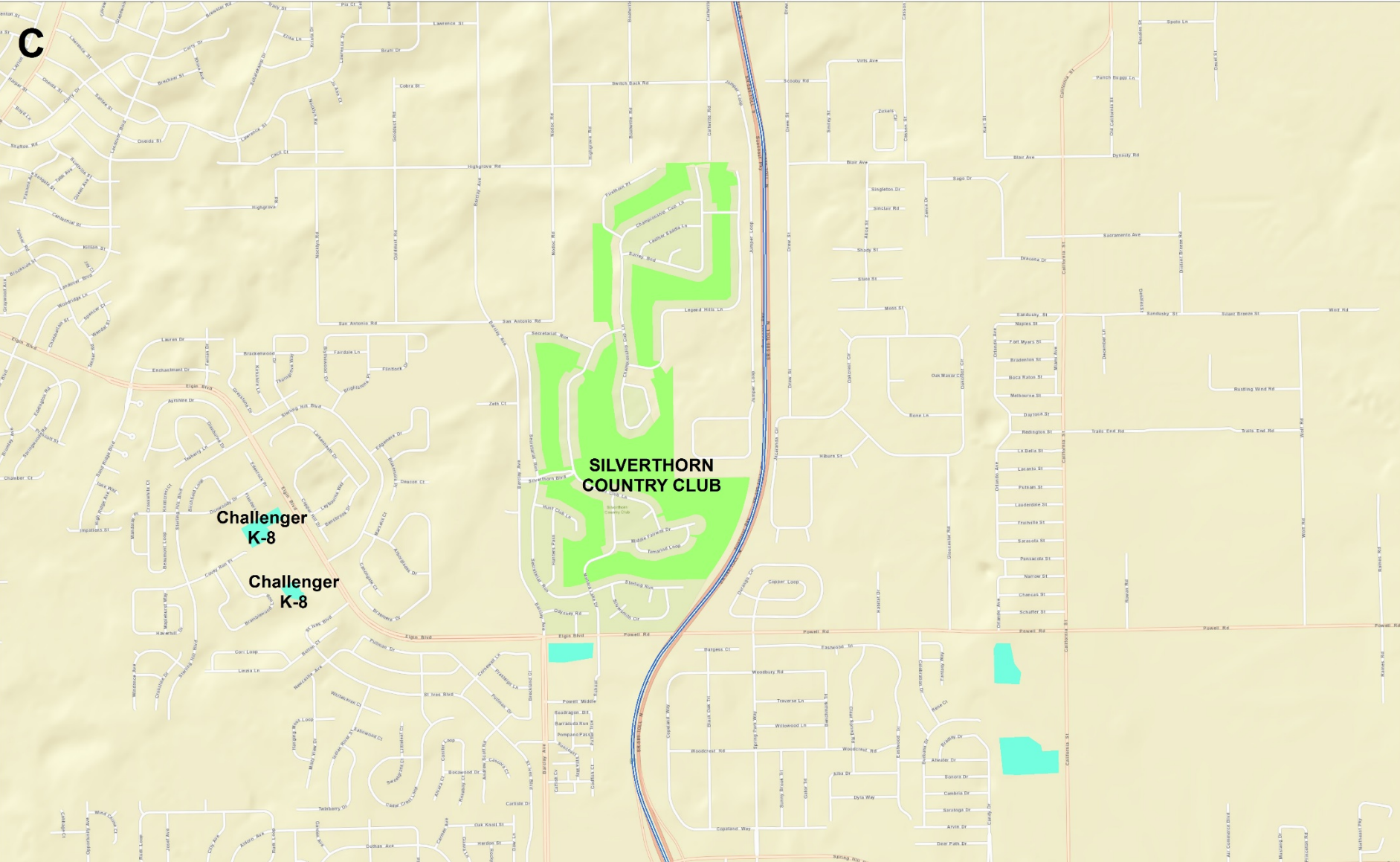


Hernando County

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.
Map ID: Hernando_Turf.mxd
[BMAP] Terry Hansen@dep.state.fl.us
Created: 09-14-16

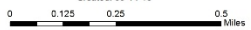
0 0.1 0.2 0.4 Miles





Hernando County

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.
Map ID: Hernando_Turf.mxd
[BMAP] Terry Hansen@dep.state.fl.us
Created: 06-14-16



- Interstates
- Major Highways

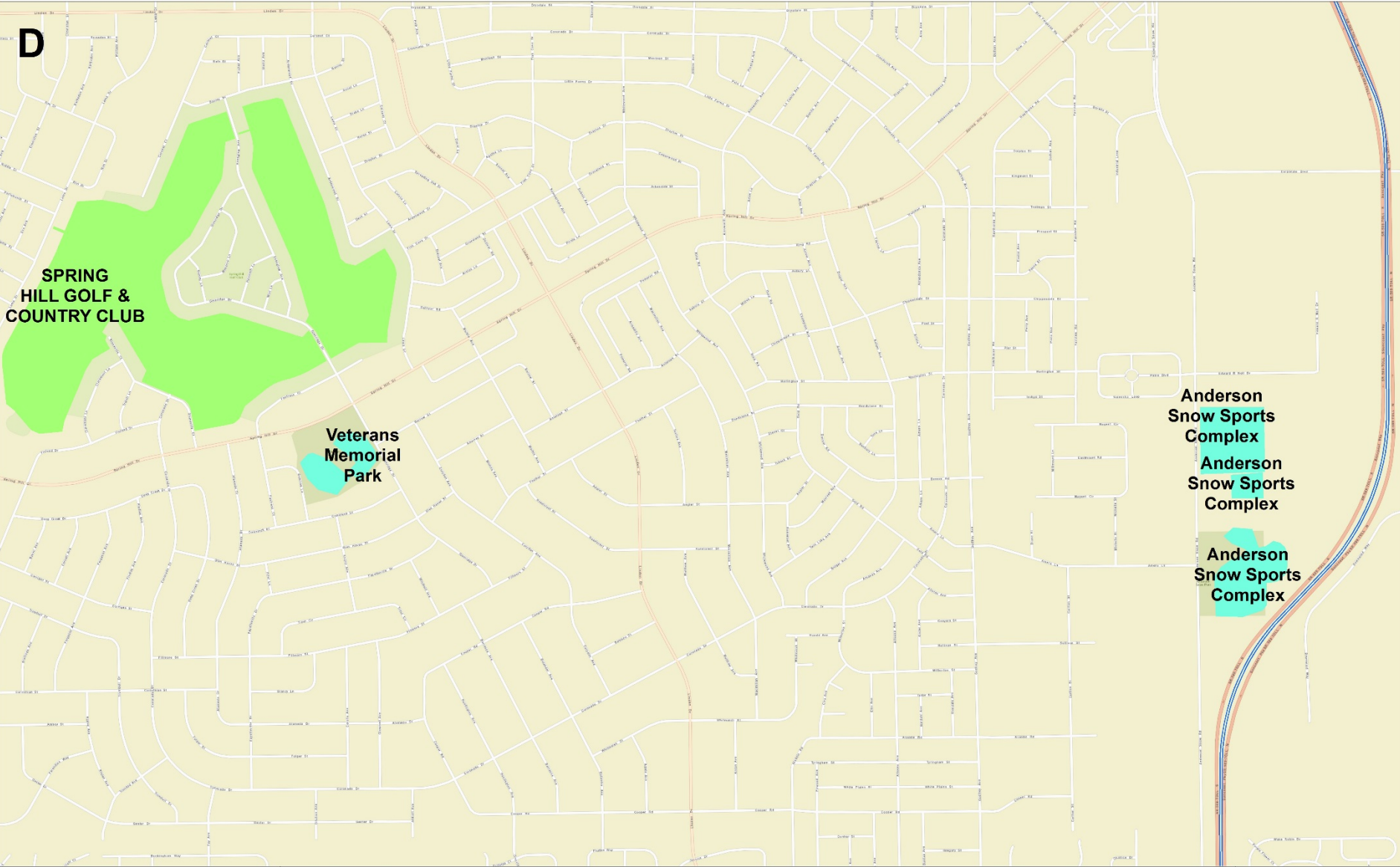
- Proposed BMAP
- BMAP Activities in Progress

- Cities
- Counties

- Sports turf
- Golf Courses



D



Hernando County

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.
Map ID: Hernando_Turf.mxd
[BMAP] Terry Hansen@dep.state.fl.us
Created: 09-14-16

0 0.075 0.15 0.3 Miles

 Interstates

 Major Highways

 Proposed BMAP

 BMAP Activities in Progress

 Cities

 Counties

 Sports turf

 Golf Courses





E

Ernie
Weave
Youth Park

D.S. Parrott
Middle
School

Hernando County

Map prepared by the Division of Environmental
Assessment and Restoration. This map
is not for legal decision making purposes.
Map ID: Hernando_Turf.mxd
[BMAP] Terry Hansen@dep.state.fl.us
Created: 09-14-16

0 0.075 0.15 0.3
Miles



Interstates



Major Highways



Proposed BMAP



BMAP Activities in Progress



Cities



Counties



Sports turf



Golf Courses



F

Brooksville

Kennedy
Park

Hernando County

Map prepared by the Division of Environmental
Assessment and Restoration. This map
is not for legal decision making purposes.
Map ID: Hernando_Turf.mxd
[BMAP] Terry Hansen@dep.state.fl.us
Created: 08-14-16

0 0.075 0.15 0.3
Miles



Interstates



Major Highways



Proposed BMAP



BMAP Activities in Progress



Cities



Counties



Sports turf



Golf Courses



G

SHERMAN
HILLS
GOLF CLUB

THE RIDGE MANOR
OAKS GOLF AND
COUNTRY CLUB

Ridge Manor
Community
Park

Hernando County

Map prepared by the Division of Environmental
Assessment and Restoration. This map
is not for legal decision making purposes.
Map ID: Hernando_Turf.mxd
[BMAP] Terry Hansen@dep.state.fl.us
Created: 06-14-16

0 0.15 0.3 0.6 Miles



Interstates



Major Highways



Proposed BMAP



BMAP Activities in Progress



Cities



Counties



Sports turf



Golf Courses





Sports Turfgrass Fertilizer

Field/Park	Contact	lb-N/yr	BMAP
Challenger K-8	Erik van de Boogard	193	WW
Explorer K-8		70	WW
Winding Waters K-8		334	Chaz
D.S. Parrott Middle School		582	Chaz
Fox Chapel Middle		98	WW
West Hernando Middle		974	Chaz
Powell Middle		149	WW
Anderson Snow Sports Complex	Mike Hall	1,213	WW
Veterans Memorial Park		332	WW
Delta Woods Park		139	WW
Ernie Weave Youth Park		1,207	Chaz
Kennedy Park		155	Chaz
Ridge Manor Community Park			None



Fertilizer Reduction Strategies

- October 18, 2016 at 9:00 AM
 - Joint meeting for Crystal River/Kings Bay and Weeki Wachee stakeholders at SWFWMD headquarters in Brooksville.
 - Nanette O'Hara, Public Outreach Coordinator, Tampa Bay Estuary Program.
 - Robyn Felix and Robin Grantham, SWFWMD Communications.





Septic System Testing Data



Fertilizer Ordinance Updates



Basin Management Action Plan

Contact: Terry Hansen, P.G.

terry.hansen@dep.state.fl.us

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

http://publicfiles.dep.state.fl.us/DEAR/BMAP/Springs Coast/BMAPs/WW_BMAP/

