



Florida Department of Environmental Protection
Division of Environmental Assessment and Restoration

***Upper Wakulla River and
Wakulla Springs
Basin Management Action Plan
(BMAP)***

***Moira R. Homann
February 14, 2017***





Agenda

- Welcome and Opening Remarks.
 1. Onsite Sewage Treatment and Disposal Systems (OSTDS) Remediation Plan.
 - Recap Items.
 - New Items.
 2. Annual Updates Upper Wakulla Springs and River BMAP.
 3. Springshed Nitrogen Sources/2016-1 Requirements Review.
 4. Urban Turfgrass Discussion.
- Next Meeting Date.
- Adjourn.



Florida Department of Environmental Protection
Division of Environmental Assessment and Restoration

***Upper Wakulla River and
Wakulla Springs Basin Management
Action Plan (BMAP)
Onsite Sewage Treatment and Disposal
Systems (OSTDS) Remediation Plan***

***Moira R. Homann
February 14, 2017***





Agenda

- Welcome and Opening Remarks.
- OSTDS Remediation Plan.
 - Sunshine Law Reminders.
 - Recap Items.
 - Posting Information.
 - Feedback on Education Efforts.
 - New Items/Discussion.
 - Septic Tank Conversion Prioritization using Geographic Information System (GIS) in the Wakulla Springs Springshed – Jamie Hughes, CDM Smith.
 - Public Comments.
 - Adjourn OSTDS Committee.



Sunshine Law Reminders

- The OSTDS Advisory Committee will operate under the Sunshine Laws (Article 1, Section 24, Florida Constitution and Section 286.011, Florida Statutes [F.S.]).
- Discussion or any form of communication between committee members on matters reasonably expected to come before the committee is **prohibited** outside of a publicly noticed meeting.
 - Communication includes but not limited to phone calls, writing, texting, and emailing another committee member.
 - Discussion between a committee member and non-committee members, including staff, is permissible.
 - Discussion of committee topics between a committee member and their alternate representative is permissible.



Recap Posting Items

- Department of Economic Opportunity (DEO) – Technical Assistance Grant. Information available [here](#).
- Florida Home Builders Association Septic Inventory, available [here](#).
 - Stan Derzypolski mentioned at last meeting.
- Florida Onsite Wastewater Association (FOWA) Public Service. Announcements (PSAs) posted [here](#).
 - 30- and 60-second PSAs about septic system maintenance.
- City of Tallahassee 2030 Master Sewer Survey, posted and available [here](#).
- Wakulla County Septic Tank Study Phase II Report on Performance Based Treatment Systems, posted and available [here](#).
 - Bob Deyle mentioned at last meeting.
- Florida Section 319 Grant information available [here](#).



Recap - Feedback on Public Education

DRAFT Stakeholder OSTDS Education Projects

Recommended Target Audiences/Stakeholders	Leon County	Wakulla County	Gadsden County	Jefferson County	City of Tallahassee	City of Gretna	City of Midway	City of Quincy	Town of Havana	FDACS	FDH	FDOT District 3	NWFWMD	Federal Correctional Institution	Florida A&M University	Florida State University	St. Joe Corporation	Talquin Electric Cooperative	Friends of Wakulla Springs	Wakulla Springs Alliance	Florida Farm Bureau Federation	Citizens
Citizens and voters	X	X									X										X	X
Board of City/County Commissioners	X	X									X										X	X
State Park																						
Real Estate Agents	X	X									X											
School Children (via board approval)		X																				
Builders	X	X									X										X	
Homeowners and Renters					X						X										X	X
OSTDS Industry	X																				X	
Environmental Groups																						X
Civic Groups (Chamber of Commerce, Kiwanis, Rotary, PTAs, Builders Association, realtors, churches)																						X
Recommended Message/ Stakeholders																						
Why change is needed/not health but ecological	X	X			X																	
Nitrogen source from OSTDS		X																			X	X
All nitrogen sources are part of the problem		X																			X	
Connection to aquifer (maybe include connect to protect)		X																				
Options available – technical and financial	X	X									X										X	
Nature of the challenge											X										X	
Market/Affordability																					X	
Connect to Protect/Be part of the solution (for sewer alternative)					X						X											X
Simple message	X										X											
Show Wakulla Springs "then" and "now"											X											
Treatment options																						X
Achievements to date																						X
Costs, financing options	X																					X
Recommended Materials & Resources/ Stakeholders																						
Festivals		X																				X
Displays at malls, airport, schools, libraries, hospitals, public places	X	X			X																	X
Wakulla Environmental Institute		X																			X	
First time homeowner program		X									X											
Think About Person Pollution (TAPP)		X			X						X											
State agency staff education																					X	
Cross-section mobile											X										X	
TV and radio public service announcements																						X
K-12 Education Program																						X
Tallahassee Museum																						
Annual home show, Parade of Homes	X										X											
FSU football games											X											
Presentations to civic groups																						X
Government newsletters, mailing inserts, columns for local newspapers	X																					X
Counties Housing Programs	X																					



DRAFT Stakeholders Education Priorities on OSTDS (cont'd)

Recommended Target Audiences/Stakeholders	Leon County	Wakulla County	Gadsden County	Jefferson County	City of Tallahassee	City of Gretna	City of Midway	City of Quincy	Town of Havana	FDACS	FDOH	FDOT District 3	NWFWMD	Federal Correctional Institution	Florida A&M University	Florida State University	St. Joe Corporation	Talquin Electric Cooperative	Friends of Wakulla Springs	Wakulla Springs Alliance	Florida Farm Bureau Federation	Citizens
Citizens and voters	X	X									X										X	X
Board of County Commissioners	X	X									X										X	X
State Park																						
Real Estate Agents	X	X									X											
School Children (via board approval)		X																				
Builders	X	X									X										X	
Homeowners and Renters					X						X										X	X
OSTDS Industry	X																				X	
Environmental Groups																						X
Civic Groups (Chamber of Commerce, Kiwanis, Rotary, PTAs, Builders Association, realtors, churches)																						X



DRAFT Stakeholders Education Priorities on OSTDS (cont'd)

Recommended Message/ Stakeholders	Leon County	Wakulla County	Gadsden County	Jefferson County	City of Tallahassee	City of Gretna	City of Midway	City of Quincy	Town of Havana	FDACS	FDOH	FDOT District 3	NWFWMD	Federal Correctional Institution	Florida A&M University	Florida State University	St. Joe Corporation	Talquin Electric Cooperative	Friends of Wakulla Springs	Wakulla Springs Alliance	Florida Farm Bureau Federation	Citizens
Why change is needed/not health but ecological	X	X			X																	
Nitrogen source from OSTDS		X																			X	X
All nitrogen sources are part of the problem		X																			X	
Connection to aquifer (maybe include connect to protect)		X																				
Options available – technical and financial	X	X									X										X	
Nature of the challenge											X										X	
Market/Affordability																					X	
Connect to Protect/Be part of the solution (for sewer alternative)					X						X											X
Simple message	X										X											
Show Wakulla Springs "then" and "now"											X											
Treatment options																						X
Achievements to date																						X
Costs, financing options	X																					X



DRAFT Stakeholders Education Priorities on OSTDS (cont'd)

Recommended Materials & Resources/ Stakeholders	Leon County	Wakulla County	Gadsden County	Jefferson County	City of Tallahassee	City of Gretna	City of Midway	City of Quincy	Town of Havana	FDACS	FDOH	FDOT District 3	NWFWMD	Federal Correctional Institution	Florida A&M University	Florida State University	St. Joe Corporation	Talquin Electric Cooperative	Friends of Wakulla Springs	Wakulla Springs Alliance	Florida Farm Bureau Federation	Citizens
Festivals		X																				X
Displays at malls, airport, schools, libraries, hospitals, public places	X	X			X																	X
Wakulla Environmental Institute		X																			X	
First time homeowner program		X									X											
Think About Person Pollution (TAPP)		X			X						X											
State agency staff education																					X	
Cross-section mobile											X										X	
TV and radio public service announcements																						X
K-12 Education Program																						X
Tallahassee Museum																						
Annual home show, Parade of Homes	X										X											
FSU football games											X											
Presentations to civic groups																						X
Government newsletters, mailing inserts, columns for local newspapers																						X
Counties Housing Programs	X																					



DRAFT Stakeholder OSTDS Education Projects

	Lead Entity/Dept.	Title of Effort/Project	Description	Anticipated Cost	Funding Available (Yes or No)
Near-Term (within one to two years)	Leon County/Public Works	Woodville Library kiosk	Outline proper operation and maintenance of septic tanks	\$2,500	Yes
	Leon County/Public Works and Housing	First Time Homeowners Program	Presentation on septic tanks and need for maintenance or upgraded systems in the Wakulla Springs Primary Springs Protection Zone	Staff time	Yes
	Leon County/Public Works	Elected Officials	Continued updates on progress and activities in OSTDS remediation	Staff time	Yes
	Joint effort of Leon County – FDOH	OSTDS Education	Inform and educate builders and property owners on need for upgraded OSTDS in BMAP area	Unknown	No
	Leon County Public Works and Community/Media Relations	Leon County LINK	Inform and educate residents on OSTDS maintenance needs	Staff time	Yes
	COT	Wakulla Nitrate Video	Educates viewers on impacts of OSTDS on Wakulla Springs Wakulla Nitrate Video	\$27,575	Complete
	COT	Septic to Sewer Outreach	Outreach for grants to connect septic to existing sewer in COT limits	\$100,000	Yes (319)/Underway
	COT/TAPP	2017-2020 Dev. & Imp Edu Plan	Development & implementation of plan to educate residents about OSTDS and impact on springs - including PSAs.	50,000 (grant+match)	ending (319)/Underway
Short-Term (within three to five years)	Joint effort of Leon County – FDOH	OSTDS industry training	Provide training and certification for installation of nitrogen-reducing OSTDS in target area	Unknown	No
	Joint effort of Leon County – FDOH	Parade of Homes	Outline proper operation and maintenance of septic tanks	Unknown	No
	Leon County Public Works	Water School	Inform and educate officials and community leaders on water issues in community, including OSTDS	\$15,000 (est)	No
	Leon County Public Works and Community/Media Relations	Education Plan	Inform and educate residents on water issues in community, including OSTDS and other nitrate sources	\$50,000 (grant + match)	No
	COT/TAPP (same as above)	2017-2020 Dev. & Imp Edu Plan	Development & implementation of plan to educate residents about OSTDS and impact on springs - including PSAs	50,000 (grant+match)	Ending (319)/Underway
	FDOH	OSTDS Inventory	Continue to update, refine and report an inventory list	Unknown	Unknown
	FDOH	New Products	Looking at and helping to get approved new technology	Unknown	Unknown
Mid-Term (within six to ten years)	Leon County/Public Works and FDOH	Development Community	Presentations on septic tanks and need for maintenance or upgraded systems in the Wakulla Springs Primary Springs Protection Zone	Unknown	No
Long-Term (within ten to 15 years)					



Pilot Project – Outreach and Social Marketing Campaign (OSTDS or Fertilizer)

Phase	Funding and Contracting	Pre-Campaign	Campaign	Post-Campaign
Purpose	- Obtain funding for campaign - Select consultant(s) to complete social marketing research and develop and implement campaign	- Know the audience - Identify barriers and benefits - Define campaign objectives	- Change behavior - Use a strategic communications approach - Carefully consider communication channels	Evaluate performance
Objectives	Secure funding and experienced consultant(s)	- Determine the following for the audience: - Awareness of issue - Attitudes and values - Current practices	- Awareness by audience that: - Their actions affect the issue - Actions can be taken by them to remedy issue - Behavior change	Observe behavior change
Actions	- Prepare and submit grant application - Prepare request for qualifications (RFQ) - Complete RFQ process and place consultant(s) under contract	- Conduct collaborative work sessions with lead entity - Develop survey, implement, and analyze results - Conduct focus groups	- Develop message(s) - Develop branding/graphics - Prepare products (direct mail, billboards, radio ads, tv ads, etc.) - Implementation (billboards; radio, tv and print advertisements; promo items, etc.)	Develop survey, implement, and analyze results
Costs (Estimated)*	Staff time and cost	\$30,000	\$240,000	\$30,000
Schedule	Year 1	Year 2	Years 3-4	Year 5

**Costs are estimated from budget information for the Southwest Florida Water Management District annual "Restoring our Springs!" campaign as well as University of Florida-Institute of Food and Agricultural Sciences' anticipated costs for implementation of its Outstanding Florida Springs OSTDS campaign in 2017/2018.*

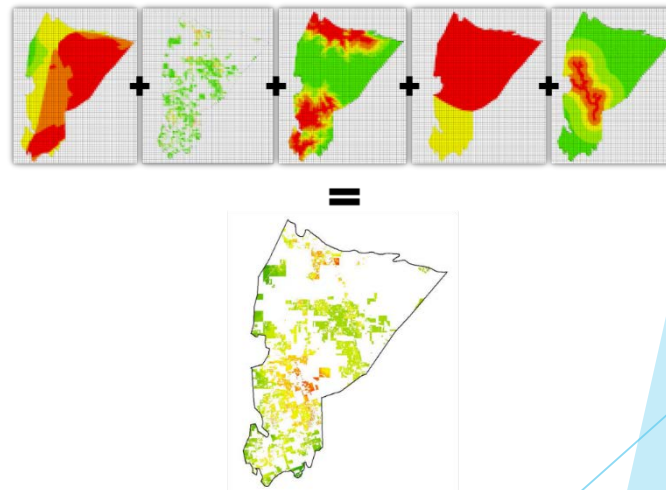


Septic Tank Conversion Prioritization Using Geographic Information System (GIS) in the Wakulla Springs Springshed

Jamie Hughes, CDM Smith

Prioritization Criteria

- ▶ Layer 1: Groundwater pollution vulnerability
- ▶ Layer 2: Locational density of septic systems
- ▶ Layer 3: Distance to existing central wastewater system infrastructure
- ▶ Layer 4: Location within springshed
- ▶ Layer 5: Proximity to underground caves



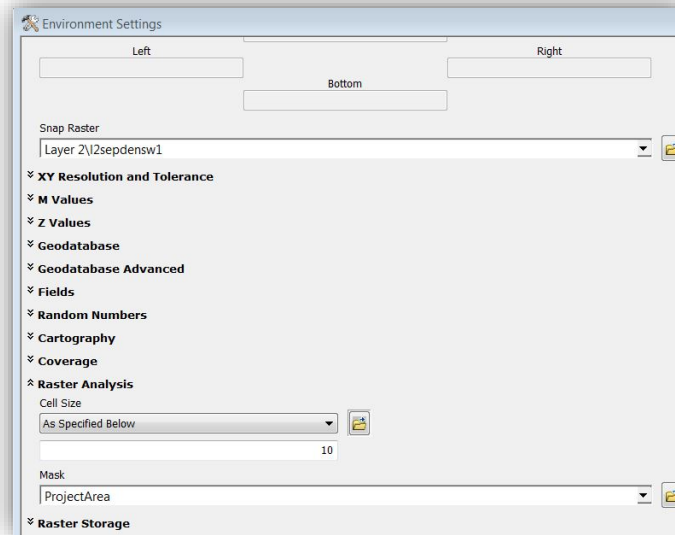
Data Sources & Acquisition

- First project task was to collect data:

Layer	Use Type	Layer Development	Source
DRASTIC Groundwater Vulnerability	Analysis	1	Florida Department of Environmental Protection
Septic Tanks/Sewered Parcels	Analysis	2	Florida Department of Health
Wastewater Utility System	Analysis	3	City of Tallahassee; Wakulla County
Roadways	Analysis	3	Florida Department of Transportation
Primary Focus Areas	Analysis	4	Florida Department of Environmental Protection (BMAP)
Underground Caves	Analysis	5	Woodville Karst Plain Project
Zoning	Reference	-	City of Tallahassee; Leon County; Wakulla County
Florida Managed Areas	Reference	-	Florida Natural Areas Inventory
Land Use/Land Cover	Reference	-	Florida Department of Environmental Protection

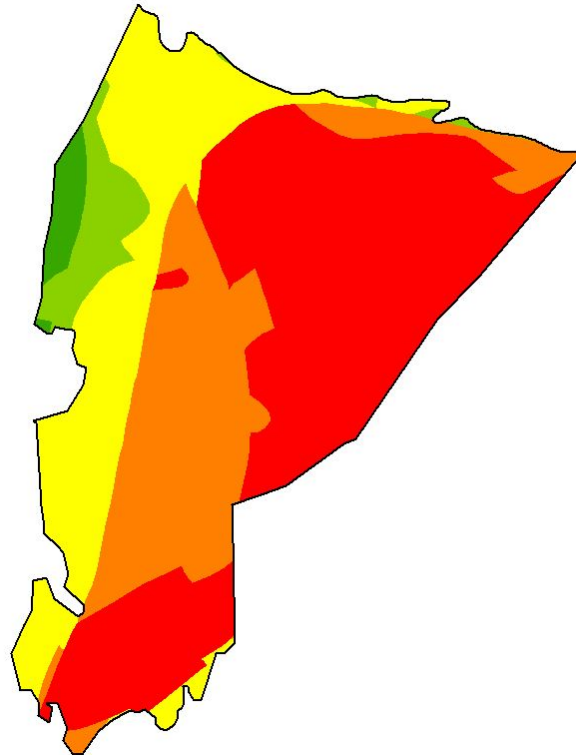
Analysis Parameters

- ▶ Ratings:
 - ▶ 1 – Low Priority
 - ▶ 2
 - ▶ 3 – Medium Priority
 - ▶ 4
 - ▶ 5 – High Priority
- ▶ No applied weights
- ▶ Cell Size: 10 Ft
- ▶ Coordinate System:
NAD_1983_HARN_StatePlane_Florida_North_FIPS_0903_Feet
- ▶ All rasters are snapped to a single raster to ensure congruent cell configuration and clipped to project area



Layer 1 Creation

- ▶ Convert polygon to raster using DRASTIC index as cell value
- ▶ Rating value ranges
 - ▶ 1: 0 – 90 (Low Priority)
 - ▶ 2: > 90 – 120
 - ▶ 3: > 120 – 150 (Medium Priority)
 - ▶ 4: > 150 – 180
 - ▶ 5: > 180 – 204 (High Priority)
- ▶ Reclassify cell index values to analysis rating

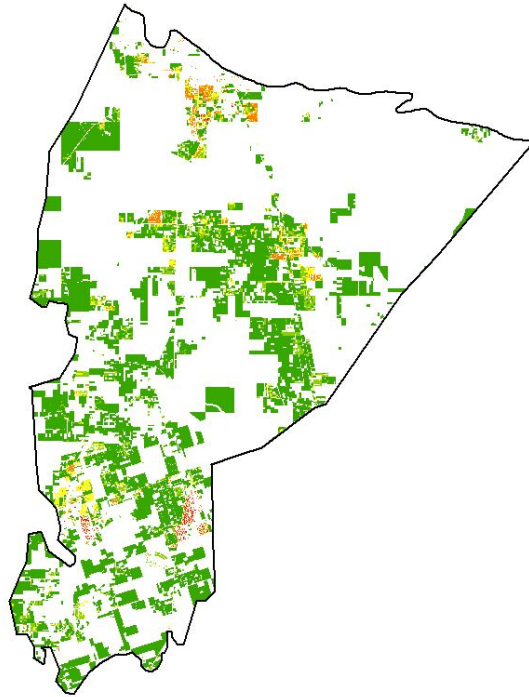


Layer 2 Creation

- ▶ Leon parcel inventory (DOH FLWMI) values for type of wastewater:
 - ▶ Estimated Septic; Septic = Yes (Will be considered for analysis)
 - ▶ Estimated Sewer; Sewer; N/A = No (Will not be considered for analysis)
- ▶ Wakulla parcel inventory (DOH FLWMI) values for type of wastewater:
 - ▶ Known septic; Likely septic; SWL Septic = Yes (Will be considered for analysis)
 - ▶ Known sewer; Likely sewer; SWL Sewer; NA; UNDT; UNK = No (Will not be considered for analysis)
- ▶ Calculating density assuming one septic system per parcel for each county:
 - ▶ Select by location the septic parcels within project area to apply calculations
 - ▶ Create and populate 2 new fields: Acre (calculated acreage) & OSTDSperAc (calculated 1/Acre)

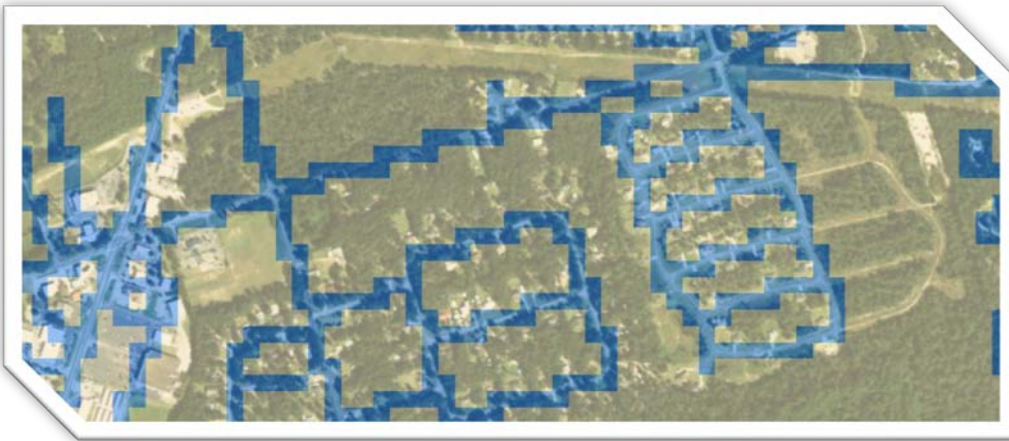
Layer 2 Creation (Cont.)

- ▶ Rating value ranges
 - ▶ 1: 0.000000 – 0.500000 tank/acre (> 2 Acres) (Low Priority)
 - ▶ 2: 0.500001 – 1.000000 tank/acre (1 - 2 Acres)
 - ▶ 3: 1.000001 – 2.000000 tank/acre (0.5 – 1 Acre) (Medium Priority)
 - ▶ 4: 2.000001 – 5.000000 tank/acre (0.2 – 0.5 Acre)
 - ▶ 5: 5.000001 – 23.000000 tank/acre (< 0.2 Acre) (High Priority)
- ▶ Combine Leon and Wakulla analysis parcels into a single layer
- ▶ Convert polygon to raster using density value as cell value
- ▶ Reclassify cell density value to analysis rating



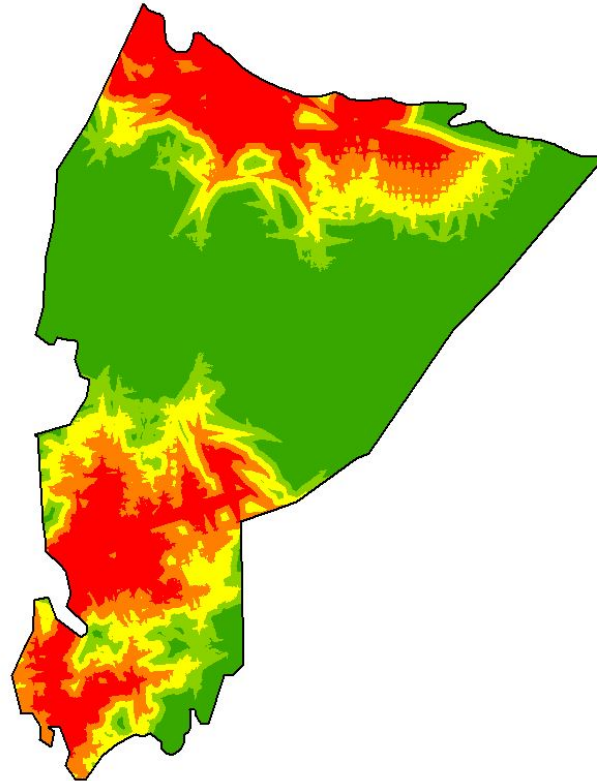
Layer 3 Creation

- ▶ Cost raster development
 - ▶ Convert roads vector layer to raster with 100 ft cell size to act as roadway + buffer
 - ▶ Reclassify to create a cost raster making roadways cost 1 and other areas cost 5
- ▶ Run Cost Distance tool with wastewater polylines as the input feature source data and roadway cost raster as the cost input



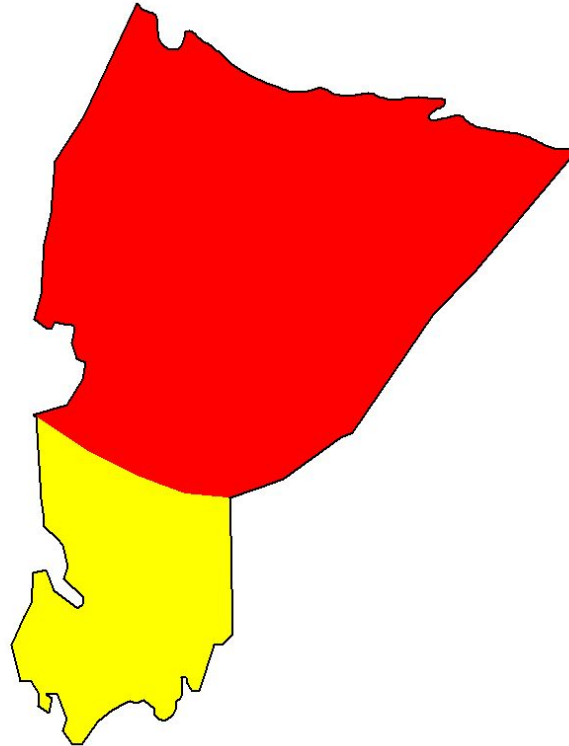
Layer 3 Creation (Cont.)

- ▶ Rating value ranges
 - ▶ 1: > 20,000 Ft (Low Priority)
 - ▶ 2: > 15,000 – 20,000 Ft
 - ▶ 3: > 10,000 – 15,000 Ft (Medium Priority)
 - ▶ 4: > 5,000 – 10,000 Ft
 - ▶ 5: 0 – 5,000 Ft (High Priority)
- ▶ Reclassify cell distance value to analysis rating



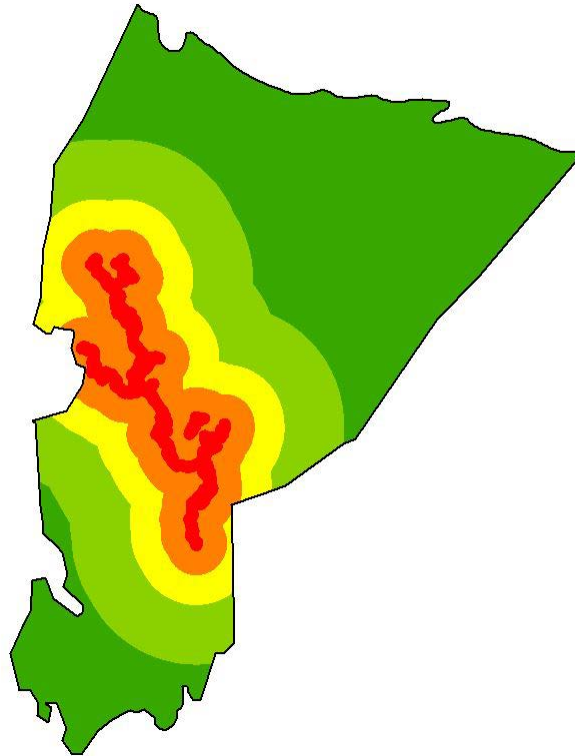
Layer 4 Creation

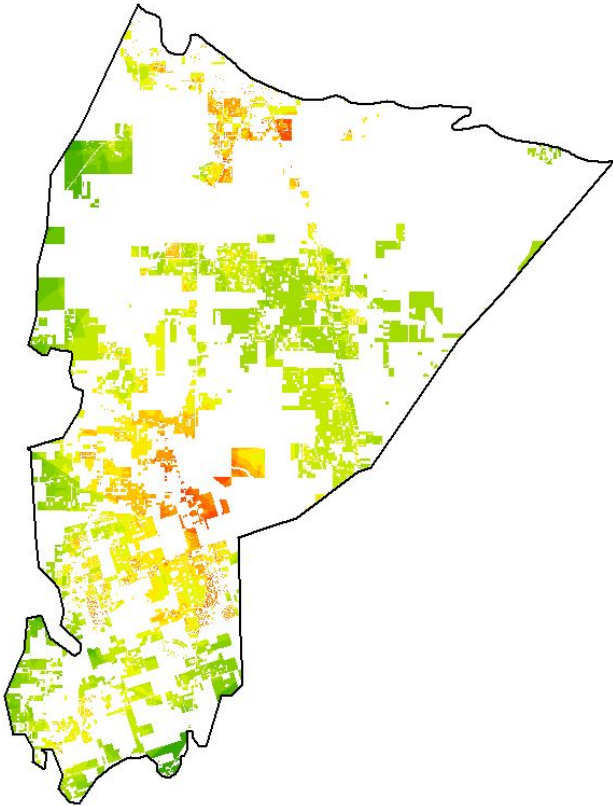
- ▶ Convert polygon to raster using PFA names as cell value
- ▶ Ratings
 - ▶ 5: PFA1 (High priority area)
 - ▶ 3: PFA2 (Medium priority area)
- ▶ Reclassify cell PFA name to analysis rating



Layer 5 Creation

- ▶ Run Euclidean Distance with caves lines as the input feature source data
- ▶ Rating value ranges
 - ▶ 1: > 20,000 Ft
 - ▶ 2: > 10,000 – 20,000 Ft
 - ▶ 3: > 5,000 – 10,000 Ft
 - ▶ 4: > 1,000 – 5,000 Ft
 - ▶ 5: 0 – 1,000 Ft
- ▶ Reclassify cell distance value to analysis rating





Raster Analysis

- ▶ Add 5 input layers together with Raster Calculator
- ▶ Output raster contains values ranging from 9-22
 - ▶ Value of 9 is the lowest priority
 - ▶ Value of 22 is the highest priority

VALUE	COUNT	% Total
9	624515	1.05
10	1023443	1.72
11	1885225	3.168
12	4363776	7.334
13	14540692	24.438
14	13693340	23.014
15	8688747	14.603
16	6786726	11.406
17	4134580	6.949
18	2095386	3.522
19	1116296	1.876
20	528548	0.888
21	15624	0.026
22	2236	0.004

Zonal Statistics

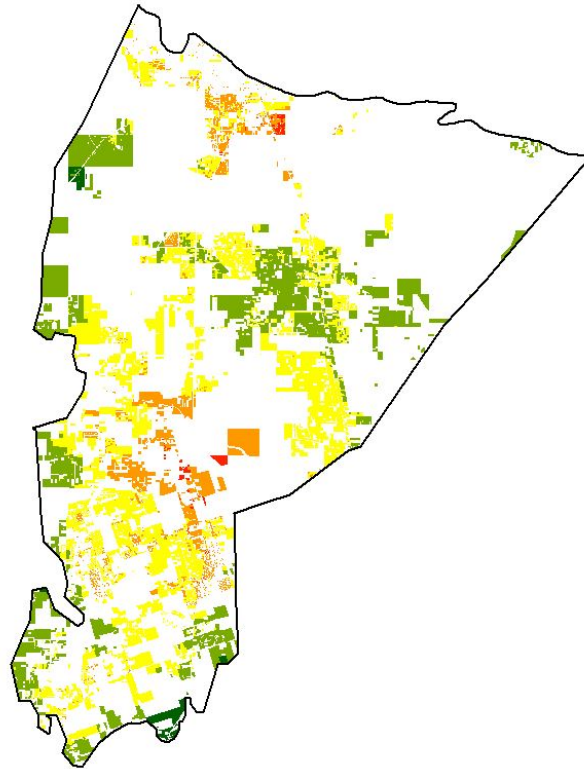


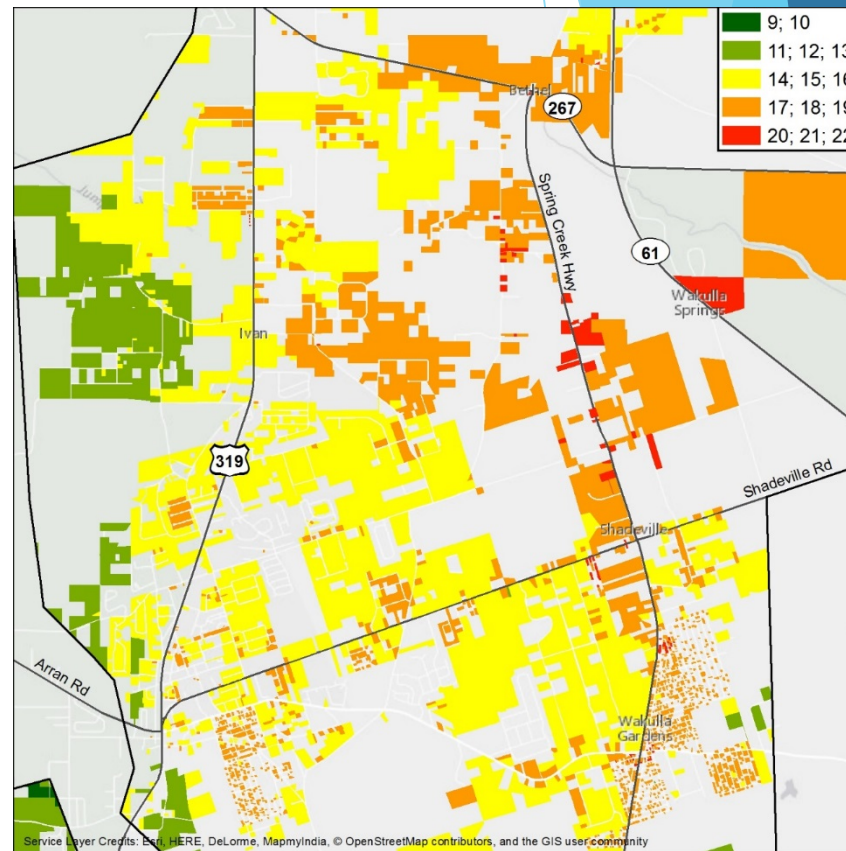
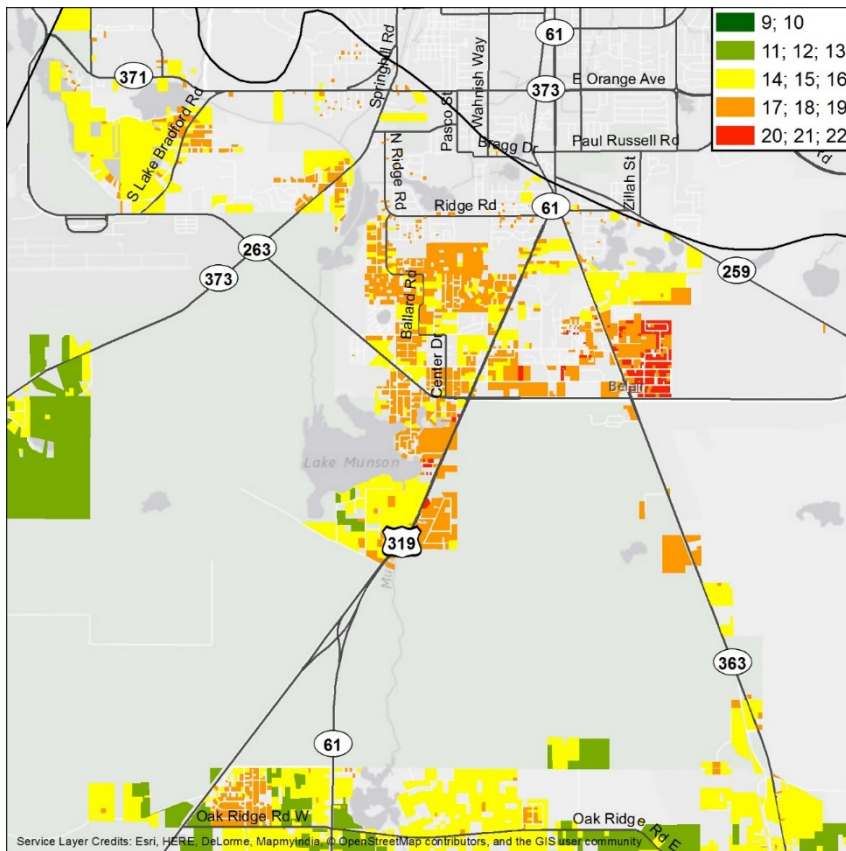
- ▶ Run Zonal Statistics as Table tool for each Leon and Wakulla counties using analysis parcel polygons as the input zone features
- ▶ The tool creates a table with several calculated statistics including Min, Max, Mean & Median
- ▶ Join zonal statistics to the parcel polygons and export all features

Results

- ▶ This analysis output does not provide recommendation for type of septic tank conversion
- ▶ This analysis output does provide insight into where conversion should have higher priority over other locations

Priority Value (Median)	Parcel Count	Percent Total
9	24	0.199%
10	49	0.406%
11	62	0.514%
12	223	1.848%
13	1126	9.329%
14	1873	15.518%
15	1930	15.990%
16	2015	16.694%
17	1616	13.389%
18	1851	15.336%
19	899	7.448%
20	374	3.099%
21	26	0.215%
22	2	0.017%





ArcGIS Online Webmap App

- ▶ Converted all input and output raster to vector for map viewing
- ▶ Accessed ArcGIS Online through National Audubon Society organizational account
- ▶ Imported smaller layers directly into web map and asked the administrator to create feature service layers for large/detailed layers.
- ▶ Created a web mapping application so it can be shared and utilized by non-GIS individuals in the Wakulla Springs alliance

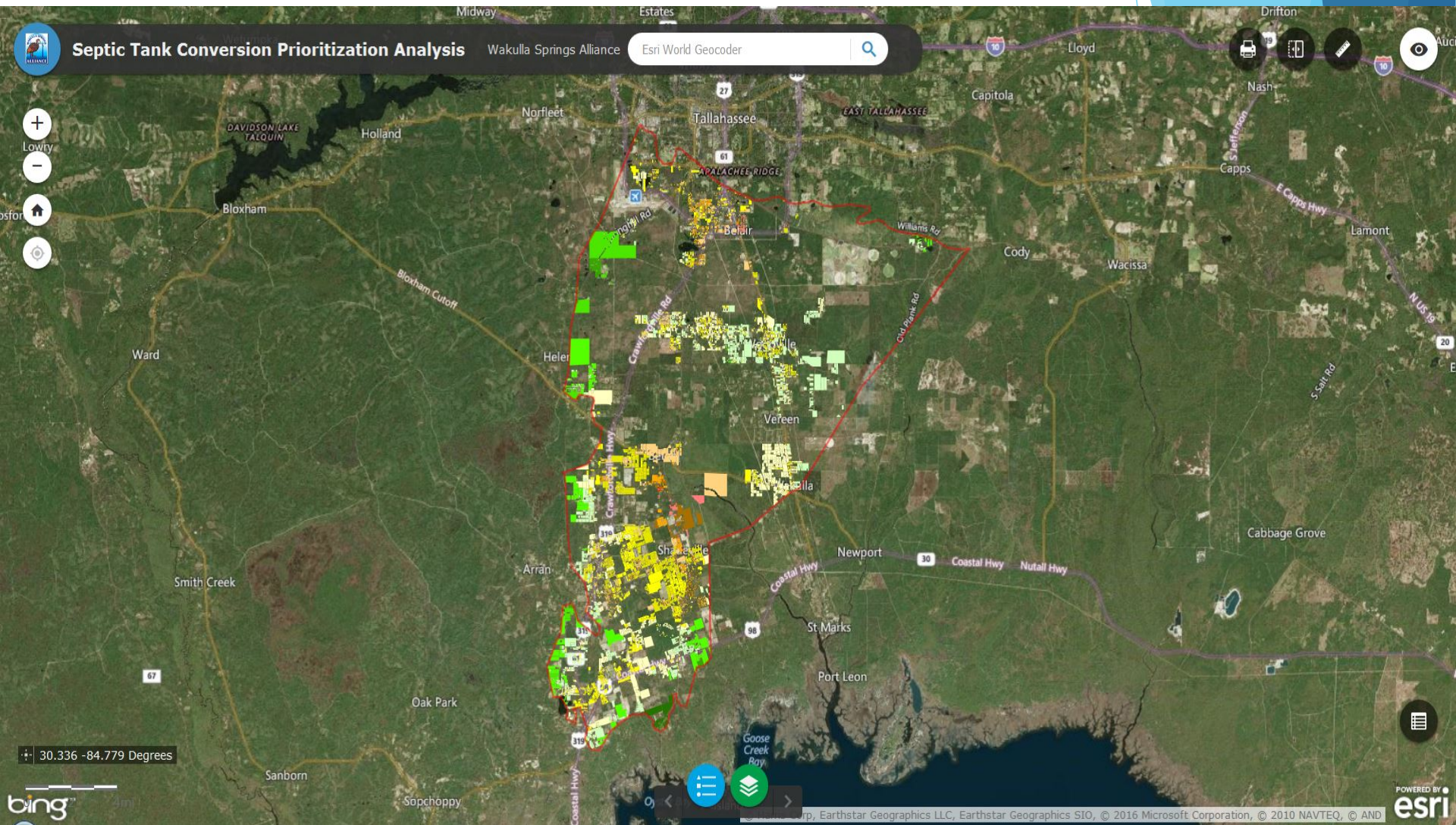
<http://audubon.maps.arcgis.com/apps/webappviewer/index.html?id=0bb623d5f8b94a2c9a114fda339c6858>



Septic Tank Conversion Prioritization Analysis

Wakulla Springs Alliance

Esri World Geocoder



30.336 -84.779 Degrees



Map data © 2016 Microsoft Corporation, © 2010 NAVTEQ, © AND



Future Considerations for Analysis

- ▶ Additional input layers
 - ▶ i.e. septic tank age
- ▶ Improved source data for input layer 1
 - ▶ Specially developed FAVA/LAVA/WCAVA
- ▶ More complete wastewater source data for Wakulla county
 - ▶ Likely needs to be digitized from source information
- ▶ More complete mapped cave source data
 - ▶ Future mapping efforts by Woodville Karst Plain Project (WKPP)
- ▶ Improve applied ratings for input layers
 - ▶ Experienced professionals

References

- ▶ Baker, A. E., Wood, A. R. & Cichon, J. R. (2007). *The Leon County Aquifer Vulnerability Assessment*. Retrieved from http://www.adgeo.net/content/lava/LAVA_Report_v1.1.pdf
- ▶ Baker, A. E., Wood, A. R. & Cichon, J. R. (2009a). *Florida Aquifer Vulnerability Assessment (FAVAII)*. Retrieved from http://www.adgeo.net/content/fava2/FAVAII_report.pdf
- ▶ Baker, A. E., Wood, A. R. & Cichon, J. R. (2009b). *The Wakulla County Aquifer Vulnerability Assessment*. Retrieved from http://www.adgeo.net/content/fava2/WCAVA_Report.pdf
- ▶ Davis, J. H., Katz, B. G. & Griffin, D. W. (2010). Nitrate-N Movement in Groundwater from the Land Application of Treated Municipal Wastewater and Other Sources in the Wakulla Springs Springshed, Leon and Wakulla Counties, Florida, 1966-2018. *U.S. Geological Survey Report 2010-5099*, 104 p.
- ▶ Division of Environmental Assessment and Restoration (2015). *Final Basin Management Action Plan for the Implementation of the Total Maximum Daily Load for Nutrient (Biology) by the Florida Department of Environmental Protection in the Upper Wakulla River and Wakulla Springs Basin*. Retrieved from <http://www.dep.state.fl.us/water/watersheds/docs/bmap/Wakulla-BMAP.pdf>
- ▶ Elder, J. F., Hunn, J. D. & Calhoun, C. W. (1985). *Wastewater Application by Spray Irrigation on a Field Southeast of Tallahassee, Florida: Effects on Ground-Water Quality and Quantity, 1980-82*. Retrieved from <http://pubs.usgs.gov/wri/1985/4006/report.pdf>
- ▶ ESRI (2016). ArcGIS Desktop: Release 10.3.1. Redlands, CA: Environmental Systems Research Institute.
- ▶ Lombardo Associates, Inc. (2011). *Onsite Sewage Treatment and Disposal Management Options – Final Report for Wakulla Springs, Leon County, Wakulla County & City of Tallahassee, FL*. Retrieved from https://www.talgov.com/Uploads/Public/Documents/planning/pdf/compln/onsite_sewage_mgt_rpt.pdf
- ▶ Pruitt, J. B., Elder, J. F. & Johnson, I. K. (1988). *Effects of Treated Municipal Effluent Irrigation on Ground Water beneath Sprayfields, Tallahassee, Florida*. Retrieved from <http://pubs.usgs.gov/wri/1988/4092/report.pdf>



Questions...
Thank you!

Special thanks to:

Sean McGlynn

Bob Deyle

Pamela Hall

Jim Stevenson

Bill VanSickle

Alan Baker

Wakulla Springs Alliance

Woodville Karst Plain Project

Jamie Hughes

jamienichole@gmail.com



Wrap Up – OSTDS Meeting

- Public Comments.
- Next meeting date April/May timeframe.
- Other comments/announcements.
- Action items.
- Adjourn OSTDS Committee.

Septic Tank Conversion Prioritization using GIS in the Wakulla Springs Springshed



Jamie Hughes

Barry Evans, Advisor

GEOG 596B, Fall 2016

February 14, 2017

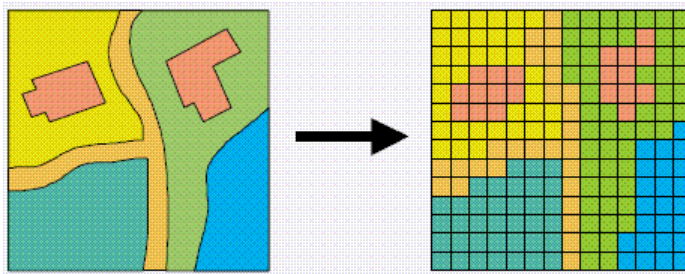
My Capstone Project

- ▶ Current situation:
 - ▶ State money is available to help fund expensive septic conversion projects within the Wakulla Springs springshed
 - ▶ Previous report (Lombardo, 2011) about onsite sewage treatment and disposal management options provides generalized recommendations on sewer conversion type for six areas of the springshed
 - ▶ No multi-criteria analysis had been done to prioritize the most critical conversion projects in the springshed
- ▶ I created a GIS raster analysis that prioritizes septic tank conversions by septic parcel within the BMAP primary focus areas
- ▶ This effort should provide focus in order to advocate for funds being applied to projects that will provide the greatest benefit to groundwater quality

What is Raster Data?

- ▶ ArcGIS Help describes raster data as follows:

“Raster datasets represent geographic features by dividing the world into discrete square or rectangular cells laid out in a grid. Each cell has a value that is used to represent some characteristic of that location, such as temperature, elevation, or a spectral value.”



ESRI, 2016



Florida Department of Environmental Protection

Division of Environmental Assessment and Restoration

Upper Wakulla River and Wakulla Springs BMAP Annual Update

***Moir R. Homann
February 14, 2017***





Agenda

- Annual Progress Report Updates.
 - Update on Activities Over the Past Year.
- 2016-1 Requirements Review/Springshed Nitrogen Sources – *Moira Homann*.
- Urban Turfgrass Discussion – *Moira Homann/Tiffany Busby*.
- Summary and Action Items – *Moira Homann/Tiffany Busby*.
- Next Meeting Date.
- Adjourn.

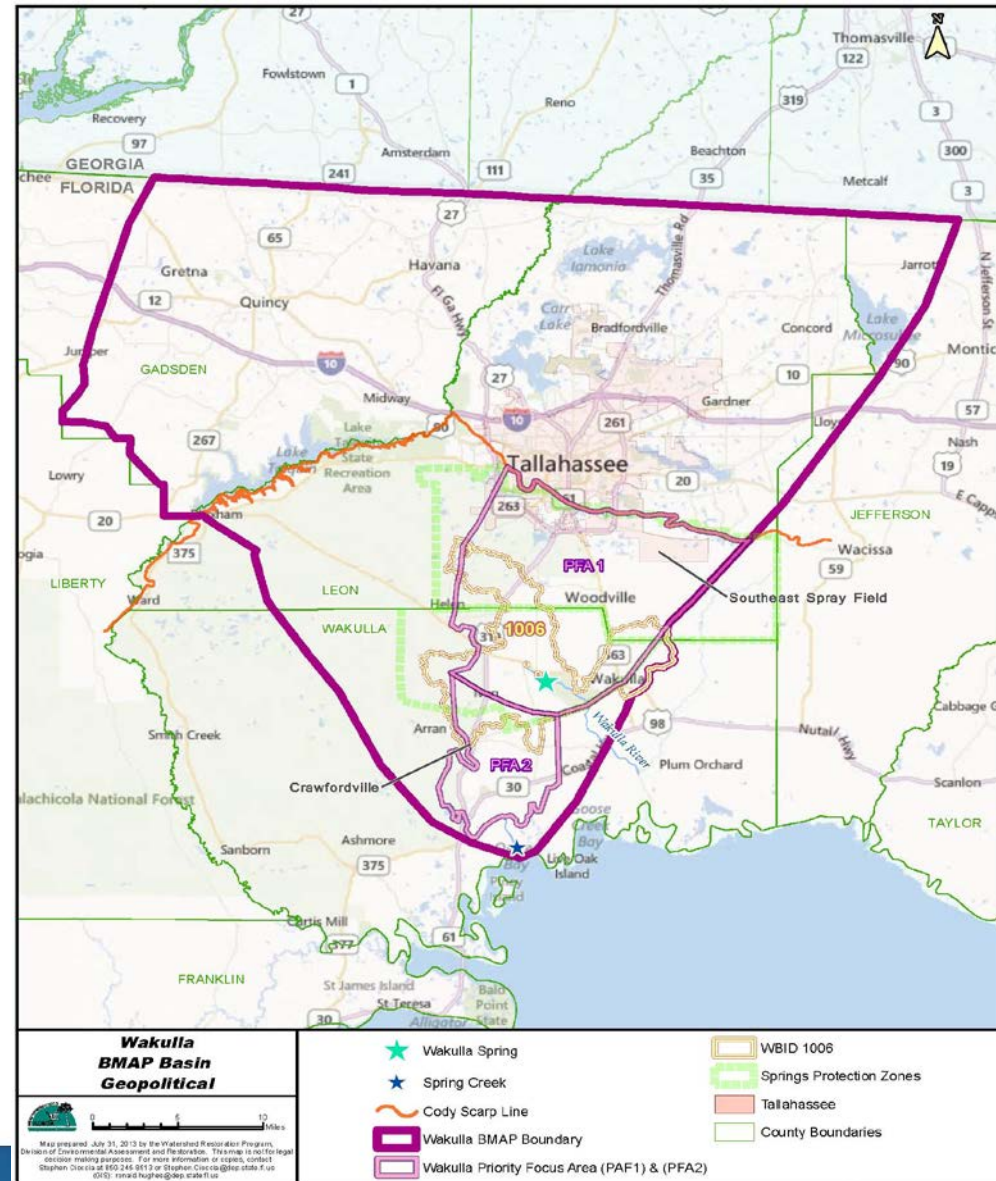


Annual Report Updates



Upper Wakulla River and Wakulla Springs BMAP

- Adopted October 2015.
 - To implement nitrate reductions to achieve the Upper Wakulla River TMDL.
 - Focuses on addressing nitrate loading from Wastewater Treatment Facilities (WWTFs), OSTDS, fertilizer, livestock.
- BMAP includes:
 - Projects and management strategies.
 - A schedule for implementation for the first five-year iteration.
 - Monitoring plan.
- BMAP area encompasses 1,325 square miles/848,445 acres.
- Two Priority Focus Areas (PFAs).
- Includes projects and management strategies located within the PFAs to achieve nitrate reductions.





Annual Progress Report

- Describes the activities that occurred during the reporting period: November 1, 2015 through October 31, 2016.
- Report will include the following:
 - Project updates.
 - Status.
 - Nutrient reductions associated with project implementation efforts (structural/non-structural).
 - Agriculture enrollment in BMPs.
 - Water quality and biological community update.
- Annual report, drafted by the end of February/early March.





Summary of Projects

Projects in the BMAP

- Stormwater Structural Best Management Practices (BMPs).
 - Stormwater Treatment Systems.
 - Stormwater System Rehabilitation.
- Agricultural BMPs.
- Special Studies/Planning/Ordinances.
 - FDEP permit updates.
 - Florida Department of Transportation (FDOT) fertilizer cessation.
- Stormwater Operation and Maintenance and Street Sweeping.
 - FDOT, City of Tallahassee.
- Conservation Land Acquisition.
 - Land Preservation.
- Wastewater/OSTDS.
 - Individual system phase out to sewer.
- Wastewater Collection System Maintenance.
 - Upgrade to Advanced Wastewater Treatment (AWT).
 - Inspections and maintenance.

New Projects Submitted

- City of Tallahassee has 5 new projects:
 - 3 public education projects.
 - 2 septic tank phase-out projects.
- Wakulla County has 4 new projects:
 - Septic tank phase-out projects.

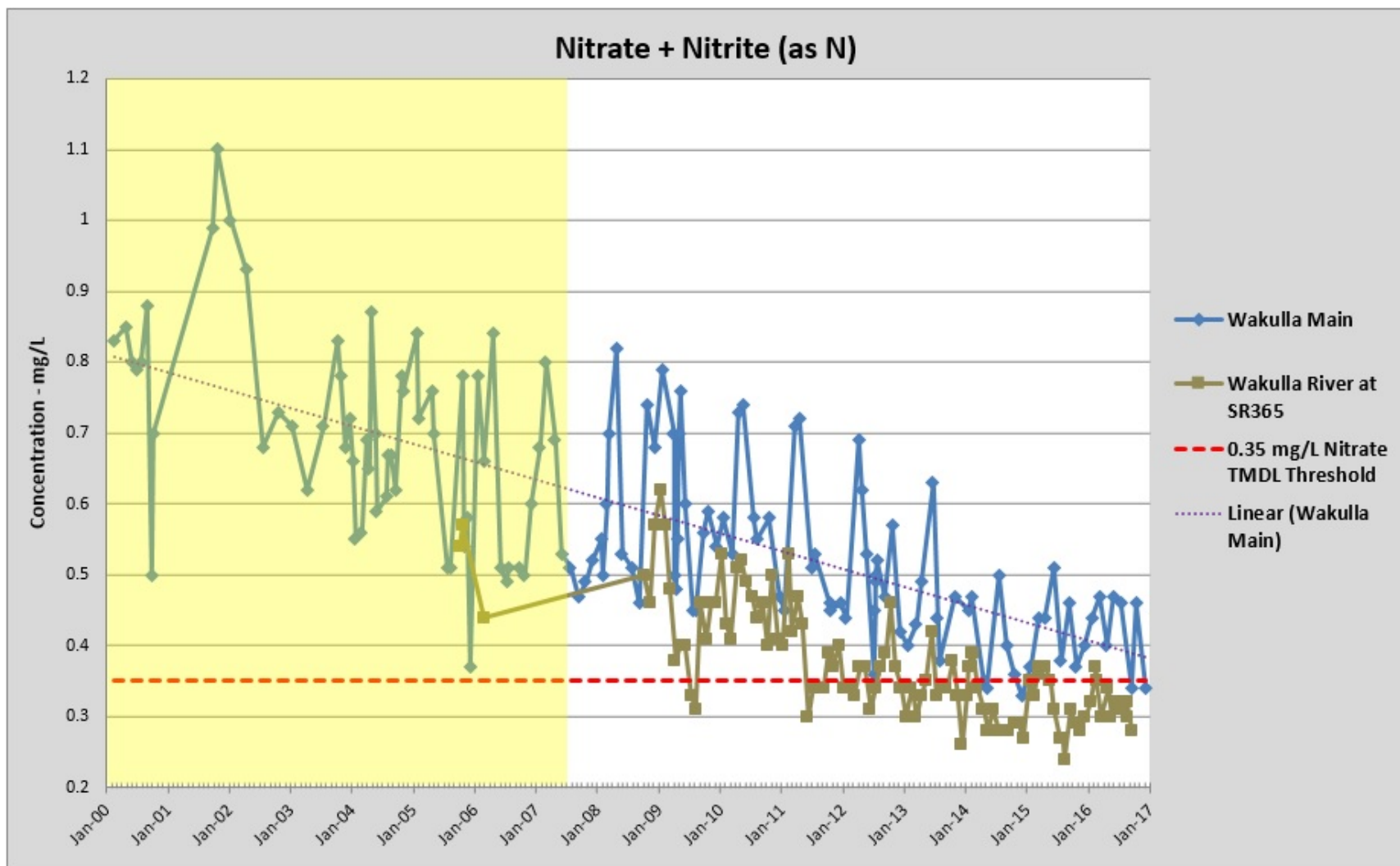


Water Quality Trends



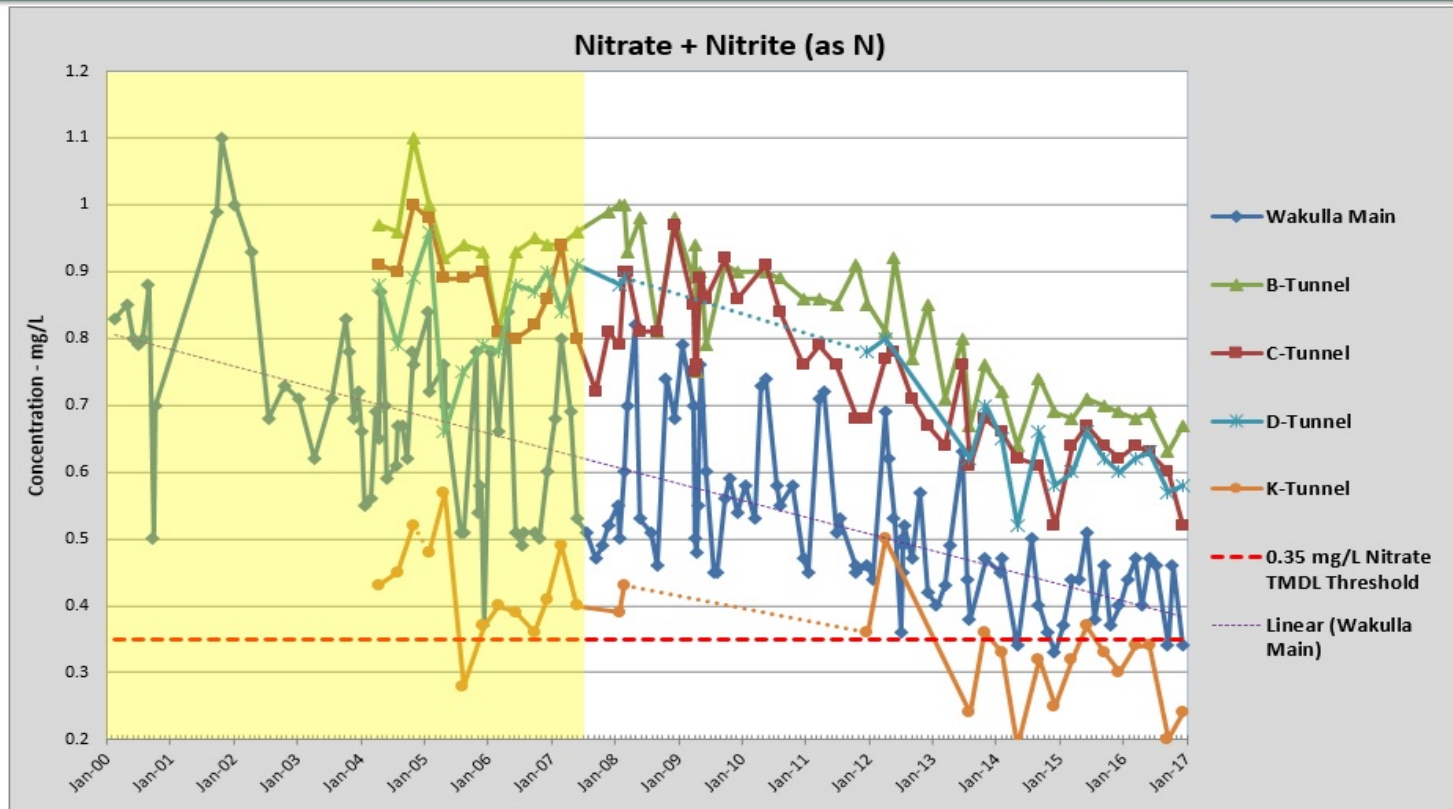


Nitrate-Nitrite Water Quality Trends in the Wakulla River and Wakulla Spring Vent





Nitrate-Nitrite Water Quality Trends in the Wakulla Springs Tunnels



- B-, C-, and D-Tunnels.
 - Higher concentrations than the main tunnel.
 - Indication that other sources of flow to the springs are diluting the concentrations at the spring vent.
 - Major contributors.
 - Bring contributing flows from the Southeast Spray Field and Ames Sink.
 - Concentrations higher than target Observed declining trend in nitrate concentrations.
- K-Tunnel.
 - Lower nitrate concentrations.
 - Tunnel may be diluting flows from the other tunnels.



Biological Community Trends



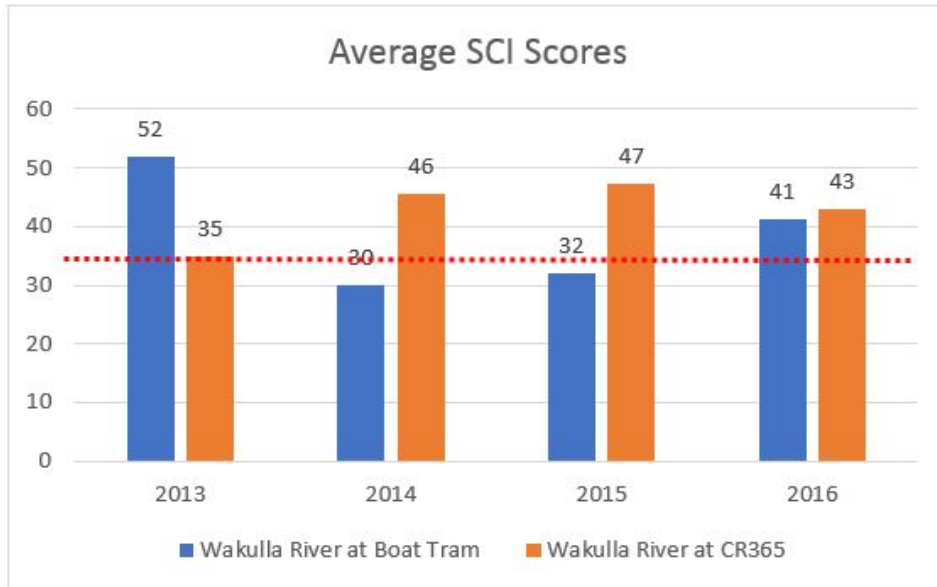
Biological Community Trends

- DEP collects samples in collaboration with Northwest Florida Water Management District (NFWFMD).
- Quarterly water chemistry and biological samples collected at two locations on the Wakulla River:
 - Upstream station is located at the Boat Tram inside the Wakulla Springs State Park, approximately 0.5 miles downstream from the spring boil.
 - Downstream station is located approximately 3.0 miles downstream of the spring boil and just outside the state park boundary at County Road 365.

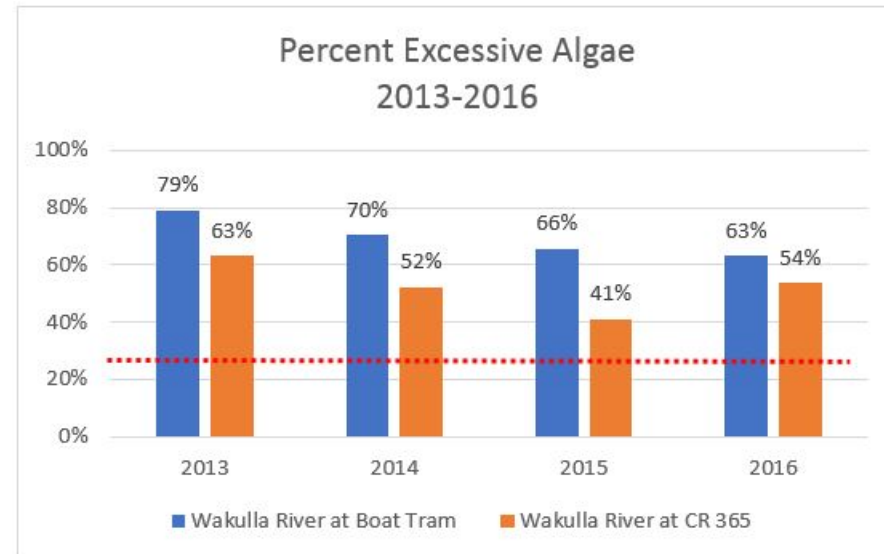


Biological Community Trends 2013-2016

Stream Condition Index (SCI) continues to show mixed results. It has passed at the CR365 for the past 2 years, but the Boat Tram site fails to meet the criteria periodically.



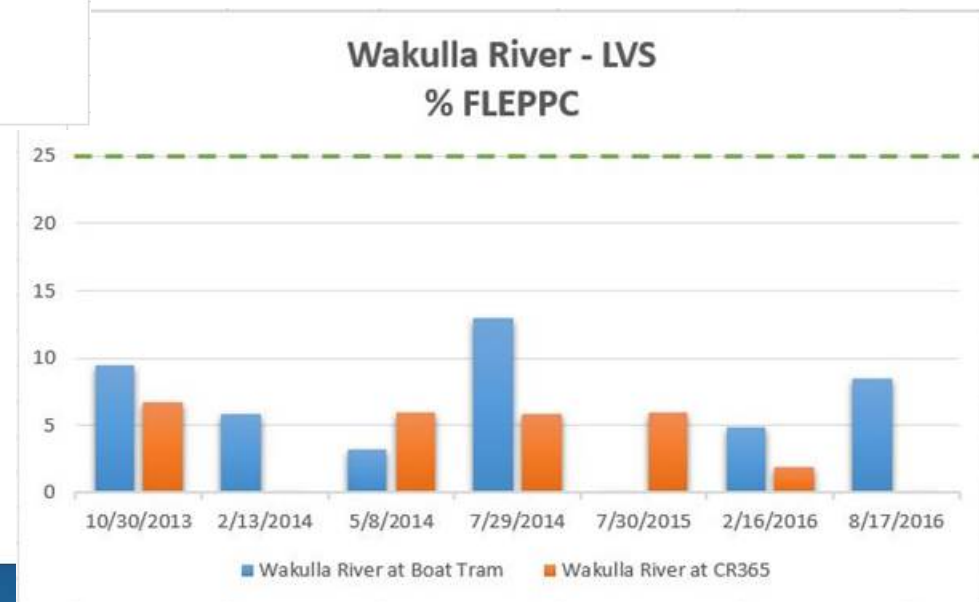
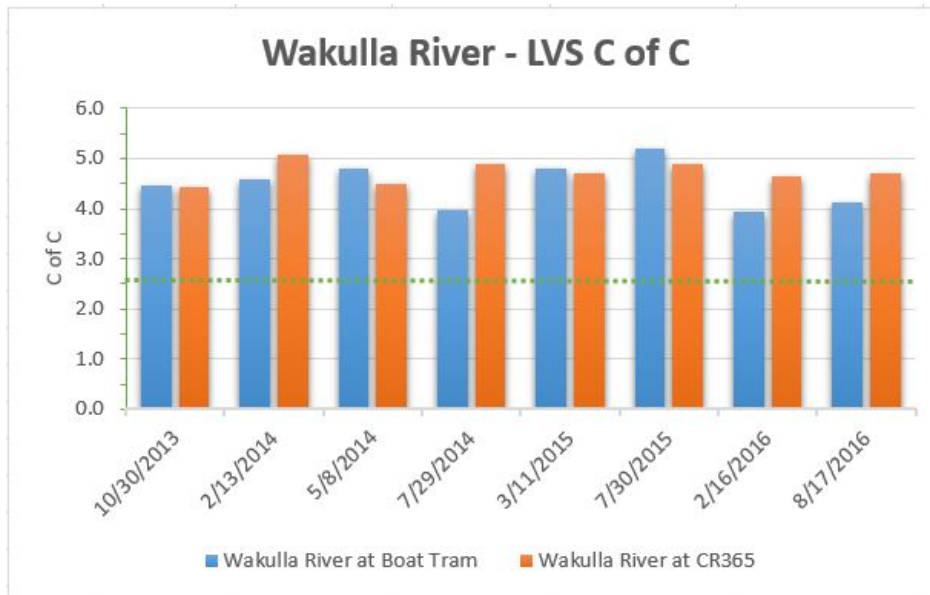
Rapid Periphyton Survey (RPS) continues to demonstrate excessive algae at both sites although there appears to be a declining trend from 2013 through 2016.





Biological Community Trends 2013-2016

Both metrics of the Linear Vegetation Survey (LVS) have passed on all dates and locations.





***Update on BMAP Activities over the
Past Year:
Florida Department of Agriculture and
Consumer Services (FDACS)
and Local Entities***

Upper Wakulla Springs and River Basin Management Action Plan (BMAP) Annual Update

Katie Hallas

FDACS

Office of Agricultural Water Policy (OAWP)

February 2017



Presentation Overview

- ✓ Agricultural Best Management Practice (BMP) Program Overview and Enrollment Update
- ✓ Implementation Verification Program Update



Agricultural BMP Program Overview and Enrollment Update



Agricultural BMP Overview

- ✓ Practical measures that reduce amount of fertilizers, pesticides, and animal waste that enter water resources.
- ✓ BMP manuals developed in collaboration with agricultural industry, agencies, and others.
- ✓ Must be **economically and technically feasible** for producer to implement.



BMP Types

✓ Management BMPs

- ✓ Examples: Nutrient and irrigation management.
- ✓ Comprise majority of practices and often are not readily observable.
- ✓ Generally affordable.

✓ Structural BMPs

- ✓ Examples: Water control structures, fencing, and tailwater recovery systems.
- ✓ May require cost share to be economically feasible.

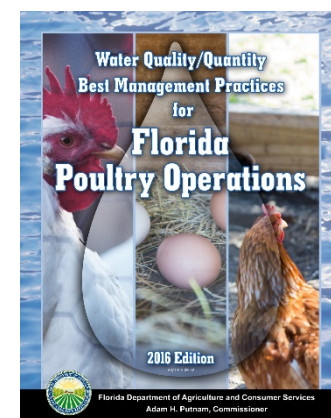
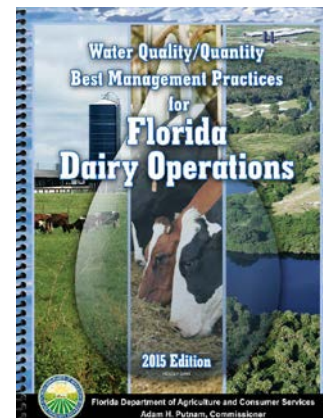
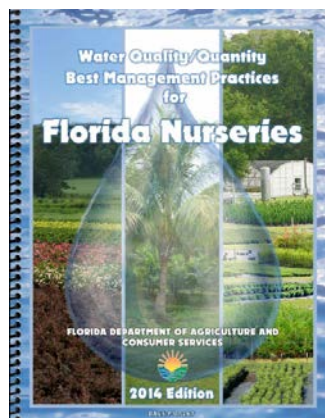
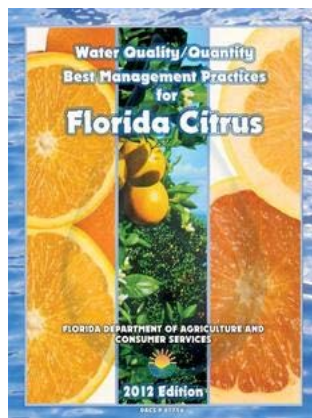
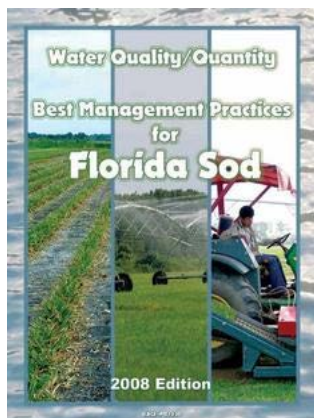
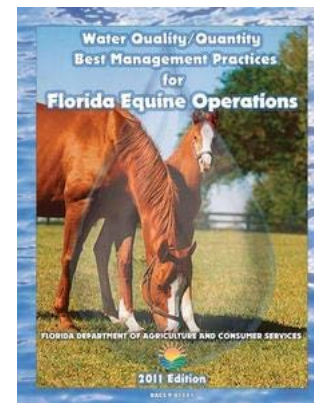
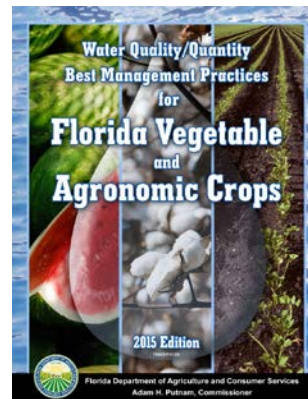
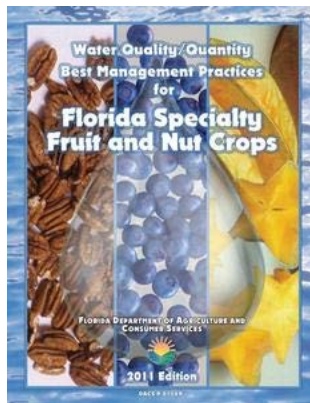
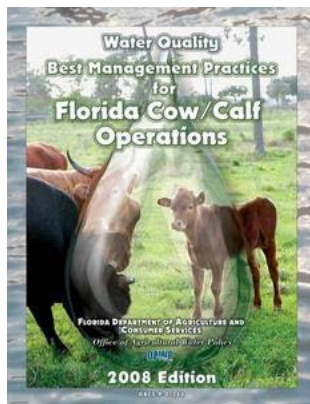


OAWP BMP Programs

Manual	Adoption	Rule Reference	Next Review
Cow/Calf	2009	5M-11	2016
Sod	2008	5M-9	2016
Specialty Fruit & Nut	2011	5M-13	2017
Equine	2012	5M-14	2017
Citrus	2013	5M-16	2018
Nursery	2014	5M-6	2018
Vegetable and Agronomic Crops	2015	5M-8	2020
Dairy	2016	5M-17	2021
Poultry	2016	5M-19	2021



OAWP BMP Manuals

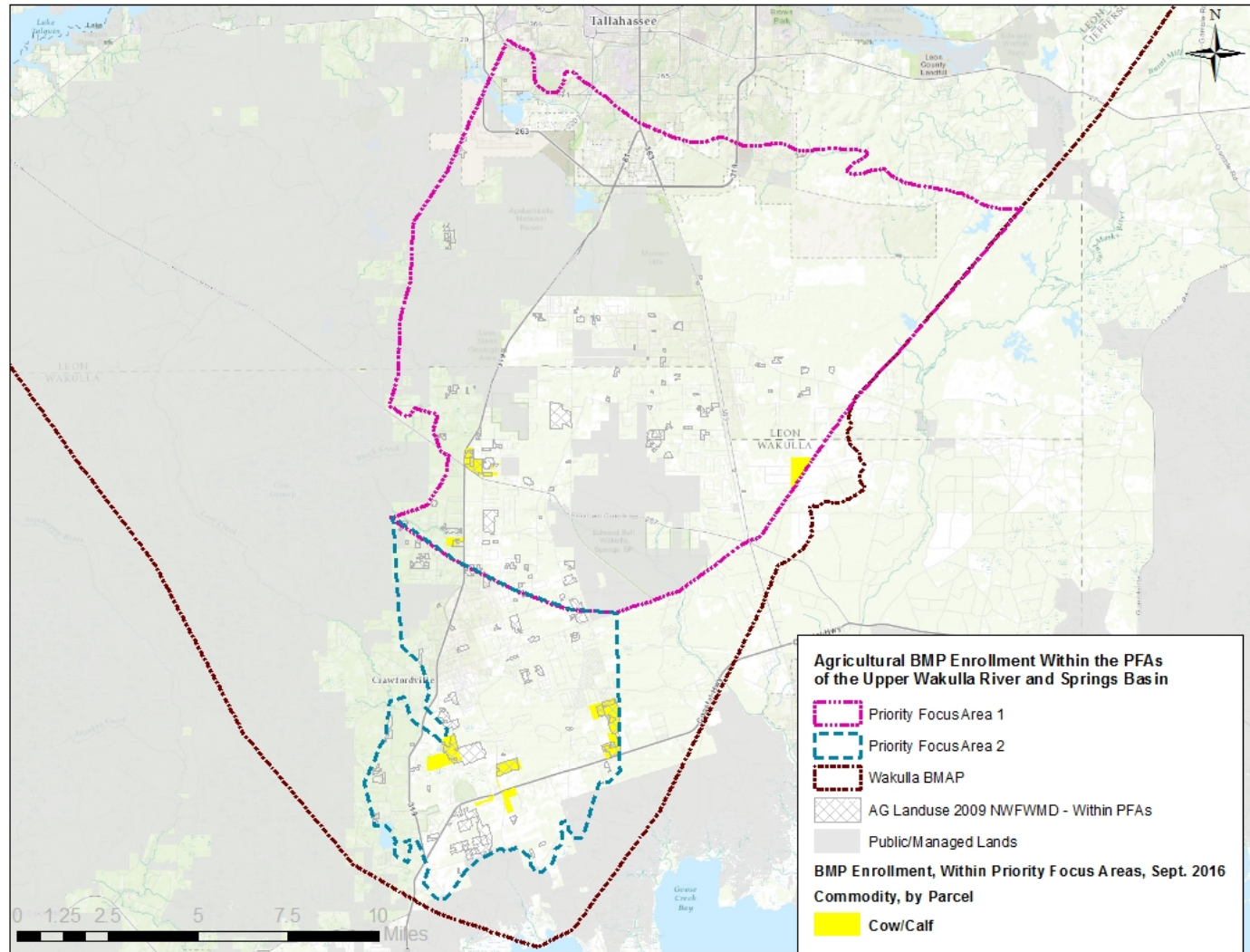


Agriculture's Role in Water Quality Protection

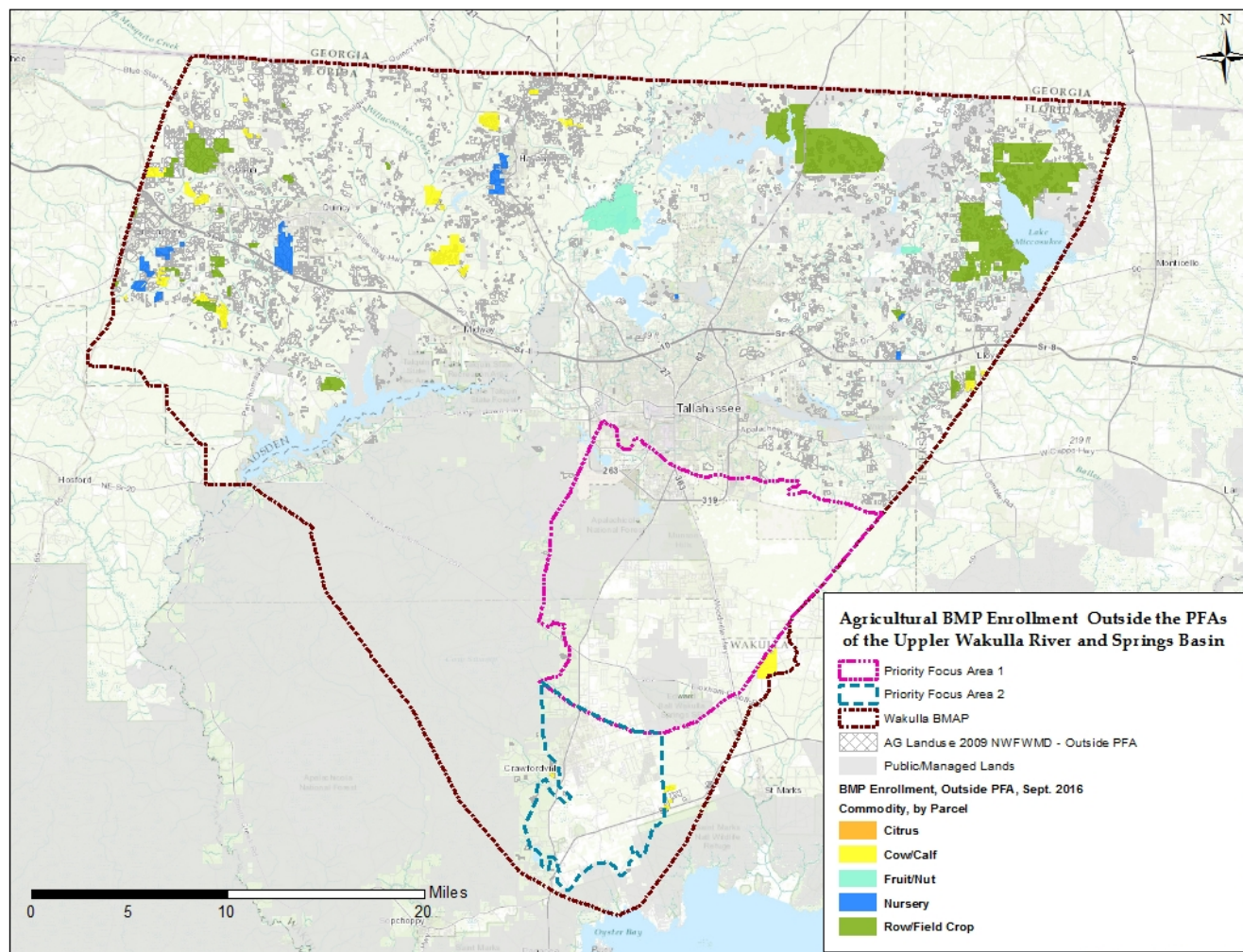
- ✓ Operations within adopted BMAP areas and/or Northern Everglades have two options:
 - ✓ Enroll in and implement FDACS BMPs.
 - ✓ Follow a Florida Department of Environmental Protection (FDEP)- or water management district approved water quality monitoring plan at operator's own expense.



Wakulla Springs BMAP Enrollment Update Inside Priority Focus Areas (PFAs), September 2016



Wakulla Springs BMAP Enrollment Update Outside PFAs, September 2016



Agricultural Land Use Inside PFAs

Wakulla Springs BMAP Area

2009 Northwest Florida Water Management District (NFWFMD) Land Use	Acres
Pasture and Rangeland (2110, 2120, 2130, 3100)	3761.48
Row/Field/Mixed Crops	288.45
Fallow Cropland	472.61
Horse Farm	37.29
Hay Fields	1162.58
Fruit Orchards/Other Groves	19.24
Nurseries	18.11
Ornamentals	14.78
Aquaculture	1.52
Other Open Lands	33.12
Total	5,809.18

Agricultural Land Use Outside PFAs

Wakulla Springs BMAP Area

2009 NFWMD Land Use	Acres
Pasture and Rangeland (2110, 2120, 2130, 3100)	26,893.79
Row/Field/Mixed Crops	11,775.01
Fallow Cropland	821.28
Specialty Farms	48.67
Horse Farm	1,298.19
Hay Fields	13,927.11
Cattle Feeding	55.15
Poultry Feeding	23.58
Tree Crops	476.50
Nurseries	258.08
Sod Farms	1,260.56
Ornamentals	1,629.78
Aquaculture	10.20
Other Open Lands	62.41
Total	58,540.31

Wakulla Springs BMAP Enrollment Update Inside PFAs, September 2016

Related FDACS BMP Programs	Acreage Enrolled	Related NOIs	2009 SJRWMD Land Use Acres within NOIs
Cow/Calf Operations	1,465.49	12	708.24
Total	1,465.49	12	708.24

Wakulla Springs BMAP Enrollment Update Outside PFAs, September 2016

Related FDACS BMP Programs	Acreage Enrolled	Related NOIs	2009 SJRWMD Land Use Acres within NOIs
Cow/Calf Operations	5,398.91	19	2,047.31
Nurseries	3,714.43	12	2,044.56
Specialty Fruit and Nut	3,196.10	3	172.07
Statewide Citrus	14.11	1	11.74
Vegetable and Agronomic Crops	23,206	22	4,800.17
Total	35,529.55	57	9,075.85

Implementation Verification Program



Implementation Verification Program

- ✓ Primary purposes:
 - ✓ Document implementation of BMPs.
 - ✓ Report on implementation extent and progress, particularly in BMAP areas.
 - ✓ Provide basis for determination of implementation status.



Source: FDACS



Conclusion

- ✓ Agricultural BMP Program Overview and Enrollment Update
- ✓ Implementation Verification Program Update



Thank you!

Wakulla Springs Contact:

Kathleen Greenwood(Tallahassee)

Kathleen.Greenwood@FreshFromFlorida.com

(850) 617-1722

Statewide BMAP Contact:

Katie Hallas (Tallahassee)

Katie.Hallas@FreshFromFlorida.com

(850) 617-1719

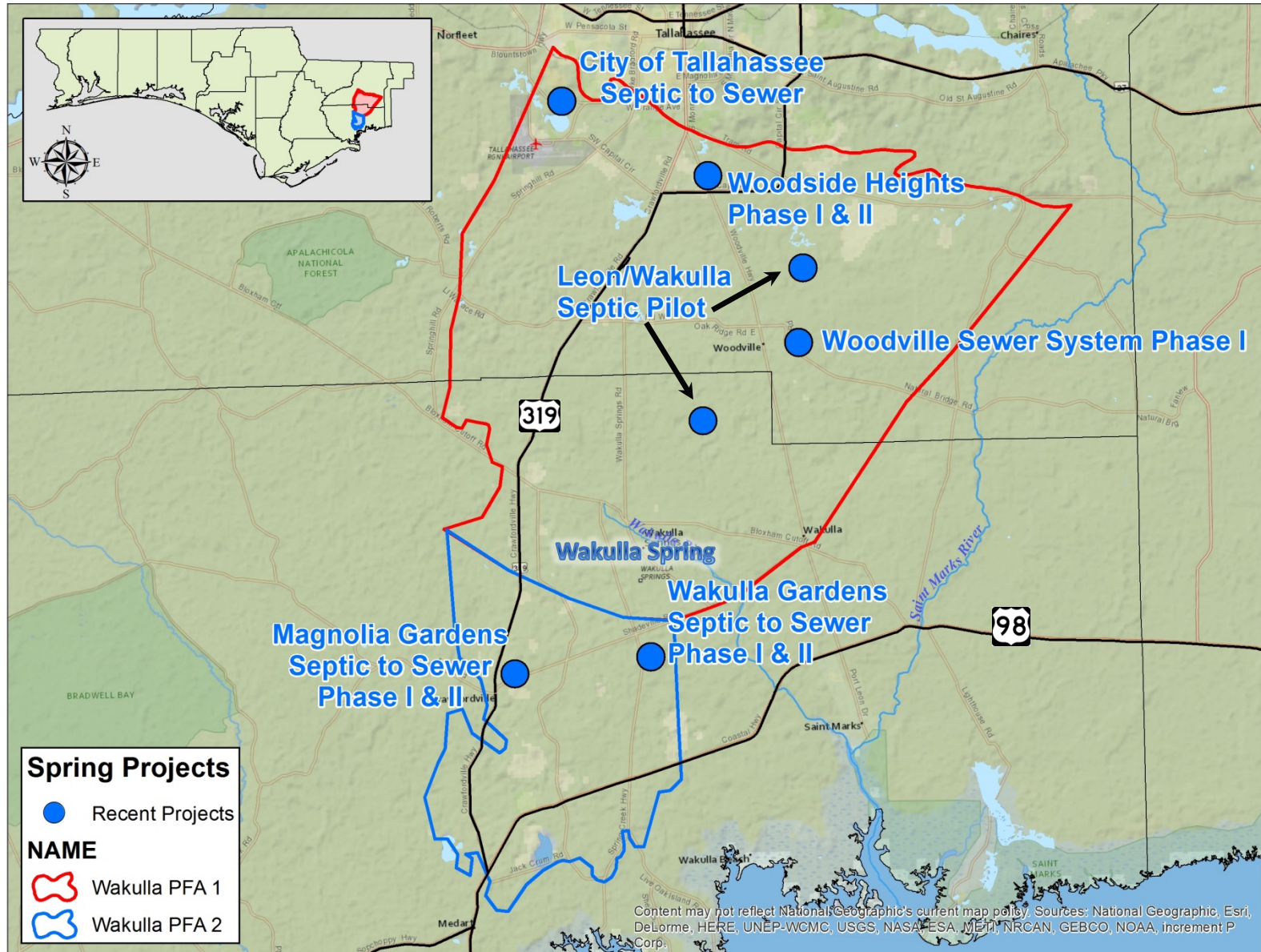




Upper Wakulla River & Wakulla Springs BMAP

February 14, 2017

Wakulla Springs - Projects





Wakulla Spring – Projects FY14/15 – FY15/16

- **Wakulla Gardens, Phases I & II:** The District will provide **\$6,540,000** (\$3,856,600 match) in grant funding for the design and construction to connect approximately 416 septic systems to central sewer within the **Wakulla Springs Priority Focus Area 2**.
- **Status:** **Phase 1** - Design, permitting complete; mandatory pre-bid meeting February 16, 2017; bid opening March 14, 2017; final completion 330 days with liquidated damages; **Phase 2** - survey complete, working on 60% design plans.
- **Magnolia Gardens, Phases I & II:** The District will provide **\$3,860,000** (\$3,856,600 match) in grant funding for the design and construction to connect approximately 300 septic systems to central sewer within the **Wakulla Springs Priority Focus Area 2**.
- **Status:** **Phase 1** - Design, permitting complete; mandatory pre-bid meeting February 16, 2017; bid opening March 14, 2017; final completion 330 days with liquidated damages; **Phase 2** - survey complete, working on 60% design plans.
- **Woodside Heights, Phases I & II:** The District will provide **\$2,450,000** (\$2,450,000 match) in grant funding for Design and construction to connect approximately 200 septic systems to central sewer within the **Wakulla Springs Priority Focus Area 1**.
- **Status:** Leon County has contracted with an engineering firm for design and permitting. The survey for the project is underway. Design will begin when the survey is complete.



Wakulla Spring – Projects FY16/17

- **Tallahassee Sewer System Project:** Provide City of Tallahassee - **\$637,000** (*\$1,950,000 match*) to connect up to **120 residences** currently served by septic systems within the **Wakulla Springs Priority Focus Area 1** to central sewer.
- **Status:** Work plan complete. Contract in review.
- **Leon County/Wakulla County Pilot Project:** The District will provide **\$1,500,000** in grant funding to Leon and Wakulla counties to design and install advanced septic systems in a Leon County neighborhood and a Wakulla County neighborhood within the **Wakulla Springs Priority Focus Area 1**.
- **Status:** Work plan under development.
- **Woodville Sewer System:** Provide Leon County **\$1,500,000** (*\$1,500,000 match*) to complete **Phase I** of a wastewater improvement project along Woodville Highway.
- **Status:** Work plan complete. Contract in review.



Vallisneria and Sagittaria Restoration Project Initiative









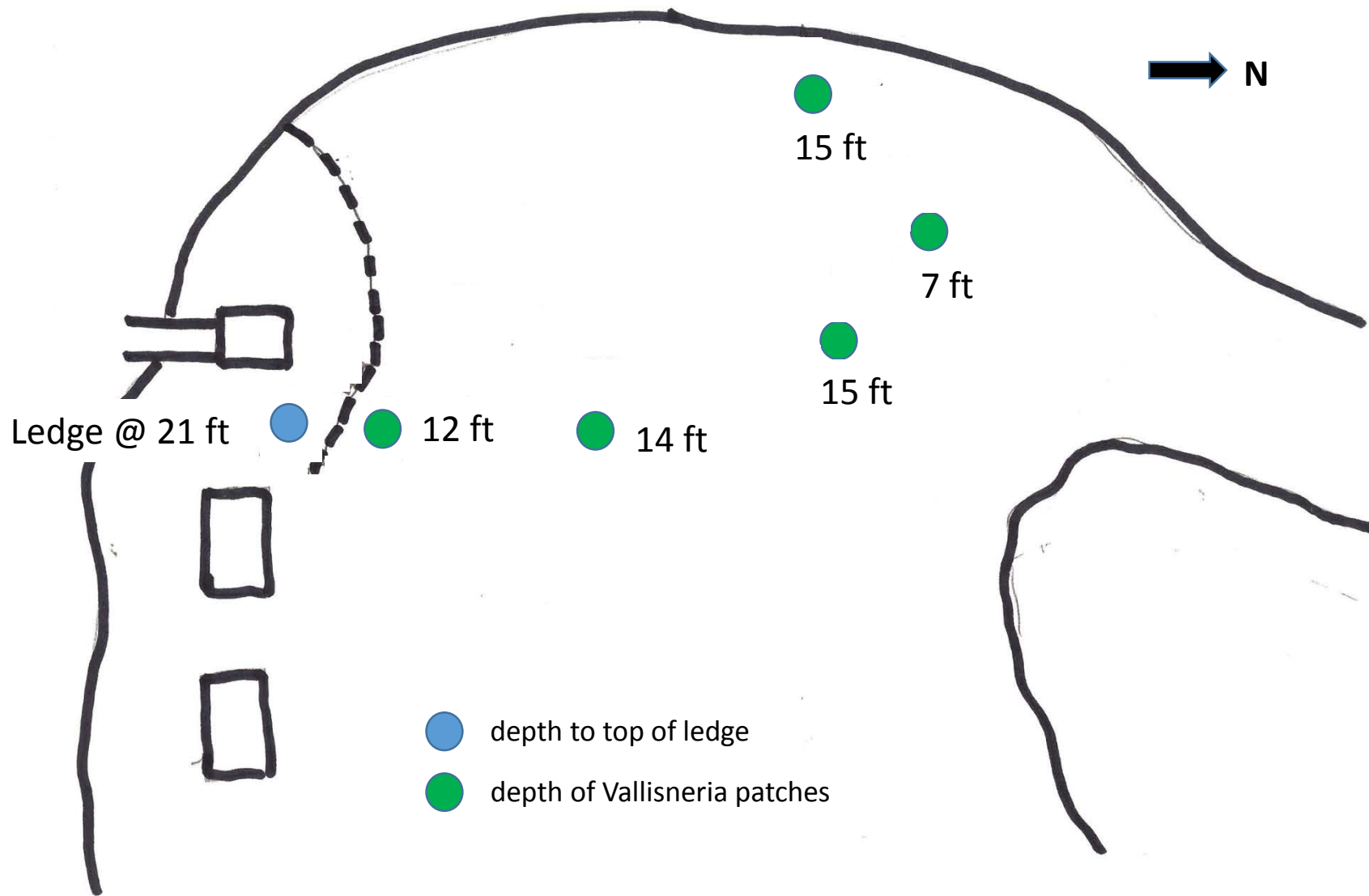
Sagittaria kurziana – Spring tape;
strap-leaf Sagittaria

Strap-leaf sagittaria
Sagittaria kurziana
Photo by Vic Ramey
© 2000 University of Florida



Vallisneria americana – Tape
grass; American eelgrass





Survey of deepest patches of Vallisneria around spring bowl 12/01/16



Local Updates



Florida Springs and Aquifer Protection Act



Chapter 2016-1 Laws of Florida

- Florida Springs and Aquifer Protection Act.
- Requires 5-, 10-, 15-, and 20-year goals to achieve TMDLs for each source identified in Nitrogen Source Inventory and Loading Tool (NSILT).
- Revise adopted BMAP to include source specific goals as well as OSTDS Remediation Plan by [July 1, 2018](#).
- Delineate PFA(s).





Requirements of Act

- Local governments within spring BMAP areas must have fertilizer ordinance!
 - [Deadline is July 2017.](#)
 - Department has model ordinance available.
 - Meets Section 403.9337, F.S.
- OSTDS Remediation Plan.
 - Effort kicked off February 2016.
- Within PFA, notification to local governments of 10-2 Environmental Resource Permit (ERP) General Permit.
- Outlines restrictions/prohibitions within PFAs.





Wrap Up

- Summary.
 - TMDL needs to be achieved no more than 20 years after the adoption of the BMAP (Wakulla = 2015).
 - For all sources:
 - Need to update information (data, projects, studies, etc.) and start gathering necessary information.
 - Identify management strategies and projects to meet the 5-year, 10-year and 15-year targets.
 - Revise adopted BMAP by [July 1, 2018](#).
- Action Items.
 - Next meeting, April/May time frame.
 - Annual report, draft by end of February/early March.
- Other comments/announcements.



Happy Valentine's Day!

An aerial photograph of a winding river or lake, likely Wakulla River, surrounded by a dense, lush green forest. The water is a deep blue color. On the right bank, there is a small dock with several boats moored. The text "Thank you!" is overlaid in large, white, bold letters across the center of the image.

Thank you!