

Florida Department of Environmental Protection



Upper Wakulla River & Wakulla Springs BMAP Area

Priority Focus Areas for Management Strategies And Sufficiency of Effort Evaluation Process

April 18, 2013
Steve Cioccia – DEP





Priority Focus Areas for Management Strategies



Purpose of Priority Focus Areas to Target BMAP Management Strategies

- Large BMAP spatial area requires narrowing of focus for BMAP's first five-year period;
- Allows management strategies to be focused in those areas expected to make the greatest improvement to the spring; and
- Maximizes effectiveness of management strategies (i.e. "most bang for the buck").



Process to Establish BMAP Proposed Priority Focus Areas (PFAs)

- Review of spatial location(s) of actual or potential pollutant contributing areas, with emphasis on:
 - Where surface pollutant inputs have greatest potential to increase nitrate in groundwater, based on the aquifer vulnerability assessments (AVAs).
 - Areas characterized with the fastest groundwater travel times to Wakulla Springs.
 - Known connectivity to the springs or direct groundwater pathways.

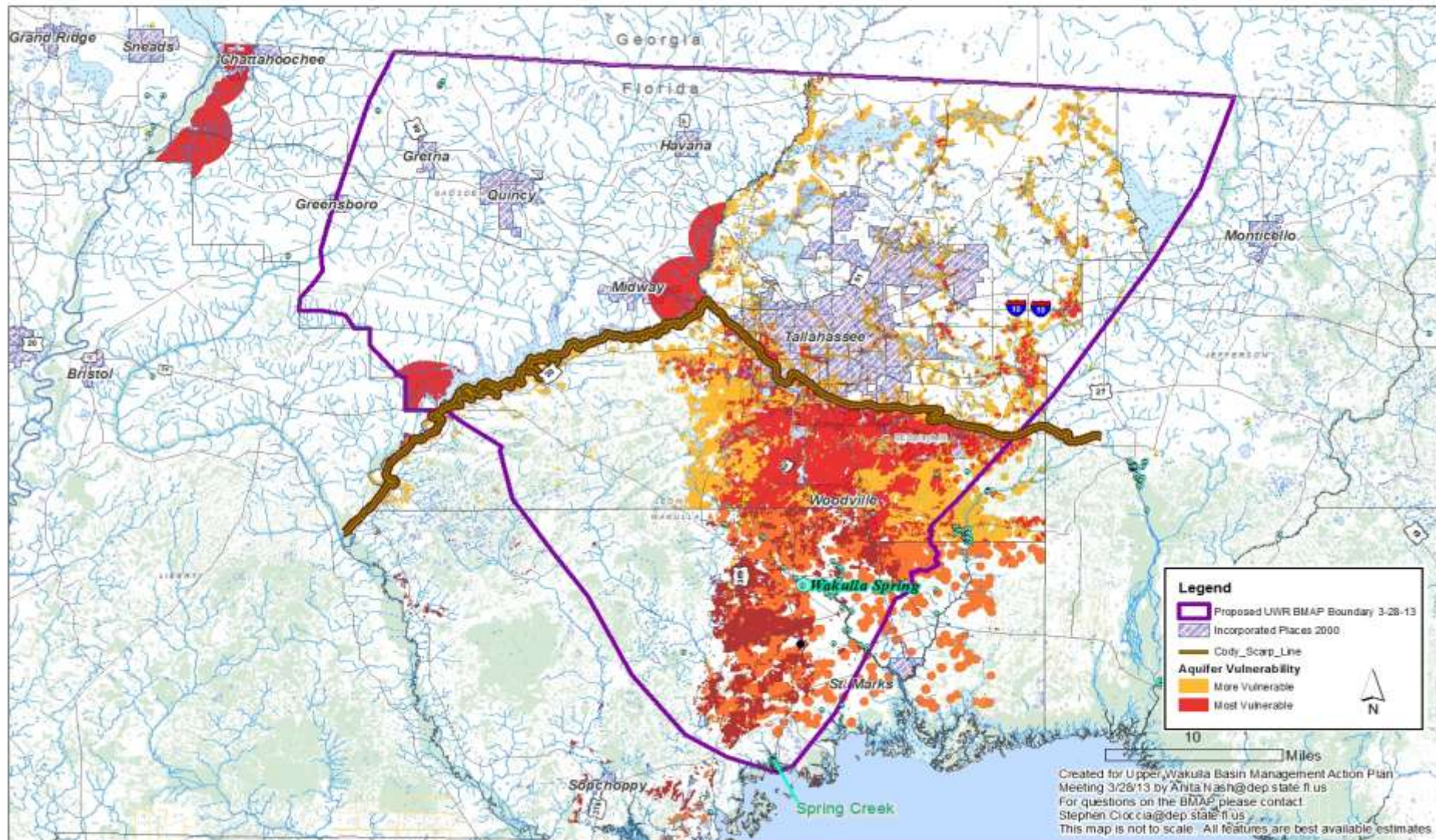


Aquifer Vulnerability Assessments Employed in Upper Wakulla BMAP

- Three individual Aquifer Vulnerability Assessments employed to cover the BMAP area:
 - Florida Aquifer Vulnerability Assessment - FAVA (FAVA II – statewide coverage), September 2009;
 - <http://adgeo.net/fava2.php>
 - Areas with most vulnerable designations were used.
 - Wakulla County Aquifer Vulnerability Assessment - WCAVA, Version 1.4, September 2009; and
 - <http://adgeo.net/fava2.php>
 - Areas with more and most vulnerable designations were used.
 - Leon County Aquifer Vulnerability Assessment - LAVA, July 2007.
 - http://www.adgeo.net/content/lava/LAVA_Report_v1.1.pdf
 - Areas with most vulnerable designations were used.



Aquifer Vulnerability Assessments Upper Wakulla BMAP Area





Leon County Aquifer Vulnerability Assessment (LAVA)

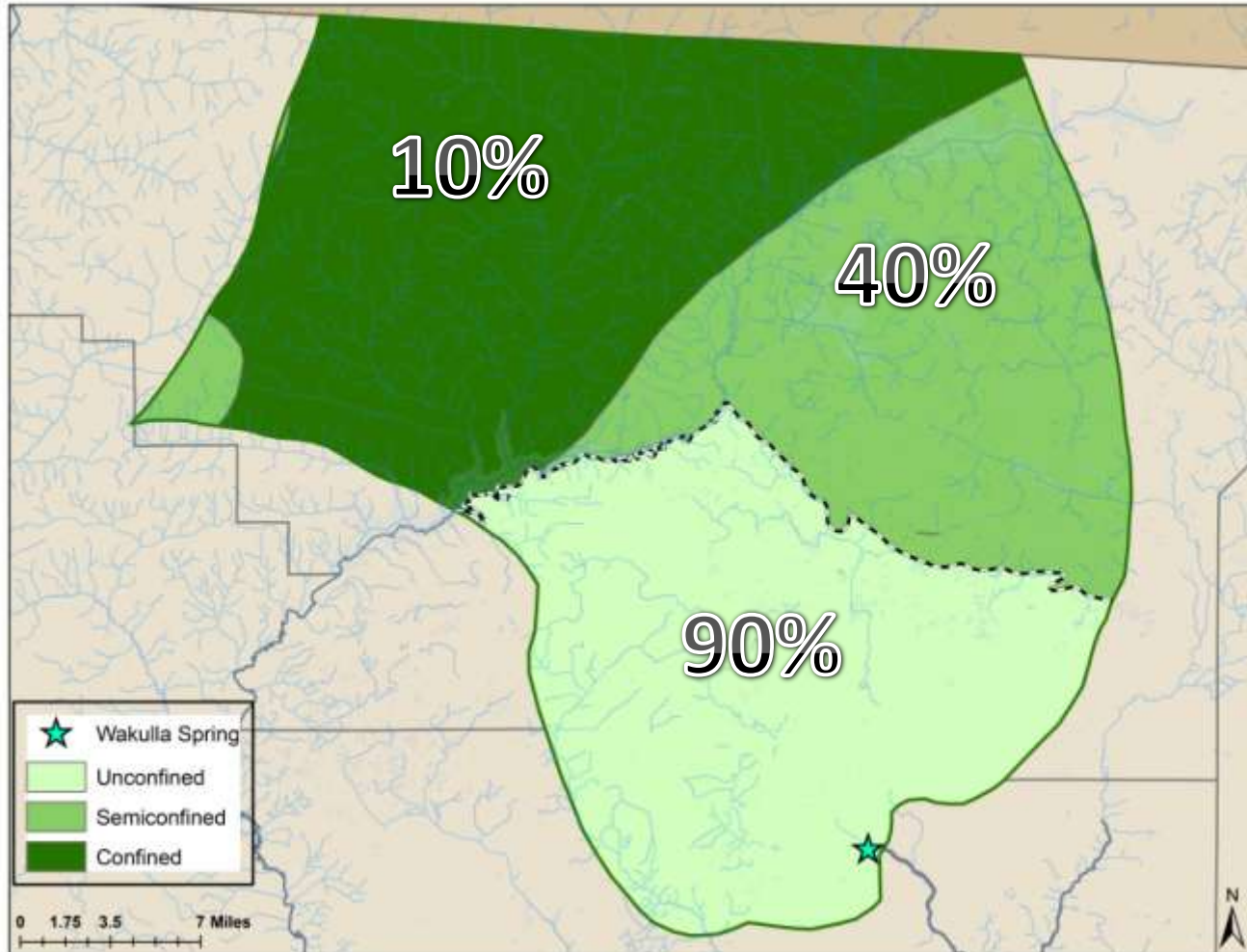
Wakulla County Aquifer Vulnerability Assessment (WCAVA)





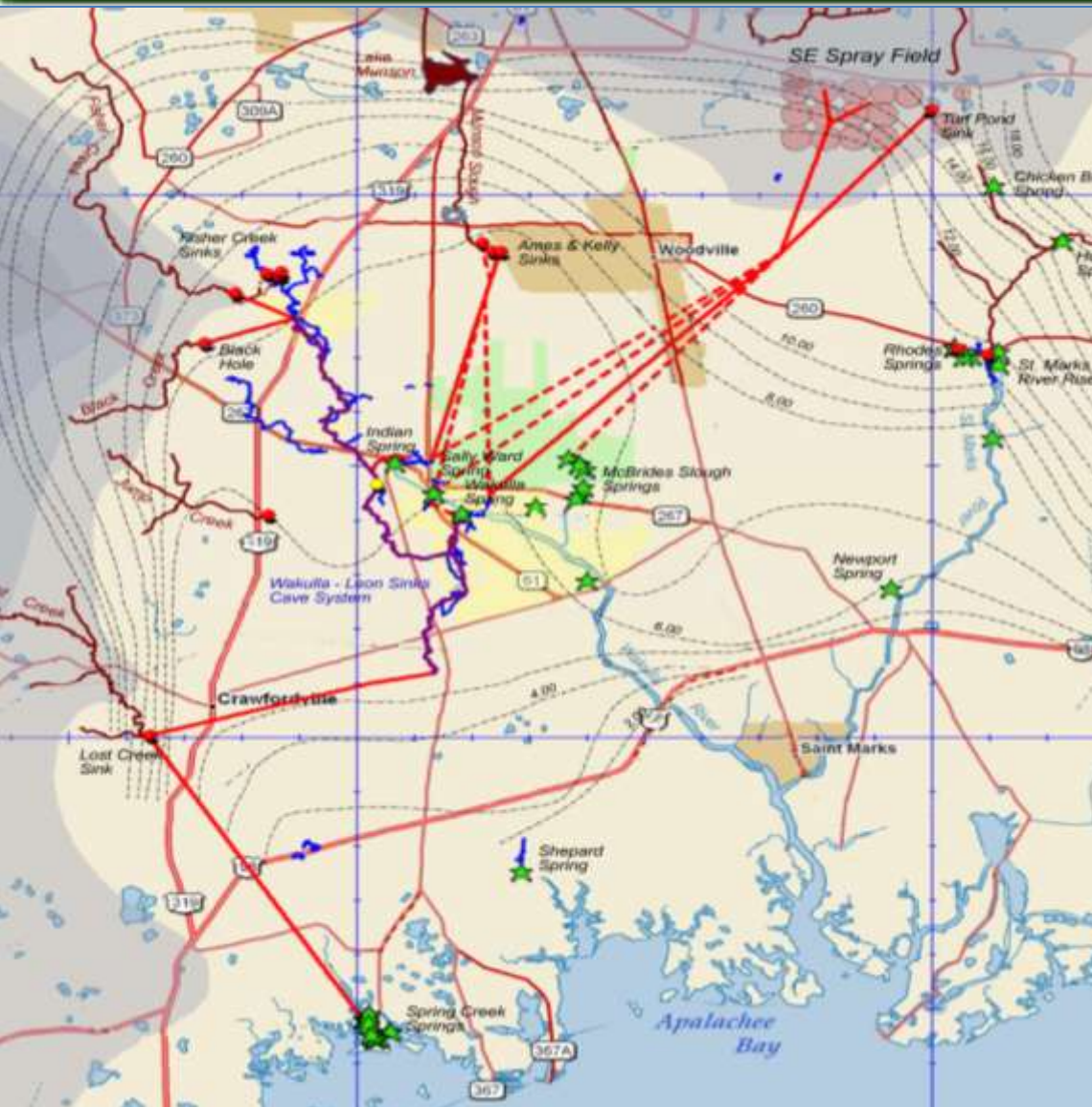
Groundwater Recharge

- ❖ Percentage of surface deposition expected to reach groundwater within each confinement area.





Dye Tracing Wakulla Karst Plain Groundwater Conduit Routes



2002: Fisher Creek – Emerald Sink
2,680 m / 56 hours (820 m/day)

2003: Black Creek – Emerald Sink
2,576 m / 76 hours (810 m/day)

2004: Emerald Sink – Wakulla Spring
16,550 m / 7.1 day (2,337 m/day)

2005: Kelly Sink – Indian Spring
8,400 m / 13.5 days (622 m/day)

2005: Ames Sink – Indian Spring
8,400 m / 17.2 days (506 m/day)

2005: Indian Spring – Wakulla Spring
8,790 m / 5.9 days (1,490 m/day)

2006: Turf Pond – Wakulla Spring
17,500 m / 56 days (312 m/day)

2008: Lost Creek – Spring Creek &
Wakulla Spring (< 7 days / > 2
weeks)



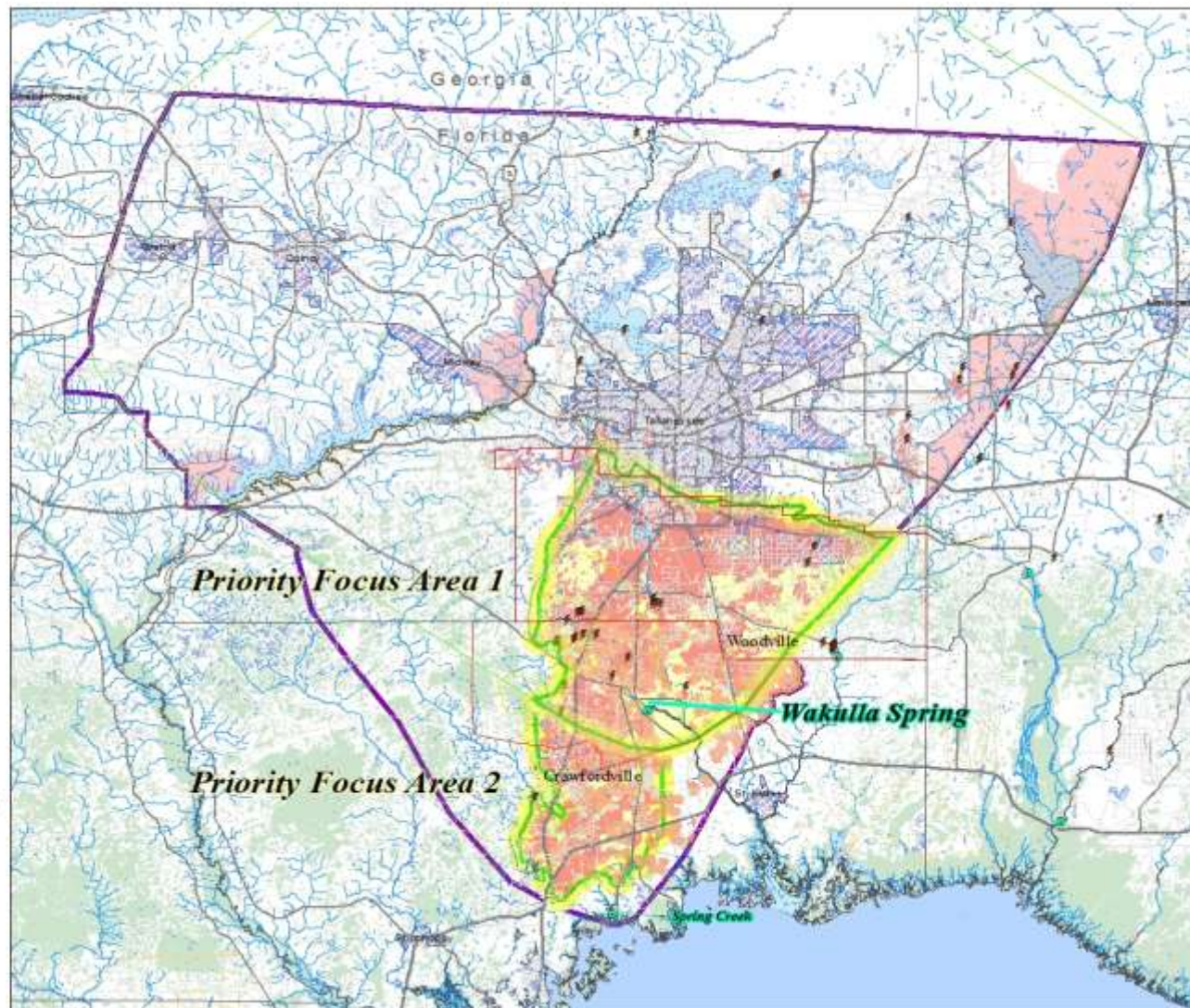
Proposed BMAP Priority Focus Areas

Priority Focus Areas in the Wakulla BMAP Area

Legend

- Priority Focus Areas (1 to the North) (2 to the South)
 - Proposed UWR BMAP Boundary 3-07-13
 - Leon Springs Protection Zone
 - Wakulla Springs Special Planning Area
 - Cody_Scarp_Line
 - FGS
 - WBID 1006 Upper Wakulla River TMDL
 - 1st Magnitude Spring Groups
 - ⚡ FGS Swallets
 - TIGER 2010 Cities (Areas)
 - Florida Counties with Shoreline (lines)
 - Interstate
 - Primary and US Highways
 - Secondary, State and County Highways
 - Local, Neighborhood, Rural or City Street
- Aquifer Vulnerability Assessment**
- More Vulnerable for Wakulla AVA
 - Most Vulnerable For Leon AVA and Wakulla AVA
 - Florida Aquifer Vulnerability Assessment More Vulnerable
- 10 Miles

Created for Upper Wakulla Basin
Management Action Plan
4/11/13 by Anita Nash@dep.state.fl.us
For questions on the BMAP please contact:
Stephen Cioccia@dep.state.fl.us
This map is not to scale.
Aquifer Vulnerability Map data used in this BMAP should be
interpreted only within its individual model areas.

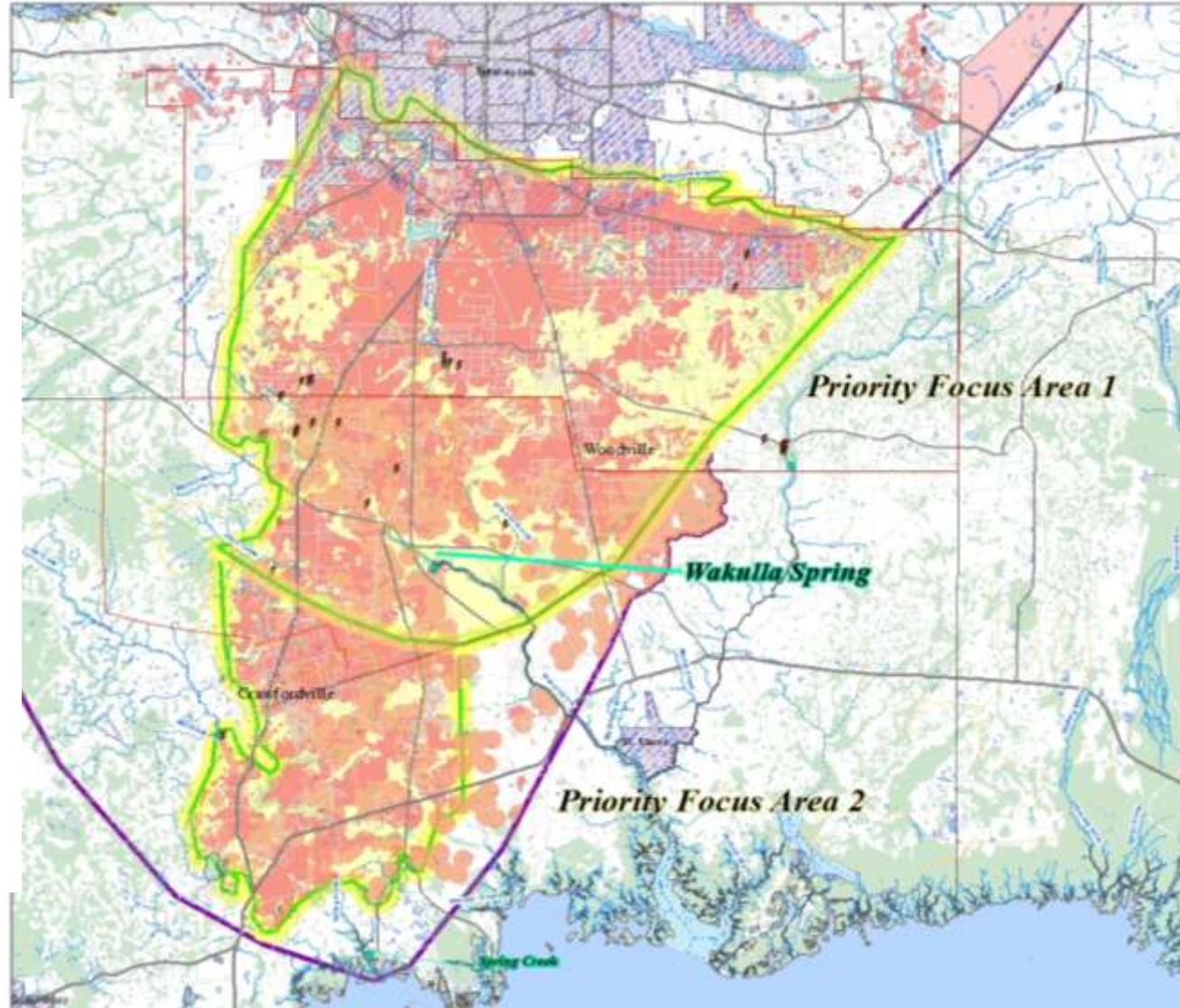




Establish Two Priority Focus Areas

PFA1 - Continually contributing to the springshed's groundwater.

PFA2 - Intermittently contributing to the springshed's groundwater.





Upper Wakulla BMAP

Proposed Priority Focus Areas

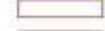
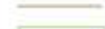
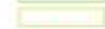
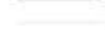
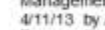
- For purpose of the BMAP, two Priority Focus Areas are proposed for consideration.
- Priority Focus Area 1 :
 - Considered as primary level of concern regarding potential to contribute to the impairment;
 - Within Wakulla Springshed delineations;
 - Areas which have been demonstrated, or with the highest probability to be regularly contributing to the groundwater flows to Wakulla Springs ;
 - High vulnerability; and
 - Area with the highest probability for surficial infiltration and contribution to the groundwater flows per the AVAs; and
 - Areas characterized with the most direct and fastest groundwater travel times to Wakulla Springs.
 - As demonstrated by dye traces



Proposed BMAP Priority Focus Area 1

Priority Focus Area 1

Legend

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- Aquifer Vulnerability Assessment**
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 -  Florida Aquifer Vulnerability Assessment More Vulnerable

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Miles

Created for Upper Wakulla Basin
Management Action Plan

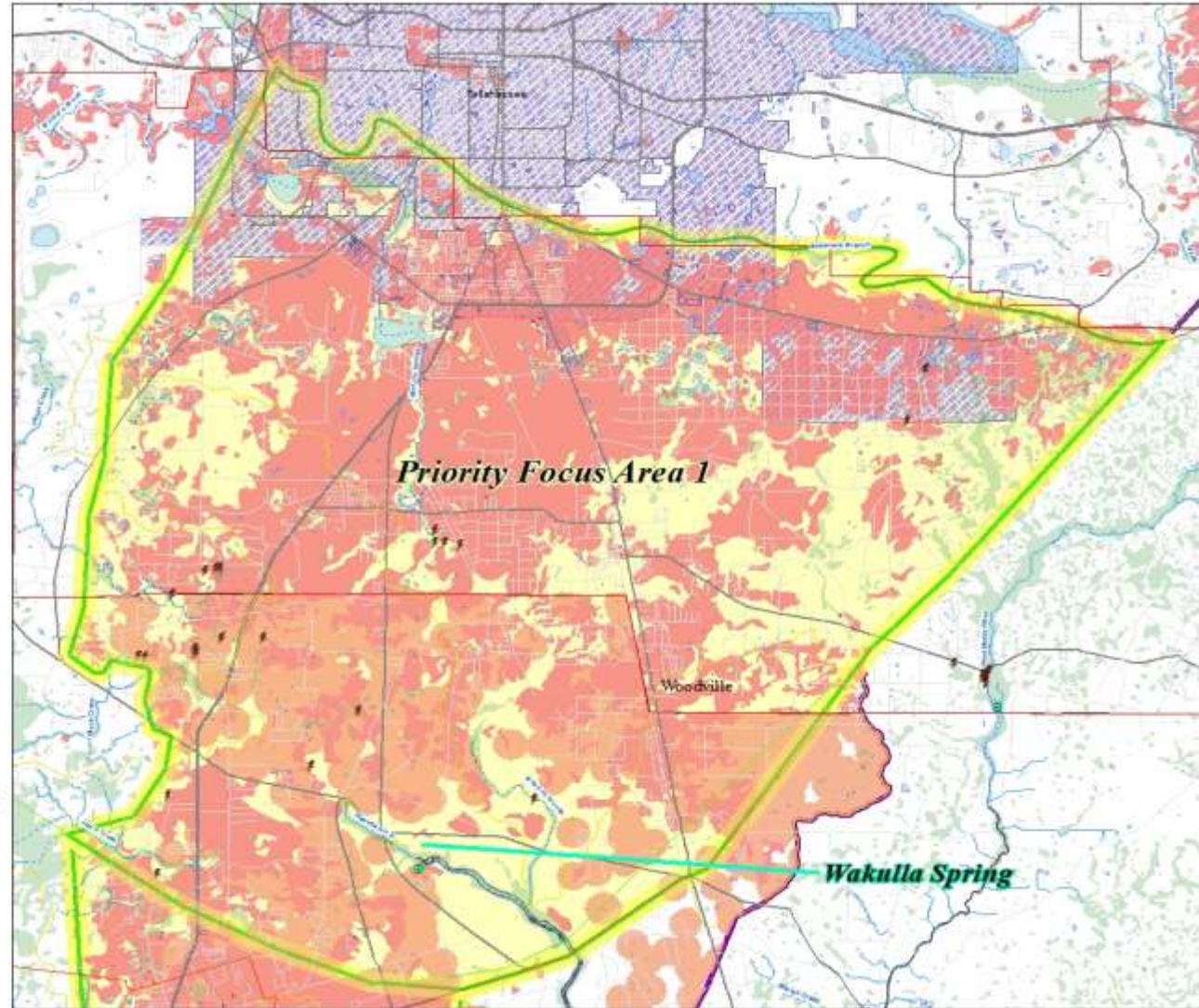
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Upper Wakulla BMAP

Proposed Priority Focus Areas

- Priority Focus Area 2:
 - Considered as secondary level of concern regarding potential to contribute to the impairment.
 - High vulnerability
 - Areas considered as having a probability for surficial infiltration to the groundwater and contribution to Wakulla Springs.
 - Groundwater connectivity demonstrated by dye traces
 - Areas which may be intermittently contributing to the groundwater flows to Wakulla Springs.
 - Area where future management strategies would significantly contribute to preventing future pollutant loadings to the groundwater.



Proposed BMAP

Priority Focus Area 2

Priority Focus Area 2

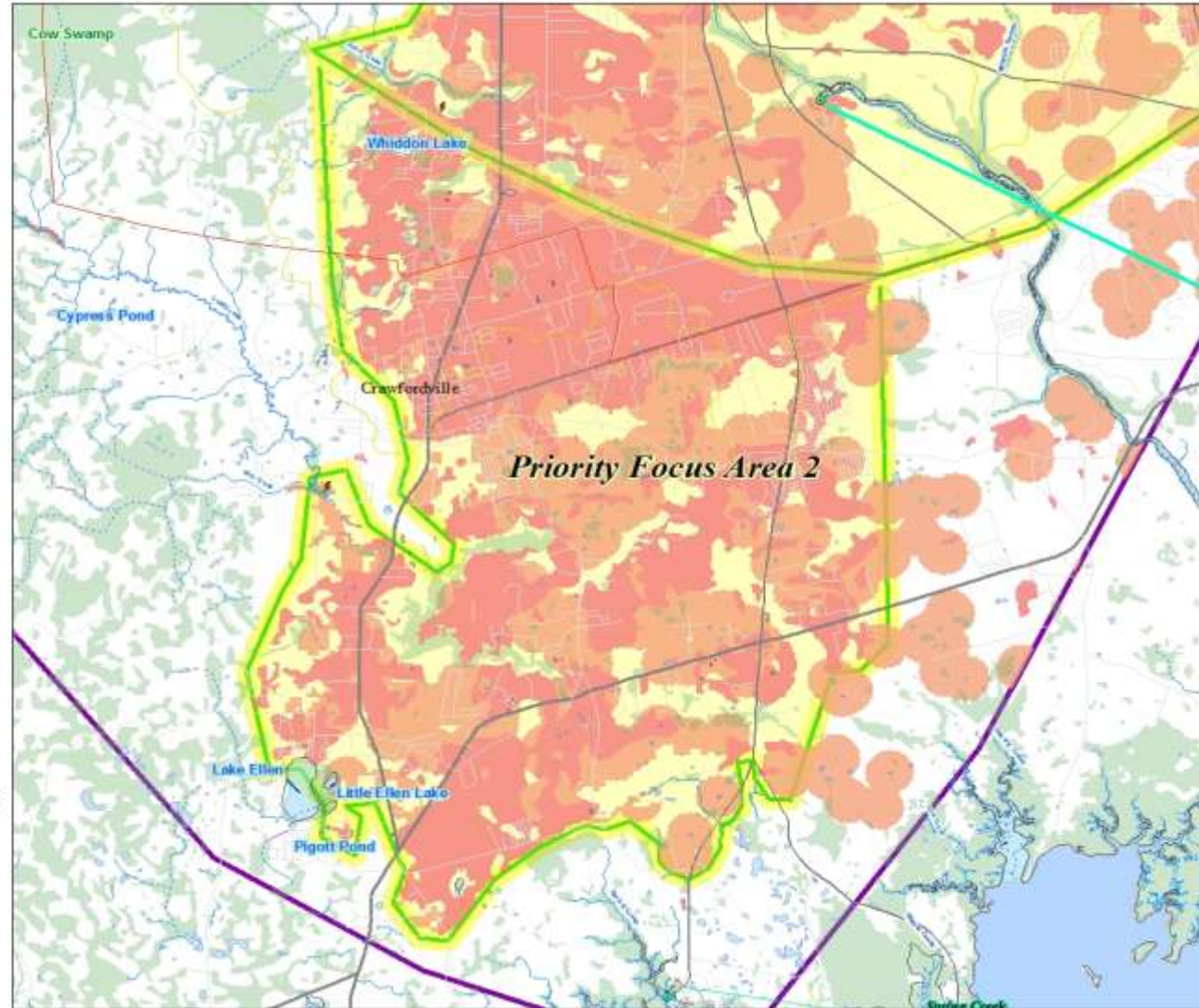
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Sufficiency of Effort Evaluation Process



Restoration Management Strategies

Sufficiency of Effort Evaluation

- BMAP process plans for implementation of management strategies in five-year planning periods.
- Unable to currently predict ability to meet the TMDL nitrate and biology targets in the next five years:
 - Future growth and septic tank loads in the springshed need to be addressed.
- Large reductions in nitrate loads accomplished since the TMDL data period:
 - Result of management strategies implemented by the stakeholders.
 - Full benefits of these management strategies may not be reflected in the springs water quality.
 - Therefore, springs water quality may continue to improve over the next several years.



Restoration Management Strategies

Sufficiency of Effort Evaluation

- BMAP requires identification of mechanisms that will address potential future increases in pollutant loading.
- Sufficiency of effort evaluation will:
 - Promote development of needed management strategies; and
 - Promote support for proposed strategies to address potential future increases in pollutant loading.
- FDEP will collect completed, ongoing, and planned management strategies from the stakeholders in PFAs 1 and 2.
 - FDEP will meet one-on-one with effected stakeholders in these areas to compile completed and planned management strategies; and
 - To discuss actions to address future nitrogen loads.



Restoration Management Strategies

Sufficiency of Effort Evaluation

- Structural projects completed since January 1, 2004 are eligible for credit in the BMAP.
- Ordinances, public education, outreach efforts, and street sweeping are eligible for credit regardless of when they were implemented.



Wakulla BMAP Contact

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<http://publicfiles.dep.state.fl.us/DEAR/BMAP/UpperWakulla/>



REMEMBERING THE GOAL!

