

# Florida Department of Environmental Protection



## Upper Wakulla River & Wakulla Springs BMAP Area

# Aquifer Vulnerability Assessments and Development of Priority Areas

March 28, 2013  
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# Aquifer Vulnerability Assessments Employed in Upper Wakulla BMAP

- Three individual Aquifer Vulnerability Assessments (AVAs) were employed to cover the proposed BMAP area:
  - Florida Aquifer Vulnerability Assessment - FAVA (FAVA II – statewide coverage), September 2009;
  - Wakulla County Aquifer Vulnerability Assessment - WCAVA, Version 1.4, September 2009; and
    - <http://adgeo.net/fava2.php>
  - Leon County Aquifer Vulnerability Assessment - LAVA, July 2007.
    - [http://www.adgeo.net/content/lava/LAVA\\_Report\\_v1.1.pdf](http://www.adgeo.net/content/lava/LAVA_Report_v1.1.pdf)



# Aquifer Vulnerability Assessments Characteristics

- Aquifer Vulnerability Definition: Tendency or likelihood for a contaminant to reach the top of a specified aquifer system after introduction at land surface, based on best available data representing the natural hydrogeologic system.
- An aquifer vulnerability assessment provides for identification of areas, based on predictive spatial analysis, which are more vulnerable to contamination from the land surface.



# Implementation Limitations

- FAVA, LAVA, and WCAVA should be evaluated individually, and should NOT be compared to each other or considered equal:
  - Created using different data sets;
  - Different scales for model input data; and
  - Different periods of record and based on the best-available data at the time of analysis; the results are static representations.
- AVAs are predictive models:
  - The models indicate with a demonstrated probability the likelihood of certain conditions being present (i.e. contaminants reaching a specified aquifer system after introduction at land surface).



# Implementation Limitations (cont.)

- The AVAs model results do not:
  - Account for human activities at the land surface;
  - Take into consideration contamination types; and
  - Estimate groundwater flow paths (incorporate conduit/cave flow pathways) or fate/transport of chemical constituents.
- Lakes and surface waters were excluded from the AVAs:
  - Treated as waters separate and distinct from the groundwater (groundwater is the target of the AVAs); and
  - Lake and river to groundwater interactions will be considered during the BMAP Process.

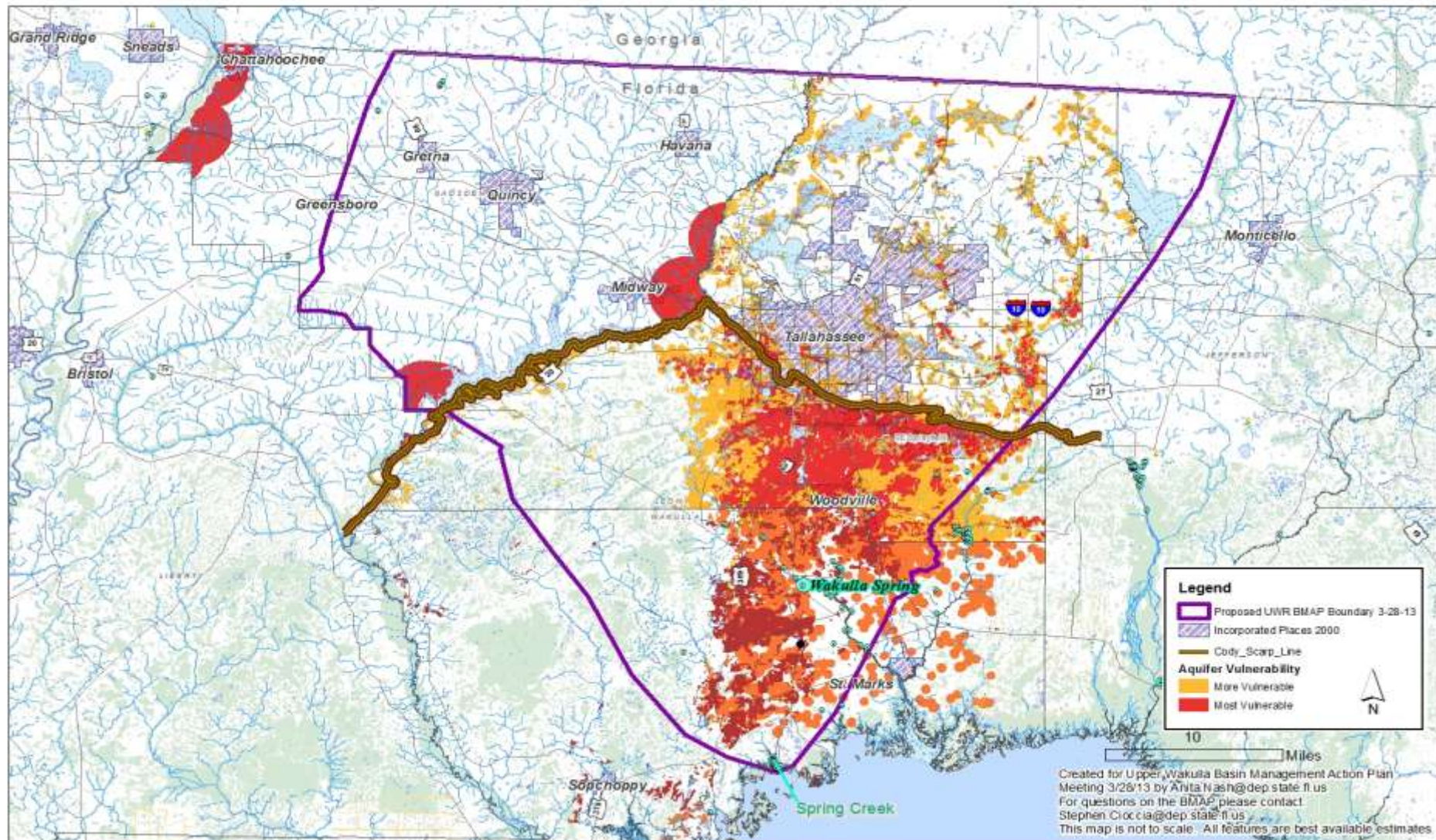


# Implementation Guides

- Areas of highest vulnerability:
  - Associated with areas where overburden on the Floridan Aquifer System is thin to absent, in areas of dense potential karst-features, and areas of higher soil pedality;
    - Soil pedality: Pedality is a unitless parameter calculated based on soil type, soil grade, and soil pedon size.
  - Land use decisions may be more defensible using the higher vulnerability class, since these areas are usually associated with the highest confidence values.
- The proposed priority areas will be determined using the individual AVA models' two highest tier designations of vulnerability:
  - Most Vulnerable; and
  - More Vulnerable.

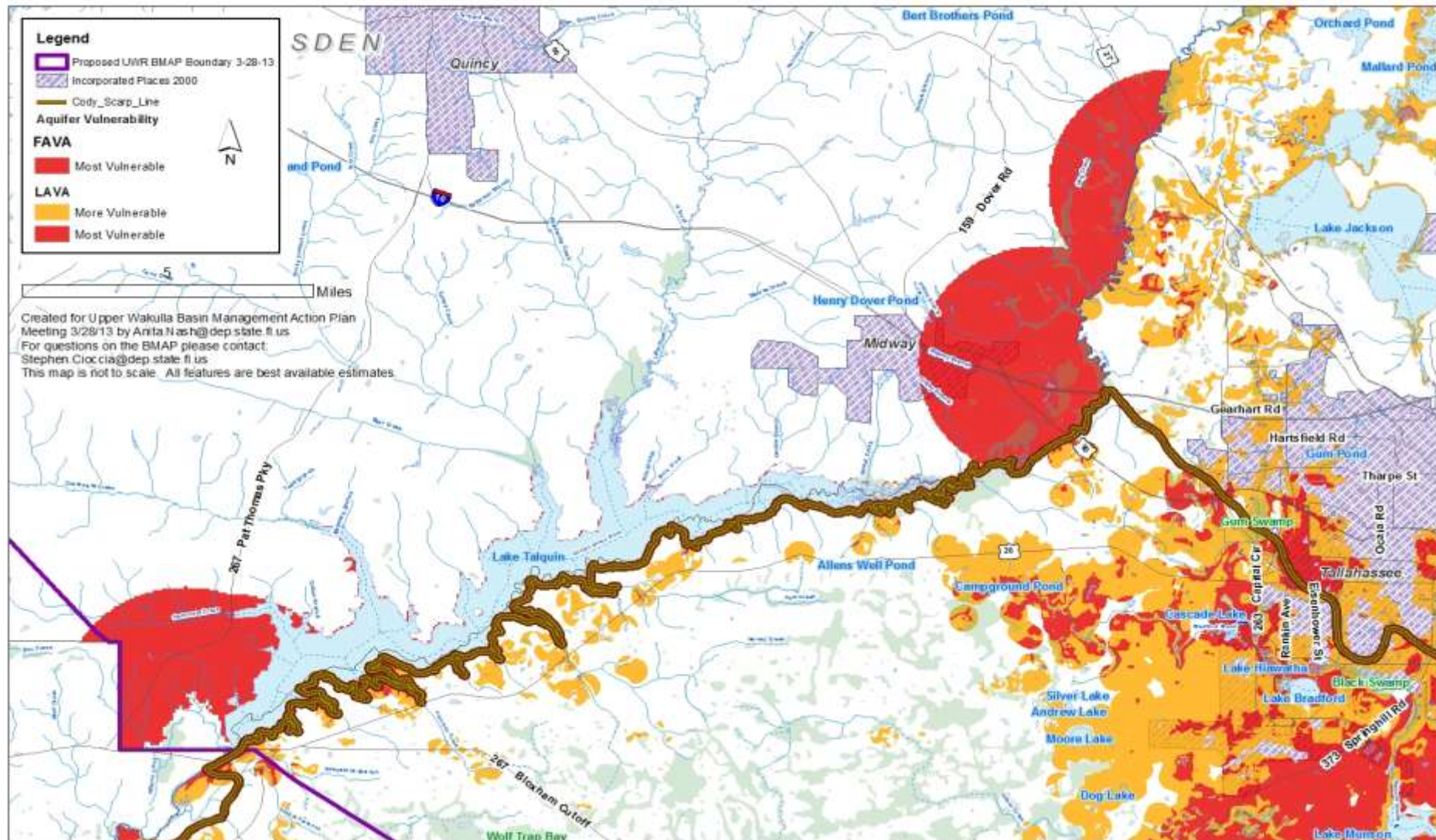


# Aquifer Vulnerability Assessments Upper Wakulla BMAP Area



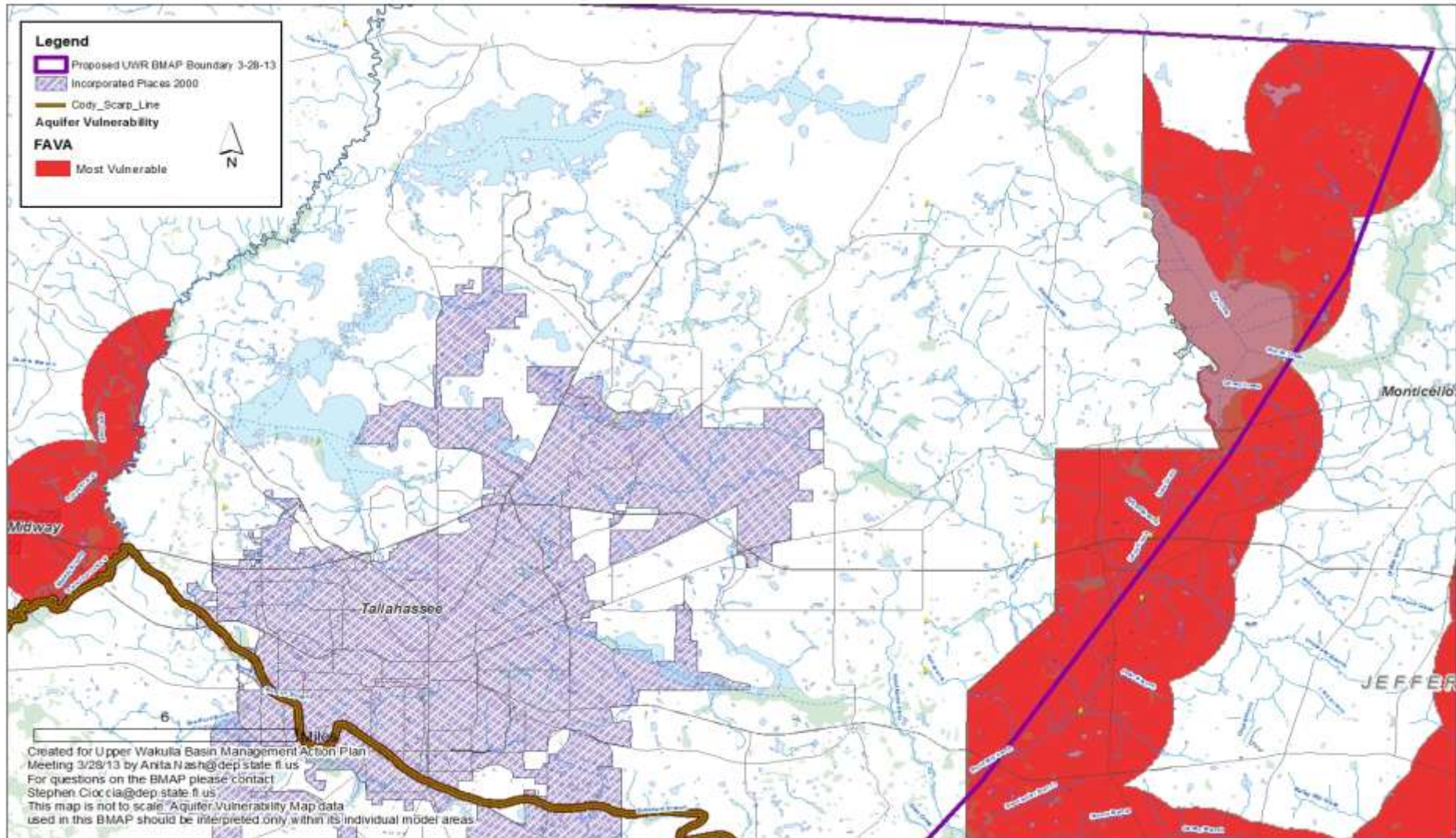


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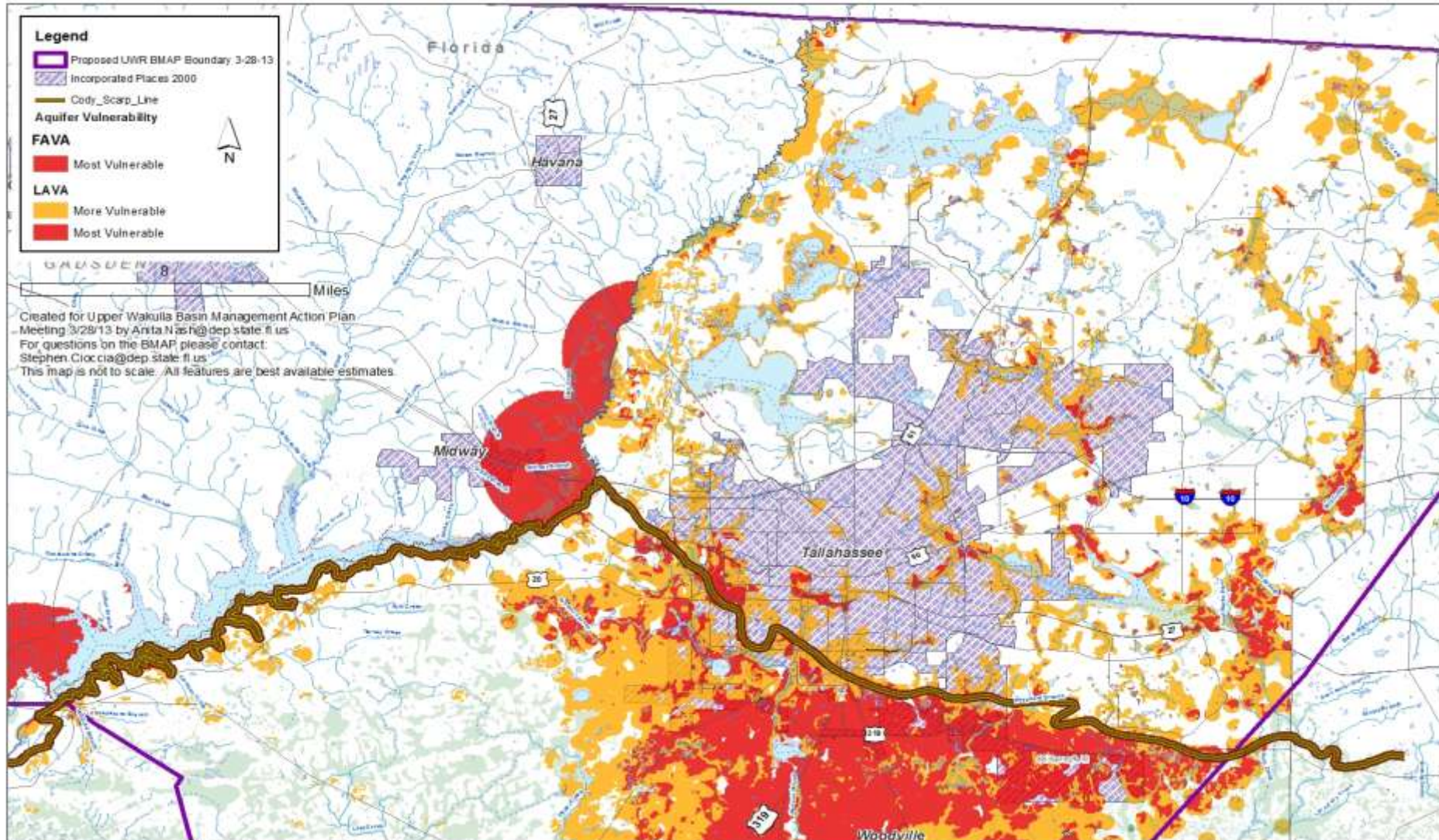


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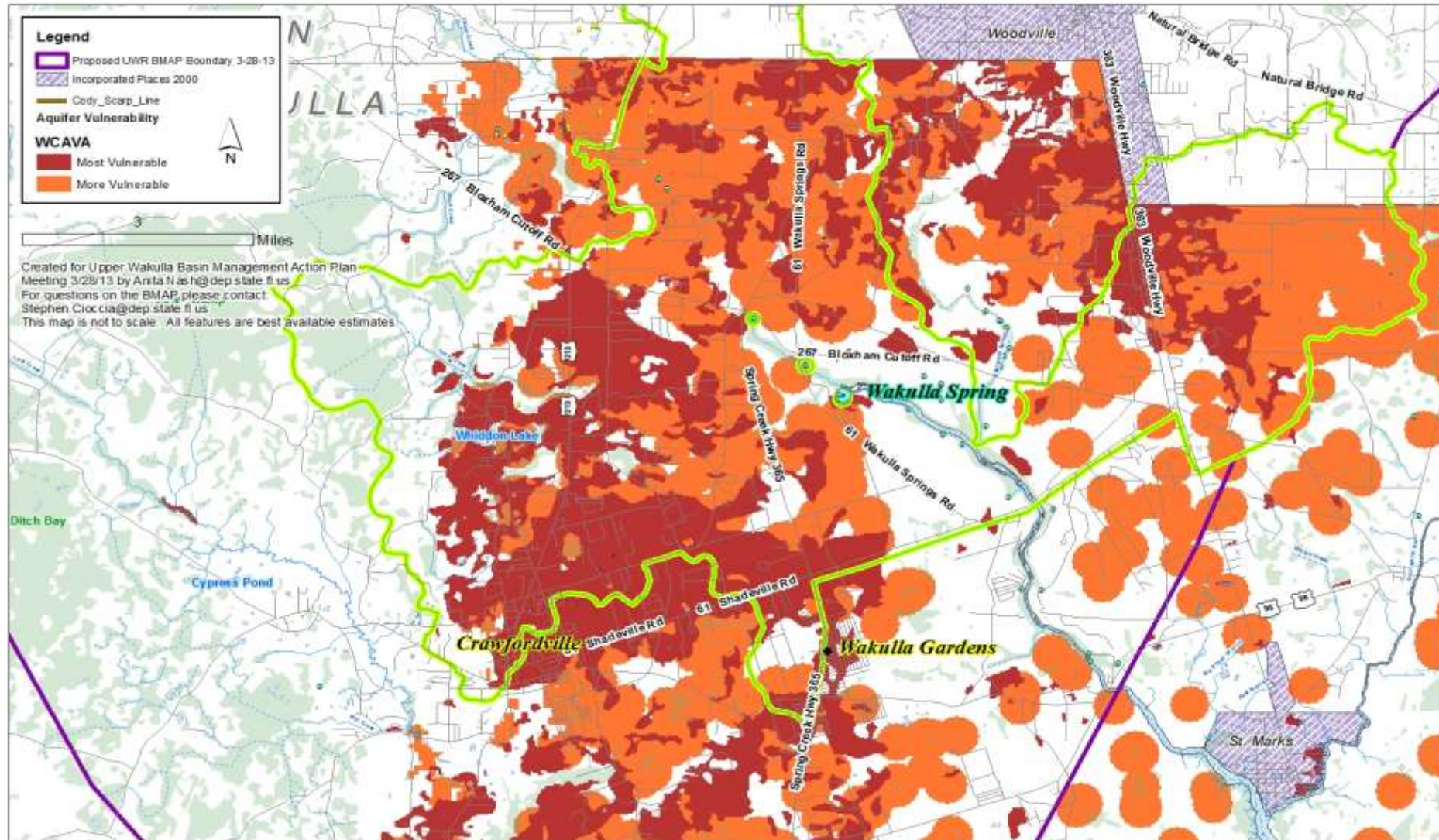
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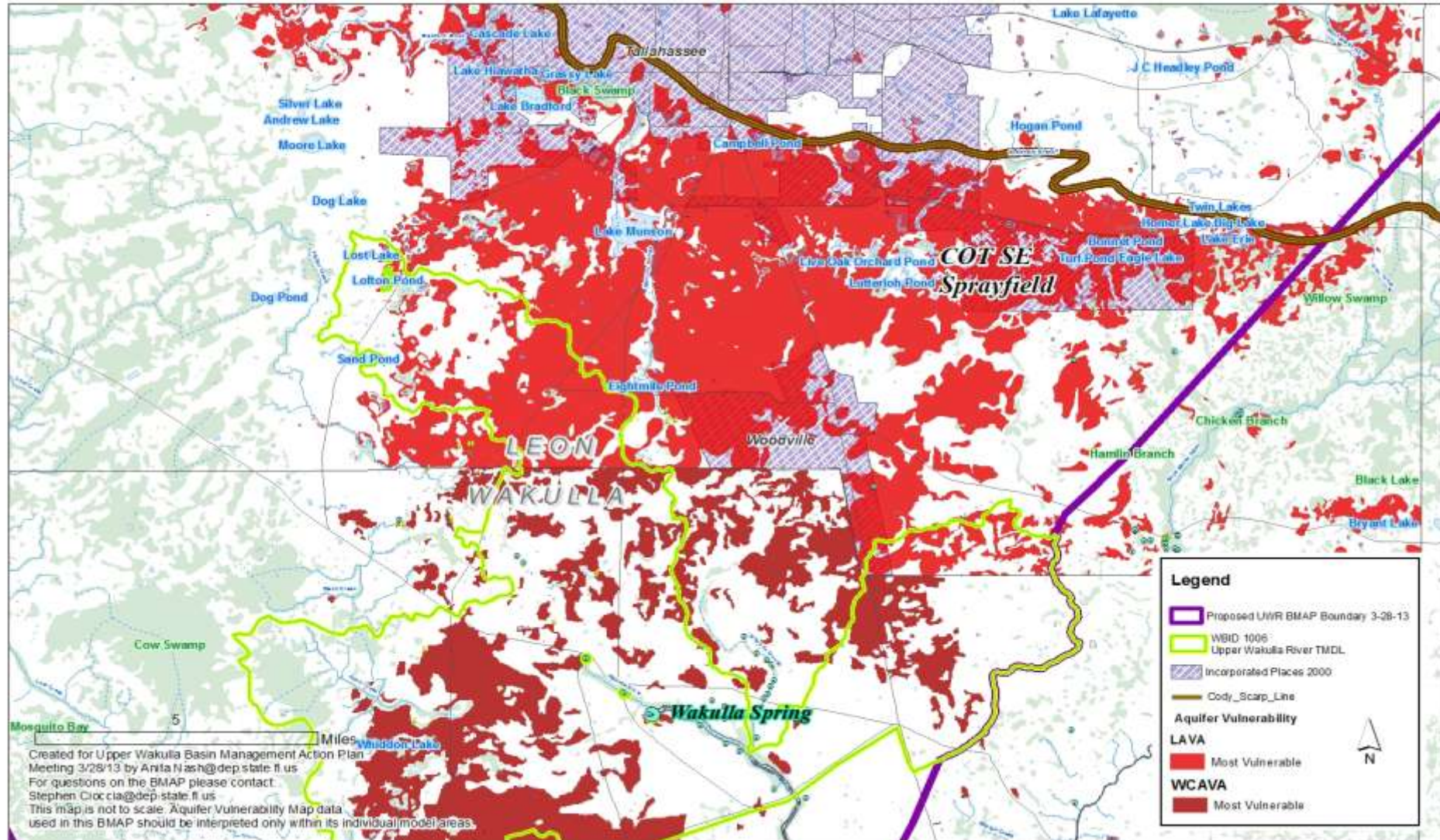
# Aquifer Vulnerability Assessments Upper Wakulla BMAP Area





# Aquifer Vulnerability Assessments

## Upper Wakulla BMAP Area





# Use of AVAs to Focus BMAP Efforts

- Dense areas of “most vulnerable” designation within the continually contributing Wakulla Springs springshed:
  - Should receive prioritization by stakeholders;
  - Are expected to have faster effects on water quality than less vulnerable designated areas; and
  - Are expected to return the most effectiveness for implemented management measures (i.e. “the most bang for the buck”).



# Proposed Criteria for Determination of Aquifer Protection Priority Zones

- For purpose of the BMAP, it is proposed that aquifer vulnerability protection zones be determined based on the following criteria:
  - Level of concern for need of management measures related to the potential to contribute to the impairment;
  - Areas characterized with the fastest groundwater travel times to Wakulla Springs would be priorities for consideration; and
  - Areas with the highest probability for NO<sub>3</sub> contaminants to reach groundwater by surficial infiltration (per the Aquifer Vulnerability Assessments) or which can be reasonably determined to contribute NO<sub>3</sub> contaminants to the groundwater flows into Wakulla Springs would be priorities for consideration.



# Wakulla BMAP Contact

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



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