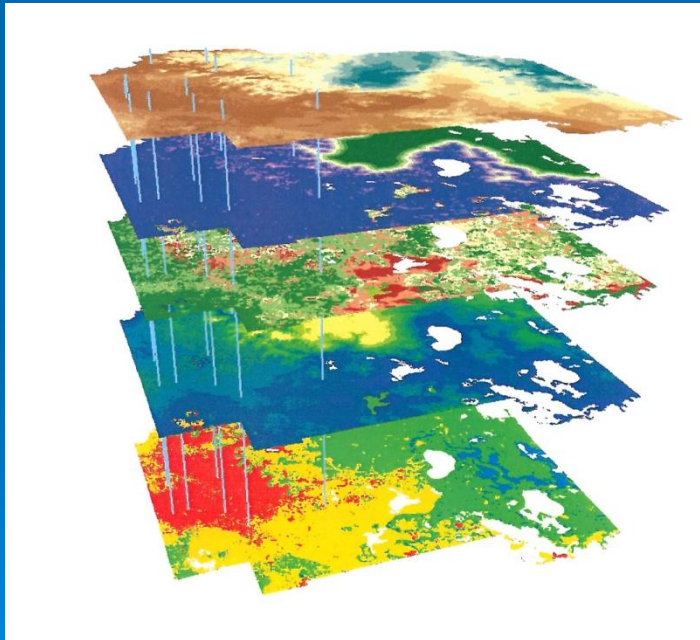




Alachua County Aquifer Vulnerability Assessment (ACAVA)



Silver Springs Basin
Working Group
March 14, 2013



Alachua County Aquifer Vulnerability Assessment

➤ What is ACAVA?

- An assessment conducted to map aquifer vulnerability using available geologic data
- A refinement of the Florida Aquifer Vulnerability Assessment (FAVA) specifically conducted in detail for Alachua County

➤ What is the purpose of ACAVA?

- Developed as a tool for groundwater and springs protection
- Used in Alachua County's Comprehensive Plan and Land Development Regulations
- In Alachua County it provides a proxy for relative recharge to the Floridan aquifer system



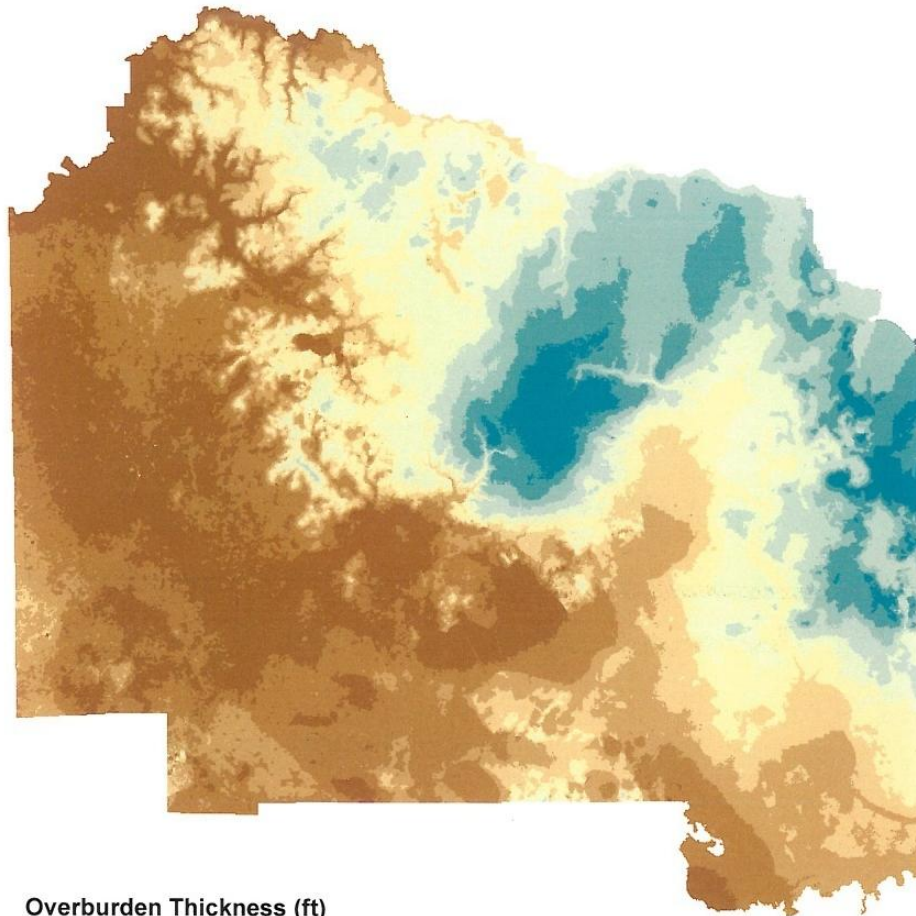
ACAVA Map Methods

- Model was developed using a Weights of Evidence (WofE) approach
 - Data-driven versus an expert driven analysis
 - WofE was used to generate a map of relative aquifer vulnerability (the Response Theme) for the Floridan aquifer system
 - Model used four geologic data layers or Evidential Themes
 - Water quality data was used to “train” the model to actual observed conditions using dissolved oxygen; nitrogen concentrations were used for validation
 - The method focused on the probability for a contaminant to travel through soils, aquifer system overburden and karst features

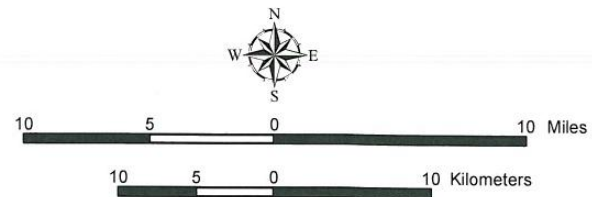
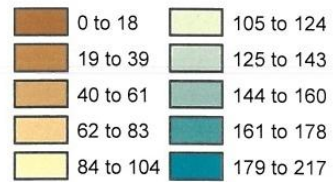


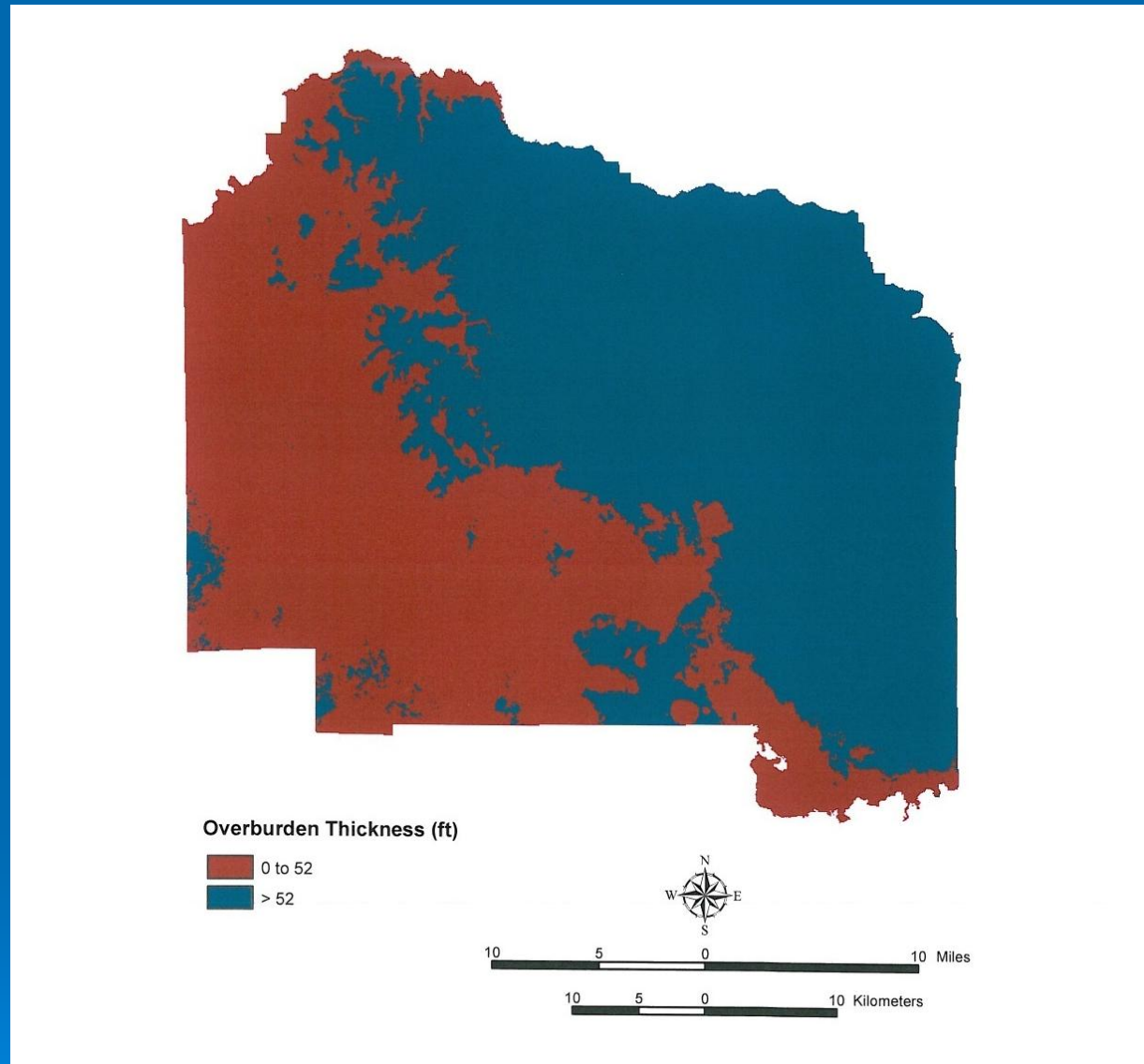
ACAVA Map Methods

- Four Evidential Themes or data layers evaluated were
 - Overburden thickness (above the Floridan aquifer system)
 - Buffered Karst Features (sinkholes, swallets...)
 - Soil Permeability (inches per hour)
 - Water Level Difference (between the surficial and Floridan aquifer systems)

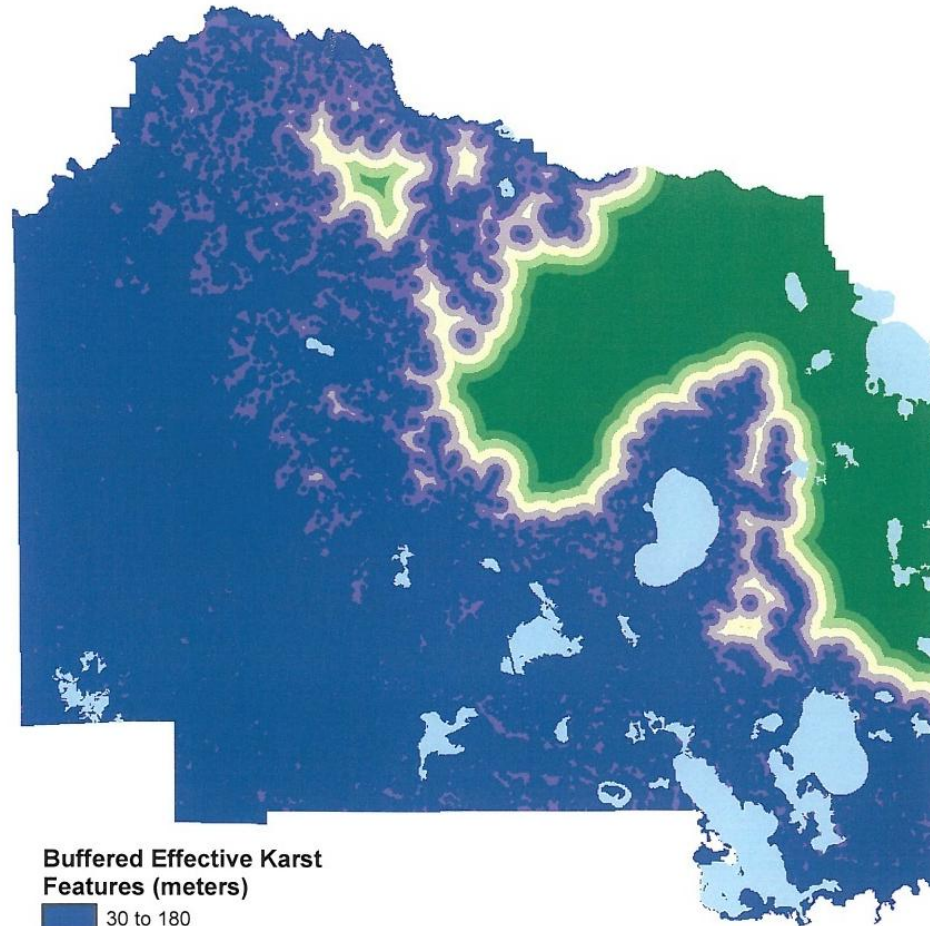


Overburden Thickness (ft)

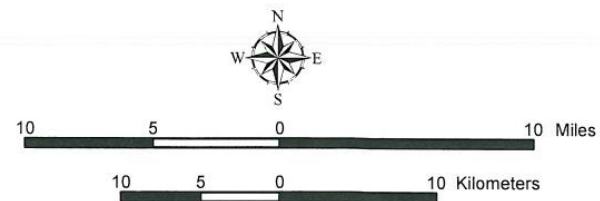
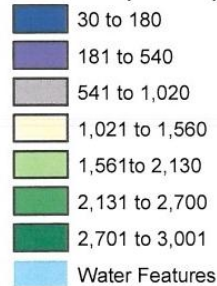


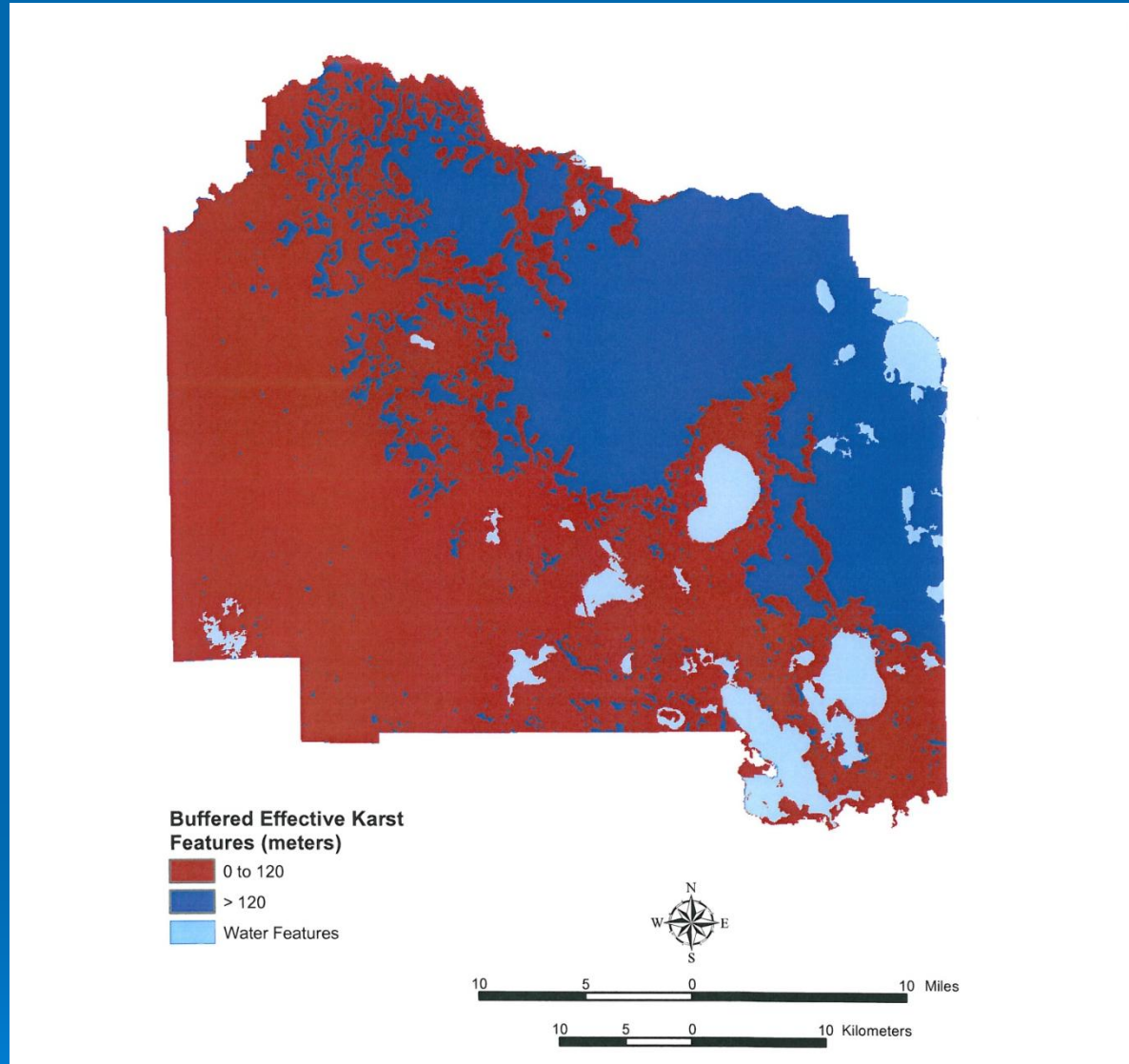


Binary generalization with a break (highest contrast) at a value of 52 feet. Areas in red are associated with higher vulnerability.

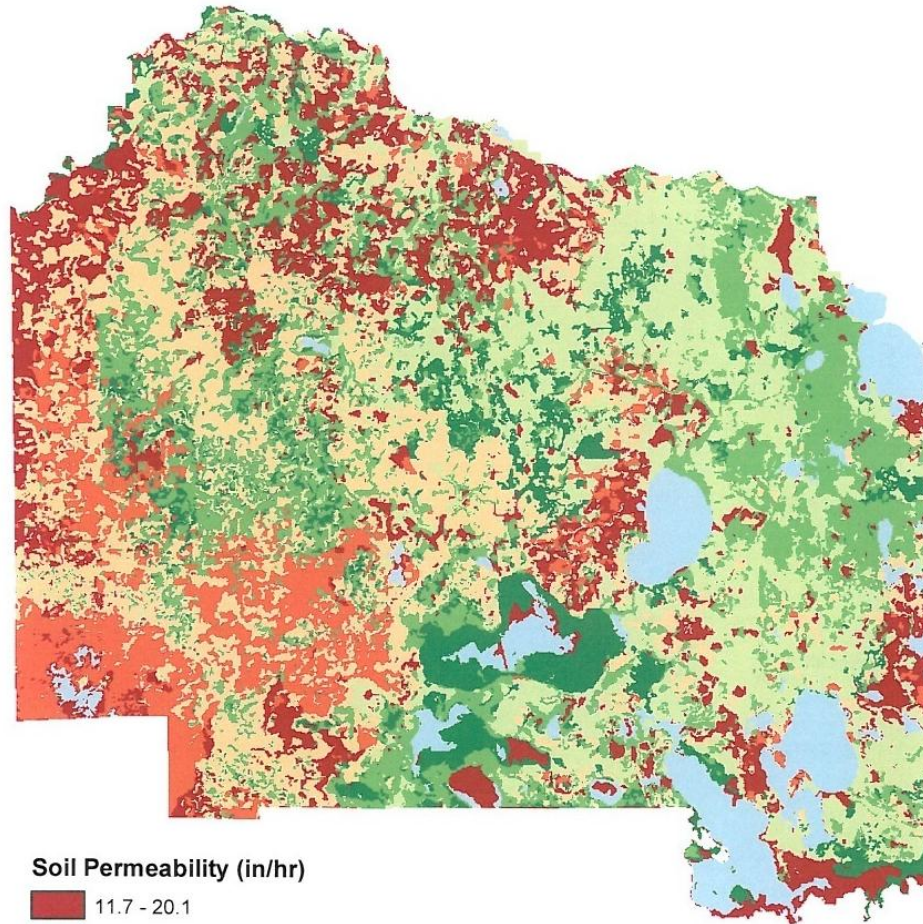


**Buffered Effective Karst
Features (meters)**

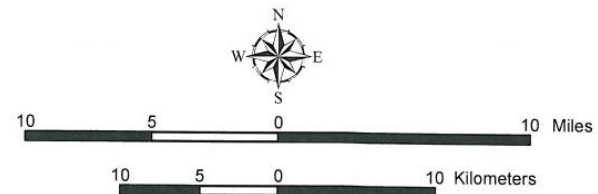
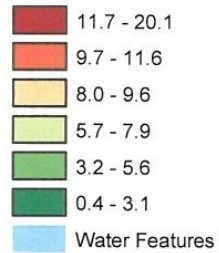


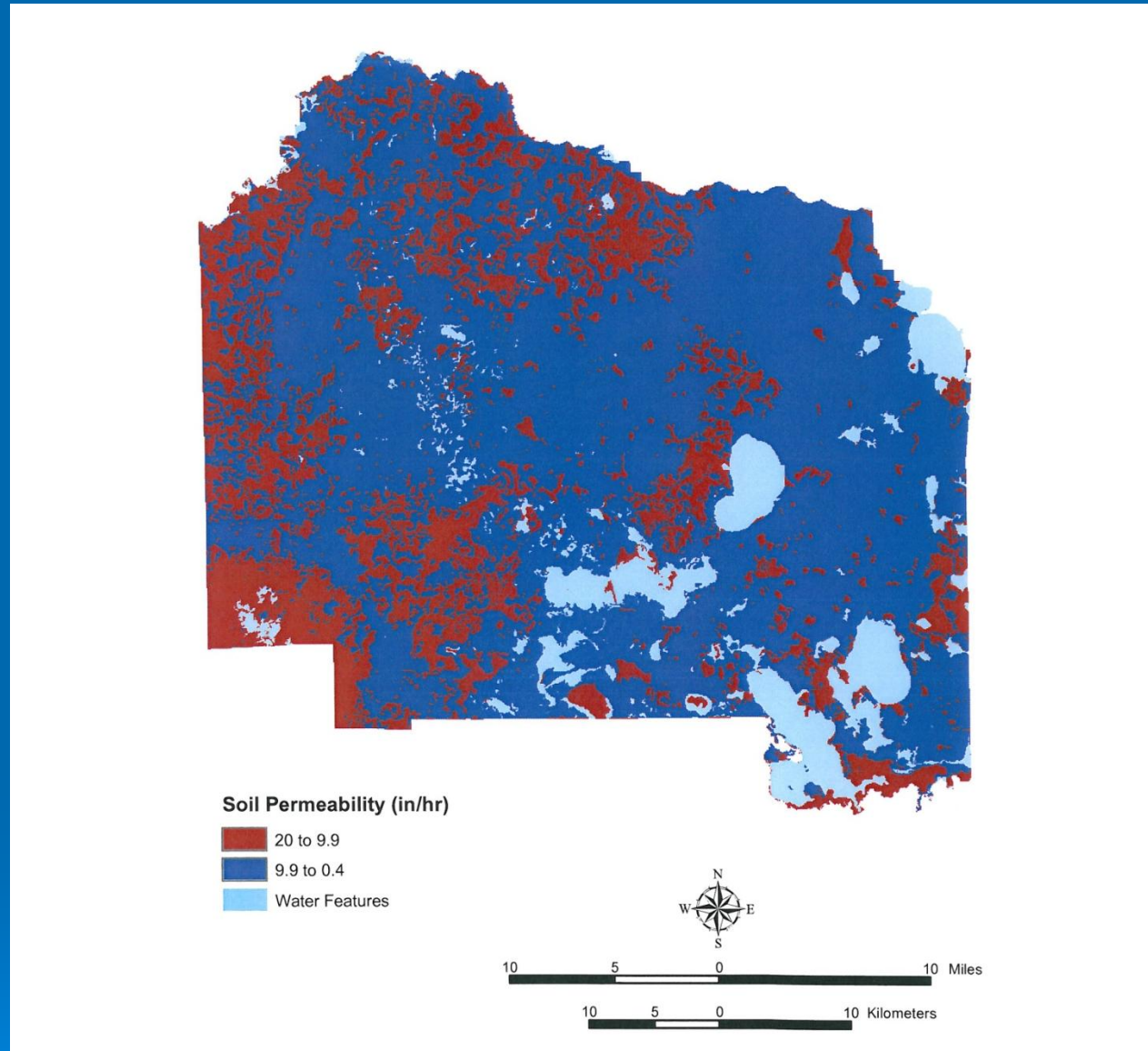


Highest contrast was associated with a distance of 120 m from a feature.
Areas nearer an effective karst feature are associated with higher vulnerability.

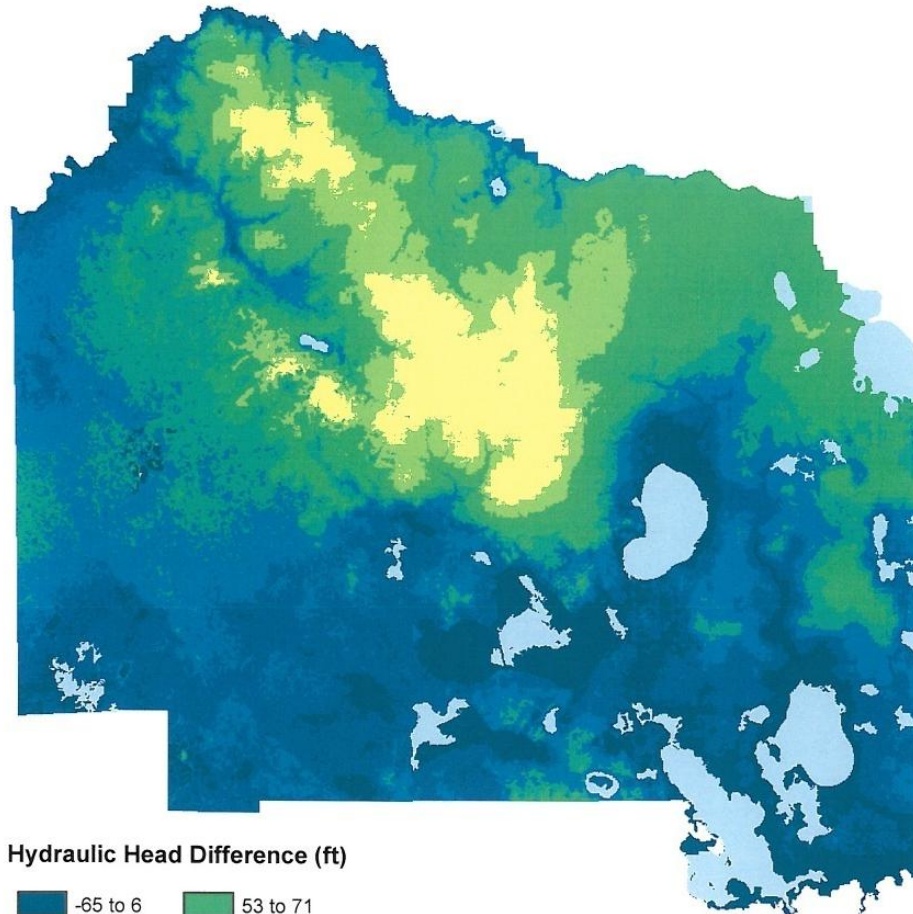


Soil Permeability (in/hr)

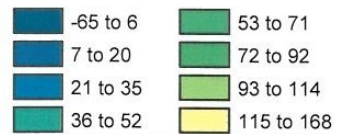




The break point was defined a values exceeding 9.9 inches per hour. The red areas are associated with high vulnerability.



Hydraulic Head Difference (ft)

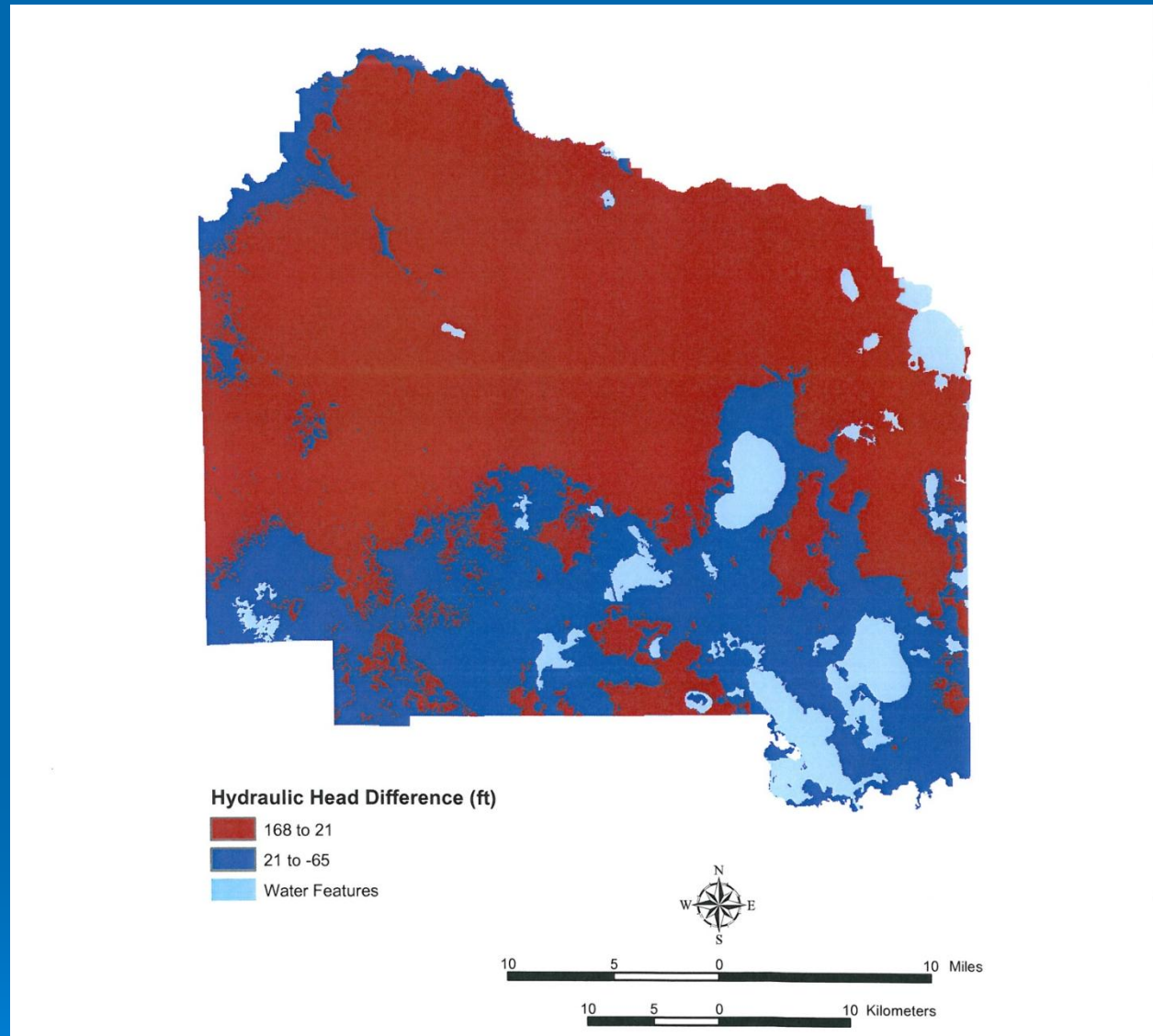


Water Features



10 5 0 10 Miles

10 5 0 10 Kilometers



Hydraulic head difference of 21 feet was the highest contrast.
The greatest differences are observed in northern Alachua County.



Aquifer Vulnerability Assessment Alachua County, Florida

ACAVA Model
Response 2008

Legend

Major Road

- County
- Interstate
- Highway
- State Road
- County Boundary

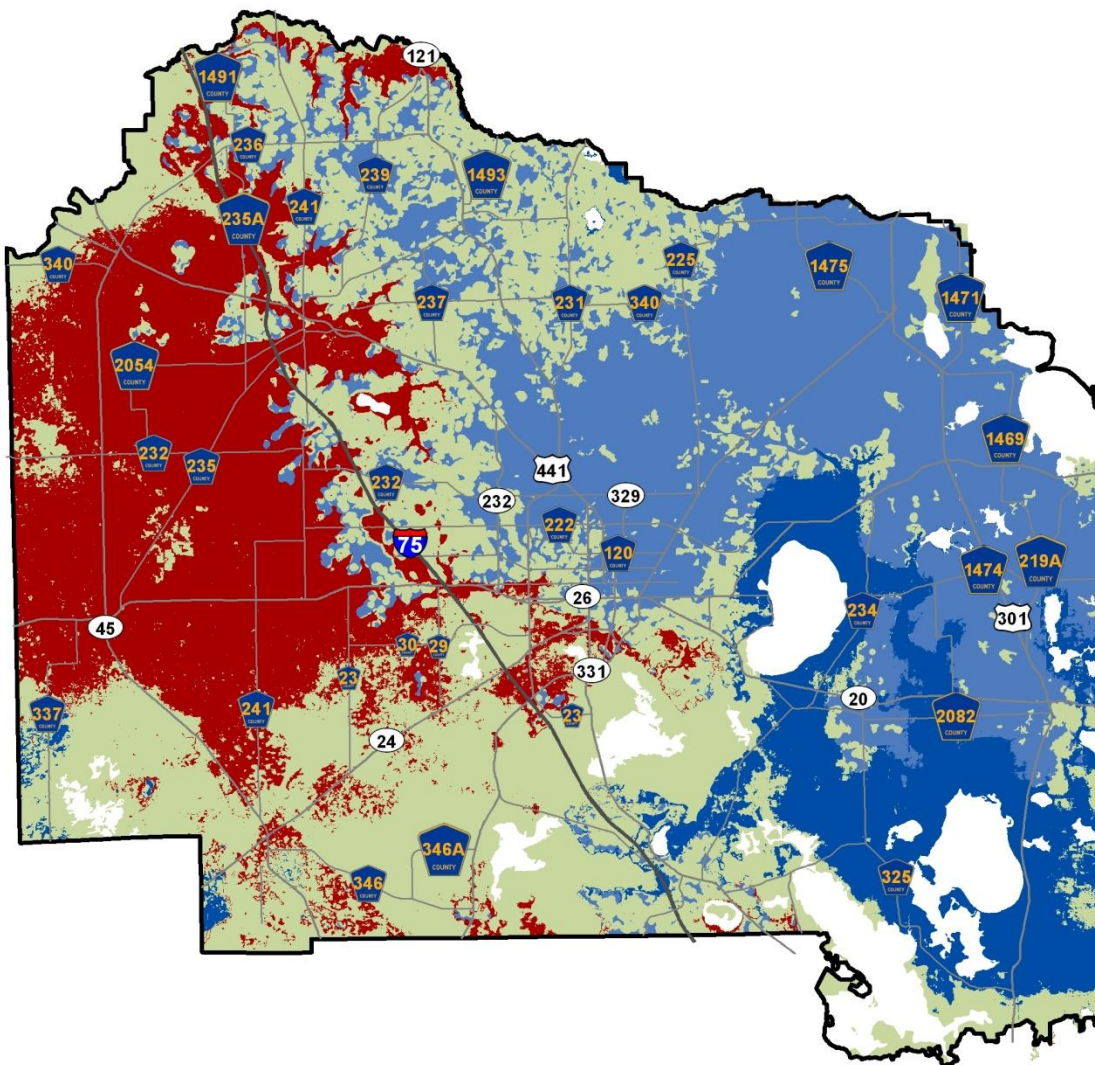
ACAVA

Vulnerability

- High
- Medium
- Low

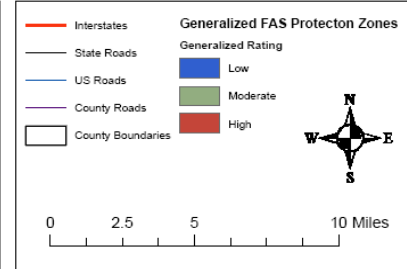
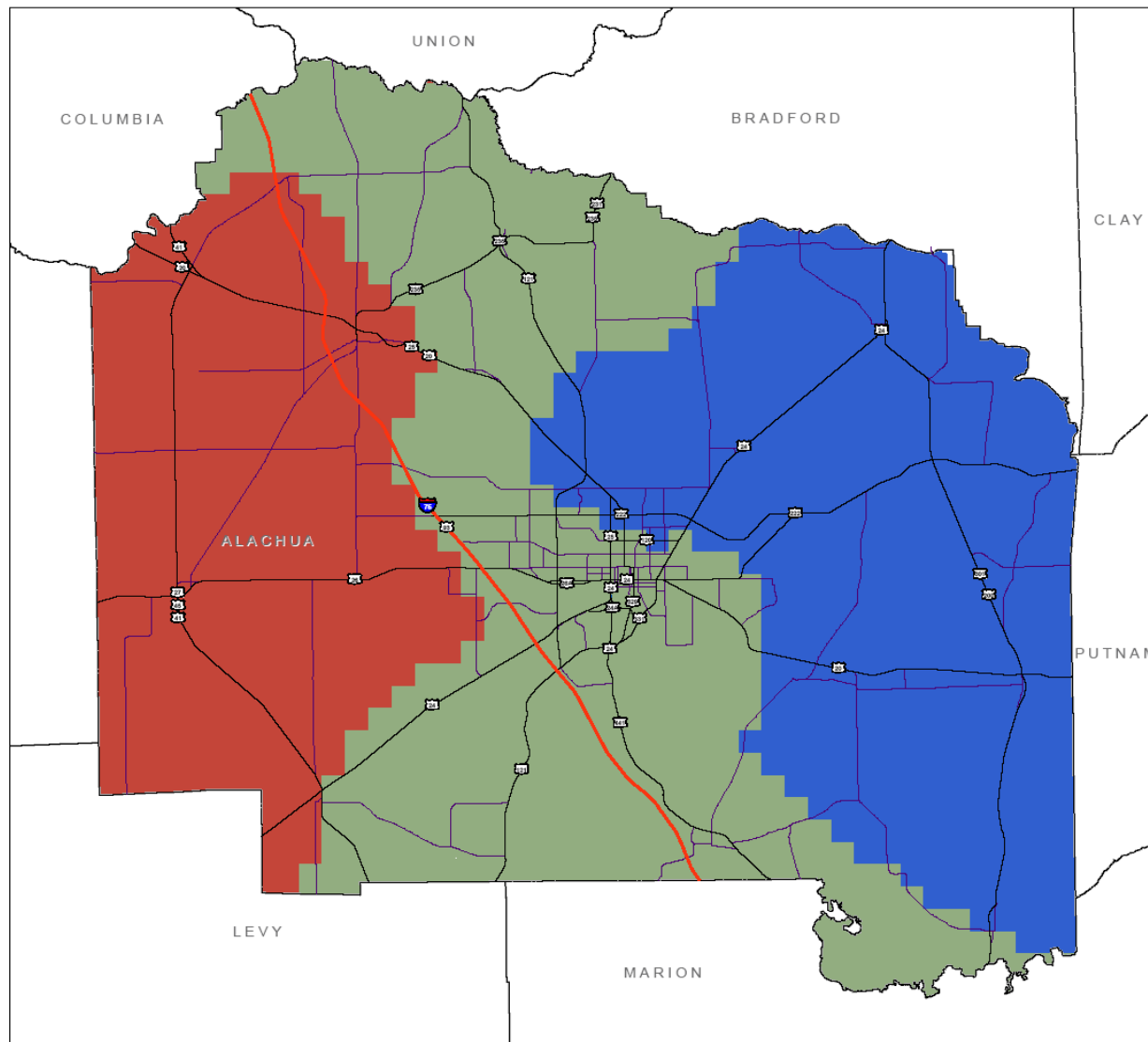


0 2 4 8 Miles



DISCLAIMER: This map and the spatial data it contains are made available as a public service, to be used for reference purposes only. The Alachua County Environmental Protection Department provides this information AS IS without warranty of any kind, implied or expressed, regarding accuracy, completeness, or fitness of use. The quality of the data is dependent on the various sources from which each data layer is obtained.

Alachua County Floridan Aquifer System Protection Zone Map

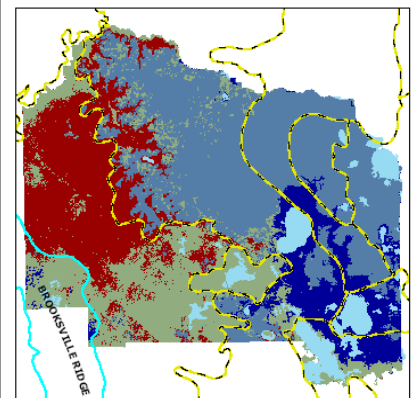


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In Copeland et al. (1991), the area of the Brooksville Ridge in central Florida is defined as having higher recharge potential than adjacent areas. The Brooksville Ridge is chiefly composed of Undifferentiated Hawthorn Group sediments which are poorly to moderately consolidated clayey sands and silty clays (Scott et al., 2001). In Alachua County, these sediments reach a calculated thickness of approximately 100 feet and can be discontinuous, deeply weathered and perforated by karst features.

In other areas of Florida, Hawthorn Group sediments form the Intermediate confining unit and normally provide an effective confining or semi-confining unit for the underlying FAS.

Recharge potential values were calculated for the study area by subtracting the USGS 2000 potentiometric surface of the FAS (USGS, 2000) from land surface elevation. Resulting recharge potential values range from 10 ft to 90 ft (relative to mean sea level). Where recharge potential is high, aquifer vulnerability is increased.





Alachua County Aquifer Vulnerability Assessment

The ACAVA report is available at:

http://www.alachuacounty.us/Depts/EPD/WaterResources/GroundwaterAndSprings/Reports%20and%20Maps%20Documents/Alachua_County_Aquifer_Vulnerability_Assessment.pdf

The report on the generalization of the ACAVA results can be found at:

http://www.alachuacounty.us/Depts/EPD/WaterResources/GroundwaterAndSprings/Reports%20and%20Maps%20Documents/AcavaResultsGeneralization_letterhead.pdf