

Georgia EPD – Floridan Aquifer Groundwater Resource Information

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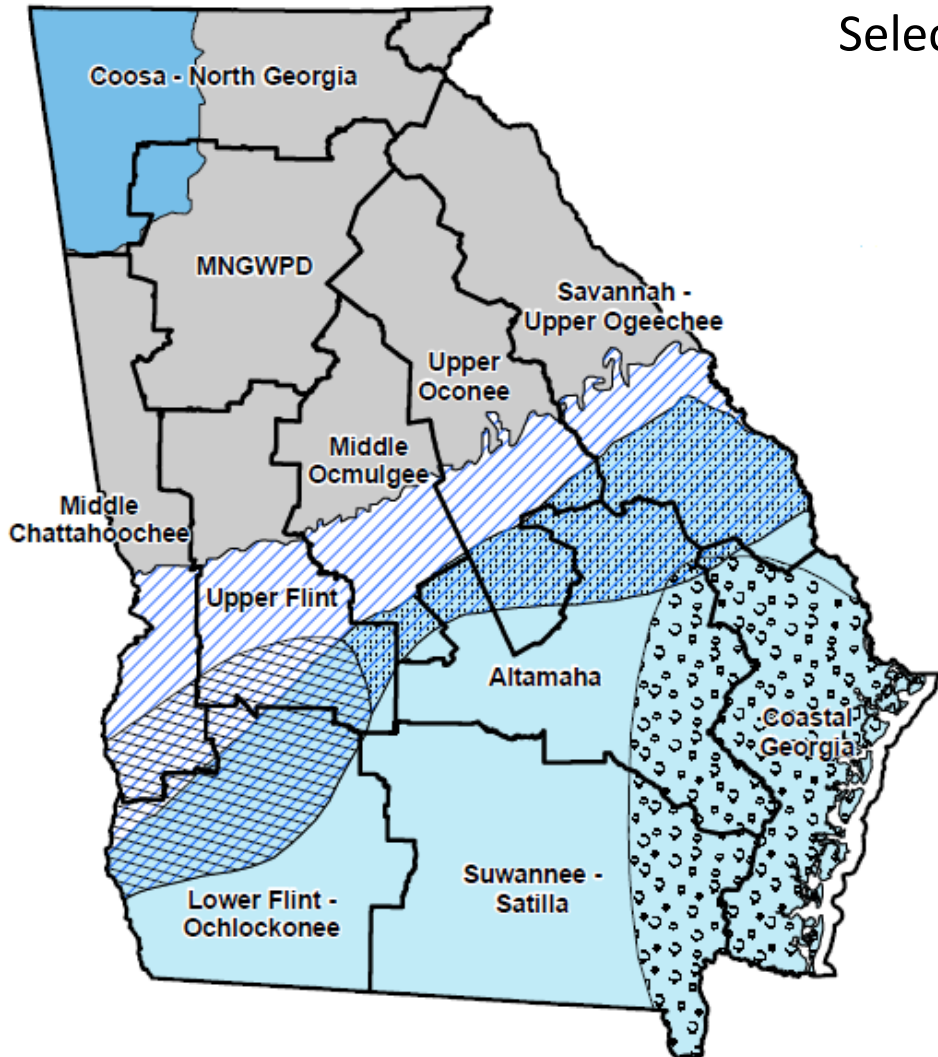


Overview of Presentation


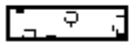




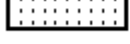

- Brief summary of historical Floridan aquifer challenges in Coastal Georgia
 - Salt-water encroachment into wells on Hilton Head Island, South Carolina
- Bottom Line - There is not an issue of saltwater encroachment in the Bryan/Bulloch area
- Simulation results of potential impacts to Floridan Aquifer from Bryan/Bulloch proposed withdrawals
- Special conditions to address impacts
- Summary and conclusions

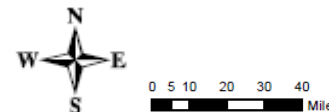
Water Planning Regions and Georgia's Aquifers

Select aquifers were prioritized for assessment.

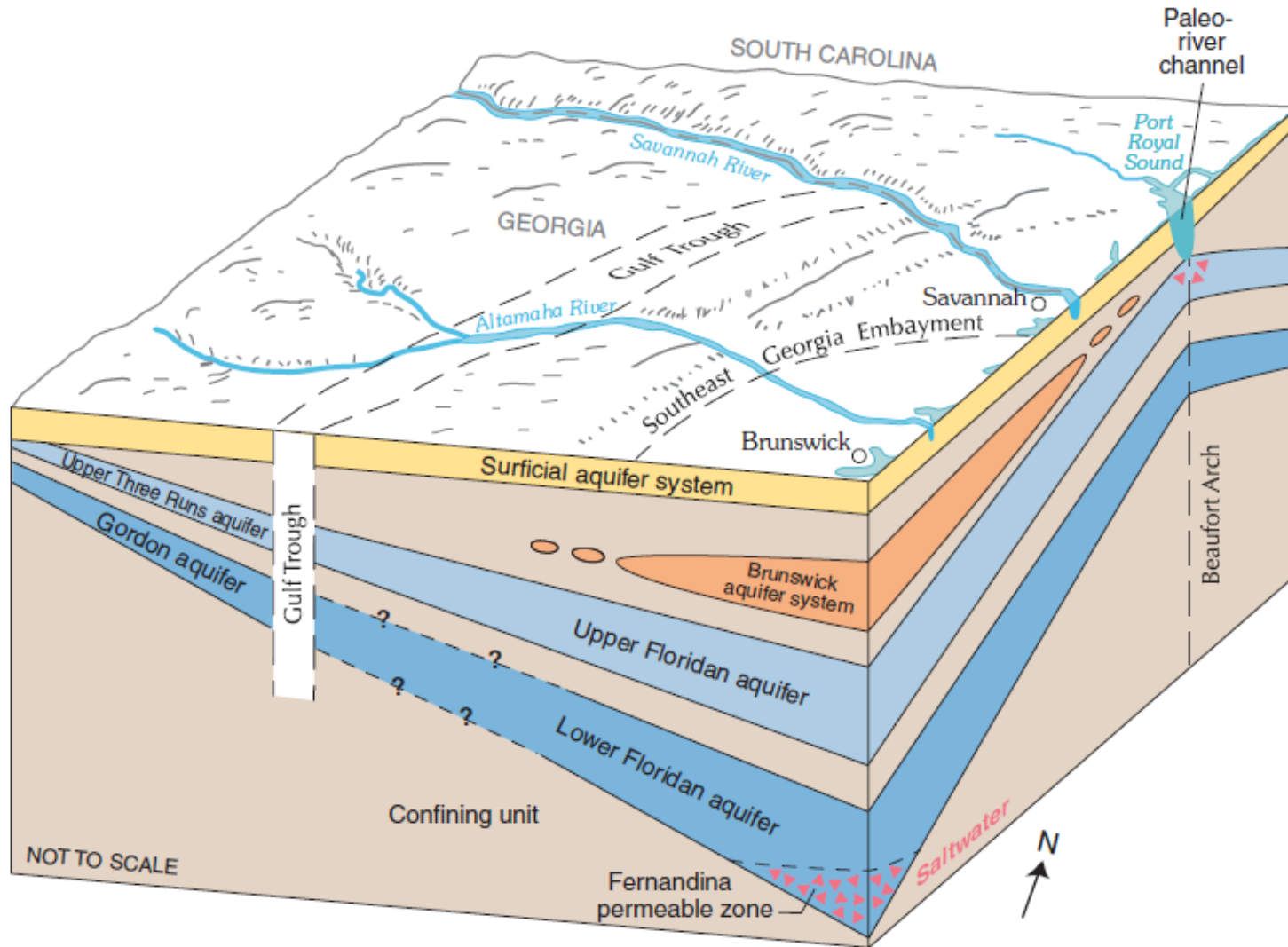


Legend

-  Water Planning Regions
-  Brunswick Aquifer System
-  Claiborne and Clayton Aquifers
-  Cretaceous Aquifer System
-  Crystalline-rock Aquifers
-  Gordon Aquifer System
-  Paleozoic-rock Aquifers
-  Upper and Lower Floridan Aquifers

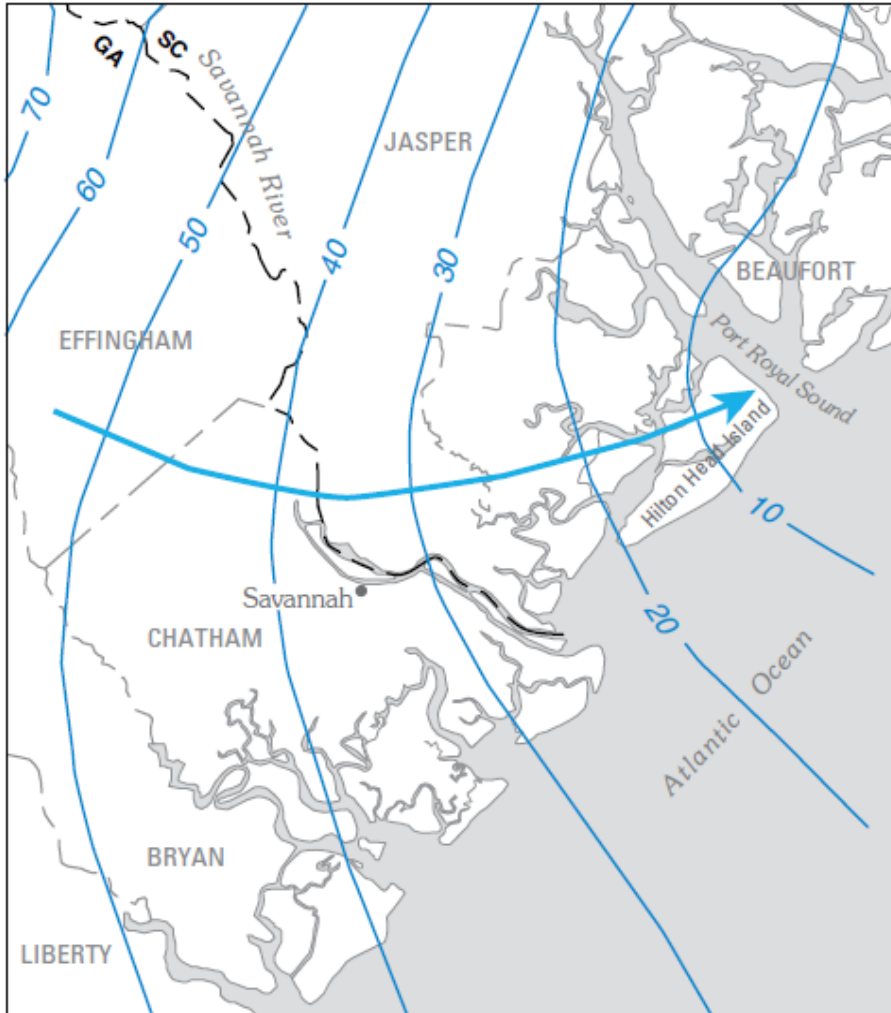


Coastal Georgia Aquifers

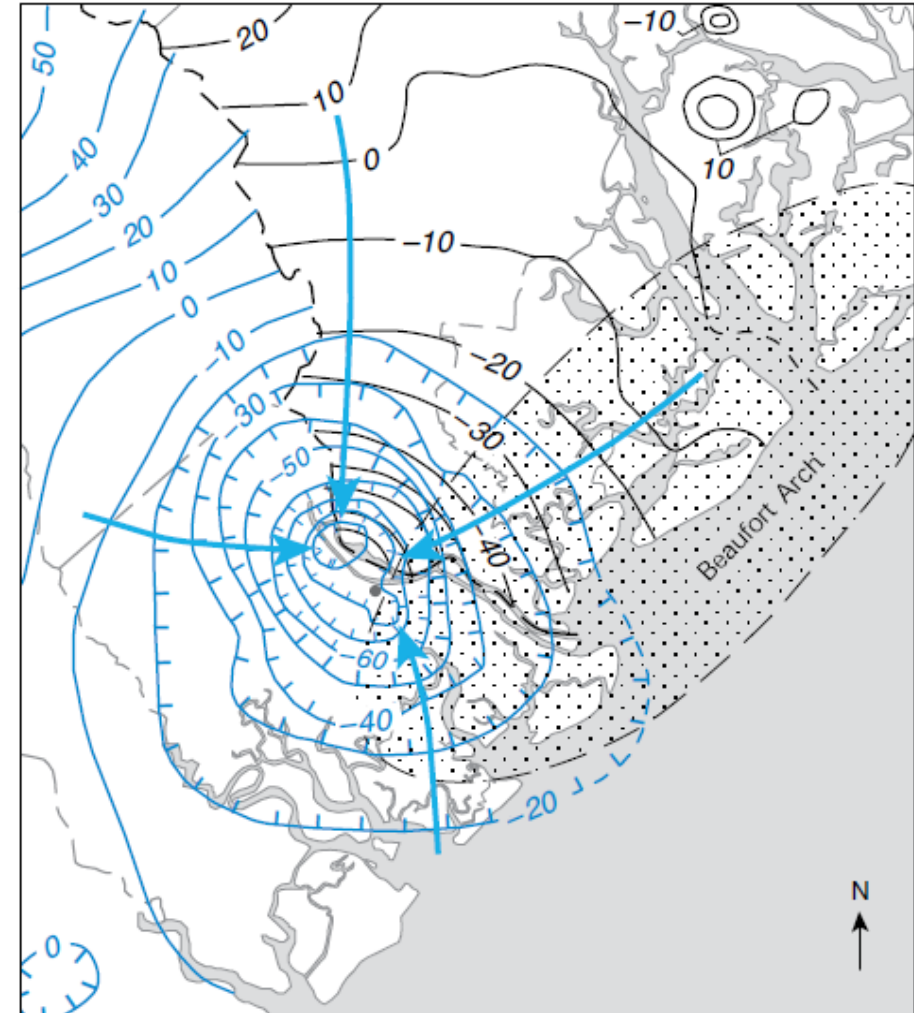


Upper Floridan Potentiometric Surface

A. Predevelopment

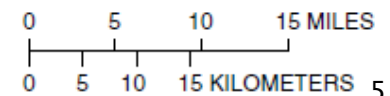


B. May and September 1998



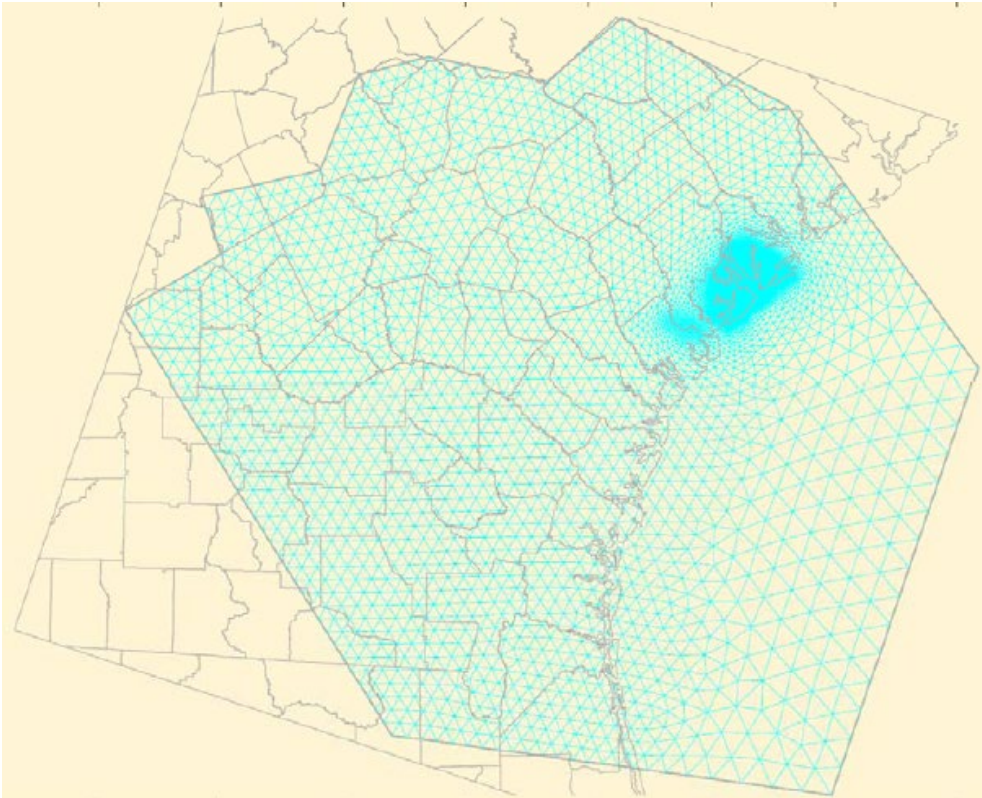
Base from U.S. Geological Survey
1:100,000 and 1:250,000-scale data

USGS SIR 2006-5058



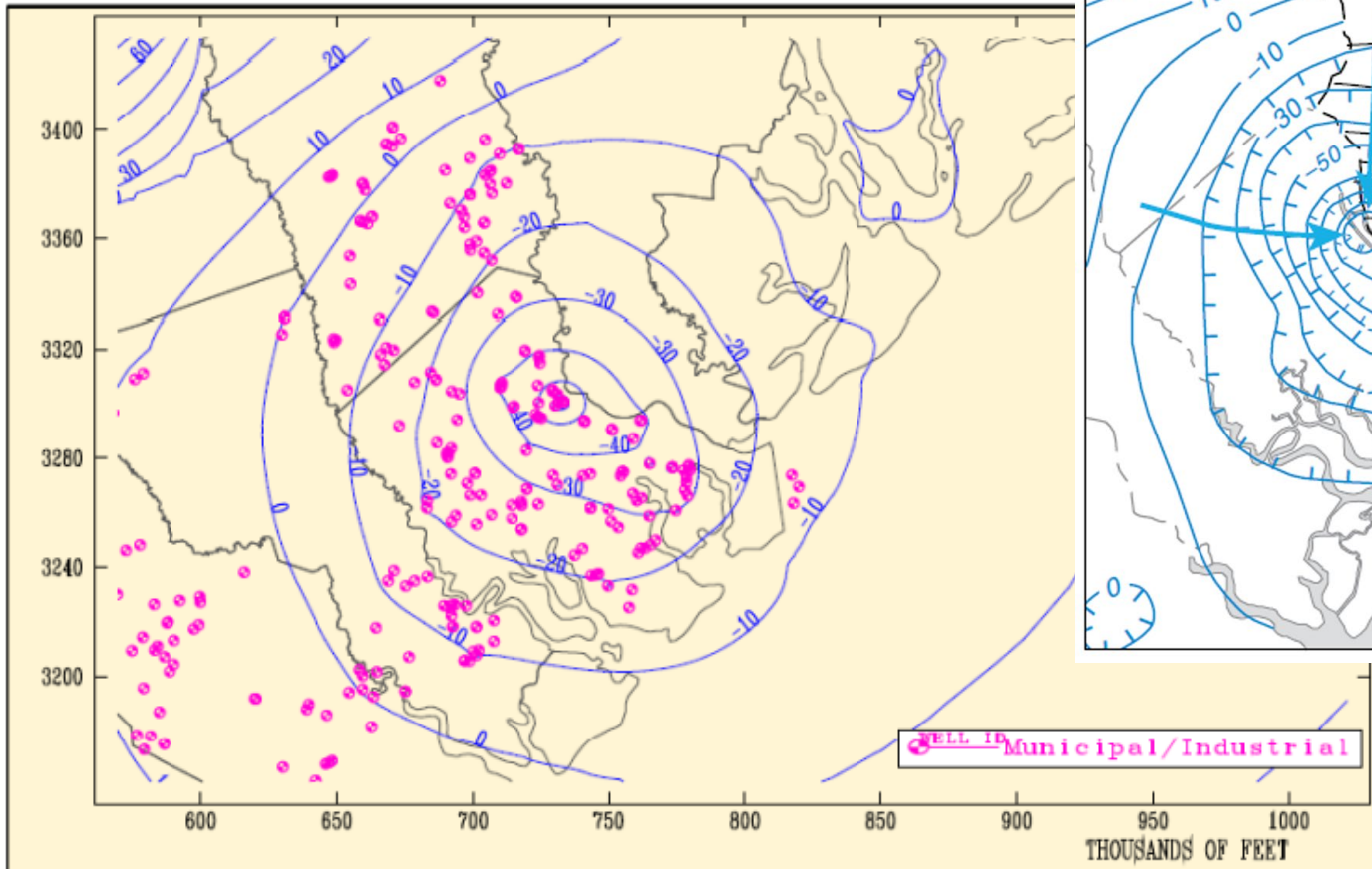
Coastal Sound Science Initiative (CSSI) Hydrologic Modeling

- CSSI model refined from the SHE model
 - Finer grid spacing around Hilton Head
 - Model was calibrated for steady state and transient conditions.
 - GA EPD and SCDHEC approved the model for use in the CSSI.
 - Baseline withdrawals (includes Ag, Drinking water systems, and Non-Farm Permitted Withdrawals):
 - Savannah Area – 69 mgd
 - Hilton Head Island – 9 mgd

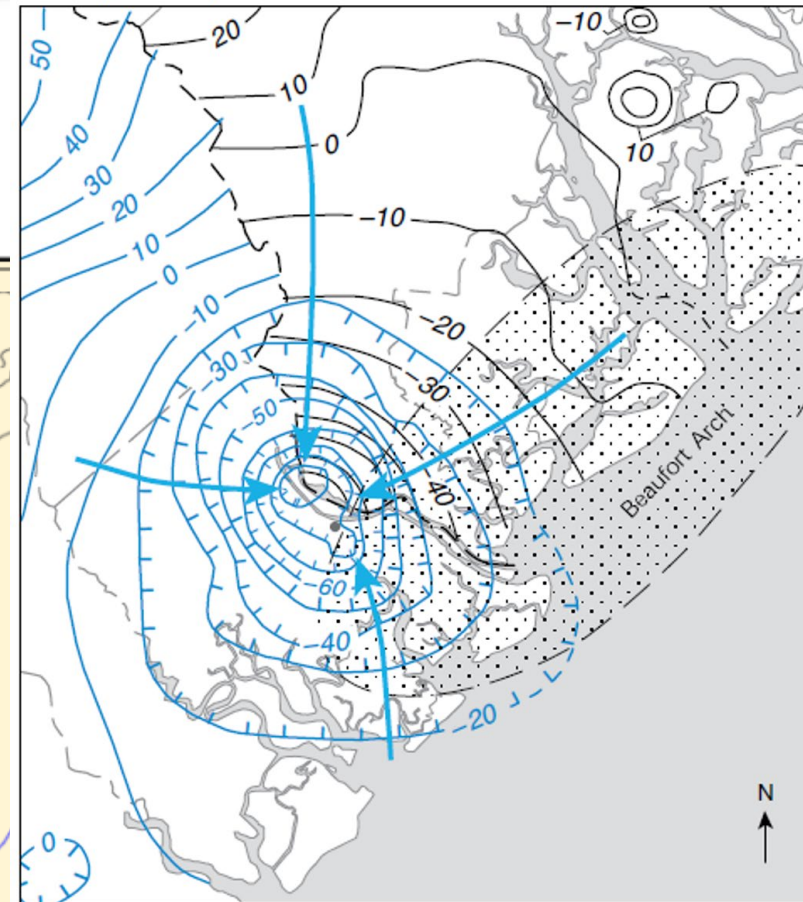


CSSI Model Updates (2017-2018)

- Reduced cone of depression by 40 ft in Savannah area
- Red Zone (Chatham & S. Effingham) – 45.6 mgd
- Yellow Zone (Bryan & Liberty) - 19.6 mgd
- Chlorides are moving toward cone of depression



B. May and September 1998



Pause – Questions?

- Bottom line - There is not an issue of saltwater encroachment in the Bryan/Bulloch area

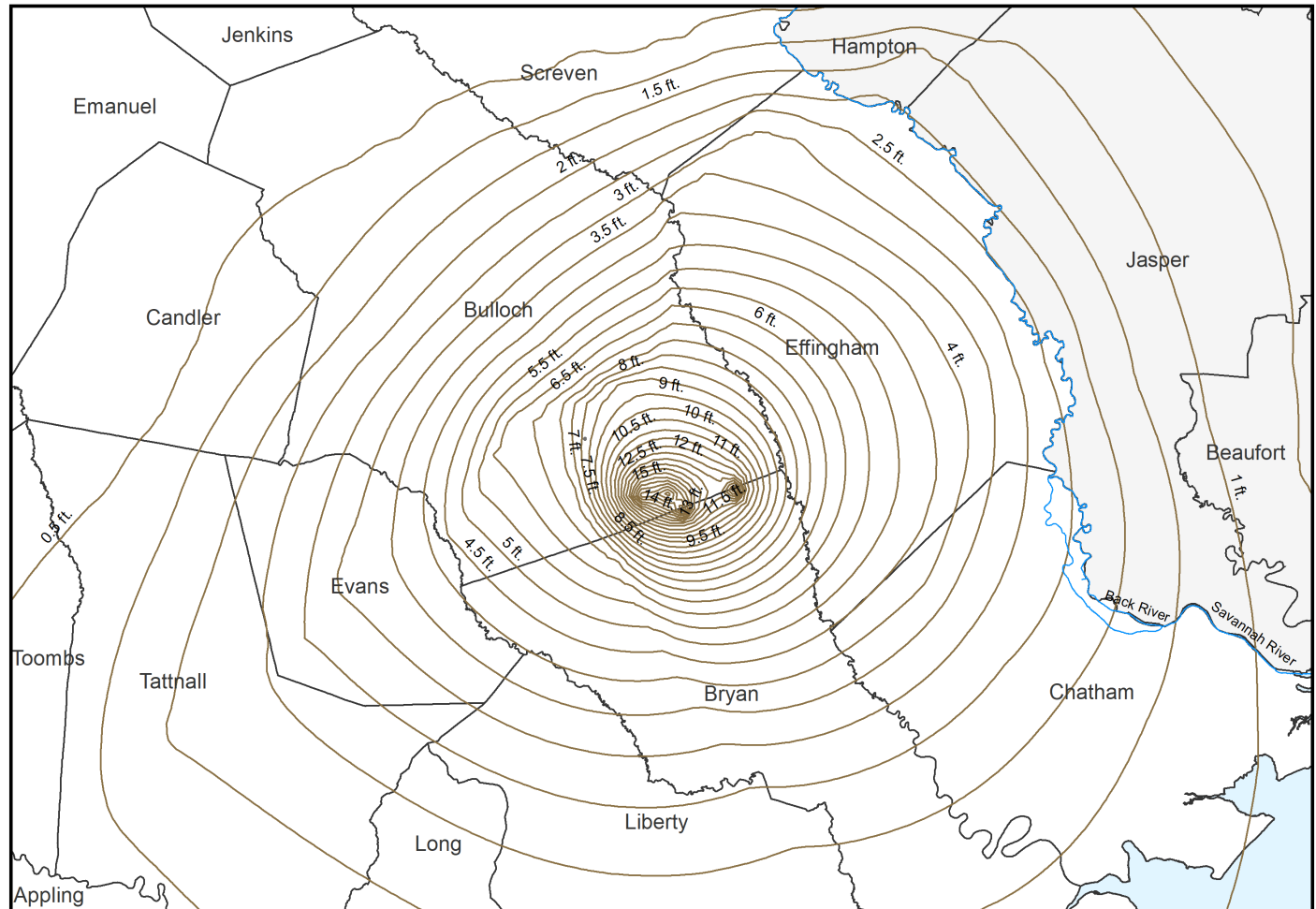
Proposed Withdrawals for Hyundai Site

- Two independent simulations were conducted of this proposed withdrawal within EPD. The simulation was as follows:
 - 4 wells pumping a total of 6.625 mgd from the Floridan Aquifer.
 - Simulation assumes pumping at permitted limits.
 - **Reality is pumping will not be at max permitted limits.**

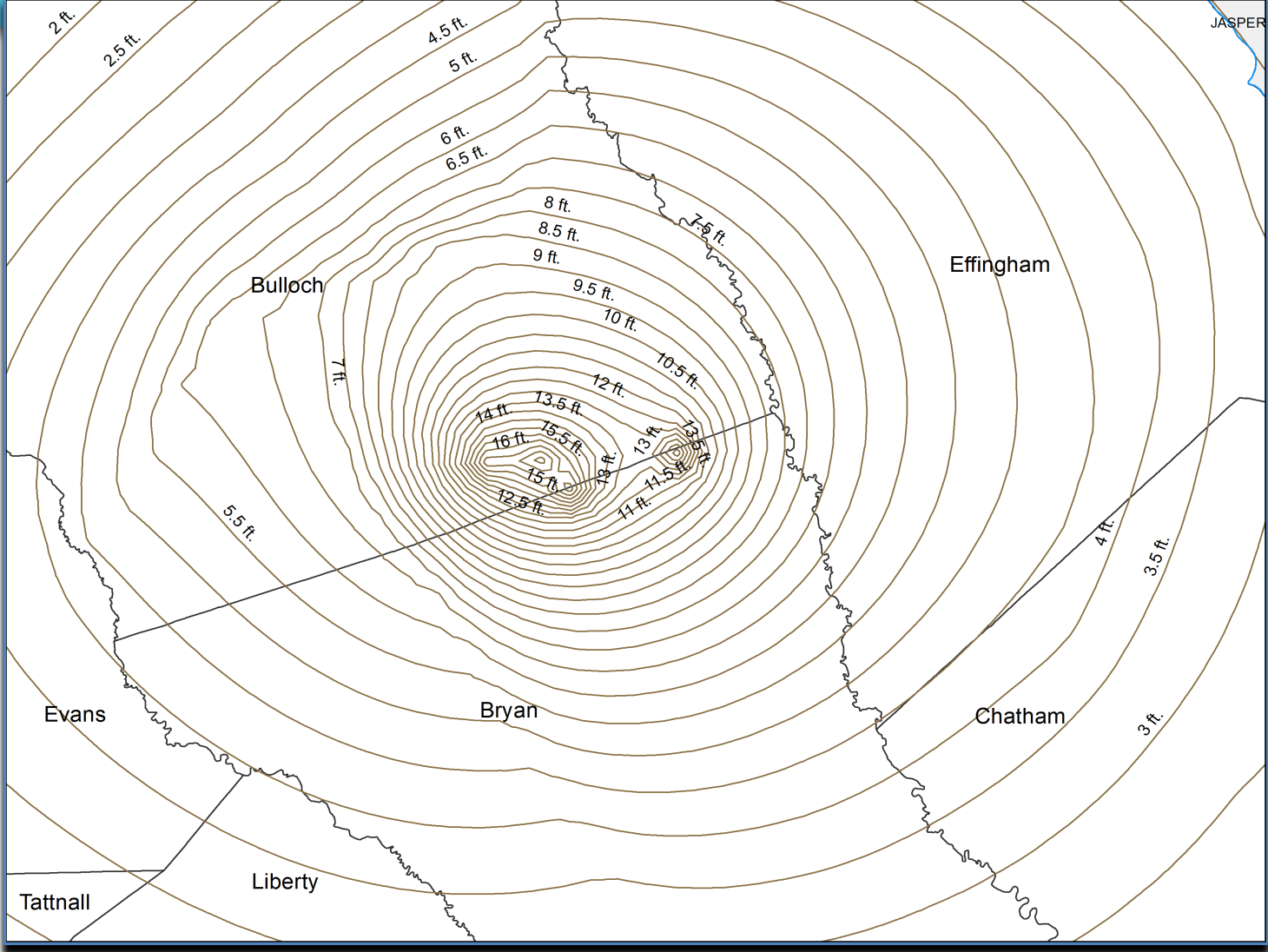
Proposed Drawdown impacts from Hyundai Site

- Maximum Drawdown is 19 feet in Floridan Aquifer
- There will be no impact to the surficial aquifer.
 - Significant confining layer between aquifers

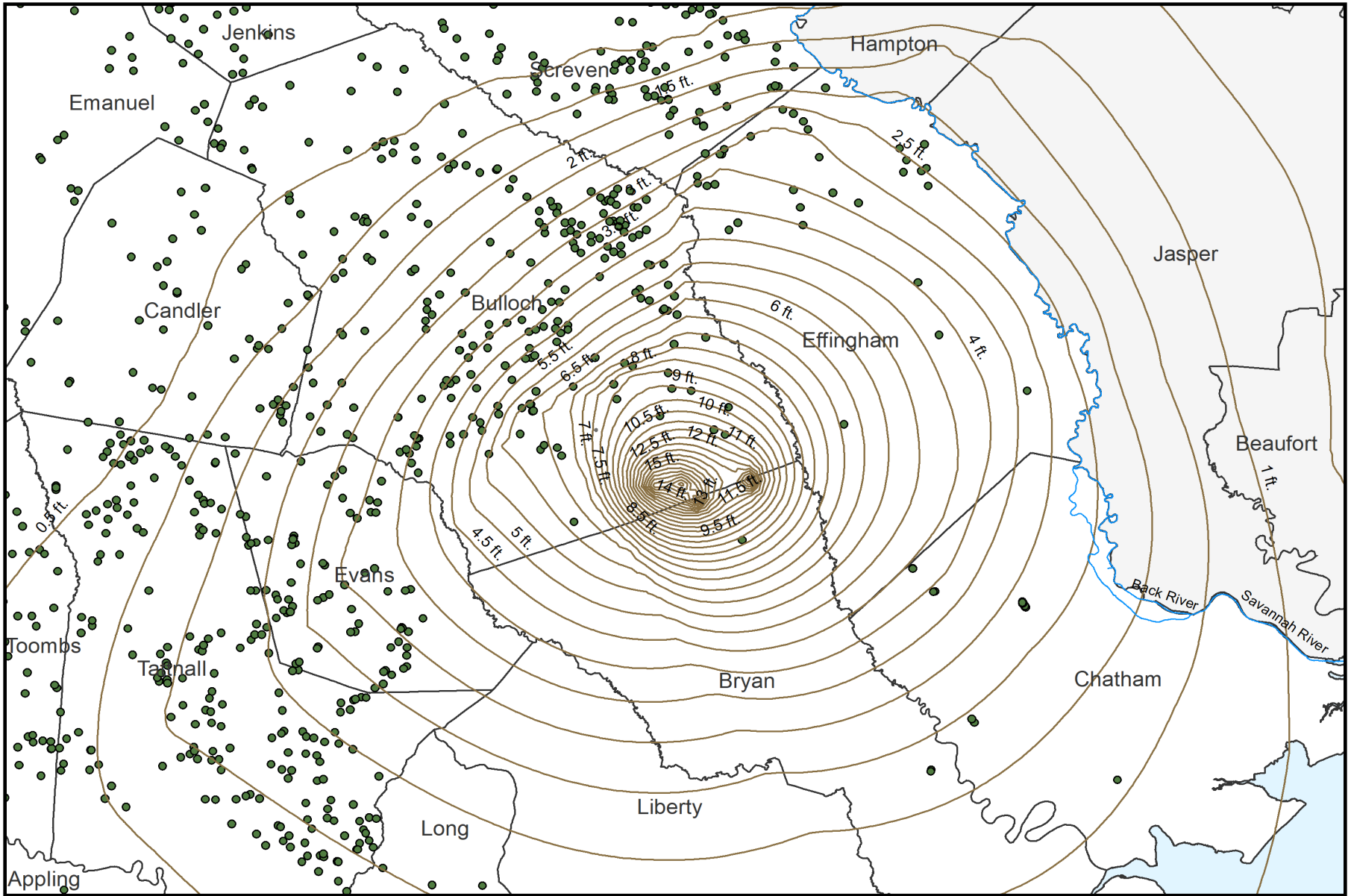
Modeled Drawdown for Proposed Hyundai Wells



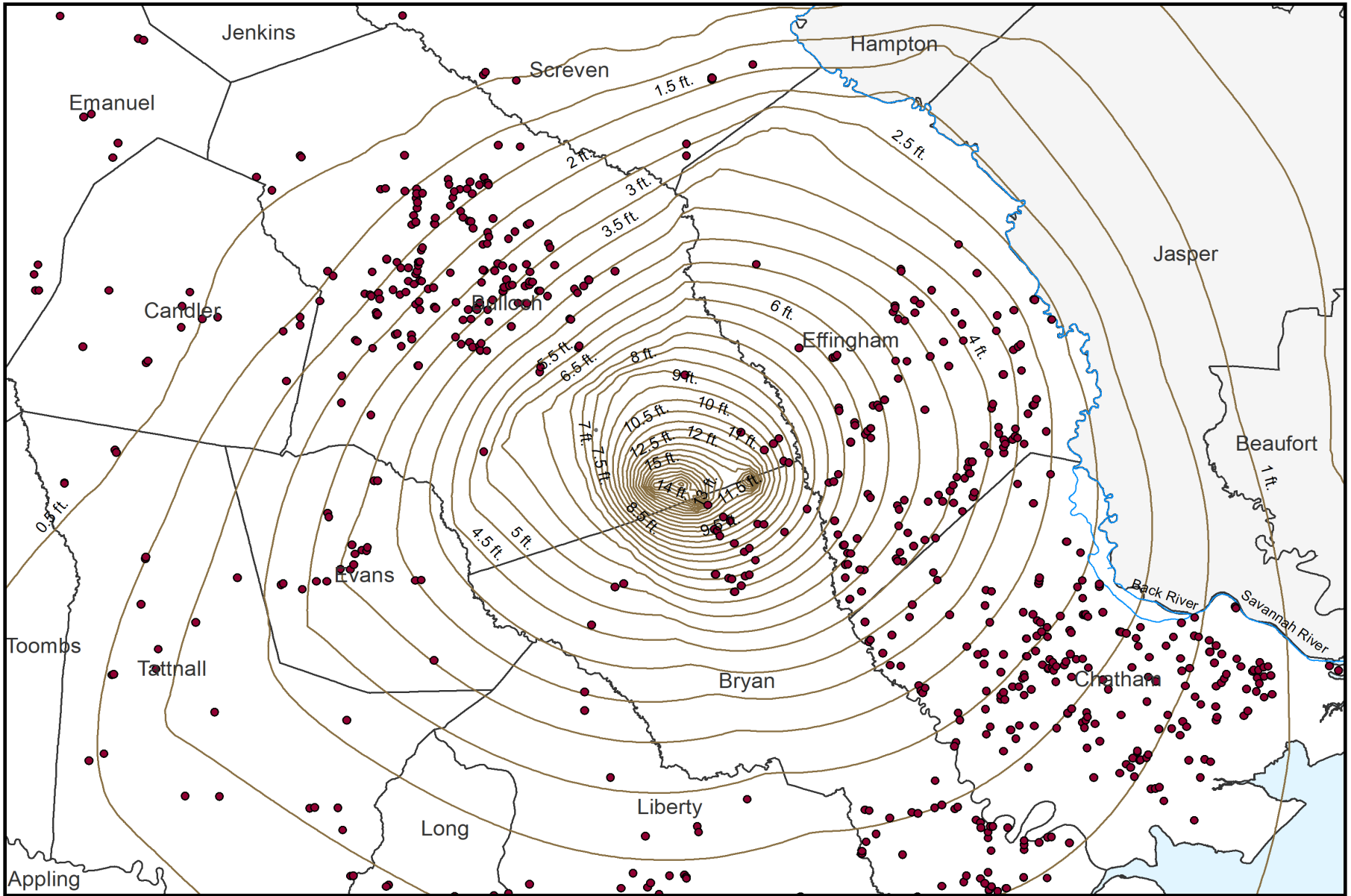
Proposed Impact from Hyundai Site - Zoomed



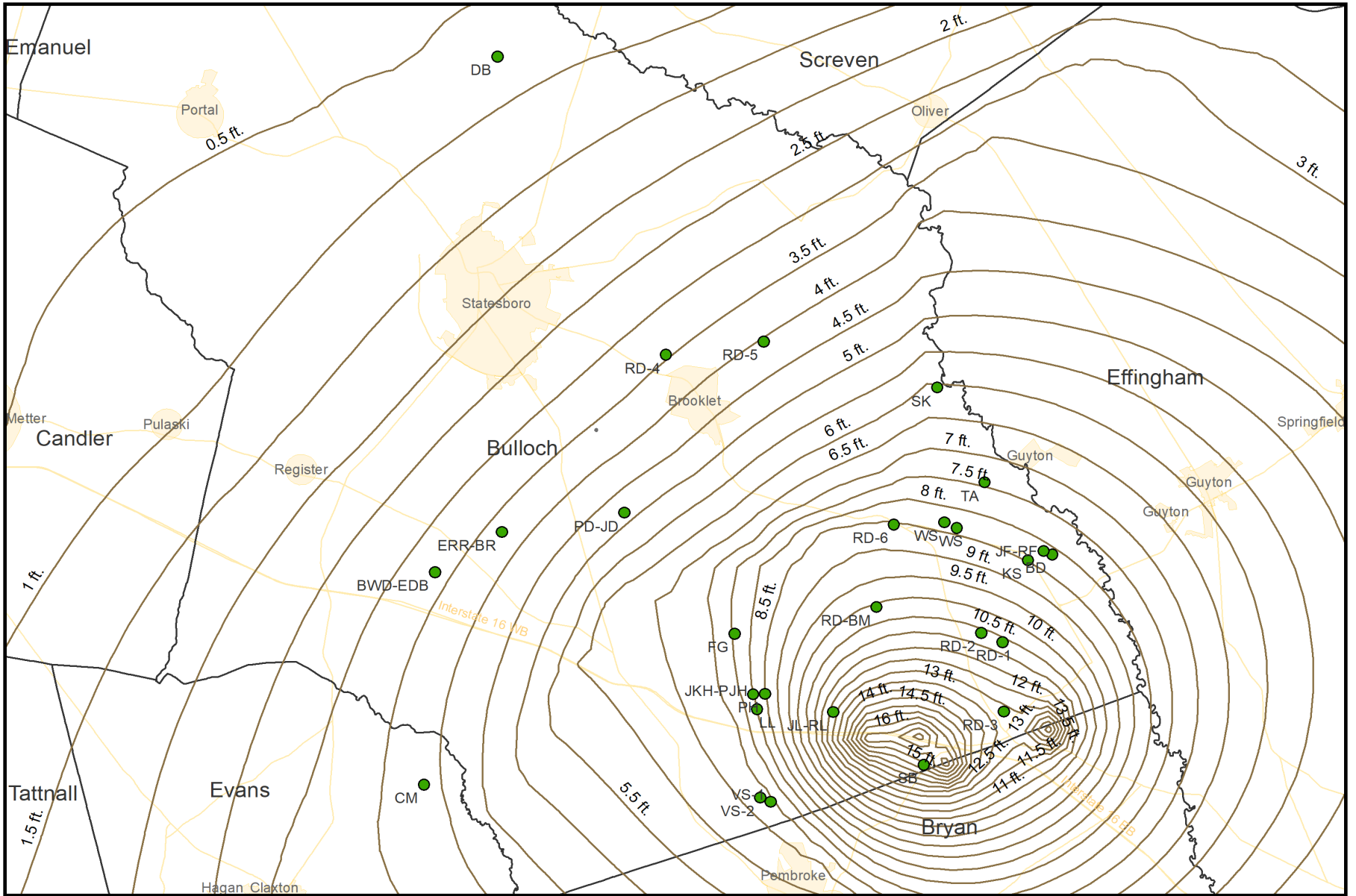
Agricultural Wells Permitted by EPD



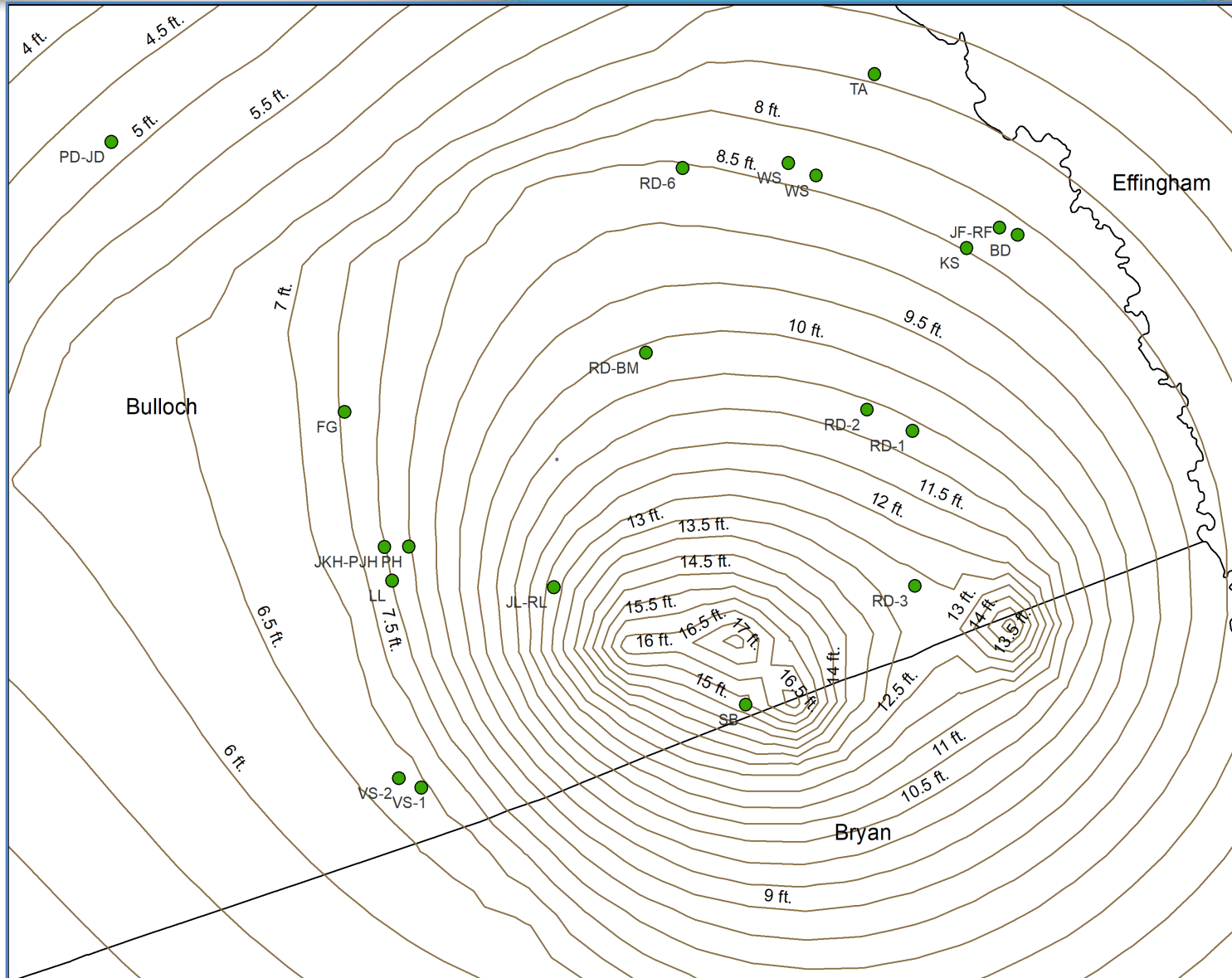
Drinking Water Wells Permitted by EPD



Resident Locations Submitted to EPD

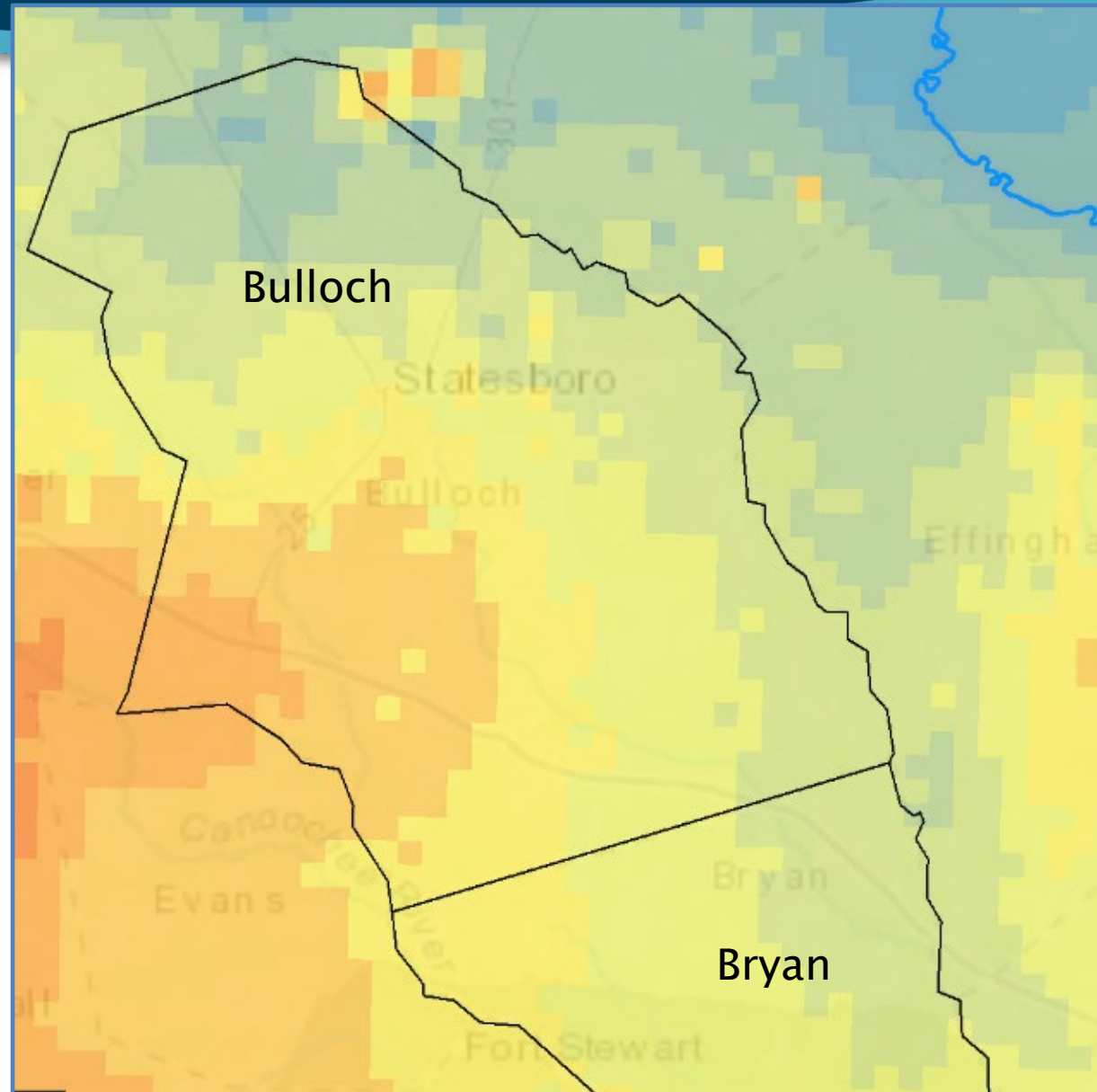
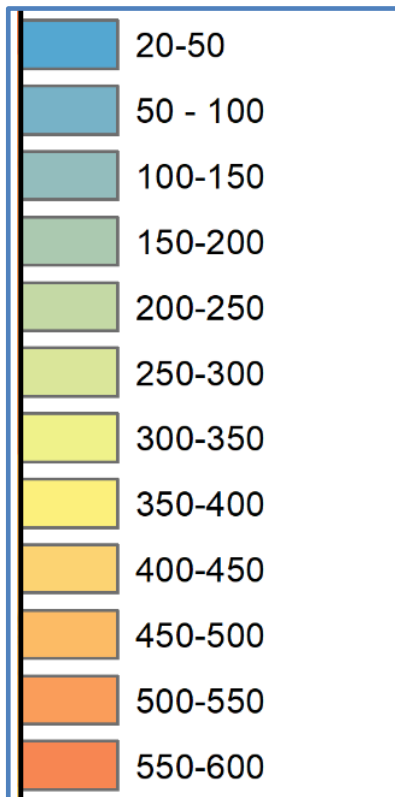


Residential Wells in Vicinity of Hyundai Site



Is Your Well Set in the Floridan Aquifer?

Feet Below Ground Surface



Pause – Questions?

- Modeling captures the geographic area and the magnitude of impact
- Current farm water use permittees (utilizing the Floridan Aquifer) will experience an impact of less than 12 feet assuming max pumping capacity (6.625 mgd)
- Private residential wells have also been assessed; the one closest to the center of the cone of depression may have a 15 feet impact, if it is sourced in the Floridan Aquifer and the site is pumping at capacity

Proposed Draft Permit Conditions

A&B) To address impacts to users in the vicinity:

- Funds set up by permittees to address impacts and issues from the use of the Bryan/Bulloch municipal wells.
- Users whose Floridan wells are within a 5-mile radius of the approximate center of the 4 proposed Bryan/Bulloch wells and whose wells experience significant water issues resulting from the operation of Bryan/Bulloch wells.

Proposed Permit Special Conditions

- A. *A joint Bulloch County and Bryan County municipal managed fund will be created by the permitted counties, which may include industrial monetary contributions and assistance, to address any potential unreasonable impacts to existing permitted individual Floridan aquifer residential (permitted by local health departments) or agricultural wells (permitted by EPD) in the nearby area within a 5-mile radius of the I-16 and Highway 119 interchange. This mitigating mechanism will exist for the term (10 years) of this permit.*

- B. *If an EPD approved party conducts an independent investigation which indicates that an unreasonable impact to an existing water well meeting the above parameters is considered to have been caused by the Floridan Aquifer drawdown engendered by the use of the 4 municipal wells providing water to the industries at the Bryan county Mega-Site, money from the fund may be used to indemnify the affected party to solve such delineated water problems. These options may include methods proposed using best management practices of a Georgia licensed well driller, such as resetting the water pump deeper or by other proposed solutions.*

Proposed Draft Permit Conditions

C-G) This set of conditions are contemplated to address long term concerns from resource managers, Coastal Water Planning Region, and utilities in the coastal region

- Permittees will work with other parties and EPD to bring surface water or other water alternatives to the area
- Permittees will work with EPD and maintain consistency with the EPD coastal permitting strategy and other policies

Proposed Permit Special Conditions

- C. The Georgia Environmental Protection Division (EPD) strongly encourages Bryan County and Bulloch County to work together to expeditiously plan for the timely provision of treated surface water (or other alternatives) and the construction of all infrastructure necessary to deliver sufficient quantities of treated water to northern Bryan County and southern Bulloch County. This provision of treated surface water (or other alternatives) and the construction of all infrastructure necessary should not exceed 25 years. Such planning should be premised on making sufficient surface water (or other alternatives) available to provide for offsetting permitted Floridan aquifer groundwater withdrawals tied to the Bryan County Mega-Site and the future water needs of any additional industrial, commercial, and residential growth which may occur in this area because of Bryan County Mega-Site development.*
- D. Groundwater withdrawals from the proposed four (4) municipal Floridan Aquifer wells in the Green Zone of Bulloch County must be reduced upon completion and operation of infrastructure to deliver surface water in the area, in coordination and compliance with any contract restrictions placed on the use of the wells by the initial funding source requirements.*
- E. Any future suggestion to drill new Floridan aquifer wells away from the Savannah Cone of Depression (such as farther west or north) and then transfer or move any already issued permitted groundwater limits must comply with all EPD policy and permitting requirements in place at the time of such a proposal.*

Proposed Permit Special Conditions

- F. Bryan County and Bulloch County must submit an initial joint annual report to EPD within 12 months of the withdrawal permits being issued, informing EPD of the pending status regarding:*
- 1. The investigation of, and discovery or development of, sufficient funding sources to pay for any effort to expand surface water availability in a timely manner.*
 - 2. All negotiations between the above parties and any others working towards the construction of necessary surface water and pipeline infrastructure.*
 - 3. Contractual documents between the parties proposed or approved.*
 - 4. A solid, firm and feasible front-loaded timetable for such developments,*
 - 5. Any other information pertaining to this effort.*
- G. Bryan County and Bulloch County must also submit annual updates to the initial report, which must at a minimum address each of the five items above, summarizing progress and providing any new information available. As significant progress, changes in conditions, or changes in timelines may occur, the level of detail provided in the annual reporting should be sufficient to appropriately inform EPD of the project status.*

Pause – Questions?

- Link to Meeting Notice and Special Conditions:
 - <https://epd.georgia.gov/water-withdrawal-permitting>

Summary

- Saltwater will not reach wells in Bryan or Bulloch County
- Maximum drawdown (if pumping at permitted limits) in Floridan Aquifer from proposed withdrawals in the vicinity of the Bryan/Bulloch wells is expected to be approximately 19 feet
- Wells set in Surficial aquifer will see no impact from proposed withdrawal at Hyundai site
- Wells in the vicinity of the Bryan/Bulloch proposed wells and set in the Floridan Aquifer may see an impact
- Permit Special condition(s) to address impacts in the vicinity
- Permit Special condition(s) to encourage utilization of surface water and to address any long-term impact on the coastal region's water resources

Ongoing Information of Coastal Resources

- Georgia EPD – Coastal Water Study
 - <https://epd.Georgia.gov/coastal-water-study>
 - Background information and Coastal Permitting Plan Guidance documents
 - Information on the Technical Advisory Committee work
 - Information on the Sound Science Initiative
- US Army Corps of Engineers SHEP Monitoring Reports
 - <http://shep.uga.edu/reports.html>
 - Information on the Sentinel monitoring wells
 - Other monitoring data associated with the SHEP
- USGS South Atlantic Water Science Center – Coastal Sound Science Initiative:
 - <https://www2.usgs.gov/water/southatlantic/ga/projects/coastal/index.html>
 - Real Time monitoring of wells in Coastal Georgia
 - Background information on Coastal history
 - Coastal Sound Science Initiative Publications

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