



Alternative Sustainable Yields of the Upper Floridan Aquifer

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Sustainable Yield Metrics

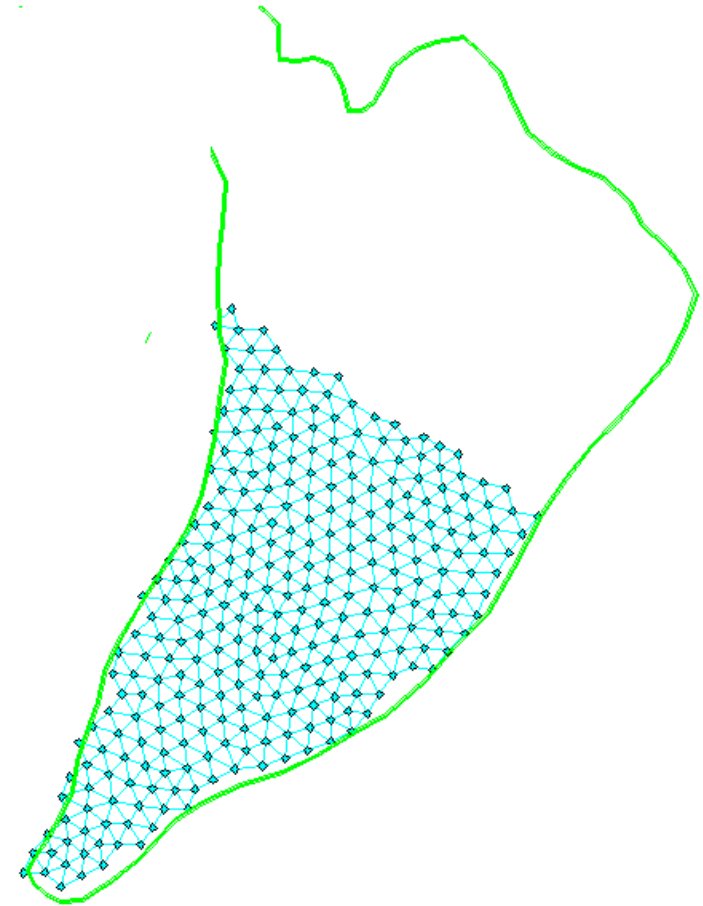
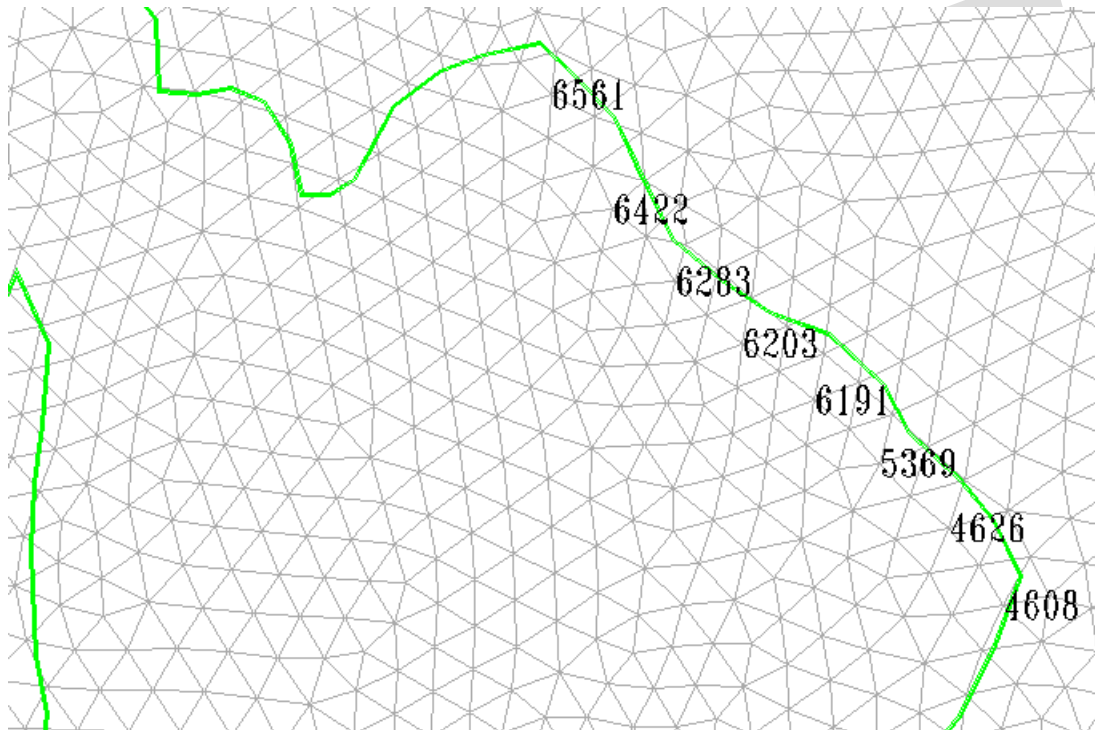
- Different sustainable yield metrics would result in different sustainable yields
- Withdrawals in the Savannah area and on Hilton Head island would have to be greatly reduced to achieve the sustainable yield metric that salt-water plumes not move further inland
- Alternative sustainable yield metrics:
 - The hydraulic head in the Upper Floridan aquifer beneath Port Royal Sound at the northern end of Hilton Head Island is such that no more salt water enters the aquifer at the northern end of the island
 - The southward hydraulic gradient in the northern portion of Hilton Head Island is reduced to slow the movement of the salt water plume on the island



Simulated Injection to Maintain Hydraulic Heads in the Aquifer

Simulate Injection at Eight Model Nodes in the Northern Part of Hilton Head Island

Shift 8.6 MGD of Pumping to Model Nodes in the Southern Part of the Island



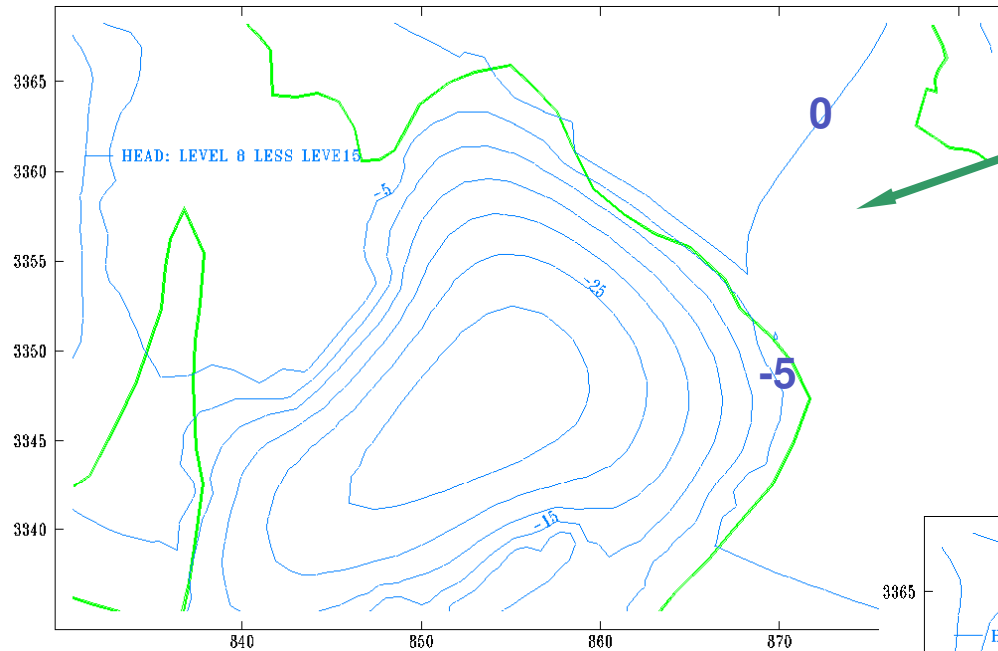


Simulated Injection to Maintain Hydraulic Heads in the Aquifer

- Model level 8 is in the upper portion of the Upper Floridan aquifer and model level 15 is the top layer of the model
- Contours are the simulated hydraulic heads in level 8 minus the simulated hydraulic heads in level 15
- Negative contours indicated that the simulated hydraulic head in level 15 was higher than the simulated hydraulic head in level 8 so that the vertical component of hydraulic gradient was downward and salt water would move into the aquifer
- Positive contours indicated that the simulated hydraulic head in level 8 was higher than the simulated hydraulic head in level 15 so that the vertical component of hydraulic gradient was upward and salt water would not move into the aquifer

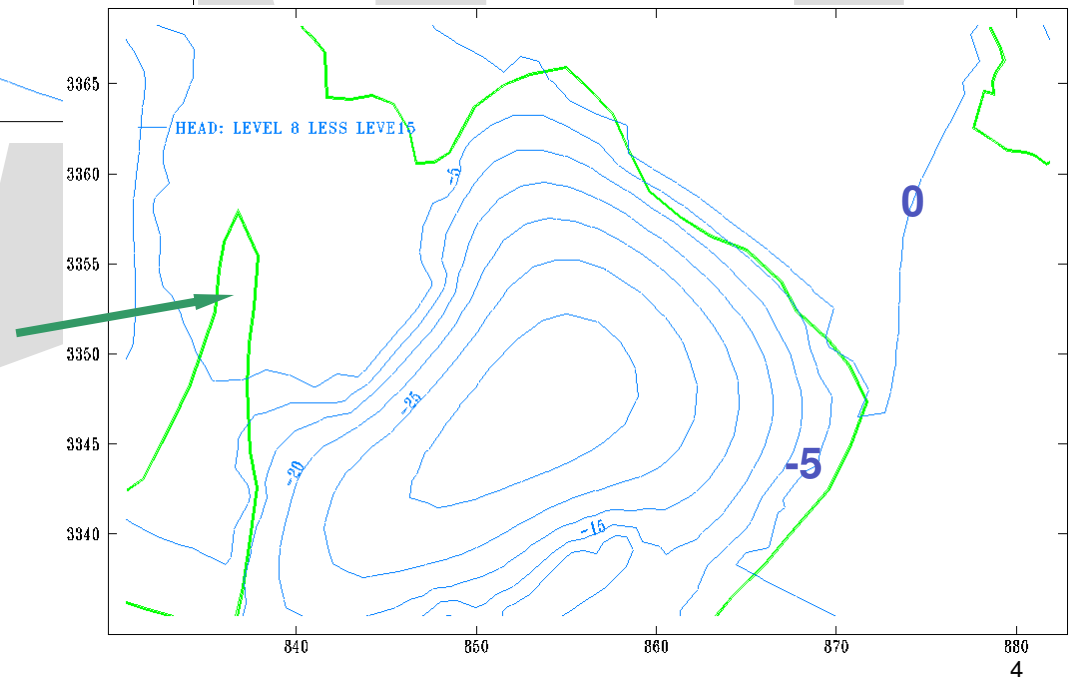


Simulated Injection to Maintain Hydraulic Heads in the Aquifer



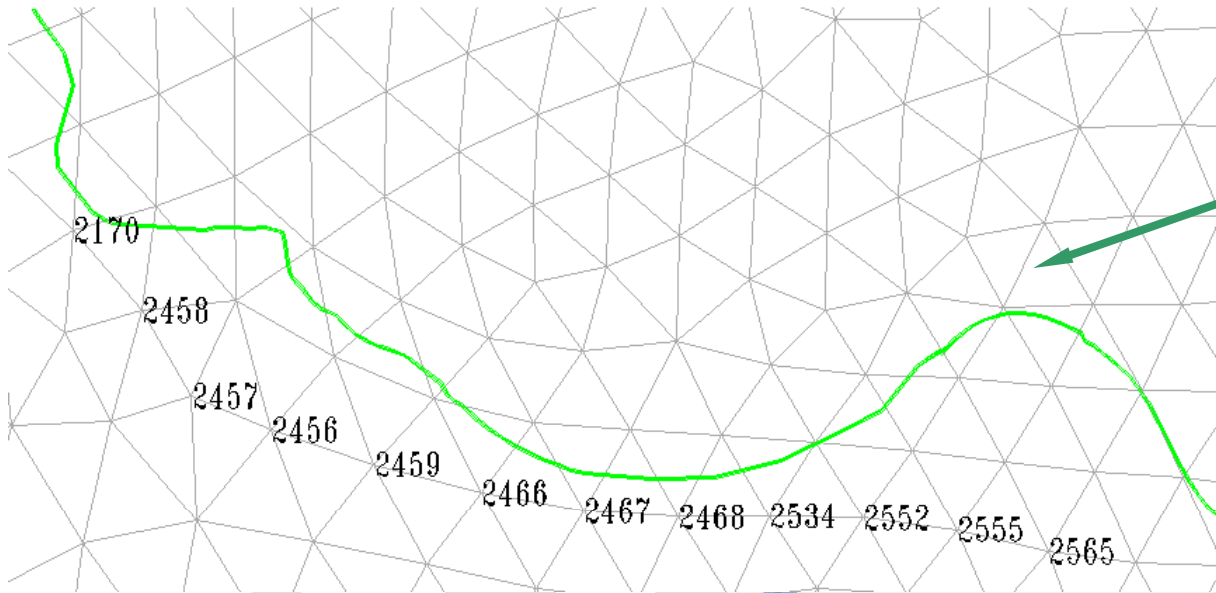
With Injection at About 6 MGD Negative Contours Beneath Port Royal Sound Indicated a Downward Hydraulic Gradient that Would Allow Salt Water to Enter the Aquifer

With Injection at About 7 MGD Positive Contours Beneath Port Royal Sound Indicated an Upward Hydraulic Gradient that Would Prevent Salt Water from Entering the Aquifer



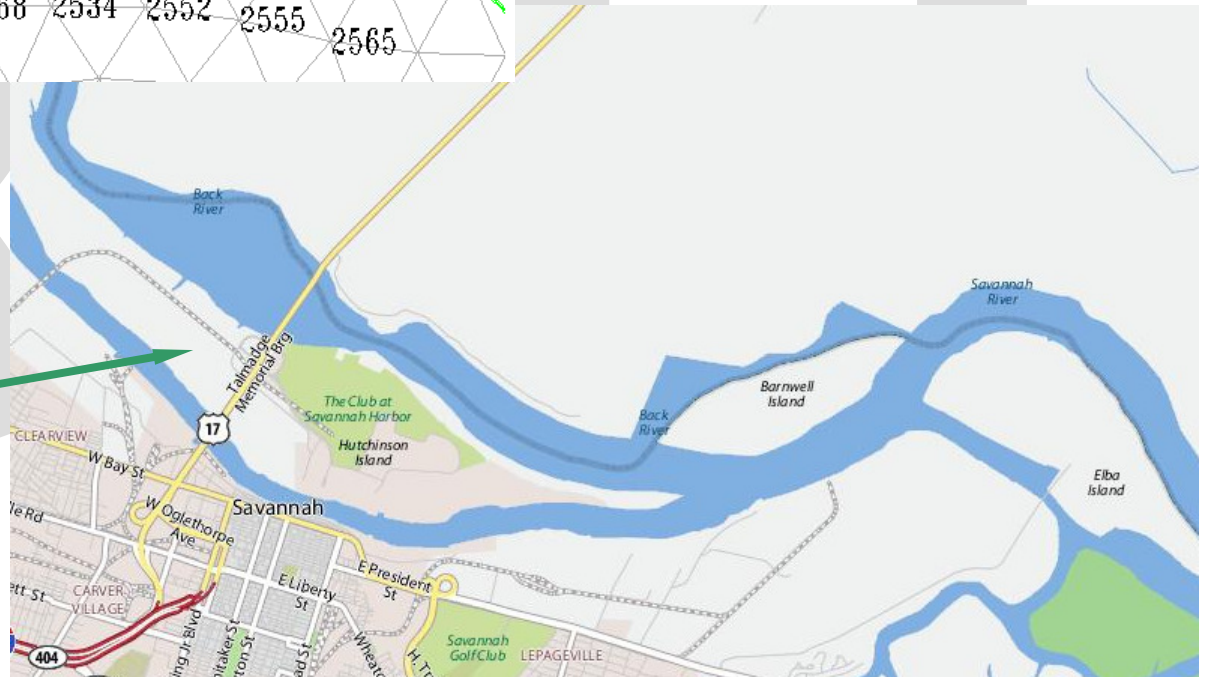


Simulated Injection at Savannah



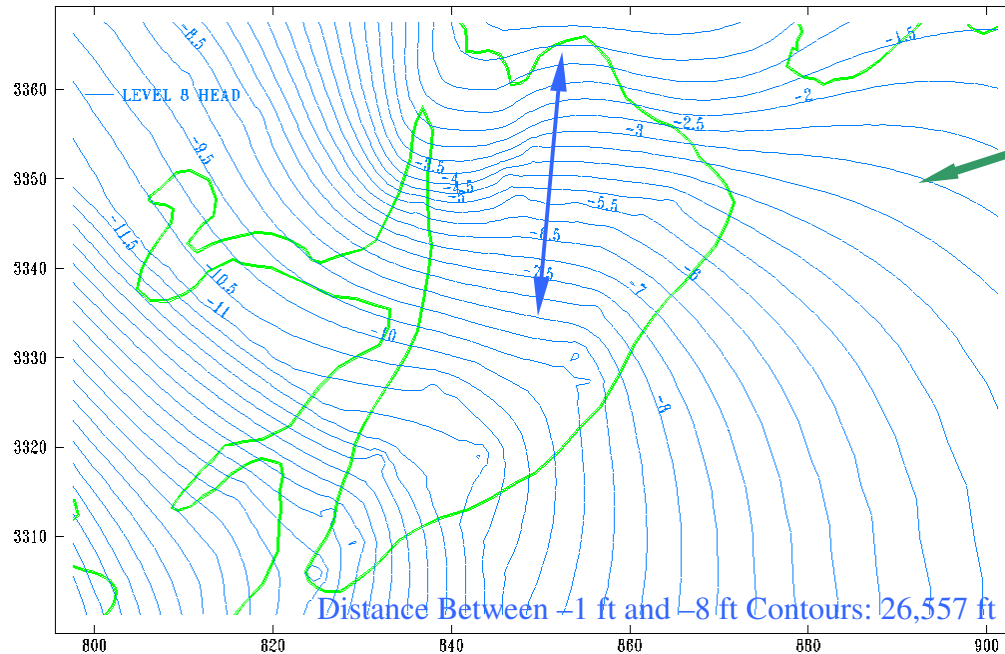
Simulate Injection at Twelve Model Nodes

Nodes Located Along the Eastern End of Hutchinson Island and South of Barnwell and Elba Islands

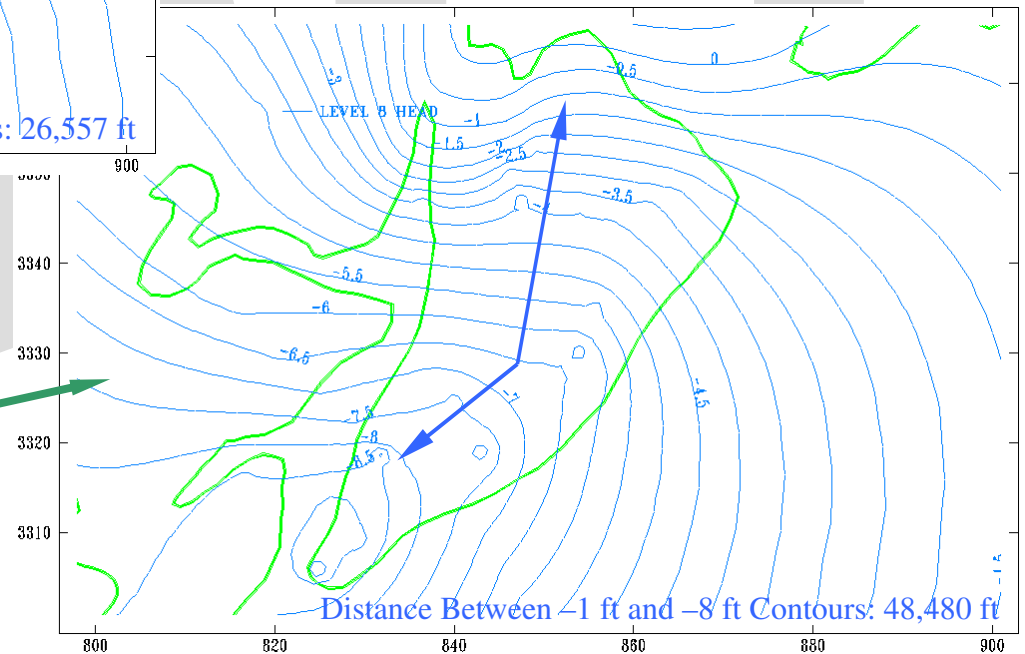




Measurement of Hydraulic Gradient



Savannah Injection at About 10 MGD

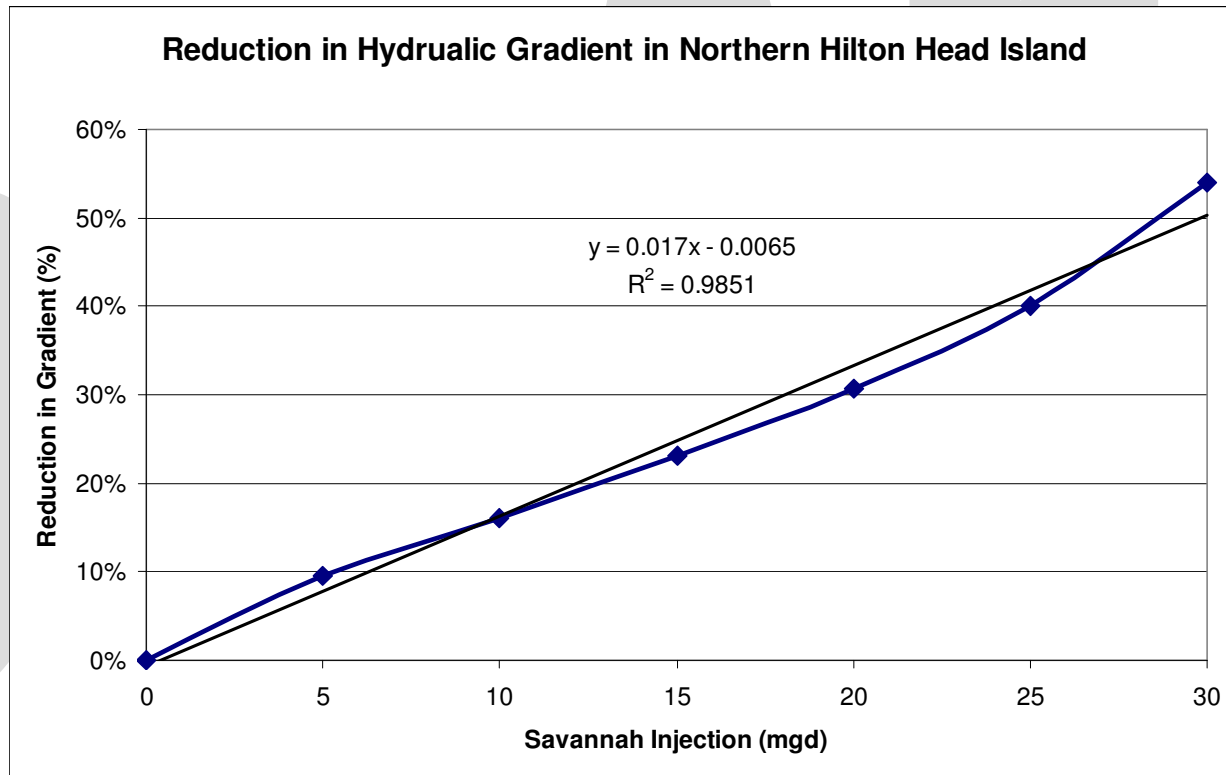


Savannah Injection at About 30 MGD



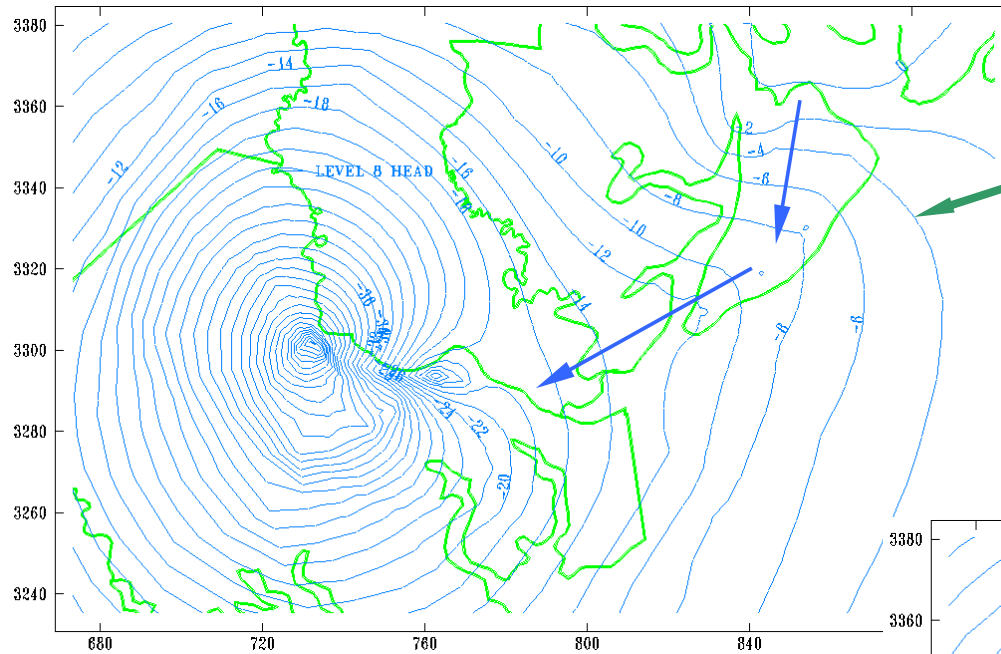
Simulation Results for Injection at Savannah

Savannah Injection (mgd)	Distance (ft) Between -1 ft and -8 ft Contours	Hydraulic Gradient	Reduction of Gradient Due to Injection	Reduction as % of Base Gradient
0	22,295	3.14E-04	0.00E+00	0.0%
5	24,667	2.84E-04	3.02E-05	9.6%
10	26,557	2.64E-04	5.04E-05	16.0%
15	29,011	2.41E-04	7.27E-05	23.1%
20	32,175	2.18E-04	9.64E-05	30.7%
25	37,143	1.88E-04	1.26E-04	40.0%
30	48,480	1.44E-04	1.70E-04	54.0%



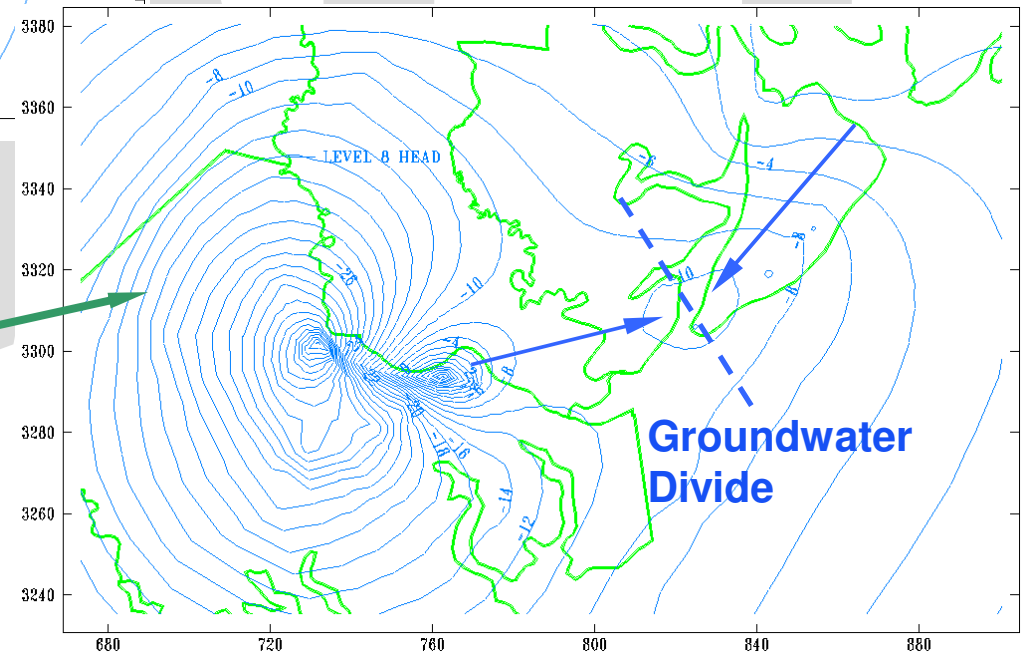


Simulated Groundwater Divide



Savannah Injection at About 20 MGD and with Pumping Throughout Hilton Head Island

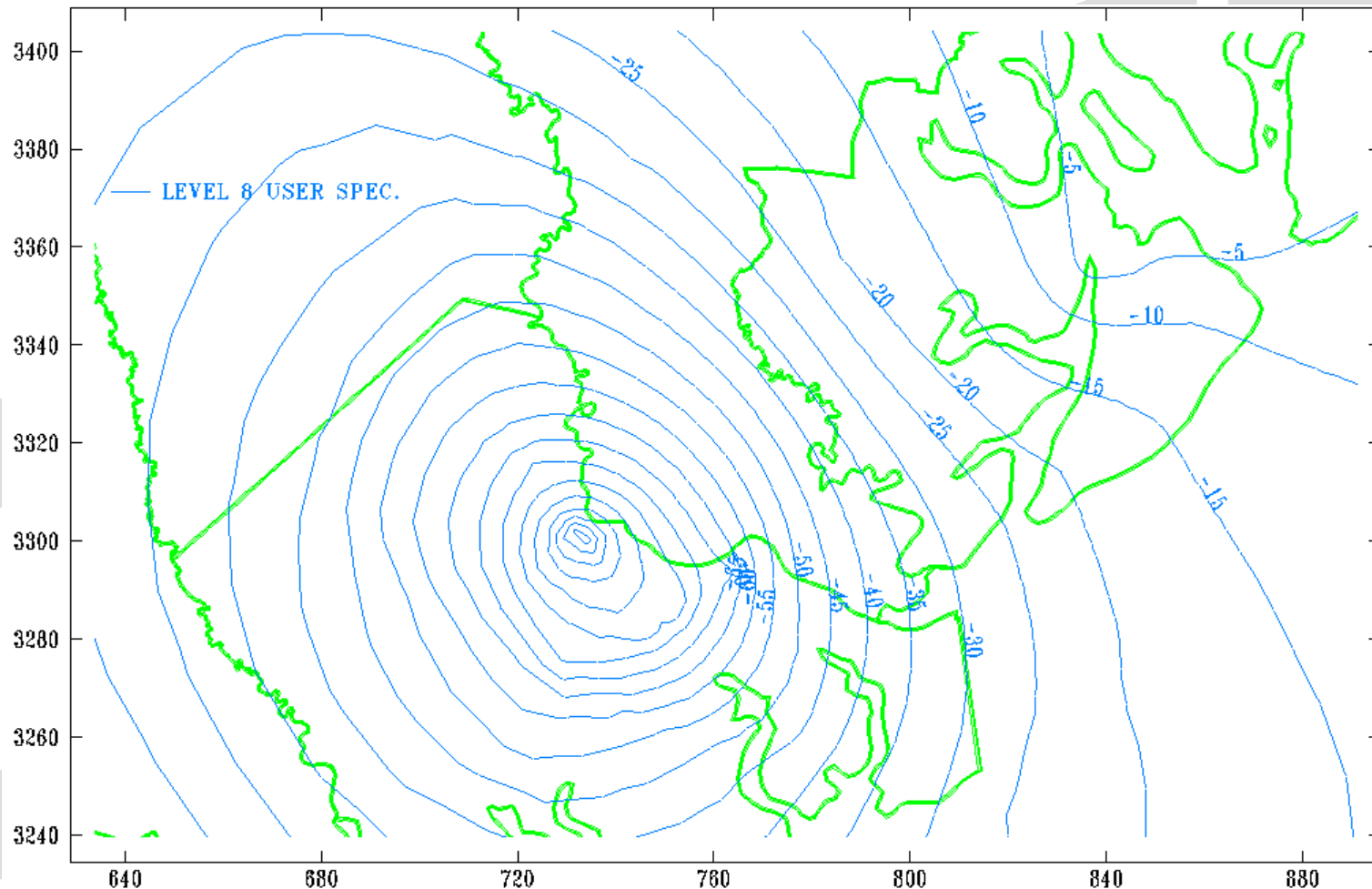
Savannah Injection at About 30 MGD and with Hilton Head Island withdrawals shifted to the south





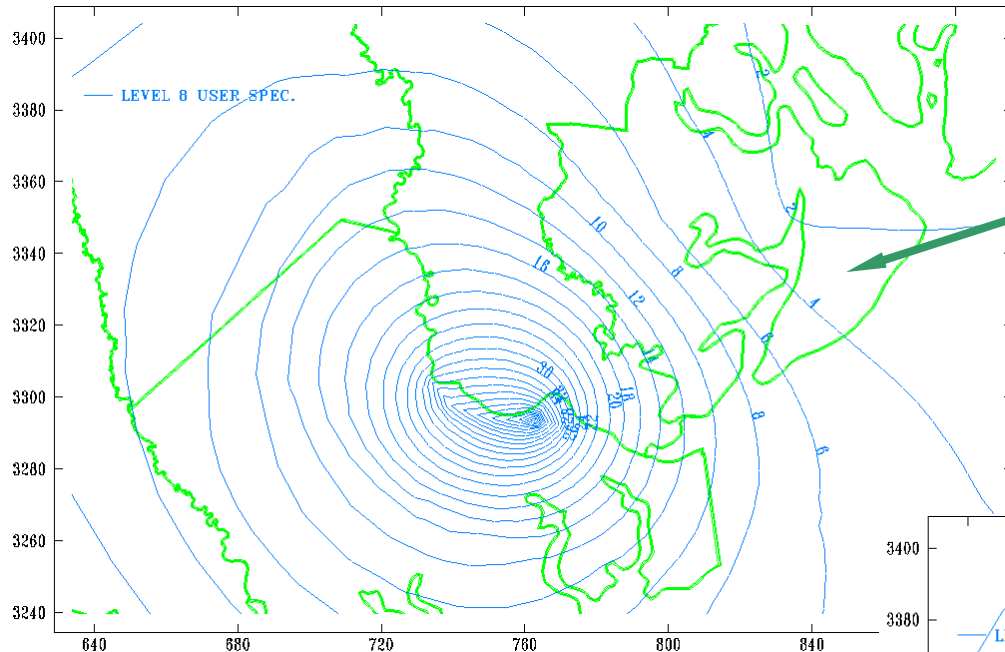
Simulated Drawdowns at Baseline Withdrawals

Withdrawals of About 8.6 MGD at Hilton Head Island, 68.8 MGD in the Savannah Area, and 17.5 MGD in the Yellow Zone





Reduced Drawdowns with Injection at Savannah



Savannah Injection at About 20 MGD

Savannah Injection at About 30 MGD

