

GROUNDWATER SUSTAINABILITY MODELING IN THE CAMBRIAN-ORDOVICIAN AQUIFER

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In an experience that may sound familiar to parts of Florida, a once “practically inexhaustible” aquifer that Iowa communities and industries rely on for water supply has come under stress. The Cambrian-Ordovician (CO) aquifer has experienced a declining potentiometric surface in certain areas due to withdrawals exceeding recharge rates. Based on input from various stakeholders, the Iowa Legislature modified regulatory requirements related to the CO aquifer in 2014 to provide a better way to protect and manage the resource into the future. New regulations included defining regulatory limits based on pumping water levels and designating two protected water source areas.

For perspective from another state dealing managing future water supply, presented will be results and observations from year-long groundwater modeling studies conducted by the Iowa Geological Survey to evaluate the sustainability of the two protected water source areas. For both areas, the evaluation was conducted in a collaborative fashion with participation from most individual water users as well as the water supply regulators—Iowa Department of Natural Resources.

A regional, statewide groundwater flow model of the CO aquifer was locally-refined in and around the protected water source areas. Modeling was conducted using Visual MODFLOW. Model development involved refining geologic surfaces, conducting a series of aquifer pump tests, and calibrating to static water level time series as well as pump test drawdowns. Future water levels, drawdowns, and regional well interference over 20 years under different growth scenarios were simulated after model calibration. Results indicate that the CO aquifer can be a sustainable water source for the protected areas into the future; however, available growth may be limited in certain parts. The groundwater model developed can now serve as a tool to help individual users in the permitting process and the regulatory authority manage the resource into the future.

PRESENTER BIO: Nathan Holt (PE), is an engineer with Drummond Carpenter, PLLC in Orlando, Florida. He graduated from UF with BS and MS degrees in Agricultural and Biological Engineering. He has experience working a variety of projects related to assessing and optimizing water resources for agricultural and groundwater systems.