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Tapping Groundwater Data: A Simple Strategy to Gain Insights on Aquifer Sustainability

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Abstract

The Water Treatment and Environmental Sustainability Departments at Cape Fear Public Utility Authority (CFPUA) have collaborated to evaluate groundwater and aquifer sustainability. Their objective is to enhance the operational efficiency of the groundwater supply wells that support the Richardson Water Treatment Plant (RWTP), a reverse osmosis facility. To maintain a reliable and sustainable groundwater supply for drinking water production, it is essential that water supply wells operate under a continuous monitoring program. Not only does this practice help in tracking water usage, it also provides data-driven insight corresponding to the current condition and future availability of an aquifer system.

This presentation will guide the audience through the methods and tools used to develop a dynamic dashboard in Power BI. It will highlight the advantages of using Power BI for data modeling, emphasizing its accessibility for users, in contrast to options that are often pricier and necessitate specialized training or expert consultation. The presented dashboard allows users to engage with high-resolution groundwater level data, collected from the RWTP well field using a network of water level data logging probes. The ability to display and customize various combinations of data visualizations will be demonstrated, while also showing that users can apply linear and statistical regressions to evaluate rates of change in groundwater levels over time. Additionally, the project incorporates Geographic Information System (GIS) technology to create contour maps, based on average monthly groundwater levels. Each unique map is chronologically sequenced and animated to exhibit the temporal evolution of the well field's interpreted water table. Audience members will experience that by visualizing the data in this manner, stakeholders can easily identify trends and anomalies, facilitating a comprehensive to focused approach for investigating operational challenges.