

## **Using slug tests to characterize hydraulic conductivity at various locations in a karstic sink-rise system: Implications for recharge mixing in the Upper Floridan aquifer**

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O'Leno State Park and River Rise Preserve in northern Florida provide the opportunity to study diffuse recharge to an unconfined karst aquifer, and to characterize the relationship between diffuse recharge, focused recharge from a sinking stream, and spring discharge. Understanding the mixing between various sources of water is important for in determining the residence time of pollutants in the aquifer, which can discharge at a spring years after entering the aquifer, as well as for karstification. At this location, the Santa Fe River flows into a sinkhole and re-emerges at the River Rise 5 kilometers down stream. While underground, the river flows through a series of conduits and emerges at the surface at several karstic windows. When the river stage is high, river water flows from the conduit into the matrix, providing a source of under-saturated water for matrix dissolution and a source for introducing pollutants into the aquifer. Previous research at O'Leno has estimated transmissivities of the Upper Floridan aquifer based on response of wells to head changes in the nearby conduit system; in addition, slug tests were performed on several deep wells screened at the level of the conduit. The recent installation of shallow wells screened at the water table has allowed research into how diffuse recharge affects the conduit system. In this study, slug tests were performed at both water table wells and conduit-level wells. The results provide a picture of the hydraulic conductivity for a range of locations and preliminary analysis indicates significant variation in hydraulic conductivities at various sites, which are associated with greater drops in specific conductivity during diffuse recharge events at wells with lower hydraulic conductivity. Further research is planned to verify these chemistry fluctuations at the water table and track the diffuse recharge as it mixes into the aquifer.