# A COMPREHENSIVE ASSESSMENT OF CHANGES TO FLOWS AND LEVELS RESULTING FROM RECLAIMED WATER AQUIFER RECHARGE USING AN INTEGRATED MODEL

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With increasing water demands, more complex modeling tools can assist engineers, scientists, and planners to improve management of water resources. One such tool is the Integrated Hydrologic Model (IHM), which dynamically couples two widely used and defensible independent models, HSPF and MODFLOW, to simulate all significant hydrologic processes in the groundwater and surface water systems. The Integrated Northern Tampa Bay (INTB) application of the IHM has been calibrated and used in West-Central Florida to address a variety of water management challenges. Recently, the model was used to evaluate alternatives for increasing recharge to the upper Floridan aquifer within the Hillsborough River watershed by applying reclaimed water to rapid infiltration basins (RIBs) and by injecting reclaimed water into upper Floridan aquifer wells. The Hillsborough River is located in West-Central Florida and is covered in part or whole by two Water Use Caution Areas indicating water resources sustainability concerns exist.

The integrated model was used to evaluate changes to aquifer water levels, springflow, and total streamflow, including surface runoff and baseflow components, for RIB and aquifer injection recharge alternatives at three locations within the watershed. Simulated aquifer water levels and springflow increased. These changes are expected to be different between an independent ground-water model and the integrated model because the integrated model dynamically generates greater evapotranspiration and surface runoff as depth-to-water table diminishes. For the simulated recharge alternatives, the integrated model estimates 50 to 75% of the total streamflow change is due to increased surface runoff. More than half of the streamflow change would be missing from the evaluation if using an independent ground water model. Compared to assessments using independent surface water or groundwater models, the use of an integrated model such as the IHM yields a more complete assessment of water management alternatives

**PRESENTER BIO:** Renee Murch is a Senior Engineer with INTERA, a global geoscience and engineering consulting firm. She has 16 years of water resources engineering experience using surface water, ground water, statistical, and integrated hydrologic models that has supported minimum flows and levels, permitting, and resolution of water resource disputes