

## **Operations and Management Model to Enhance Water Resource Sustainability and Climate Resilience in Central Texas**

The Post Oak Savannah Groundwater Conservation District (POSGCD), in collaboration with the Brazos River Authority (BRA) and The Meadows Center for Water and the Environment at Texas State University (Meadows Center), proposes to develop an **OPerations and MANagement Model (OPMAN)** that will be used by POSGCD to help establish a comprehensive and consistent set of rules, policies, and strategies to address numerous water resource management challenges. These challenges—balancing the responsibilities to conserve and protect groundwater, including the protection of private property water rights, while allowing development of groundwater to meet needs of the State—are faced by nearly every other groundwater conservation district in Texas.

The magnitude of the management challenges that POSGCD must address is amplified due to its proximity to a large growth corridor in central Texas that currently includes 5.0 million people and is expected to grow to 9.5 million people by 2070. To support this growth and meet water demands, municipalities and industries are targeting a highly-productive and climate-resilient region of the Carrizo-Wilcox Aquifer. In 2019, groundwater production from the Carrizo-Wilcox in POSGCD was 13,000 acre-feet. In 2020, the Vista Ridge Project began exporting 50,000 AFY to the City of San Antonio. In 2021, drawdown of more than several hundred feet occurred in existing wells within the POSGCD. Currently, the POSGCD has 100,000 AFY of groundwater production under permit for transport to 11 counties in central Texas. To achieve groundwater sustainability while ensuring a reliable groundwater resource for landowners within the District and for large water-supply projects, POSGCD is developing a consensus-based management program that applies the best available science.

OPMAN will be an integral component of this consensus-based management program. It will serve as a credible and defensible tool for making decisions regarding management of groundwater resources within POSGCD. Currently, the POSGCD is using a groundwater availability model (GAM) that was developed by the State (Texas Water Development Board) for the Carrizo-Wilcox Aquifer to support regional water management. The regional scale of the GAM cannot accurately inform local management decisions without significant modification. The development of OPMAN will start by reconstructing and recalibrating the portion of the GAM that covers the POSGCD (Milam and Burleson counties), enabling OPMAN to more accurately simulate local hydrogeologic conditions. OPMAN will be developed using considerably more hydrogeologic data than used to develop the GAM. This data includes numerous aquifer-pumping tests and water level measurements from over 350 Carrizo-Wilcox wells since the Vista Ridge Project began pumping (2020). The model will also provide estimates of predictive uncertainty to help evaluate risks and quantify the reliability of policy decisions. The OPMAN will also have the functionality to be readily updated as new information becomes available.

Once developed, OPMAN will be used to improve aquifer management and long-term sustainability for POSGCD groundwater users. OPMAN will be used to develop adaptive management schemes based on climate scenarios with the goal of providing flexibility in annual groundwater production volumes while achieving the desired future conditions (the regional groundwater management goals). OPMAN will also be used to evaluate potential benefits from incentivized conjunctive permits and aquifer storage and recovery facilities, and to examine the sensitivity of aquifer conditions to alternative curtailment schemes of production and permits to achieve long-term management goals. As the state need for groundwater resources increases, the role for improved techniques, such as OPMAN, to inform policy and management is critical to the long-term uses of the groundwater resources. The project will provide a process that other groundwater managers can use to meet the needs of their organization.