

A Stochastic Evaluation of the Subsidence Potential of the Hawthorn Group in south Florida as a Result of the CERP ASR System

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ABSTRACT

The proposed Comprehensive Everglades Restoration Project (CERP) represents a massive re-plumbing of southern Florida. The CERP also includes a very large Aquifer, Storage and Recovery (ASR) well system that is unprecedented in both size and scope. The CERP ASR plan includes 330 ASR wells to provide flexible water storage and water supply for Lake Okeechobee and other urbanized areas as well as important natural areas. The CERP ASR plan is well advanced and includes the development of a regional groundwater model and many other technical studies. One of the key completed studies evaluated possible impacts from large pressure changes within the Floridan Aquifer System (FAS) and the overlying Hawthorn Group confining unit.

Both analytical modeling and desktop spreadsheet evaluations were completed to provide a preliminary review of the pertinent issues. In general, the preliminary evaluation concluded that effective stress changes within the FAS and Hawthorn Group were likely but that potential impacts would probably be minor and could be controlled further through operational constraints. This paper builds upon the original work completed for the CERP to evaluate subsidence potential within the Hawthorn Group. For this paper, further subsidence evaluations have been completed using a stochastic analysis approach. Principal variables were assigned reasonable ranges based upon lab testing results and literature values so that a full probabilistic evaluation could be completed.

This paper will endeavor to discuss the original preliminary subsidence findings along with the results from the new stochastic simulations. The stochastic simulation approach will be outlined and final results presented. Then, ASR operational considerations will be discussed in order to bracket expected subsidence. Lastly, the paper will discuss and comment upon the overall findings and issues that have been identified.