

## **Assessment of Brackish Groundwater Desalination Concentrate as Potential Source Water for Hydraulic Fracturing Operations in the Eagle Ford Shale**

**Nima Ghahremani<sup>1</sup> and Lee Clapp<sup>1</sup>**

<sup>1</sup>Department of Environmental Engineering, Texas A&M University–Kingsville, Kingsville, Texas

### **ABSTRACT**

The main purpose of this study is to evaluate the feasibility of using concentrate streams from brackish groundwater desalination plants located within the Eagle Ford Shale region as hydraulic fracturing fluid. As part of this study, a time-series water quality analysis has been carried out on concentrate samples from the City of Kenedy, Texas, brackish groundwater desalination plant. The results have shown low concentrations of total dissolved solids (TDS) and problematic multivalent ions over a year of monitoring. In addition, geochemical modeling analyses are being performed to assess the down-hole potential associated with using the concentrate water as hydraulic fracturing fluid. This geochemical modeling is being performed using the PHREEQC geochemical software package and using the results of the concentrate chemical characterization studies along with the in-situ temperature and pressure. The downhole scaling potential associated with different blend ratios of flowback water and desalination concentrate are also being simulated in the model. The results of this study will provide a framework for identifying opportunities and obstacles for using brackish groundwater desalination concentrate for hydraulic fracturing operations. Lessons learned can be applied to other brackish water sources, including cooling tower blowdown from refineries and power stations. The concentrate characterization and geochemical modeling studies will also complement ongoing flowback water treatment research.