

An Update on Brackish Groundwater Mapping in Texas

Alysa K. Suydam, P.G.; Erika Mancha
Texas Water Development Board
1700 North Congress Ave., Austin, Texas 78701
512-936-9488, alysa.suydam@twdb.texas.gov

Brackish groundwater for inland desalination continues to be a water supply of interest in Texas' 50-year state water planning efforts. In the 2022 State Water Plan, groundwater desalination is expected to provide approximately 157,000 acre-feet per year of water supply by 2070. Currently, brackish groundwater desalination can supply 100,769 acre-feet per year of water.

Crucial to the development of groundwater desalination is mapping the location and estimating the quantity and quality of brackish resources in the state. A contracted study from 2003 estimated that there are more than 2.5 billion acre-feet of brackish groundwater in aquifer storage in the state, but this study was limited and narrow in scope. Since then, the Brackish Resources Aquifer Characterization System (BRACS) department at the Texas Water Development Board (TWDB) has completed 13 studies of brackish aquifers, is currently working on 3 studies, and plans to complete at least another 9 studies by 2032. Aquifer mapping projects extend knowledge of brackish resources by studying oil and gas geophysical well logs to extend the known downdip limit of the resource. Aquifers in Texas are typically mapped to 3,000 mg/L Total Dissolved Solids (TDS), but BRACS studies aim to map aquifers to at least 10,000 mg/L TDS. With the additional detail of a BRACS study, our current estimates of brackish groundwater volumes in the state surpass the 2003 estimate. From the current 13 completed studies, we estimate there is more than 3.8 billion acre-feet of brackish groundwater in aquifer storage in BRACS studied aquifers.

Building on these studies, the TWDB will map brackish groundwater production zones (BGPZs) in the major and minor aquifers of the state by 2032. BGPZs are portions of aquifers that can supply significant volumes of brackish groundwater over 30- and 50-year horizons without significantly affecting freshwater resources, existing use, and are mapped to avoid injection disposal wells and injectate. To date, 31 BGPZs in 6 aquifers have been designated in the state. Pumping models from the mapped BGPZs estimate they could provide approximately 123,000 acre-feet per year of brackish groundwater, for a 50-year total of more than 6 million acre-feet.

In addition to mapping brackish aquifers, the BRACS department has contracted studies to aid in the characterization of brackish aquifers. Contracted projects range from analyzing deep cores for properties like porosity, investigating the usefulness of existing seismic data in mapping aquifers, groundwater comingling investigation, developing a guidance document on drilling and logging an ideal exploratory brackish groundwater well, and developing tools to map Class II disposal injectate. These contracted projects either aid in characterizing brackish groundwater or aim to help stakeholders better understand the resource.