



Desalination: Seawater

With a 367-mile coastline along the Gulf of Mexico, Texas has access to an almost limitless, drought-proof supply of seawater. Desalination is the process that reduces total dissolved solids (~35,000 milligrams per liter) in seawater to produce drinking water. However, the relatively high cost of seawater desalination when compared to traditional water supplies poses a challenge to implementing the first large-scale seawater desalination facility in the state.

Seawater Desalination Initiative

In 2002, the Texas Water Development Board (TWDB) established the Seawater Desalination Initiative to develop a proposal for building a large-scale seawater desalination plant. TWDB efforts began by funding feasibility studies in three locations: City of Brownsville, City of Corpus Christi, and City of Freeport.

Demonstration Projects in Texas

Next, the TWDB funded two pilot-scale studies: one at the Brownsville Ship Channel conducted by the Brownsville Public Utilities Board and the second on South Padre Island conducted by the Laguna Madre Water District.

The pilot plant study concluded that desalinating seawater was technically feasible, and the proposed scope was reduced to a 2.5-million-gallon-per-day (2,800 acre-feet per year) plant with an estimated cost of \$22.5 million. The TWDB requested \$9.5 million from the Texas Legislature to help construct this smaller project, but did not receive the funding. The project was placed on hold, pending procurement of funds.

South Padre Island was not one of the initial three sites selected for feasibility study by TWDB. However, Laguna Madre Water District completed feasibility, pilot plant, and environmental studies for its project. The proposed 1-million-gallon-per-day (1,120 acre-feet per year) desalination facility would cost an estimated \$13.2 million. In May 2011, voters authorized the district to issue bonds to finance the construction of a seawater desalination facility, but the district placed the project on hold while they explored indirect potable reuse.

State Regulations

In 2015, the 84th Texas Legislature passed House Bill 2031 relating to the diversion, treatment, and use of seawater. The legislature also passed House Bill 4097 relating to the use of seawater desalination for industrial purposes. The overall goal of the legislation was to streamline and expedite the

regulatory process associated with seawater desalination. In response, the Texas Commission on Environmental Quality created a new permitting process and made rules effective December 8, 2016.

Seawater Desalination in Texas

Texas does not have an operational seawater desalination facility but has made progress toward this goal in recent years. Since 2024, the TWDB issued three loans for seawater desalination projects: \$222 million and \$535 million to the City of Corpus Christi and \$10 million to the Laguna Madre Water District. The 2022 State Water Plan lists seven recommended water management strategy projects located throughout the Gulf Coast for seawater desalination; most of these proposed projects are in the Corpus Christi area. The Texas Water Fund, created in 2023, is now available to fund seawater desalination projects.

Biennial Report on Desalination

In 2003, the 78th Texas Legislature passed House Bill 1370 directing the TWDB to undertake or participate in research and demonstration projects to advance seawater desalination. The TWDB prepares a biennial report on the progress of seawater desalination activities in the state and submits it to the Texas Legislature no later than December 1 of each even-numbered year (Texas Water Code §16.060). The 2024 biennial report on desalination is the 11th report in series and marks the completion of 22 years toward advancing seawater desalination in Texas. The biennial reports are available at www.twdb.texas.gov/innovativewater/desal/docs.asp#title-01.

Desalination in the 2022 State Water Plan

In the 2022 State Water Plan, three regional water planning groups (regions H, M, and N) include seawater desalination as a water management strategy. If these strategies are implemented, seawater desalination will produce about 192,000 acre-feet of new water supply per year by 2070. This constitutes about 1.5 percent of all recommended water management strategies. Regional water planning groups propose implementing seven seawater desalination projects, which could lead to seven new seawater desalination plants.

For more information, visit www.twdb.texas.gov/innovativewater/desal, or contact Erika Mancha at erika.mancha@twdb.texas.gov, 512-463-7932 or William Delgado Ph.D., at william.delgado@twdb.texas.gov, 512-936-9488.