

## Water Desalination in Texas

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Water management has long been a key issue for Texas. With a population expected to reach almost 46 million by the year 2060, demand for water projected to increase by almost 27 percent, and existing supplies expected to decline by about 18 percent, Texans have had to plan far in advance to sustain their communities, farms, businesses, industries, and environment. The 2007 State Water Plan, which examines Texas' projected water demands and resources through 2060, shows that conventional strategies such as water conservation, reservoirs and groundwater will continue to be robust staples of the state's water supply. However, the state's future water portfolio will also include a growing share of technology-based water supplies such as desalination and water reuse.

Texas is ideally suited for desalination. It has more than 360 miles of coastline along the Gulf of Mexico with access to a seemingly endless supply of seawater. Moreover, approximately two-thirds of Texans live within 150 miles of the coast. Inland, there are more than 30 aquifers spread across the state with each containing an ample supply of brackish groundwater. According to a 2003 estimate in a Texas Water Development Board (TWDB) study, this inland ocean of brackish groundwater totals more than 2.7 billion acre-feet.

Currently, there are approximately 100 public water systems in Texas using desalination to treat brackish sources for a total of nearly 80 million gallons per day of installed capacity. El Paso leads this list with its flagship facility, the 27.5 million-gallons-per-day Kay Bailey Hutchison Brackish Groundwater Desalination Plant. However, there are no seawater desalination plants as yet in Texas. But this may soon change.

In recent years, there has been a growing interest in seawater desalination, largely due to Governor Rick Perry's vision for developing a drought-proof supply for Texas by turning seawater into potable water. In an April 29, 2002, address in San Antonio directing the TWDB to recommend a large-scale seawater desalination demonstration project, he said "To me it is not a matter of whether saltwater will one day be used as an abundant source for public use, but when and where. As a people, we must have the courage to look into the future and invest today for a better tomorrow. There is no greater untapped source of water than the ocean water that Texas can easily access." It has since become the cornerstone of Governor Perry's water policy initiative.

Thanks to a series of legislative appropriations now totaling more than \$4.7 million, Texas has been methodically moving toward fulfilling Governor Perry's vision. After conducting three feasibility studies for potential seawater desalination projects, TWDB awarded a grant of \$1.3 million in 2006 to the Brownsville Public Utilities Board to perform a seawater desalination pilot plant study in Brownsville (the Lower Rio Grande Regional Seawater Desalination Pilot Plant).

Located on the Brownsville Ship Channel, the Brownsville pilot plant is the latest step toward developing the first seawater desalination facility in Texas. The study includes conventional media-filtration, three membrane-based pre-treatment alternatives and two reverse-osmosis membrane types. Results to date suggest that construction of a full-scale seawater desalination plant in southern Cameron County where Brownsville is located could begin as early as 2010.

The state is also funding (\$231,000) a smaller scale pilot study on neighboring South Padre Island. The open ocean intake pilot study will be completed in late 2008 and if found feasible will result in a 1 million-gallons-per-day plant that will supply water to the residents of the island.

Concurrent with funding for seawater desalination studies, the Texas Legislature also appropriated funds to TWDB to implement a brackish groundwater desalination initiative. The goal of this initiative is to develop tangible examples or models of brackish groundwater desalination that illustrate the use of innovative, cost-effective technologies and offer solutions to practical issues. A total of \$2.12 million has been awarded to nine separate entities to implement research studies and/or demonstration projects to facilitate the development of brackish groundwater supplies in the state.

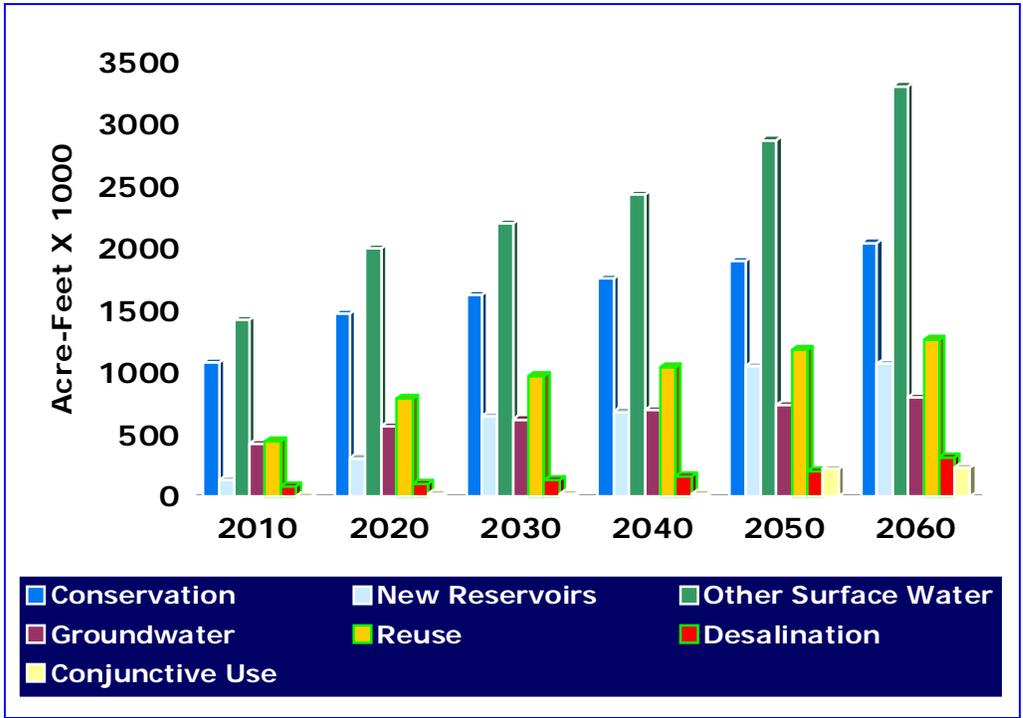
On the regulatory front, the legislature has taken a number of steps to ease the burden on operators of desalination plants. An example of this is the push to make it easier to dispose concentrates in underground injection wells.

The state has also been active on the educational front. With assistance from organizations such as the International Desalination Association and the South Central Membrane Association, it has been active in educating water suppliers and planners on the use of membrane filtration for water reuse and desalination. Through conferences and technical forums, the water planning community has become better informed about the benefits and challenges of water desalination technology. In recognition of the growing importance of and strides made in desalination, the Texas House and Senate designated March 7, 2007, as Texas Desalination Day.

All of these efforts may help explain, at least in part, the growing importance of water desalination strategies on the state water planning process. According to the 2007 State Water Plan, 3.5 percent of the new water supplies to be developed by 2060 will be provided by desalination (see graph below). Although modest compared to other strategies (for example, water reuse accounts for 14 percent of the portfolio), desalination strategies increased by 74 percent from the previous State Water Plan published in 2002.

As Texas begins the next planning cycle leading to the 2012 State Water Plan, growing uncertainty about the impact of climate change, compounded by difficulties with and the length of time required to develop conventional water supplies such as reservoirs, will likely result in even greater consideration of the relatively more expeditious water supply options presented by desalination. These options will become particularly important if substantial progress is made toward lowering the energy requirements of water desalination.

The future of desalination in Texas looks promising, but some critical challenges lie ahead. For example, the Brownsville Seawater Desalination will need to secure financial assistance to construct a full-scale plant in 2010. At the end of this year, TWDB will prepare a progress report that will identify the amount and type of financial assistance that might be needed to implement the Brownsville project. The Texas Legislature, which convenes in January 2009, will have another opportunity to gage the importance of this initiative and adopt measures to fulfill Governor Perry’s vision of new and abundant drought-proof supplies from seawater desalination.



**Summary of Recommended Water Management Strategies in the 2007 State Water Plan**

More information on desalination activities in Texas can be found on TWDB’s Web site at <http://www.twdb.state.tx.us/iwt/desal.asp>.

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