
Seawater Desalination in Texas

Seawater desalination is the process of removing salt from ocean water to produce fresh water. Given its high costs and potential environmental impacts, it should complement, rather than replace, investments in sustainable water management strategies such as water conservation, reuse, and reducing water loss.

Seawater Desalination At A Glance

- Texas currently doesn't have an operating seawater desalination plant, however 8 such facilities are currently recommended in the state water plan.
- Out of the 8 recommended facilities, 5 are proposed to be located in Corpus Christi.
- Together, these 8 proposals would provide less than 4% of the new water supplies Texas plans to develop by 2080 (compared to approximately 30% from water conservation)
- The 8 recommended seawater desalination projects are estimated to cost roughly \$11.4B in public funding, nearly 4 times the \$2.8B estimated for 7 proposals in 2021
- Two additional seawater desalination proposals – the Bayshore Desalination Facility near Galveston Bay and the RGV-Desal project in South Padre Island – are privately funded and aren't expected to rely on public dollars at this moment.
- About half of desalinated seawater becomes fresh water and the other half becomes hypersaline concentrated brine, which must be disposed of; the least expensive option is to discharge brine into nearby bays and estuaries.
- The safest way to dispose of concentrated brine is to discharge it 3 miles offshore into the Gulf, where stronger currents can dilute it easily. While it can add to upfront project costs (e.g., one proposed project estimated about \$264M for offshore discharge infrastructure), it helps better protect coastal ecosystems, communities, and economies.
- In addition to discharge impacts, pulling in seawater for treatment can harm marine life as larger organisms can become trapped on intake screens (impingement), while smaller organisms can be drawn into the system (entrainment).
- Texas Water Development Board (TWDB) makes decisions about state funding for seawater desalination facilities, and Texas Commission on Environmental Quality (TCEQ) is responsible for permitting both the diversion of seawater and the discharge of brine, along with any wastewater from the plant.
- Desalinated seawater is expensive: the 2026 TWDB regional water plans estimates range from about \$2,300 to over \$10,000 per acre-foot once full project costs are included (about \$7 to \$32 per 1,000 gallons).
- Seawater desalination is energy-intensive and can require about 3,000-4,300 kWh per acre-foot: if all 8 recommended projects were built, that's enough energy to supply the annual electricity needs for more than 100,000 Texas homes.

Coastal Impacts

- Texas bays and estuaries produce 100M+ pounds of seafood products each year, worth \$150-\$250M annually.
- Saltwater recreational fishing generates an estimated \$2B per year in Texas.
- The Texas coast is a biodiversity hotspot that attracts over 8M visitors and generates \$5B annually from wildlife tourism alone.
- Because Texas barrier islands limit water circulation, brine discharged into bays and estuaries can accumulate and persist in sensitive habitats, forming “dead zones.”
- Without proper regulation, brine discharges can alter salinity in bays and estuaries in ways that can harm critical habitat for many species, including the federally endangered Kemp’s Ridley sea turtle, as well as fish, oysters, crabs, and shrimp.
- Nearly 7M Texans live in coastal counties, and hundreds of thousands work in fishing, tourism, shipping, and recreation industries that depend on healthy bays and estuaries.
- Unregulated seawater diversion and brine discharges can disproportionately affect Indigenous communities who depend on healthy coastal ecosystems for livelihoods, food, and cultural practices.

Regulatory Gaps

- Texas lacks enforceable surface water quality standards for salinity, requiring only that “salinity gradients in estuaries must be maintained to support attainable estuarine dependent aquatic life uses” (TAC 30 §307.4(g)(3)).
- Texas allows seawater diversion from bays and estuaries, where marine life can be harmed through impingement and entrainment .
- Seawater desalination permits for discharges often rely on site-specific reviews instead of a comprehensive assessment of potential impacts across entire bays and estuaries.
- Neither TCEQ permitting nor TWDB funding criteria currently require seawater diversion and brine discharge to be located at least 3 miles offshore in environmentally suitable Gulf zones, despite Texas-specific scientific recommendations that resulted from previous legislative action.
- Current permitting doesn’t require applicants to demonstrate how brine discharges from multiple seawater desalination facilities could collectively raise salinity over time.

Proposed Solutions

- Require seawater desalination proposals seeking state funding to clearly demonstrate that other sustainable strategies – like water conservation, recycling, and loss mitigation – have been fully pursued and found insufficient to meet water demand.
- Prohibit seawater diversion from and brine discharge into Texas bays and estuaries.
- Direct TCEQ to establish enforceable surface water quality standards for salinity to protect bays and estuaries from concentrated brine discharges.

- Require seawater diversion and brine discharge to be located at least 3 miles seaward into the Gulf in environmentally suitable zones identified by scientists.
- Limit state funding eligibility to facilities proposing seawater intake and brine discharge at least 3 miles offshore in environmentally suitable zones identified by scientists.
- Direct TCEQ to set strict permitting standards for design of water diversion systems to prevent impingement and entrainment of marine life.
- Require independent science-based environmental review for any proposed discharge, including analysis of site-specific salinity conditions, baseline ecological studies, and evaluation of cumulative impacts.
- Establish and fund long-term monitoring and adaptive management for seawater desalination in Texas.

Seawater Desalination Projects Recommended in the 2027 State Water Plan

Project Name	Project Sponsor	Water Supply Amount (ac-ft/year)	Unit Cost (per ac-ft/year)	Capital Cost
Barney Davis (Region N)	City of Corpus Christi	33,627	\$3,705	\$582,000,000
Inner Harbor Seawater Desalination (Region N)	City of Corpus Christi	33,604	\$3,786	\$1,233,812,464
La Quinta Seawater Desalination (Region N)	City of Corpus Christi	44,806	\$3,460	\$1,141,000,000
Harbor Island Seawater Desalination (Region N)	Port of Corpus Christi Authority	112,014	\$3,616	\$3,456,000,000
La Quinta Channel Seawater Desalination (Region N)	Port of Corpus Christi Authority	33,627	\$3,452	\$844,000,000
GCWA Coastal Desalination (Region H)	Gulf Coast Water Authority (GCWA)	22,400	\$2,292	\$283,297,581
Laguna Madre Water District Seawater Desalination (Region M)	Laguna Madre Water District	5,600	\$3,821	\$127,001,000
LCRA - Seawater Desalination (Region K)	Lower Colorado River Authority (LCRA)	30,000	\$10,281	\$3,559,691,000
Total water supply amount: 315,678 ac-ft/year			Total cost: \$11,226,802,045	