

# WATER MARKET INSIDER

Q3, 2022

## GROWING WATER DEMAND, DROUGHT AND INCREASING WATER DEVELOPMENT COSTS

WHY TEXAS NEEDS A MORE ROBUST SURFACE WATER MARKET

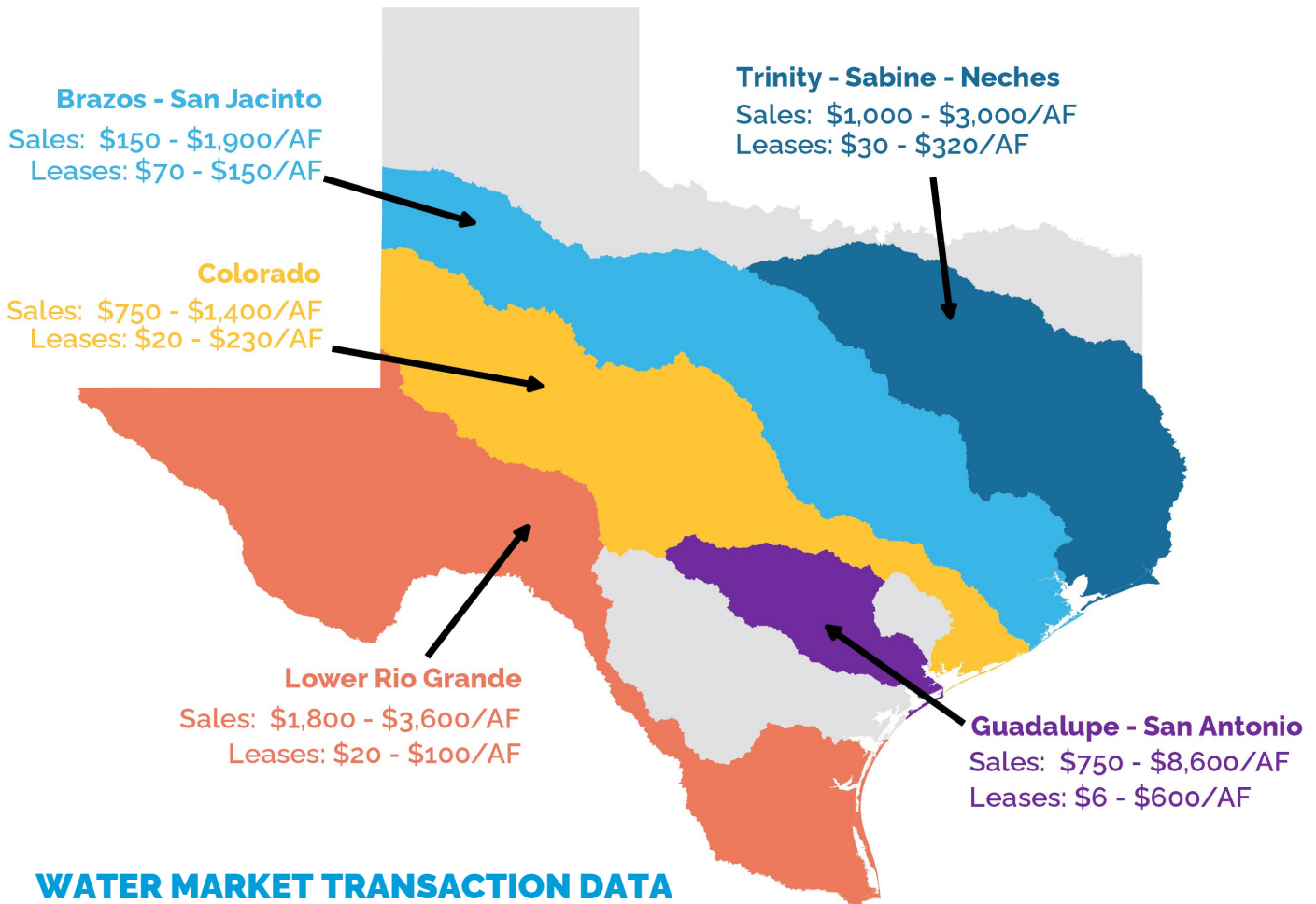
Outside of the Lower Rio Grande, the market for surface water rights in Texas has experienced limited growth in recent years. However, a number of the dynamics that have driven an expansion in water right trading in other states are present in Texas. This Water Market Insider explores the recent history of surface water right trading in five selected Texas regions and describes several of the factors that could lead to increased trading in the future.

Pennybacker Bridge – Lake Austin

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**Figure A: Surface Water Lease and Sale Pricing by River Basin**



**WATER MARKET TRANSACTION DATA**

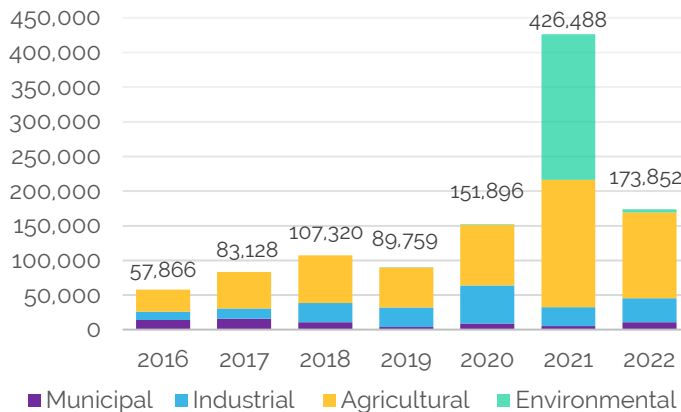
Prior to the 2011 drought, surface water markets in Texas had been relatively dormant, with transaction activity concentrated in regions with unique political, economic, and environmental conditions. The Lower Rio Grande River watershed (LRG) is one such region with higher water right trading activity since the establishment of the Rio Grande Regional Water Authority (RGRWA) in 2009. The RGRWA helps manage annual water right allocations and acts as a clearinghouse to bring buyers and sellers together, which encourages water market activity. In other Texas basins, water right trading has been less frequent though the water market is becoming a more commonly used water management tool across the state.

**Figure A** summarizes pricing data for leases and sales throughout Texas. Pricing is summarized by market region. Each region is based on one of Texas' major river systems including the LRG, Colorado, Guadalupe, Brazos, and Trinity Rivers.

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**Figure B: Annual Volume of Surface Water Traded**



**Figure B** shows the volume of surface water traded from 2016 to present, including both leases and sales. Overall market activity was highest in 2021 with over 400,000 AF leased and over 11,200 AF in sales. Overall trading activity in Texas is lower than states such as California which consistently exceeds 500,000 AF leased annually with nearly 1 million AF leased in 2020 and 2021.

## LEASING ACTIVITY

WestWater's data on surface water trading shows that leasing activity has been steadily increasing since 2016. 50,000 AF of water was leased in 2016, in 2020 the volume leased increased to roughly 140,000 AF, in 2021 it jumped to over 400,000 AF, and as of July 2022 around 170,000 AF was committed under a water lease. The median transaction volume for water right leases is 100 AF, though transaction volumes have been as high as 210,000 AF.

The increase in leasing activity has mostly been driven by growing demand from environmental and agricultural users. Environmental leasing activity has been expanding with transactions concentrated in the Colorado, Trinity, and Guadalupe River basins. In 2021, the total volume leased increased substantially due to a single year environmental lease of 210,000 AF in the Guadalupe River market region. Agricultural leasing activity is largely driven by LRG transactions, which year-over-year have increased in six out of the seven years between 2016 and 2022 likely due to dry conditions. LRG agricultural leases peaked in 2021 at 190,000 AF leased.

Prices vary considerably by region and other water right characteristics, like the water right priority date. Overall lease prices range from \$6 per AF for a nonconsumptive water right to \$600 per AF for small volume leases to the oil and gas industry.

## River Authority Contract Re-assignments

In Texas, quasi municipal entities known as River Authorities play a major role in surface water markets. A River Authority is a multi-county water district that manages and controls a large portion of the state's water rights. The boundaries of a River Authority usually encompass the watershed of a river. In the Brazos River Basin, over 30% of the surface water permitted is owned by the Brazos River Authority (BRA) and in the Guadalupe and Colorado river basins the Guadalupe-Blanco River Authority (GBRA) and the Lower Colorado River Authority (LCRA) own around 65% of the water rights in their respective basins.

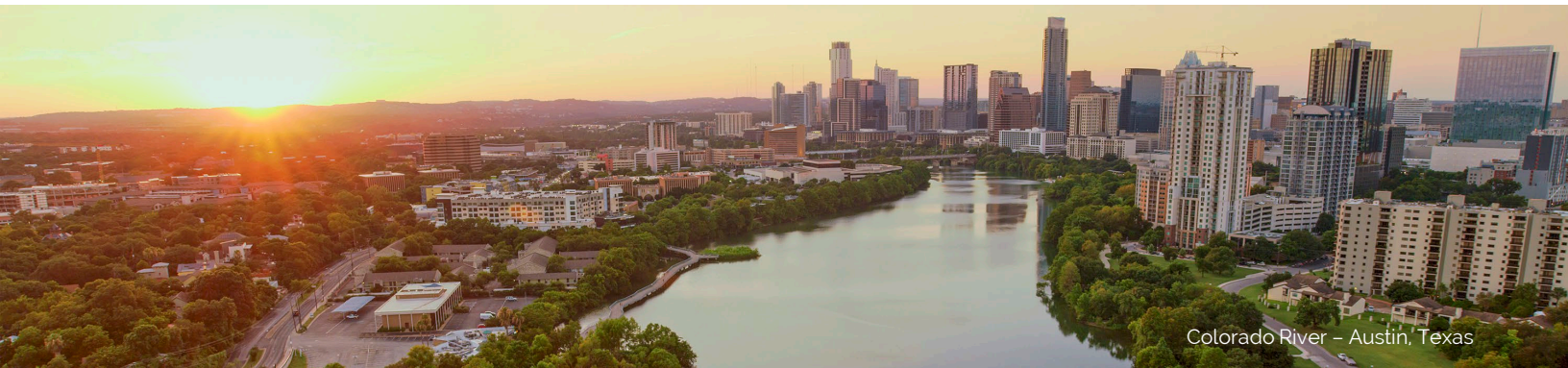
River Authorities enter water supply contracts with entities within their boundaries. River Authority water supply contracts are usually long-term, lasting 40 years or more. Contract holders are required to make annual payments based on a \$/AF system rate and the volume of the contract regardless of whether they use the water or not.

Under some circumstances, River Authority contract holders can temporarily re-assign their contract to another entity at any rate or payment structure they choose. As new contracts become less and less available, temporary contract re-assignments have become a more common type of water transaction.

BRA non-interruptible water contracts (known as firm contracts) are trading with increasing frequency. From 2016 to present over 160,000 AF of BRA firm contracts have been traded. BRA firm contracts are usually traded for short terms with most agreements lasting only one year or less, though longer term agreements, between three and ten years, have also occurred. Industrial users are the most common buyer of re-assigned BRA contracts. Prices range from the prevailing BRA system rate, which is currently \$83 per AF per year up to \$150 per AF per year. Sellers are generally municipalities who own large BRA contracts based on their anticipated future demand that are incentivized to sell the contract temporarily to avoid having to pay for unused water.

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Colorado River – Austin, Texas

#### SALE ACTIVITY

Permanent water right sales activity is more sporadic and shows less of an increasing trend than what is observed from leasing data. The total volume sold has ranged from around 1,000 AF in 2019 to 14,500 AF in 2020. The median transaction volume for water right sales is around 105 AF, though transactions as large as 9,700 AF have been completed. Municipal and Industrial users purchase water rights more often and in higher volumes than agricultural users. Municipal and industrial buyers generally purchase high priority water rights or water rights with storage capacity. Agricultural transactions involve both high and low priority water rights and are usually associated with a lower value per AF.

Surface water right transaction unit prices for permanent water right sales also vary considerably by location. Low-priority (less reliable) agricultural water rights have sold for as low as \$150 per AF and high-priority (highly reliable) water rights have been purchased by municipal users for as much as \$8,600 per AF.

#### Water Markets and the Environment

Water markets are an effective tool in protecting endangered species and preserving ecological habitats. While these types of transactions have only recently become more common in the Texas surface water market, groundwater rights have been purchased for environmental uses in the Edwards Aquifer Authority (EAA) region since 2014. Environmental water right purchasing programs known as the Voluntary Irrigation Suspension Program Option (VISPO) and Aquifer Storage and Recovery (ASR) program have played an important role in protecting the endangered species native to Comal Springs, including the Texas Blind Salamander.

Surface water right transaction activity to support environmental flows is likely to increase in the future as NGOs and other entities use voluntary, market-based tools to improve habitat conditions. According to various state and national studies, lack of freshwater inflows poses an ongoing threat to Texas Bays and estuaries.<sup>1,2</sup> Declining oyster harvests and high mortality rates among endangered species like the whooping crane have been attributed to diminished freshwater inflows during periods of drought.<sup>3</sup> Several nonprofit organizations, including The Nature Conservancy and Texas Water Trade have utilized water right leasing to improve environmental flows and protect endangered species. For example, in 2022 water was purchased for instream purposes to support threatened and endangered wildlife in Matagorda and Galveston Bay.<sup>4,5</sup>

<sup>1</sup>[Norman D. Johns, Bays in Peril: A Forecast for Freshwater Flows to Texas Estuaries](#)  
<sup>2</sup>[The Texas Water Development Board \(TWDB\) closes tracks and monitors inflows as a way of gauging the "character and health" Texas' bays and estuaries. TWDB, Freshwater Inflow Needs of Texas Estuaries](#)  
<sup>3</sup>[Texas Environmental Flows Initiative, Final Report – March 2019](#)  
<sup>4</sup>[Texas Living Waters Project, Newly Launched Matagorda Bay Ecosystem Assessment can Inform conservation Efforts](#)  
<sup>5</sup>[Ashley Glass, Texas Nonprofits Buy Water in Bulk to Help Fight Off Drought Conditions](#)

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#### CHANGING CONDITIONS

The following sections provide a brief overview of the factors that are influencing the market for surface water rights throughout the state.

**GROWING WATER DEMAND:** Texas is one of the fastest growing states in the nation. When compared to all US states, Texas had the highest total population increase and the 7th largest percent increase from 2020 to 2021.<sup>6</sup> This growth is expected to continue and will result in commensurate increases in water demand. Texas' population boom, which has created demand increases in municipal and industrial sectors, has exacerbated supply shortages during times of drought. Population projections estimate an increase from 29 million today to around 51 million by 2070.

**Figure C: Statewide Supply and Demand Projections**

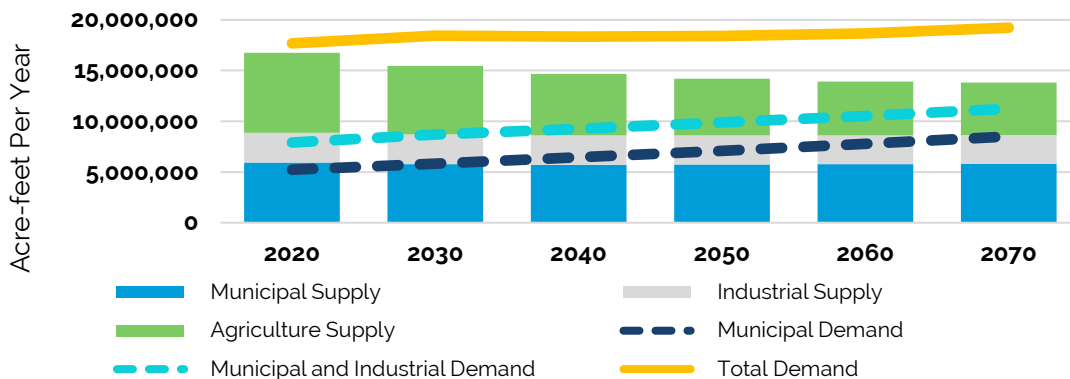


Figure C illustrates water supply, and water demand projections developed by the Texas Water Development Board (TWDB).<sup>7</sup> According to the TWDB's projections, existing supply will be insufficient for municipal and industrial uses starting in 2030, whereas irrigation and livestock use are already faced with water supply shortages affecting output.

**DROUGHT:** Surface water availability in Texas is highly variable. The state has historically experienced periods of drought followed by wetter conditions and flooding in some areas.

**Figure D: US Drought Monitor Conditions for Texas, 2000 – Present**

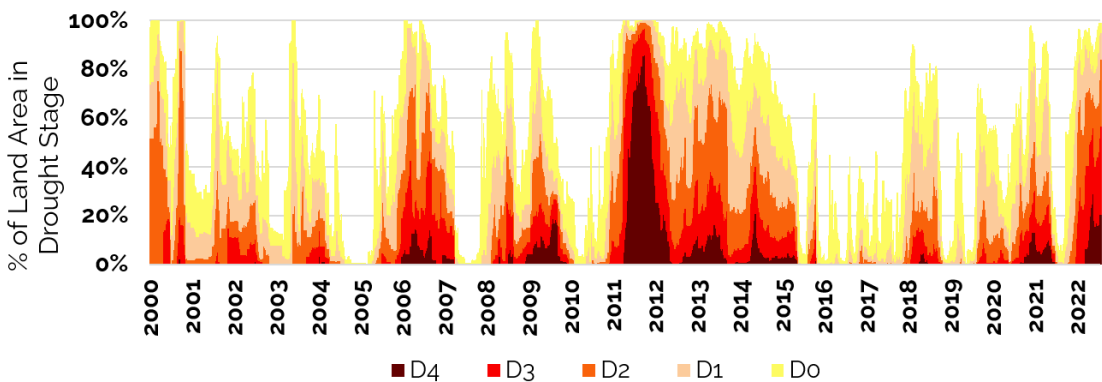


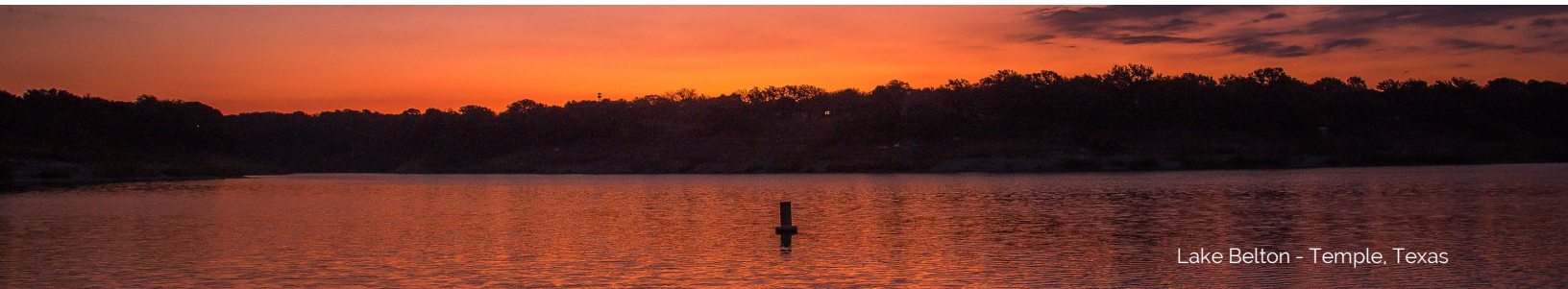
Figure D illustrates data from the United States Drought Monitor that displays the percentage of the state's land area classified as stage 0 to 4 drought from 2000 to present. In recent history the worst drought occurred from 2011 to 2015. In July 2022, around 60% of the state was in a severe drought (stage 3-4).

<sup>6</sup>Desert News, the fastest growing states in the U.S. are all out west. Retrieved

<sup>7</sup>Texas Water Development Board, 2021 Regional Water plan Population & Water Demand projections

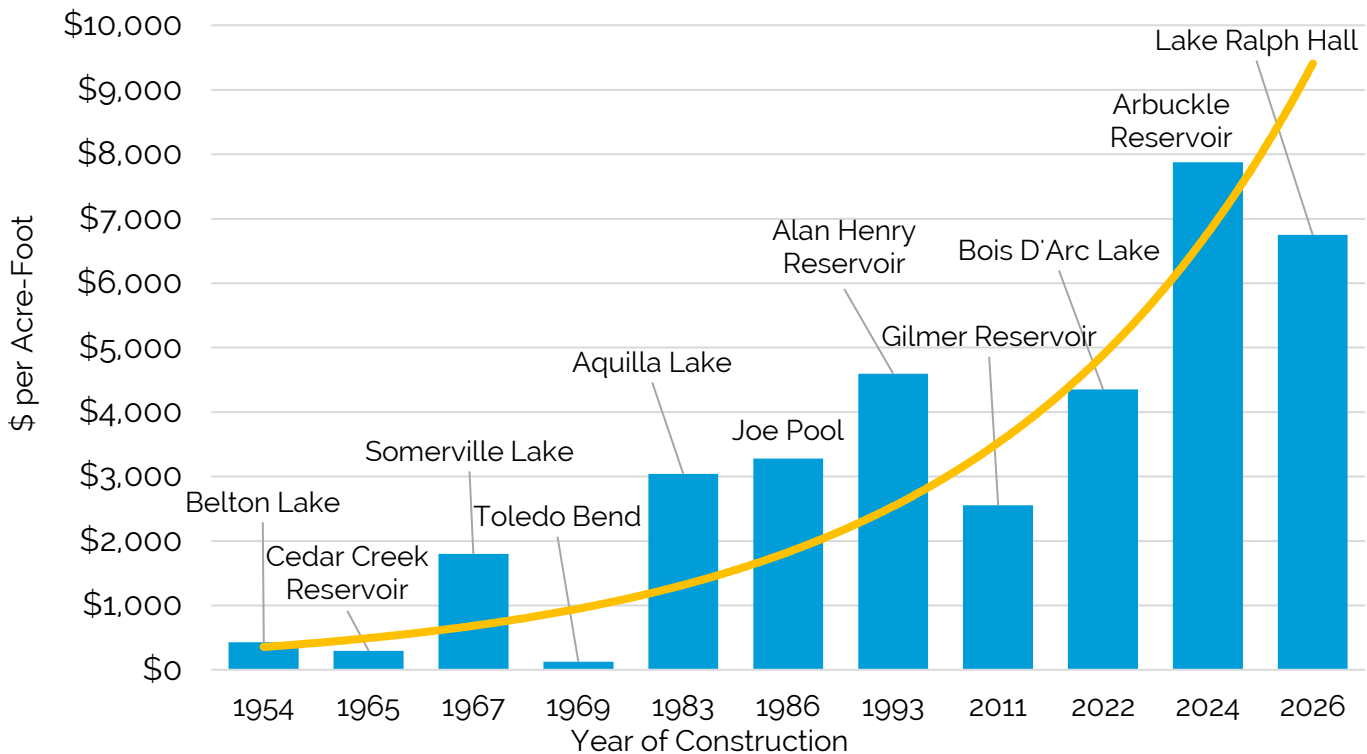
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Lake Belton - Temple, Texas

**Figure E: Costs to Build Reservoir Storage**



**HIGH COST OF NEW WATER SUPPLY:** To meet the increasing demand associated with growth, Texas water providers have traditionally invested in the development of "new" supplies by constructing reservoirs or developing groundwater. However, the cost of developing these projects is increasing.

**Figure E** shows the cost per acre-foot of storage for reservoirs completed from the 1950s to today. Prices were adjusted to reflect 2022 dollars using the Universal Consumer Price Index (CPI-U). Starting in the 1970s environmental regulation began to drive up construction costs. More recently, the rising cost of land, labor, and materials have escalated the price of reservoir development to over \$7,500 per AF of storage.

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#### TEXAS WATER RIGHT REGULATION AND MANAGEMENT

The management and regulation of surface water rights in Texas has also shaped how surface water market activity has developed. Virtually all available surface water in the state has been appropriated, with new water rights being issued only in unique circumstances and usually for less reliable supplies. As a result, surface water rights are effectively capped and new surface water users are limited to either purchasing a raw water contract or buying existing water rights. In addition, there are ongoing discussions between the Texas Sunset Advisory Commission and Texas Commission on Environmental Quality (TCEQ) regarding enforcement of TCEQ's water right cancellation policy for unused water rights. If more strict enforcement is applied, it will likely incentivize market participation among water rights holders that have been using less water than allowed by their water rights.<sup>8</sup>

In response to ongoing and projected water shortages, water users have had to adjust to a changing regulatory environment surrounding water right reliability. Priority calls on water rights during droughts are becoming more common throughout Texas. For example, in response to a priority call from Dow Chemical, the owner of a 1942 priority water right, junior water rights along the Brazos were curtailed in 2009, 2011, 2012, 2013, and 2018.<sup>9</sup>

#### CONCLUSION

The changing conditions described above are likely to result in increased surface water right market participation in Texas, as seen in other states. Water markets allow for the re-allocation of water supplies to support growing demands and mitigate the impact of drought at a relatively low cost within the existing regulatory framework. Expanded water markets can help to minimize both economic disruptions and environmental effects associated with increasing water scarcity and reduce or delay investments in increasingly expensive water supply projects. 🌍



Lake Bardwell - Ennis, Texas

<sup>8</sup>*Sunset Advisory Commission staff reports on TCEQ issue 3.*

<sup>9</sup>*Priority calls and curtailment are common across the state, having occurred in the Brazos, Colorado, Rio Grande, Neches, and Sabine River basins. In 2015 a water master program was established on the Brazos River which was established to proactively manage water rights according to water right priority on a real-time basis. Similar programs exist for the Concho River basin (Concho River Watermaster program) and for the Nueces, Lavaca, San Antonio, and Guadalupe River basins (South Texas Watermaster program).*

## ABOUT WESTWATER RESEARCH

WestWater Research is the leading economic consulting firm in market research, pricing, valuation, and transaction advisory services for water rights and water resource development. For more than 20 years, our clients have relied on our expertise to make sound water resource management and financial decisions as water demands increasingly outpace available supplies. WestWater works across the country with five regional offices to provide market intelligence, valuation, transaction advisory, strategic planning, and asset management services relating to water rights and water resources. We are known for our rigorous analysis and information-driven investment strategy formulation. Backed by more than thirty years of research and data collection, our proprietary Waterlitix database is the world's largest and most comprehensive pricing tool for water transactions in the West. At WestWater Research, we know the value of water.

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