

# 2012

# Water for Texas

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## TEXAS WATER DEVELOPMENT BOARD

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January 2012



# Texas Water Development Board

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January 5, 2012

To the People of Texas:

Texas is currently experiencing what has been described as the worst one-year drought in the state's history, again emphasizing the importance of long-range planning to meet the state's water needs. The 2012 State Water Plan is the third plan that incorporates 16 regional water plans developed under Texas Water Code, Section 16.053. Reflecting the dedicated work of over 400 voting and nonvoting members of the regional water planning groups, this plan was developed between January 2006 and December 2011. This document provides recommended actions to provide long-term water supply solutions to meet water supply needs during drought of record conditions. The State Drought Preparedness Plan is developed by the Drought Preparedness Council for managing and coordinating the state's response. The State Drought Preparedness Plan outlines measures to prepare for, respond to, and mitigate the effects of drought and can be found at

<http://www.txdps.state.tx.us/dem/CouncilsCommittees/droughtCouncil/droughtPrepPlan.pdf>.

**The primary message of the 2012 State Water Plan is a simple one: In serious drought conditions, Texas does not and will not have enough water to meet the needs of its people, its businesses, and its agricultural enterprises. This plan presents the information regarding the recommended conservation and other types of water management strategies that would be necessary to meet the state's needs in drought conditions, the cost of such strategies, and estimates of the state's financial assistance that would be required to implement these strategies. The plan also presents the sobering news of the economic losses likely to occur if these water supply needs cannot be met. As the state continues to experience rapid growth and declining water supplies, implementation of the plan is crucial to ensure public health, safety, and welfare and economic development in the state.**

Respectfully submitted,



Edward G. Vaughan, Chairman

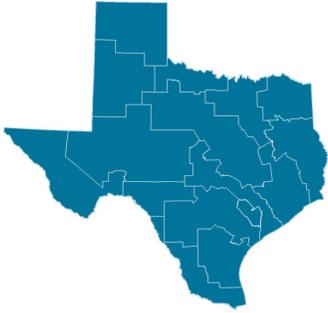
## Our Mission : Board Members

To provide leadership, planning, financial assistance, information, and education for the conservation and responsible development of water for Texas

Edward G. Vaughan, Chairman  
Joe M. Crutcher, Vice Chairman  
Melanie Callahan, Executive Administrator

Thomas Weir Labatt III, Member  
Lewis H. McMahan, Member

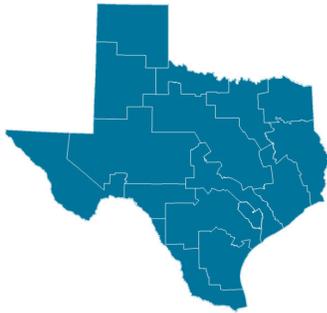
Billy R. Bradford Jr., Member  
Monte Cluck, Member



# Acknowledgments

The 2012 State Water Plan would not have been possible without the time and expertise of numerous people and organizations throughout the state of Texas. The Texas Water Development Board (TWDB) would like to express its sincere appreciation to all of those that participated in the development of the 16 regional plans and this state water plan: the more than 400 regional water planning group members, consultants, and administrative agencies; staff of the TWDB; Texas Parks and Wildlife Department, Texas Department of Agriculture, Texas Commission on Environmental Quality, and other state and federal agencies; and the individuals and organizations that provided public input during the planning process.

Finally, we would like to thank the leadership of the state of Texas for their consistent support and recognition of the importance of water planning.



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# Quick Facts

The population in Texas is expected to increase 82 percent between the years 2010 and 2060, growing from 25.4 million to 46.3 million people.

Water demand in Texas is projected to increase by only 22 percent, from about 18 million acre-feet per year in 2010 to about 22 million acre-feet per year in 2060.

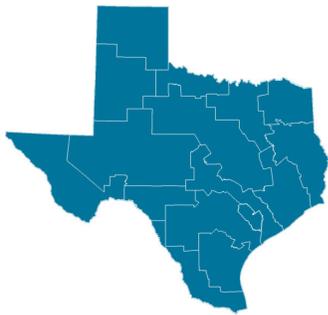
Existing water supplies — the amount of water that can be produced with current permits, current contracts, and existing infrastructure during drought — are projected to decrease about 10 percent, from about 17.0 million acre-feet in 2010 to about 15.3 million acre-feet in 2060, due primarily to Ogallala Aquifer depletion and reduced reliance on the Gulf Coast Aquifer.

If Texas does not implement new water supply projects or management strategies, then homes, businesses, and agricultural enterprises throughout the state are projected to need 8.3 million acre-feet of additional water supply by 2060.

Annual economic losses from not meeting water supply needs could result in a reduction in income of approximately \$11.9 billion annually if current drought conditions approach the drought of record, and as much as \$115.7 billion annually by 2060, with over a million lost jobs.

The regional planning groups recommended 562 unique water supply projects designed to meet needs for additional water supplies for Texas during drought, resulting in a total, if implemented, of 9.0 million acre-feet per year in additional water supplies by 2060.

The capital cost to design, construct, or implement the recommended water management strategies and projects is \$53 billion. Municipal water providers are expected to need nearly \$27 billion in state financial assistance to implement these strategies.



# Executive Summary

**“If Texans cannot change the weather, they can at least, through sound, farsighted planning, conserve and develop water resources to supply their needs.”**

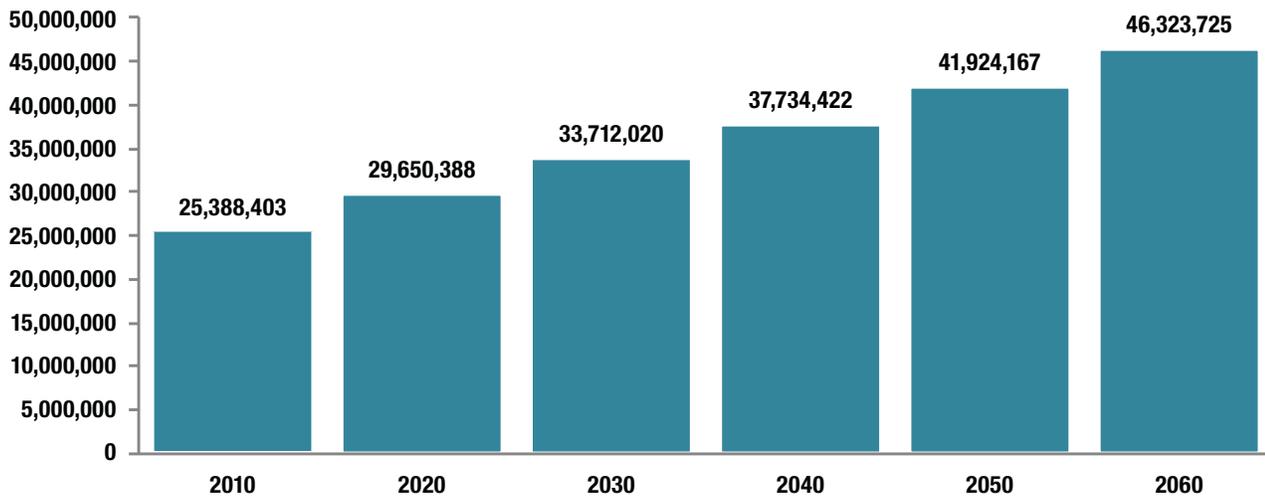
**— A Plan for Meeting the 1980 Water Requirements of Texas, 1961**

## **WHY DO WE PLAN?**

This plan is designed to meet the state’s needs for water during times of drought. Although droughts have always plagued Texas, the one that occurred in the 1950s was particularly devastating. It was, in fact, the worst in our state’s recorded history and is still considered Texas’ “drought of record.” The purpose of this plan is to ensure that our state’s cities, rural communities, farms, ranches, businesses, and industries will have enough water to meet their needs during a repeat of this great drought.

As recognized by the Texas Legislature upon passage of omnibus water planning legislation in 1997, water—more than any other natural resource—challenges the state’s future. Scarcity and competition for water, environmental concerns, and the cost of new water supplies have made sound water planning and management increasingly important. With the state’s population expected to grow by 82 percent in the next 50 years, the availability of water supplies during times of drought is essential for not only the Texans of today but for those of tomorrow as well.

**FIGURE ES.1. PROJECTED POPULATION GROWTH.**



## HOW DO WE PLAN?

Water planning in Texas starts at the regional level with 16 regional water planning groups, 1 for each of the 16 designated planning areas in the state. Each planning group consists of about 20 members that represent at least 11 interests, as required by Texas statute, including **Agriculture, Industry, Public, Environment, Municipalities, Business, Water Districts, River Authorities, Water Utilities, Counties, and Power Generation.**

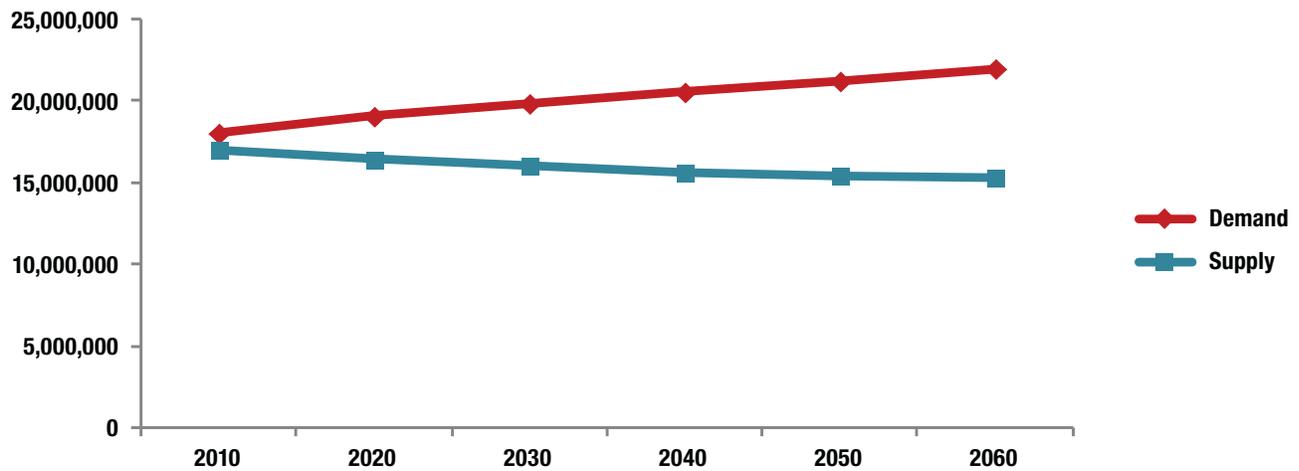
During each five-year planning cycle, planning groups evaluate population projections, water demand projections, and existing water supplies that would be available during times of drought. Planning groups identify water user groups that will not have enough water during times of drought, recommend strategies that could be implemented to address shortages, and estimate the costs of these strategies. While carrying out these tasks, planning groups assess risks and uncertainties in the planning process and evaluate potential impacts of water management strategies on the state’s water, agricultural, and natural resources.

Once the planning groups adopt their regional water plans, they are sent to the Texas Water Development Board (TWDB)—the state’s water supply planning and financing agency—for approval. TWDB then compiles the state water plan, which serves as a guide to state water policy, with information from the regional water plans and policy recommendations to the Texas Legislature. Each step of the process is open to the public and provides numerous opportunities for public input.

## HOW MANY TEXANS WILL THERE BE?

The population in Texas is expected to increase significantly between the years 2010 and 2060, growing from 25.4 million to 46.3 million people. Growth rates vary considerably across the state, with some planning areas more than doubling over the planning horizon and others growing only slightly or not at all (Figure ES.1). Thirty counties and 225 cities are projected to at least double their population by 2060, but another 52 counties and 158 cities are expected to lose population or remain the same. The rest are expected to grow slightly.

**FIGURE ES.2. PROJECTED WATER DEMAND AND EXISTING SUPPLIES (ACRE-FEET PER YEAR).**



### HOW MUCH WATER WILL WE REQUIRE?

Although the population is projected to increase 82 percent over 50 years, water demand in Texas is projected to increase by only 22 percent, from about 18 million acre-feet per year in 2010 to a demand of about 22 million acre-feet per year in 2060 (Figure ES.2). Demand for municipal water (including rural county-other) is expected to increase from 4.9 million acre-feet in 2010 to 8.4 million acre-feet in 2060. However, demand for agricultural irrigation water is expected to decrease, from 10 million acre-feet per year in 2010 to about 8.4 million acre-feet per year in 2060, due to more efficient irrigation systems, reduced groundwater supplies, and the transfer of water rights from agricultural to municipal uses. Water demands for manufacturing, steam-electric power generation, and livestock are expected to increase, while mining demand is expected to remain relatively constant.

### HOW MUCH WATER DO WE HAVE NOW?

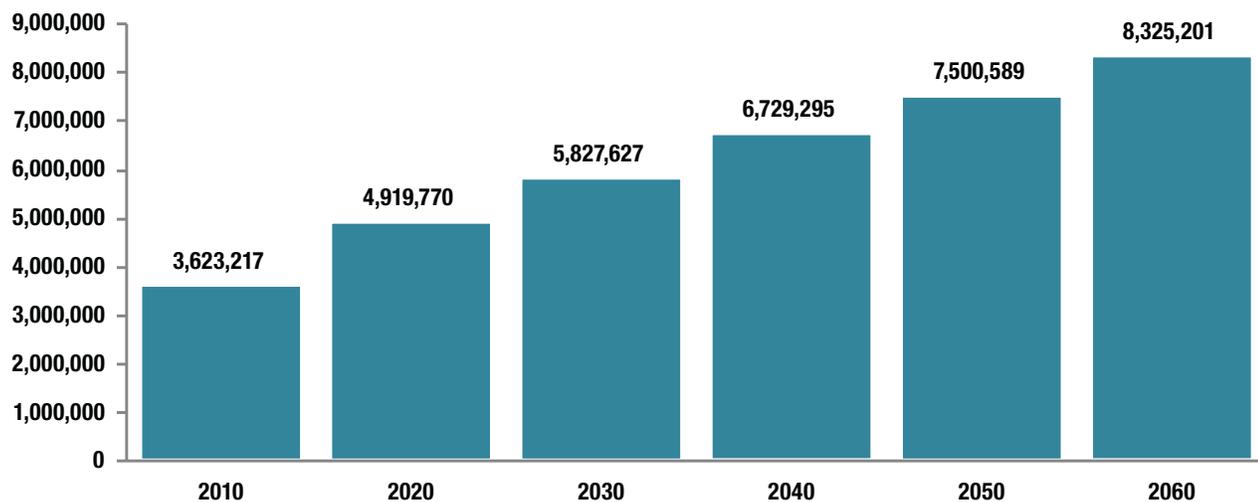
Existing water supplies—categorized as surface water, groundwater, and reuse water—are projected to decrease about 10 percent, from about 17.0 million

acre-feet in 2010 to about 15.3 million acre-feet in 2060. For planning purposes, existing supplies are those water supplies that are physically and legally available, defined as the amount of water that can be produced with current permits, current contracts, and existing infrastructure during drought.

Groundwater supplies are projected to decrease 30 percent, from about 8 million acre-feet in 2010 to about 5.7 million acre-feet in 2060. This decrease is primarily due to reduced supply from the Ogallala Aquifer as a result of its depletion over time and reduced supply from the Gulf Coast Aquifer due to mandatory reductions in pumping to prevent land subsidence.

Surface water supplies are projected to increase by about 6 percent, from about 8.4 million acre-feet in 2010 to about 9.0 million acre-feet in 2060. In a departure from the convention employed in previous regional water plans, some surface water supplies were added to the accounting of existing supplies only in the decade when an existing contract was expanded to call on the increased amount of supply, as the increase

**FIGURE ES.3. PROJECTED NEED FOR ADDITIONAL WATER IN TIMES OF DROUGHT (ACRE-FEET PER YEAR).**



would only then become “legally” available. With the adoption of this convention by some planning groups, existing surface water supplies are projected to increase over the planning horizon. In previous plans the full amount of supply was shown from the first decade, and supplies were shown to decrease over time as a result of sedimentation of reservoirs.

Existing supply from water reuse is expected to increase from 482,000 acre-feet per year in 2010 to about 614,000 thousand acre-feet per year by 2060. This represents an increase of about 65 percent in 2060 reuse supplies, as compared to the 2007 State Water Plan.

## **DO WE HAVE ENOUGH WATER FOR THE FUTURE?**

We do not have enough existing water supplies today to meet the demand for water during times of drought. In the event of severe drought conditions, the state would face an immediate need for additional water supplies of 3.6 million acre-feet per year with 86 percent of that need in irrigation and about 9 percent associated directly with municipal water users. Total

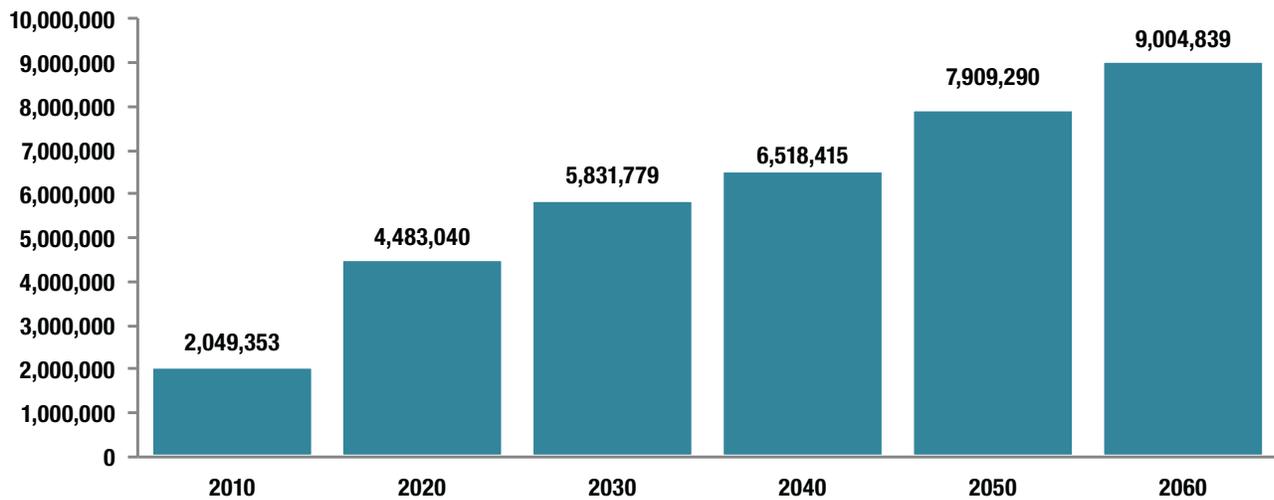
needs are projected to increase by 130 percent between 2010 and 2060 to 8.3 million acre-feet per year (Figure ES.3). In 2060, irrigation represents 45 percent of the total needs and municipal users account for 41 percent of needs.

## **WHAT CAN WE DO TO GET MORE WATER?**

When projected demands for water exceed the projected supplies available during drought conditions, the planning groups recommended water management strategies—specific plans to increase water supply or maximize existing supply. These strategies included 562 unique water supply projects designed to meet needs for additional water supplies for Texas during drought (this figure is lower than presented in previous plans because it does not separately count each entity participating in a given project).

The strategies recommended by regional water planning groups would provide, if implemented, 9.0 million acre-feet per year in additional water supplies by 2060 (Figure ES.4). Water management strategies can include conservation, drought management,

**FIGURE ES.4. WATER SUPPLIES FROM WATER MANAGEMENT STRATEGIES IN THE STATE WATER PLAN (ACRE-FEET PER YEAR).**



reservoirs, wells, water reuse, desalination plants, and others. About 34 percent of the volume of these strategies would come from conservation and reuse, about 17 percent from new major reservoirs, and about 34 percent from other surface water supplies.

Some planning groups recommend water management strategies that would provide more water than would be needed during a repeat of the drought of record. This “cushion” of additional supplies helps address risks and uncertainties that are inherent in the planning process, such as:

- greater population growth or higher water demands than projected;
- climate variability, including a drought worse than the one experienced during the 1950s; and
- difficulties in financing and implementing projects.

### **ARE ALL THE WATER SUPPLY NEEDS MET?**

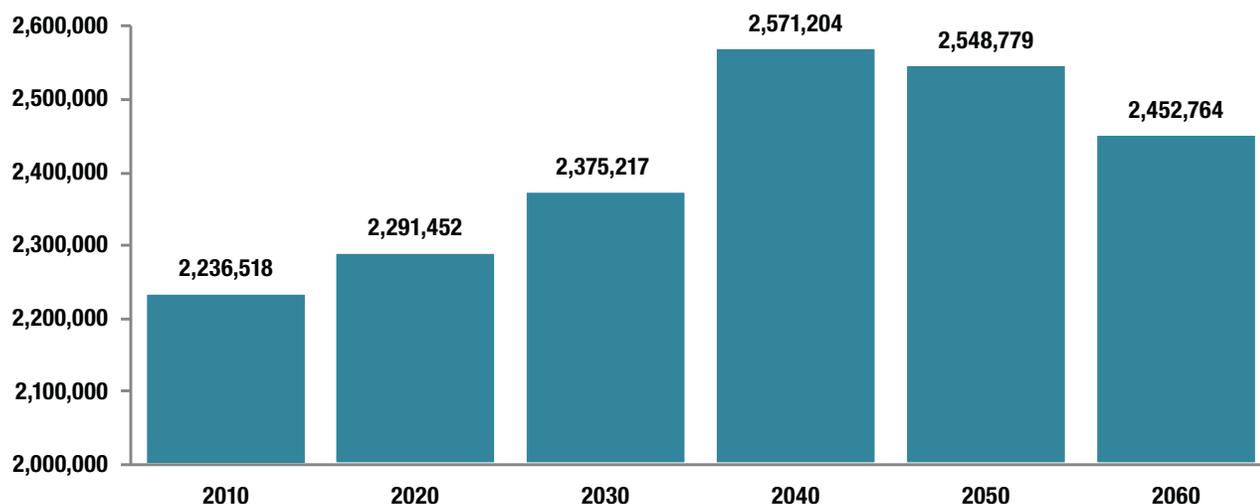
Four planning groups were able to identify strategies to meet all of the needs for water identified in their regions, including municipal, manufacturing, mining, irrigation, steam-electric power generation, and livestock. Twelve planning groups were unable to

meet all water supply needs for each water user group in their planning areas. Approximately 2.2 million acre-feet of water supply needs are unmet in 2010, increasing to approximately 2.5 million acre-feet in 2060 (Figure ES.5). Unmet water supply needs occur for all categories of water user groups, with the exception of manufacturing. Irrigation represents the vast majority (98-99 percent) of unmet needs in all decades. The major reason for not meeting a water user group’s water supply need is that the planning group did not identify an economically feasible water management strategy to meet the water supply need.

### **HOW MUCH WILL IT COST?**

The estimated total capital cost of the 2012 State Water Plan, representing the capital costs of all water management strategies recommended in the 2011 regional water plans, is \$53 billion. This amount represents about a quarter of the total needs for water supplies, water treatment and distribution, wastewater treatment and collection, and flood control required for the state of Texas in the next 50 years (Figure ES.6). These costs consist primarily of the funds needed to permit, design, and construct projects that implement

**FIGURE ES.5. UNMET WATER SUPPLY NEEDS (ACRE-FEET PER YEAR).**



recommended strategies, with the majority of the costs (about \$46 billion) going toward meeting municipal needs; that is, the needs of residential, commercial, and institutional water users in cities and rural communities. Based on surveys conducted as part of the planning process, water providers will need nearly \$27 billion in state financial assistance to implement strategies for municipal water user groups.

### **WHAT IF WE DO NOTHING?**

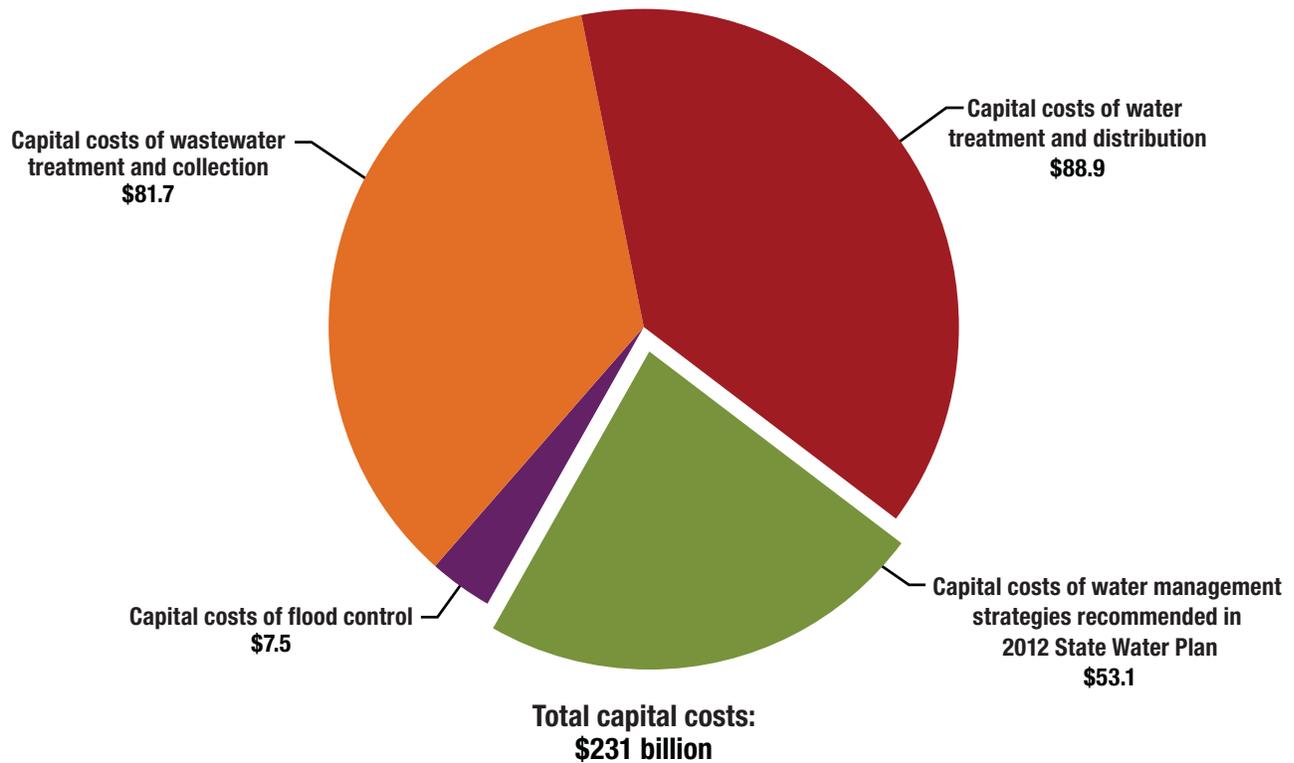
If drought of record conditions recur and water management strategies identified in regional water plans are not implemented, the state could suffer significant economic losses. If a drought affected the entire state like it did in the 1950s, economic models show that Texas businesses and workers could have lost almost \$12 billion in income in 2010. By 2060 lost income increases to roughly \$116 billion. Foregone state and local business taxes associated with lost commerce could amount to \$1.1 billion in 2010 and \$9.8 billion in 2060. Lost jobs total approximately 115,000 in 2010 and 1.1 million in 2060. By 2060, the

state's projected population growth could be reduced by about 1.4 million people, with 403,000 fewer students in Texas schools. If we do nothing, over 50 percent of the state's population in 2060 would face a water need of at least 45 percent of their demand during a repeat of drought of record conditions.

### **WHAT MORE CAN WE DO NOW TO PREPARE FOR TIMES OF DROUGHT?**

The state and regional water plans must be implemented to meet the state's need for water during a severe drought. Water providers surveyed during the planning process reported an anticipated need of \$26.9 billion in state financial assistance to implement municipal water management strategies in their planning areas. This amount represents about 58 percent of the total capital costs for water supply management strategies recommended for municipal water user groups in the 2011 regional water plans. Of the total reported needs for state financial assistance, nearly \$15.7 billion is expected to occur between the years 2010 and 2020, \$4.2 billion will occur between 2020 and 2030, and \$4.1 billion between 2030 and 2040.

**FIGURE ES.6. TOTAL CAPITAL COSTS FOR WATER SUPPLIES, WATER TREATMENT AND DISTRIBUTION, WASTEWATER TREATMENT AND COLLECTION, AND FLOOD CONTROL (BILLIONS OF DOLLARS).**



About \$400 million would be for projects in rural and economically distressed areas of the state.

The planning groups also made a number of regulatory, administrative, and legislative recommendations that they believe are needed to better manage our water resources and to prepare for and respond to droughts. Based on these recommendations and other policy considerations, the TWDB makes the following recommendations to facilitate the implementation of the 2012 State Water Plan:

**ISSUE 1: RESERVOIR SITE AND STREAM SEGMENT DESIGNATION**

The legislature should designate the three additional sites of unique value for the construction of reservoirs recommended in the 2011 regional water plans

(Turkey Peak Reservoir, Millers Creek Reservoir Augmentation, and Coryell County Reservoir) for protection under Texas Water Code, Section 16.051 (g). These sites are shown in Figure ES.7.

The legislature should designate the nine river or stream segments of unique ecological value recommended in the 2011 regional water plans (Pecan Bayou, Black Cypress Creek, Black Cypress Bayou, Alamito Creek, Nueces River, Frio River, Sabinal River, Comal River, and San Marcos River) for protection under Texas Water Code, Section 16.051. The sites are shown in Figure ES.8.

**ISSUE 2: RESERVOIR SITE ACQUISITION**

The legislature should provide a mechanism to acquire feasible reservoir sites so they are available for

development of additional surface water supplies to meet future water supply needs of Texas identified in the 2011 regional water plans and also water supply needs that will occur beyond the 50-year regional and state water planning horizon.

### **ISSUE 3: INTERBASIN TRANSFERS OF SURFACE WATER**

The legislature should enact statutory provisions that eliminate unreasonable restrictions on the voluntary transfer of surface water from one basin to another.

### **ISSUE 4: PETITION PROCESS ON THE REASONABLENESS OF DESIRED FUTURE CONDITIONS**

The legislature should remove TWDB from the petition process concerning the reasonableness of a desired future condition except for technical review and comment.

### **ISSUE 5: WATER LOSS**

The legislature should require all retail public utilities to conduct water loss audits on an annual basis, rather than every five years.

### **ISSUE 6: FINANCING THE STATE WATER PLAN**

The legislature should develop a long-term, affordable, and sustainable method to provide financing assistance for the implementation of state water plan projects.

## **WHAT HAVE WE DONE ALREADY TO IMPLEMENT WATER MANAGEMENT STRATEGIES FROM PREVIOUS PLANS?**

In response to the 2007 State Water Plan, the 80th and 81st Texas Legislatures provided funding to implement \$1.47 billion in state water plan projects through three of TWDB's financial assistance programs. To date, TWDB has provided over \$1 billion in low-interest loans and grants to implement 46 projects across the state, all of which represent water management

strategies in the 2006 regional water plans and the 2007 State Water Plan. Once fully implemented, these projects will supply over 1.5 million acre-feet of water needed during times of drought to millions of Texans. In 2011, the 82nd Texas Legislature authorized additional funding to finance approximately \$100 million in state water plan projects. These funds will be available during state fiscal years 2012 and 2013. TWDB has also provided over \$500 million in funding to implement water management strategies recommended in the 2007 State Water Plan through other loan programs.

To provide a measure of the progress made in implementing the strategies included in the 2007 State Water Plan, TWDB surveyed project sponsors of recommended municipal water management strategies. Of the 497 projects for which responses were received on behalf of the sponsoring entities, 139 of them (28 percent) reported some form of progress on strategy implementation. Of these, 65 (13 percent) reported that strategies had been fully implemented. Of the 74 projects (15 percent) that reported incomplete progress, 13 (3 percent) reported that project construction had begun. The number of fully implemented projects—65—represents a significant increase from the 21 projects that the 2007 State Water Plan reported had been implemented from the 2002 State Water Plan. The implementation of many of these projects would not have been possible without the funding provided by the Texas Legislature through TWDB's financial assistance programs.

Like all planning efforts, state water plans have made recommendations based on the needs of the times during which they were developed. When times change, so do plans. Some projects that were once recommended may be no longer feasible or necessary due to advances in technology or changes

in water availability, population and demographics, or state or federal policies. The five-year state and regional water planning cycle is designed to address risks, uncertainties, and emerging needs in our ever-changing state. So if we cannot change the weather, Texas will have a plan to meet the needs of our communities for water when the next drought inevitably arrives.

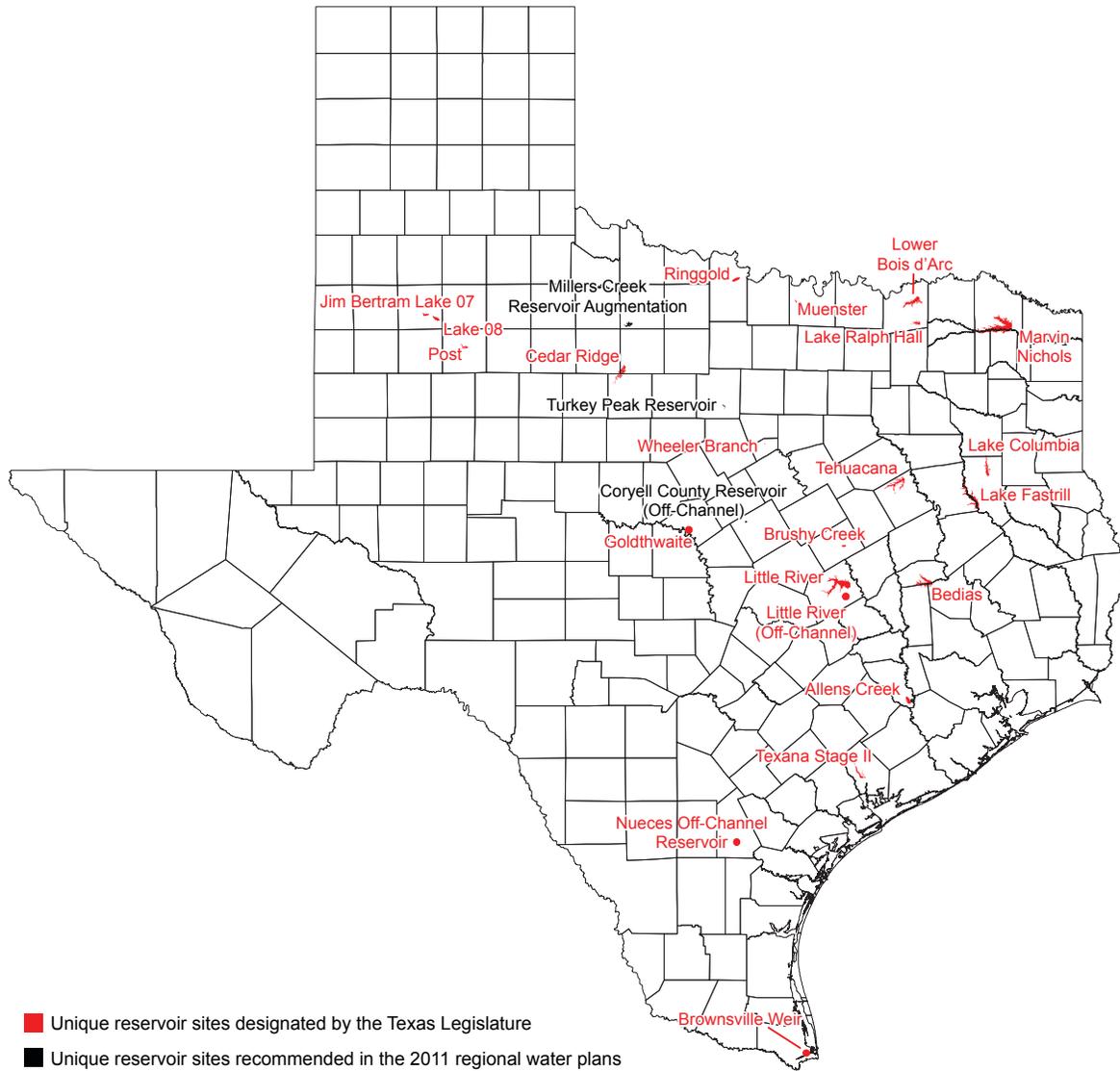
- Other uncertain potential future challenges such as natural disasters or climate variability (Chapter 10, Challenges and Uncertainty).

## POTENTIAL FUTURE PLANNING ISSUES

During every planning cycle, new issues emerge that influence the development of regional water plans and the state water plan. The following issues, discussed in further detail in the 2012 State Water Plan, are potentially among some of the issues that will impact future rounds of planning:

- Changes in population projections based on the results of the 2010 U.S. Census (Chapter 3, Population and Water Demand Projections).
- Changes in water demand projections from population growth or varying water use activities, such as the increased use of water for hydraulic fracturing mining operations (Chapter 3, Population and Water Demand Projections) or expanded production of biofuels (Chapter 10, Challenges and Uncertainty).
- Impacts to water availability from new environmental flow standards or modeled available groundwater numbers based on the desired future conditions of aquifers (Chapter 5, Water Supplies).
- Limitations of groundwater permitting processes that provide for term-permits or that allow for reductions in a permit holder's allocations, which could impact the feasibility of water management strategies (Chapter 5, Water Supplies).
- Lack of sufficient financial assistance to aid in implementation of recommended water management strategies (Chapter 9, Financing Needs).

**FIGURE ES.7. DESIGNATED AND RECOMMENDED UNIQUE RESERVOIR SITES.**



**FIGURE ES.8. DESIGNATED AND RECOMMENDED UNIQUE STREAM SEGMENTS.**

