

# **Building Strong Collaborative Relationships for a Sustainable Water Resources Future:**

**STATE OF TEXAS**

SUMMARY OF STATE WATER PLANNING

U.S. Army Corps of Engineers  
Civil Works Directorate  
441 G Street NW  
Washington, DC 20314-1000

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The findings contained in this report are based on the information collected from the literature search and interviews for this initiative and should not be construed as an official Department of the Army position, policy or decision unless so designated by other official documentation.

# STATE OF TEXAS



**Figure 1. Texas has 16 Regional Water Planning Areas**

## 1. RESPONSIBLE STATE AGENCIES/REGIONAL ENTITIES

The state of Texas has been involved with water resource planning and development since 1904. Today the Texas Water Development Board has a broad range of water resource responsibilities and is responsible for state water resource planning. The Texas Water Development Board (TWDB) was created in 1956 by legislative act and constitutional amendment. The constitutional amendment, approved by Texas voters, authorized the TWDB to issue \$200 million in State of Texas General Obligation Water Development Bonds for the conservation and development of Texas' water resources through loans to political subdivisions.

In 1977 the three water agencies existing at the time, the Texas Water Development Board, the Texas Water Rights Commission and the Water Quality Board, were combined by the Texas Legislature, creating the Texas Department of Water Resources

(TDWR). This new single agency was responsible for developing Texas' water resources, maintaining the quality of water and assuring equitable distribution of water rights.

In 1985 Sunset Legislation reorganized the Texas Department of Water Resources, splitting the agency into two separate agencies, the Texas Water Commission, which is now termed the Texas Commission on Environmental Quality, and the Texas Water Development Board (current agency). The TWDB was made responsible for long-range planning and water and wastewater project financing. The Texas Commission on Environmental Quality is the state agency that allocates surface water rights and is responsible for water quality programs and permitting.

TWDB has a six-member [Board of Directors](#) appointed to six-year staggered terms by the Governor meets monthly. The Board considers loan applications from eligible applicants, awards grants for water-related research and planning, and conducts other TWDB business, such as approving the State Water Plan.

From: <http://www.twdb.state.tx.us/ABOUT/history.asp>

#### **Key Agency Contacts:**

Texas Water Development Board Staff:  
J. Kevin Ward, Executive Administrator

#### **Texas Water Development Board's 6 members:**

James E. Herring, Chairman, Amarillo  
Jack Hunt, Vice Chairman, Houston  
Lewis H. McMahan, Member, Dallas  
Edward G. Vaughn, Member, Boerne  
Thomas Weir Labatt III, Member, San Antonio  
Joe M. Crutcher, Member, Palestine

#### **Additional Key Water Planning Staff:**

Water Resource and Planning and Information, Carolyn L. Brittin, Deputy Executive Administrator

Water Resource Planning, Dan Hardin, Director

#### **Mailing Address:**

TWDB  
1700 N. Congress Ave  
Austin, TX 78701  
Telephone: (512) 463-7847

Fax: (512) 475-2053  
E-Mail: [info@twdb.state.tx.us](mailto:info@twdb.state.tx.us)

Texas Commission on Environmental Quality  
Mark R. Vickery, P.G., Executive Director

Mailing Address:  
TCEQ  
P.O. Box 13087  
Austin, TX 78711-3087  
Telephone: (512) 239-3900  
FAX: (512) 239-3939

**Water Resources Planning and Information (WRPI)** supports the TWDB's mission by collecting, analyzing, and disseminating water-related data and by providing other services necessary to aid in planning and managing the state's water resources. It also provides statewide geographic data services and flood mitigation planning, including administration of federal assistance programs.

**WRPI** encompasses the following divisions and services:

Texas Natural Resources Information System (TNRIS): provides a centralized information system incorporating all Texas natural resource data.

Water Resources Planning: collects and compiles planning data; administers the regional and state water planning processes; maintains the Regional Water Planning Database; and manages the Water Use Survey program.

Flood Mitigation Planning: acts as State Coordinating body for the National Flood Insurance Program by providing community technical assistance and training; manages the state flood protection planning grant program and federal Flood Mitigation Assistance. (From - <http://www.twdb.state.tx.us/wrpi/index.htm>)

The Texas Water Development Board leads a diverse range of water resource planning, management and development activities. The TWDB:

- Provides loans to local governments for water supply projects; water quality projects including wastewater treatment, municipal solid waste management and nonpoint source pollution control; flood control projects; agricultural water conservation projects; and groundwater district creation expenses.
- Provides grants and loans for the water and wastewater needs of the state's economically distressed areas.
- Provides agricultural water conservation funding and water-related research and planning grants.

- Supports regions in developing their regional water plans that is incorporated into a statewide water plan for the orderly development, management and conservation of the state's water resources by studying Texas' surface and groundwater resources.
- Collects data and conducts studies concerning the instream flow needs and fresh-water needs of the state's bays and estuaries.
- Administers the [Texas Water Bank](#), which facilitates the transfer, sale or lease of water and water rights throughout the state, and administers the [Texas Water Trust](#), where water rights are held for environmental flow maintenance purposes.
- Maintains a centralized data bank of information on the state's natural resources called the [Texas Natural Resources Information System](#) and manages the [Strategic Mapping Program](#), a Texas-based, public and private sector cost-sharing program to develop consistent, large-scale computerized base maps describing basic geographic features of Texas.
- Serves as Texas National Flood Insurance Program's Coordinating Agency.
- Develops and maintains groundwater availability models for the state's groundwater resources.

TWDB financial assistance programs are funded through state-backed bonds, a combination of state bond proceeds and federal grant funds, or limited appropriated funds. To date, the TWDB has sold nearly \$1.55 billion of these bonds to finance the construction of water- and wastewater-related projects. In 1987, the TWDB added the Clean Water State Revolving Fund (CWSRF) to its portfolio of financial assistance programs. Low-interest loans from the CWSRF finance costs associated with the planning, design, construction, expansion or improvement of wastewater treatment facilities, wastewater recycling and reuse facilities, collection systems, stormwater pollution control projects and nonpoint source pollution control projects. Funded in part by federal grant money, the CWSRF provides loans at interest rates lower than the market can offer to any eligible applicant.

The TWDB also administers the Drinking Water State Revolving Fund (DWSRF). Through the DWSRF, the TWDB will make low-interest loans for financing public drinking water systems that facilitate compliance with primary and secondary drinking water regulations or otherwise significantly further the health protection objectives of the federal Safe Drinking Water Act (SDWA), as amended in 1996. Loans from the DWSRF finance all costs associated with the planning, design and construction of projects to upgrade or replace water supply infrastructure, to correct exceedances of SDWA health standards, to consolidate water supplies and to purchase capacity in water system. Funded in part by federal grant money, the DWSRF provides loans at interest rates lower than the market can offer to any eligible applicant.

(From - <http://www.twdb.state.tx.us/wrpi/index.htm>)

## **2. STATE/REGIONAL WATER PLANNING STATUS**

In 1961 the State of Texas published its first state water plan. The state completed updates to this plan in 1968, 1984, 1990, 1992, 1997, and 2002. The Texas Water Development Board adopted their current plan pursuant to Texas Water Code, Title 2,

Section 16.051 on November 14, 2006. The 2007 State Water Plan is the second plan adopted that incorporates regional water plans developed under Texas Water Code, Section 16.053.

The State Water Plan is composed of three Volumes and recently completed Addendum:

- Volume I - Contains highlights of the 2007 Water Plan including an executive summary that includes statewide water resource information and the Texas Water Development Board's legislative policy recommendations.
- Volume II - Contains much of the substantive planning information including 16 regional water plans.
- Volume III - is a digital version of the 16 regional water plans and a database of the regional water planning information for each water user group in Texas.
- Addendum – Provides updated information regarding: changes to some recommended management strategies; changes to some supply and demand projections; and text and figure changes.

### **The State of Texas Water Planning Process**

The Texas water planning process is focused on ensuring that Texas will have enough water in the future during a drought-of-record to sustain its cities and rural communities, farms and ranches, businesses and industries, and the environment. While overall Texas has an abundance of natural resources, water is sometimes in short supply, particularly during periods of drought. Texas has one of the fastest growing populations in the country. In 1950, only 8 million people lived in Texas. In 2000, nearly 21 million people called Texas home, and another 25 million will likely arrive by 2060. A growing population, combined with Texas' vulnerability to drought, makes water supply a crucial issue. From V-I

Following passage of Senate Bill 1 by the 75th Legislature in 1997, TWDB initiated a regional water planning process by developing and publishing draft rules for regional and state water planning, along with related amendments to TWDB regional water planning grant rules. After consulting extensively with other state agencies, stakeholders, and the public, TWDB adopted final rules in February 1998. These rules described the required elements in the regional and state water plans, the delineation of planning areas, the composition of planning groups, and guidelines for financial assistance from the TWDB.

Senate Bill 1 directed TWDB to designate regional water planning areas, taking into consideration such factors as river basin and aquifer delineations, water utility development patterns, socioeconomic characteristics, existing regional water planning areas, political subdivision boundaries, public comment, and other factors that TWDB deemed relevant. Regional water planning area boundaries were adjusted to include entire municipalities. Counties located on a boundary were contacted to determine preferences. Some counties opted to be part of two adjacent regional water planning areas. In other cases, regional planning area boundaries were adjusted to encompass entire counties. TWDB also considered the delineation of climatic zones in forming the

planning regions. This process eventually resulted in 16 regional water planning areas. TWDB is required to review and update the planning area boundaries at least once every five years. In 2001, TWDB reviewed the planning area boundaries and did not change them. The planning area boundaries in the 2007 State Water Plan are the same as in the 2002 State Water Plan.

Each of the regional water planning areas has its own planning group, who represents the interests of its planning area and is responsible for developing a regional water plan. As required by Senate Bill 1, TWDB selected the initial members of the planning groups. These members, known as initial coordinating bodies, were selected from 11 interests identified in Senate Bill 1 and other relevant interests in the regional water planning areas. Senate Bill 1 required that interests including but not limited to public, counties, municipalities, industries, agriculture, environment, small businesses, electric-generating utilities, river authorities, water districts, and water utilities be represented. The initial coordinating bodies then added other members as appropriate, as they transitioned into planning groups. To replace members who leave the planning groups, the groups vote to approve new members.

Each planning group approved bylaws to govern its methods of conducting business and designated a political subdivision, such as a river authority, groundwater conservation district, or council of governments, to administer the planning process and manage any contracts related to developing regional water plans.

The ongoing work of the regional water planning process consists of seven tasks:

- Describing the regional water planning area.
- Quantifying current and projected population and water demand.
- Evaluating and quantifying current water supplies.
- Identifying surpluses and needs.
- Evaluating water management strategies and preparing plans to meet the needs.
- Recommending regulatory, administrative, and legislative changes.
- Adopting the plan, including the required level of public participations.

### **3. WATER MANAGEMENT VISION AND GOALS**

The Texas Water Development Board's Vision, Mission, and select water resource goals are summarized below.

#### **Agency Vision**

*Sustainable, affordable, quality water for Texans, our economy, and our environment.*

#### **Agency Mission**

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



This mission is considered to be a vital part of Texas' overall vision and its mission and goals which relate to maintaining the viability of the state's natural resources, health and economic development. To accomplish its goals of planning for the state's water resources and for providing affordable water and wastewater services, the TWDB provides water planning, data collection and dissemination, financial assistance and technical assistance services to the citizens of Texas. The tremendous population growth that the state has and will continue to experience, and the continual threat of severe drought, only intensify the need for the TWDB to accomplish its goals in an effective and efficient manner.

(From - <http://www.twdb.state.tx.us/about/aboutTWDBmain.asp>)

The overarching purpose of the state water plan is to provide for the orderly development, management, and conservation of water resources and preparation for and response to drought conditions, in order that sufficient water will be available at a reasonable cost to ensure public health, safety, and welfare; further economic development; and protect the agricultural and natural resources of the entire state (Texas Water Code, Chapter 16.051).

### **Select Statewide Priority Goal for Natural Resources and Agriculture**

Priority Goal: To conserve and protect our state's natural resources (air, water, land, wildlife, and mineral resources) by

- Providing leadership and policy guidance for state, federal, and local initiatives.
- Encouraging responsible, sustainable economic development.

Relevant benchmarks include:

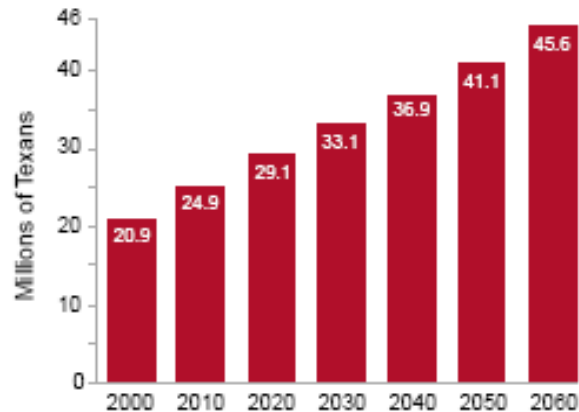
- Acre-feet of desalinated brackish and ocean water produced for Texas.
- Percent of water conservation through decreased water usage, increased water reuse, and brush control.
- Percent of Texas water that meets or exceeds safe water quality standards.
- Percent of regulatory permits processed while ensuring appropriate public input.
- Percent of implemented new technologies that provide efficient, effective, and value-added solutions for a balanced Texas ecosystem.
- Average time required in responding to natural disasters, such as wildfires and hurricanes.
- Number of jobs created or retained in rural communities through state investment.

For additional information please see

[http://www.twdb.state.tx.us/publications/reports/Administrative%20Reports/StratPlan2009\\_2013.pdf](http://www.twdb.state.tx.us/publications/reports/Administrative%20Reports/StratPlan2009_2013.pdf)

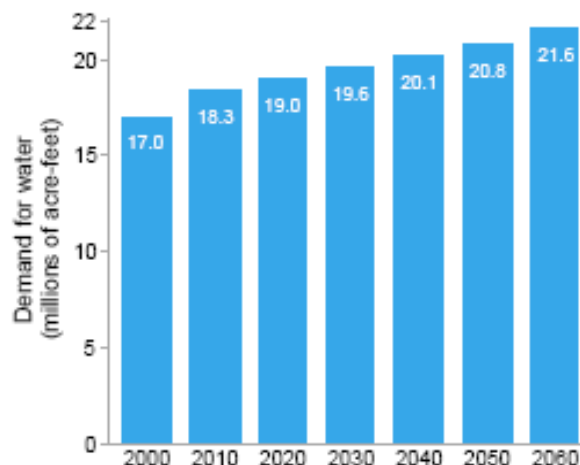
#### 4. SCOPE OF WATER RESOURCE PLANNING

The population of Texas is expected to more than double between the years 2000 and 2060, growing from about 21 million to about 46 million. The growth rates, however, will vary considerably across the state. While some areas will double or even triple their populations, others will grow only slightly, and still others will lose population. Forty-three counties and 297 cities are projected to at least double their population by 2060, but another 45 counties and 137 cities are expected to lose population or remain the same. The rest are expected to grow slightly.



**Figure 2. State of Texas Population Projections through the Year 2060**

Although the population of Texas is expected to double over the next 60 years, the demand for water in Texas will increase by only 27 percent, from almost 17 million acre-feet of water in 2000 to a projected demand of 22 million acre-feet in 2060. Demand for municipal water is expected to increase from 4 million acre-feet in 2010 to just over 8 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 approximately 9 million acre-feet per year in 2060, due to more efficient irrigation systems, reduced ground-water supplies, and the transfer of water rights from agriculture to municipal uses.



**Figure 3. State of Texas Total Projected Future Water Need through the Year 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 18 percent, from about 17.9 million acre-feet in 2010 to about 14.6 million acre-feet in 2060. Water supplies are from three primary sources: surface water, groundwater, and reuse water.

- Surface water supplies are projected to decrease about 6 percent, from about 9.0 million acre-feet in 2010 to about 8.4 million acre-feet in 2060. This decrease in surface water supply is partly due to the accumulation of sediments in reservoirs.
- Groundwater supplies are projected to decrease 32 percent, from about 8.5 million acre-feet in 2010 to about 5.8 million acre-feet in 2060. This decrease is primarily due to reduced supply from the Ogallala Aquifer as a result of depletion and reduced supply from the Gulf Coast Aquifer due to mandatory reductions in pumping to prevent land subsidence.
- Existing water supply from water reuse—the use of water after it has already been used—is expected to be about 370,000 acre-feet per year by 2060.

The planning groups identified about 4,500 water management strategies to generate additional water supplies for Texas during drought. A water management strategy is a specific plan to increase water supply or maximize existing supply to meet a specific need. If these strategies are implemented, Texas will increase its water supplies by 3.6 million acre-feet per year by 2010 and 9.0 million acre-feet per year by 2060. The water management strategies include municipal and agricultural conservation, reservoirs, wells, water reuse, desalination plants, and other strategies. Additional municipal water conservation strategies would result in about 617,000 acre-feet per year of water by 2060. Additional irrigation conservation strategies would result in about 1.4 million acre-feet per year by 2060. Fourteen new major reservoirs would result in about 1.1 million acre-feet per year by 2060. Additional water wells would result in about 800,000 acre-feet per year by 2060. Additional water reuse would result in about 1.3 million acre-feet per year by 2060. Desalination projects would result in about 313,000 acre-feet per year by 2060.

Nine planning groups were unable to meet all water supply needs for each water user group in their planning areas. Approximately 1.8 million acre-feet of water supply needs are unmet in 2010, increasing to approximately 2.7 million acre-feet in 2060. Supply needs occur for irrigation, steam-electric power generation, and mining water user groups in 2010 and 2060. 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.

The planning groups also estimated how much the 4,500 water management strategies would cost to implement. Total capital costs, which primarily consist of up-front money needed to design, construct, or implement strategies, are about \$30.7 billion. Based on surveys conducted as part of the planning process, local jurisdictions indicate that a significant part of the total costs can be borne by local sponsors. However, the local jurisdictions identified specific funding needs that the state could fill. Therefore, TWDB recommends that the legislature consider an initial appropriation of \$77.5 million for the 2008 to 2009 biennium, which would provide grants and loans for constructing \$929.6 million in projects. Cumulative appropriations of \$674.6 million between 2008 and 2028 would result in \$1.7 billion in projects. These funds would help ensure that Texas has enough water for the future.

### **What if Texas Does Nothing?**

Projected water shortages during drought could cost businesses and workers in the state approximately \$9.1 billion in 2010. By 2060, this figure increases to roughly \$98.4 billion. The loss of state and local business taxes associated with lost commerce could amount to \$466 million in 2010 and \$5.4 billion in 2060. If Texas does nothing, about 85 percent of the state's projected population will not have enough water by 2060 during drought conditions.

### **Outline of the 2007 Water Plan**

The 2007 State Water Plan provides a comprehensive evaluation of current and future water uses and needs, implementation strategies and issues, funding and other policy considerations. The Texas Water Plan, Volume II contains much of the substantive planning information and is presented in 13 major sections as described below.

1. Highlights of the 2007 State Water Plan—provides an overview of the water planning process.
2. Regional Summaries—contains detailed analysis and summary of each planning region - Panhandle (A) Region, Region B, Region C, North East Texas (D) Region, Far West Texas (E) Region, Region F, Brazos G Region, Region H, East Texas (I) Region, Plateau (J) Region, Lower Colorado (K) Region, South Central Texas (L) Region, Rio Grande (M) Region, Coastal Bend (N) Region, Llano Estacado (O) Region, Lavaca (P) Region.

3. Fifty Years of Water Planning in Texas—summarizes the creation of the Texas Water Development Board, the Evolution of Texas Water Planning 1957 to 2007, Historical Accuracy of Water Planning Projections, Implementation Status of 2002 State Water Plan.
4. Population and Water Demand Projections—including the methodology for Population, Subcounty Population Projections, Water Demand Methodology – (Municipal Water Demand, Manufacturing and Mining Water Demands, Steam-Electric Power Generation Water Demands, Irrigation Water Demands, and Livestock Water Demands).
5. Climate of Texas—provides an overview of Temperature, Precipitation, and Evaporation; Climate Divisions; Climate Influences; and Climate Trends
6. Surface Water Resources—summarizes Major River and Coastal Basins of Texas including the Brazos Basin, Canadian Basin, Colorado Basin, Cypress Basin, Guadalupe Basin, Lavaca Basin, Neches Basin, Nueces Basin, Red River Basin, Rio Grande Basin, Sabine Basin, San Antonio Basin, San Jacinto Basin, Sulphur Basin, Trinity Basin; Reservoirs; Bays and Estuaries; Surface Water Quality; Surface Water Monitoring; Surface Water Availability Modeling; Surface Water Availability Projections; and Existing Surface Water Supply Projections
7. Groundwater Resources— Aquifers of Texas including the Blaine Aquifer, Blossom Aquifer, Bone Spring-Victorio Peak Aquifer, Brazos River Alluvium Aquifer, Captain Reef Complex Aquifer, Carrizo-Wilcox Aquifer, Dockum Aquifer, Edwards (Balcones Fault Zone) Aquifer, Edwards-Trinity (High Plains) Aquifer, Edwards-Trinity (Plateau) Aquifer, Ellenburger-San Saba Aquifer, Gulf Coast Aquifer, Hickory Aquifer, Hueco-Mesilla Bolsons Aquifer, Igneous Aquifer, Lipan Aquifer, Marathon Aquifer, Marble Falls Aquifer, Nacatoch Aquifer, Ogallala Aquifer, Pecos Valley Aquifer, Queen City Aquifer, Rita Blanca Aquifer, Rustler Aquifer, Seymour Aquifer, Sparta Aquifer, Trinity Aquifer, West Texas Bolsons Aquifer, Woodbine Aquifer, Yegua-Jackson Aquifer; Groundwater Monitoring Programs (Groundwater Levels and Groundwater Quality); Groundwater Availability Modeling; Existing Groundwater Supply Projections; Groundwater Availability Projections.
8. Water Reuse —discusses the role of reuse in meeting future needs.
9. Water Supply Needs—provides a detailed identification of water needs and socioeconomic impacts of not meeting water needs.
10. Water Management Strategies—summarizes the identification and evaluation of potential water management strategies including: Quantity, Reliability, and Costs; Impacts to the State’s Water, Agricultural, and Natural Resources; Impacts on Water Quality; Overview of Recommended Strategies (Water Conservation,

Strategies Using New and Existing Surface Water, Strategies Using Groundwater, Strategies Using Water Reuse, Strategies Using Desalination, Strategies Using Conjunctive Use, Strategies Using Land Stewardship, and Major Conveyances).

**11. Plan Implementation Funding**—includes the costs of water supply needs in the 2007 State Water Plan, constraints related to State Water Plan implementation, potential solutions to provide additional state assistance for implementation of the 2007 State Water Plan Water Management Strategies including:

- Funding for Optimum Regional Water Supply Projects Using TWDB’s State Participation Program
- Funding for Regional Water Supply Projects Using TWDB’s Water Infrastructure Fund Program, Using TWDB Programs to Provide the State Assistance Needed to Implement the 2007 State Water Plan, Water-Related Infrastructure Funding Through Private Activity Bonds, Water-Related Infrastructure Funding Needs and;
- Traditional Financing Mechanisms
- Costs of Water and Wastewater Treatment, Distribution, and Collection
- Costs of Flood Control
- Financing Water and Wastewater Treatment and Internal Distribution Needs in Disadvantaged Areas
- Overview of Water-Related Project Financing for Disadvantaged Communities, and Statewide Economically Distressed Areas Funding Needs

**12. Challenges and Uncertainties in Water Supply Planning**—summarizes several approaches to understanding risk and uncertainty including:

- Addressing Risk in Water Supply Planning
- Addressing Uncertainty in Regional Water Planning
- Uncertainty in Projections, (Population Projections, Industrial Demand Projections, Irrigation Demand Projections)
- Drought
- Climate Change
- Natural Disasters and Terrorism
- New Technologies
- Sustainability of Water Resources in Texas
- Policy and Legislative Changes

**13. Planning Group Policy Recommendations**—summarizes policy recommendations

## Regional Planning

Chapter 2 of the 2007 Water Plan, Volume II contains detailed information for each of the 16 Regional Planning Areas. The following is an overview of the topics addressed for each planning area:

- The physical, demographic, and socioeconomic attributes of each region
- Population and water demand projections
- Existing water supplies, including groundwater, surface water, and reuse;
- Future water supply needs
- Recommended water management strategies and their costs
- The status of water conservation measures, including recommended water management strategies that rely on water conservation
- Identifies select, ongoing concerns, issues, and policy recommendations identified by each planning group.

Individual regional plans and a comprehensive database of regional water plan information are available in Volume III of the state water plan, which is available online at TWDB's web sites <http://twdb.state.tx.us/data/db07/DefaultSelect.asp> and [http://www.twdb.state.tx.us/rwpg/planning\\_page.asp](http://www.twdb.state.tx.us/rwpg/planning_page.asp).

## 5. PARTNERSHIPS, STAKEHOLDER, AND PUBLIC INVOLVEMENT

The 2007 state water plan process was implemented with a focus on a "bottom-up" consensus-driven approach to water planning that involves 16 regional water planning groups. Within TWDB guidelines, each regional planning group reviewed water use projections and water availability volumes in drought-of-record conditions. When a water need is identified, the planning groups evaluate and recommend water management strategies to meet the need. Once the planning group adopts the regional water plan, the plan is sent to the TWDB for approval. The TWDB then compiles information from the regional water plans and other sources to develop the state water plan.

(From - <http://www.twdb.state.tx.us/wrpi/swp/swp.htm>)

The 16 planning groups are comprised of about 450 total members. Each planning area is represented by a planning group that consists of about 20 members representing a variety of interests, including agriculture, industry, environment, public, municipalities, business, water districts, river authorities, water utilities, counties, and power generation. As previously mentioned, each planning group evaluates population projections, water demand projections, and existing water supplies available during drought. Based on this information, each planning group identifies who will not have enough water, recommends strategies and projects that could be implemented to obtain more water, and estimates the costs of these strategies and projects. Once the planning group adopts the regional water plan, the plan is sent to TWDB for review and approval. After determining that no regional conflict exists or after resolution of any regional conflicts, TWDB then compiles information from the regional water plans and other sources to develop the state water plan. The entire process is open to the public.

It is interesting to note that the planning groups review projections provided by TWDB and may propose revisions resulting from changed conditions or new information. In the 2007 plan, all 16 planning groups requested revisions to population and water demand projections for some of the water users in their regions. TWDB, after consulting with the Texas Department of Agriculture, Texas Commission on Environmental Quality, and Texas Parks and Wildlife Department, formally approved requests for revisions that met the criteria established for this process.

In addition to the TWDB the following Texas State Agencies also develop water-related information or water-related financial assistance programs:

- [TCEQ](#) - Texas Commission on Environmental Quality
- [TPWD](#) - Texas Parks and Wildlife Departments

## 6. PLAN IMPLEMENTATION STRATEGY

### Water Supply Recommendations

The Texas Water Plan provides a comprehensive analysis of planning and implementation options and needs, including financial needs. In addition the planning groups include regulatory, administrative, and/or legislative recommendations as part of their plans. They also include recommendations for designating unique reservoir sites and stream segments of unique ecological value, consider water conservation strategies, and evaluate the impacts to the state's water, agricultural and natural resources. In the 2007 State Water Plan, planning groups recommend significantly greater amounts of water conservation and reuse in addition to estimating impacts of water management strategies on the state's water, agricultural, and natural resources.

The Texas Water Plan emphasizes that a key goal of regional water planning is to assess and recommend water management strategies to meet those needs. A recommended water management strategy is a specific plan to increase water supply or maximize existing supply to meet a specific need. Water management strategies that were identified include:

- Implementing water conservation and drought management
- Developing new groundwater and surface water supplies
- Expanding and improving management of existing water supplies, such as improving reservoir operations, reallocating reservoir storage space, using groundwater and surface water conjunctively, and conveying water from one area to another
- Water reuse
- Implementing other, less traditional, approaches such as desalinating seawater and brackish water, controlling vegetation that consumes large volumes of water, practicing land stewardship, and weather modification.

Each of the 16 planning groups identified potentially feasible water management strategies for detailed analyses. As a result of their analyses, planning groups

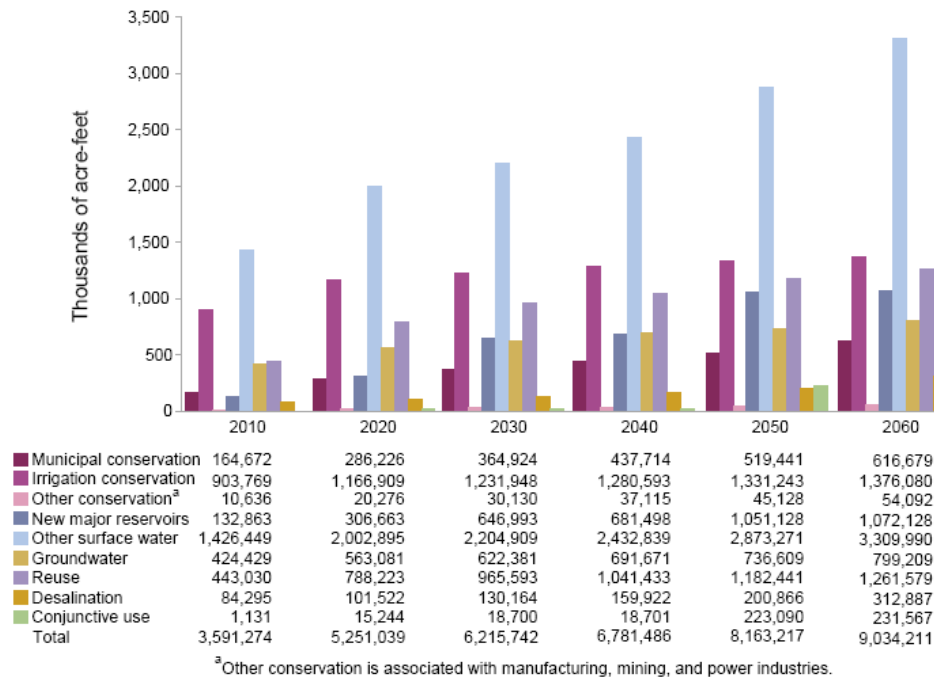


recommended a portfolio of water management strategies tailored to meet each region's water supply needs. Some strategies were carried forward from the prior planning cycle and reassessed due to changing conditions or new information. Other water management strategies considered by planning groups introduced new approaches to meeting water supply needs.

In summary, the planning groups recommended more than 4,500 individual water management strategies to meet water supply needs resulting in a projected total of 9.0 million acre-feet per year of new supplies by 2060 (see Figure 2). Some of the recommended water management strategies are associated with supplies that are available but not physically connected or legally available.

- Surface water management strategies, excluding major reservoirs, are projected to result in 3.3 million acre-feet per year.
- Municipal water conservation strategies are projected to result in about 617,000 acre-feet per year by 2060.
- Irrigation conservation strategies are projected to result in about 1.4 million acre-feet per year by 2060.

The planning groups recommended 14 new major reservoirs that are projected to generate approximately 1.1 million acre-feet per year by 2060. Recommended water management strategies relying on groundwater are projected to result in about 800,000 acre-feet per year by 2060. Recommended water reuse water management strategies are projected to result in about 1.3 million acre-feet per year by 2060. Desalination projects recommended as water management strategies are projected to result in about 313,000 acre-feet per year by 2060. For additional detail please see Volume 2 of the 1997 Water Plan.



**Figure 4 - Total New Supply Volumes Generated by all Recommended Water Management Strategies over the Planning Period**

**Legislative Recommendations**

In regard to legislation, the planning groups and TWDB noted several issues that the legislature should consider addressing to help implement the state water plan and ensure Texas has water for the future. These issues include recommendations for the following topics, which are discussed in more detail in the following section:

- Financing of recommended water management strategies
- Reservoir site designation and acquisition
- Interbasin transfers of water
- Environmental water needs
- Water conservation
- Expedited amendment process for regional water plans
- Indirect reuse

General information regarding the specific TWDB legislative policy recommendations regarding the 2007 Water Plan is summarized below.

Issue: Financing Water Management Strategies

The legislature should consider appropriating funds to TWDB for debt service to the State Participation and Water Infrastructure Fund programs to fund water management strategies in the 2007 State Water Plan. An initial appropriation of \$77.5 million for the

2008 to 2009 biennium would pay the first two years of debt service on general obligation bonds and grants, ultimately resulting in funding \$1.7 billion in projects needed through 2020. The total appropriation needed through 2028 for debt service and grants is \$674.6 million.

The legislature should maintain the existing state programs for water and wastewater infrastructure financing in order to provide adequate financial assistance for ongoing compliance with regulatory requirements and ensure Texas continues to access federal funds for water-related infrastructure projects.

Capital costs for recommended water management strategies in the 2007 State Water Plan are about \$30.7 billion. Estimates of capital costs include both the direct costs of constructing facilities, such as materials, labor, and equipment, and the indirect expenses associated with construction activities, such as costs for engineering studies, legal counsel, land acquisition, contingencies, environmental mitigation, interest during construction, and permitting fees.

#### Issue: Reservoir Site Designation and Acquisition

The legislature should designate all remaining viable reservoir sites of unique value for protection under Texas Water Code, Section 16.051(g), that are identified by TWDB and planning groups in the 2006 Regional Water Plans and the 2007 State Water Plan. The legislature should also designate any other feasible sites needed beyond the 50-year regional and state water planning horizon identified by TWDB-funded research currently in progress.

The legislature should designate all river or stream segments of unique ecological value recommended in the 2006 Regional Water Plans and the 2007 State Water Plan for protection under Texas Water Code, Section 16.051(f). In addition, the legislature should provide a mechanism to acquire viable reservoir sites and possibly associated mitigation areas. These sites could be used to develop additional surface water supplies to meet the future water supply needs identified in the 2006 Regional Water Plans and those that will occur beyond the 50-year planning horizon.

#### Issue: Interbasin Transfers of Surface Water

The legislature should provide statutory provisions that eliminate unreasonable restrictions on the voluntary transfer of surface water from one basin to another. Interbasin transfers of surface water have been an important, efficient, and effective means of meeting the diverse water supply needs of an ever-increasing population in Texas.

#### Issue: Environmental Water Needs

The legislature should enact statutory provisions similar to those in Article 1, House Committee Substitute Senate Bill 3, 79th Legislative Session considering

recommendations from the Environmental Flows Advisory Committee, in light of the importance of balancing human water needs with the needs for instream flows and bay and estuary freshwater inflows and the need for greater certainty in water right permitting.

Debate continues in the state as to how much and by what means water should be provided to the environment for instream flows and freshwater inflows to bays and estuaries. It is important for water planners and surface water right permit applicants to have greater certainty or predictability in how environmental flow conditions will be determined in the water right permitting process. The state, through TWDB, the Texas Commission on Environmental Quality, and the Texas Parks and Wildlife Department, has studied the environmental inflow needs for bays and estuaries since 1977. However, the results of those studies have not obtained widespread acceptance and are not readily incorporated into the water right permitting and regional water planning processes.

#### Issue: Water Conservation

The legislature should review the Water Conservation Implementation Task Force recommendations and implement those that will result in optimal levels of water use efficiency and water conservation for the citizens of Texas.

In 2001, Senate Bill 2, the 77th Texas Legislature emphasized the importance of water conservation as a water management strategy. This legislation requires that planning groups consider water conservation practices for each need identified for a water user group. A comparison of the 2007 State Water Plan to the 2002 State Water Plan shows the growing importance of water conservation in Texas. For example, recommended water management strategies for conservation in the 2002 State Water Plan generated 14 percent of the water needed to meet the state's needs in 2050—a total of about 990,000 acre-feet per year. In the 2007 State Water Plan, conservation accounts for nearly 23 percent of required water in 2060—a total of about 2 million acre-feet. These figures represent “active conservation,” measures usually initiated by water utilities, individual businesses, residential water consumers, and agricultural producers to reduce water consumption. In the 2006 Regional Water Plans, 14 of the 16 planning groups included some water conservation strategies to meet needs, and 13 of the 16 planning groups included policy recommendations concerning water conservation.

In 2003, the 78th Texas Legislature considered a broad spectrum of issues related to water conservation and established the Water Conservation Implementation Task Force via passage of Senate Bill 1094. The task force was created to review, evaluate, and recommend optimum levels of water use efficiency and conservation for the state. The task force also developed a Best Management Practices Guide consisting of 21 municipal, 14 industrial, and 20 agricultural water conservation best management practices. The practices contained in the Best Management Practices Guide are voluntary efficiency measures that save a quantifiable amount of water, either directly or indirectly, and can be implemented within a specified timeframe.

Municipal water conservation strategies in the 2006 Regional Water Plans relied heavily on the Water Conservation Implementation Task Force's Best Management Practices Guide and included aggressive plumbing fixture replacement programs, water-efficient landscaping codes, water loss and leak detection programs, education and public awareness programs, rainwater harvesting, and changes in water rate structures. Fourteen of the 16 planning groups recommended municipal water conservation as a potential way to meet future municipal water needs. In total, municipal water conservation strategies constitute nearly 617,000 acre-feet (7 percent) of water generated by all recommend strategies by 2060.

Twelve of the 16 planning groups recommended agricultural water conservation as water management strategies to meet water needs. In total, irrigation conservation strategies would generate nearly 1.4 million acre-feet of water in 2060, which equals about 15 percent of water generated by all recommend strategies by 2060.

#### Issue: Expedited Amendment Process

The legislature should provide statutory authority in Texas Water Code, Section 16.053, to allow for an expedited process for minor amendments to regional water plans where TWDB's Executive Administrator determines the amendment will not result in over-allocation of a source, is not related to a new reservoir, and does not have a significant impact on instream flows or freshwater inflows to bays and estuaries.

Texas Water Code, Section 16.053, requires that water supply projects meet needs in a manner consistent with the state water plan and an approved regional water plan to qualify for state financial assistance. In addition, Texas Water Code, Section 11.134, requires that proposed water appropriations address water supply needs in a manner consistent with state and regional water plans to receive a water right permit from the Texas Commission on Environmental Quality. In the event an applicant's project does not meet needs in a manner consistent with the state and regional water plans, the applicant must seek an amendment of the appropriate regional water plan and the state water plan or seek a waiver of this requirement. Such amendments can be costly and time-consuming because of the following requirements relating to amendments:

- 60 days notice and comment period prior to amending their plan
- Notice must be provided to each municipality greater than 1,000 population, each county judge, each river authority or special law district, each retail public utility, and each surface water right holder
- Notice must be published in a newspaper of general circulation in each county located in whole or in part in the regional water planning area
- A public hearing on the proposed amendment must be conducted to obtain public comments

Issue: Indirect Reuse

The legislature should develop policy in response to the following questions identified by the Texas Water Conservation Association's Reuse Committee:

- Under current law, is the use of wastewater effluent after discharge to a stream a use of "state water" subject to the laws of prior appropriation or is it subject to a different regulatory scheme?
- Does current law allow effluent derived from different sources of water to be treated differently for purposes of evaluating a request to reuse this effluent?
- Does current law provide for different treatment of effluent derived from "future" and "existing" return flows, regardless of the source?
- Who can obtain indirect reuse rights?
- To what extent should protection be afforded to the environment in reuse permitting decisions?

Finally, the Texas Water Board Strategic Plan contains significant detail on the Boards implementation goals and metrics for measuring progress toward meeting those goals. Please see visit

[http://www.twdb.state.tx.us/publications/reports/Administrative%20Reports/StratPlan2009\\_2013.pdf](http://www.twdb.state.tx.us/publications/reports/Administrative%20Reports/StratPlan2009_2013.pdf) for additional details.

## **7. OUTCOMES ASSESSMENT PROCESS**

The state of Texas monitors the Water Plan through the implementation strategy described in the previous sections. The state provides routine updates to the legislature and other stakeholders. The Water Plan includes over 4500 water management strategies which in turn are ultimately implemented by local water providers. The state provides loans and grants and seeks to identify positive incentives for providers to follow and implement the Water Plan strategies. The state of Texas can directly implement water resource management strategies but have focused on a more locally driven process with local project sponsors that build, manage, and/or implement water management actions and strategies.

## **8. NEEDS, CHALLENGES AND CRITICAL PRIORITIES - INTERVIEW INSIGHTS**

Please see the State/Regional Water Planning Status and Scope of Water Resource Planning sections of this document for details on trends, challenges and priorities. Population growth and drought have been two key drivers for both planning and water resource development and management strategies and implementation. In addition the following observations and recommendations highlight some key needs in the state of Texas.

- More funding from the federal government to continue to implement the USGS cooperative stream gauging program.

- Texas has done extensive planning and is now focusing on implementing the activities identified through their planning efforts. The state has concern regarding the large permitting backlog that the United State Army Corps of Engineers (USACE) is experiencing. The state would like to see additional resources and staff to move the permitting process forward in a more timely and efficient way.
- USACE does not need to do a duplication of planning and research when the state has already done the work. The state would also like to see an expedite process if the project is in the state plan; especially in regard to the development of the project “purpose and need” (i.e., if it is in the plan the “purpose and need” have been identified).
- USACE and United States Fish and Wildlife Service need to be more clear and helpful on what the guidelines are in terms of mitigation in terms of restoration and replacement criteria and the location of mitigation.
- Texas has spent millions of dollars doing planning and is now positioned to expend billions of dollars implementing these plans and the state will need USACE and other federal agencies to be a partner and advocate for moving these plans forward.
- The United State Environmental Protection Agencies State Revolving Fund Program is an example of a success story of how to work well with states with funding coming to states and state administering, prioritizing, and implementing the program with EPA in a support role; the EPA state-federal work group that has been good venue to vet issues before the federal government “comes out with or presents their approach” on policy and issues.
- In regard to federal legislation and other federal proposals, federal agencies need to work proactively with the states through the Western State Water Council, increased utilization of WestFast, and National Water Resources Association.

## 9. REFERENCES

Much of the language and information in this summary comes directly from reports published by the Texas Water Development Board.

Texas Water Development Board. Water for Texas. Volume I. January 2007. Retrieved from <http://www.twdb.state.tx.us/wrpi/swp/swp.htm> on February 5-6, 2009

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