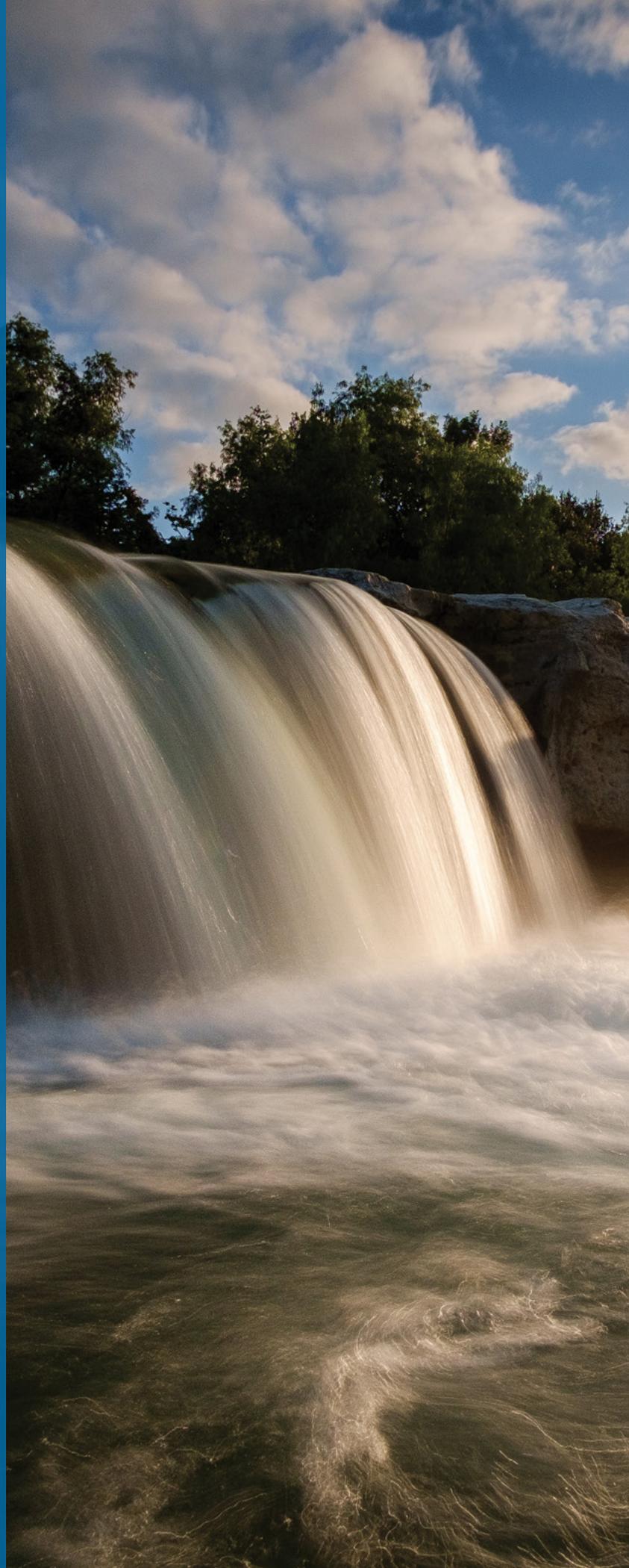


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Introduction

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QUICK FACTS

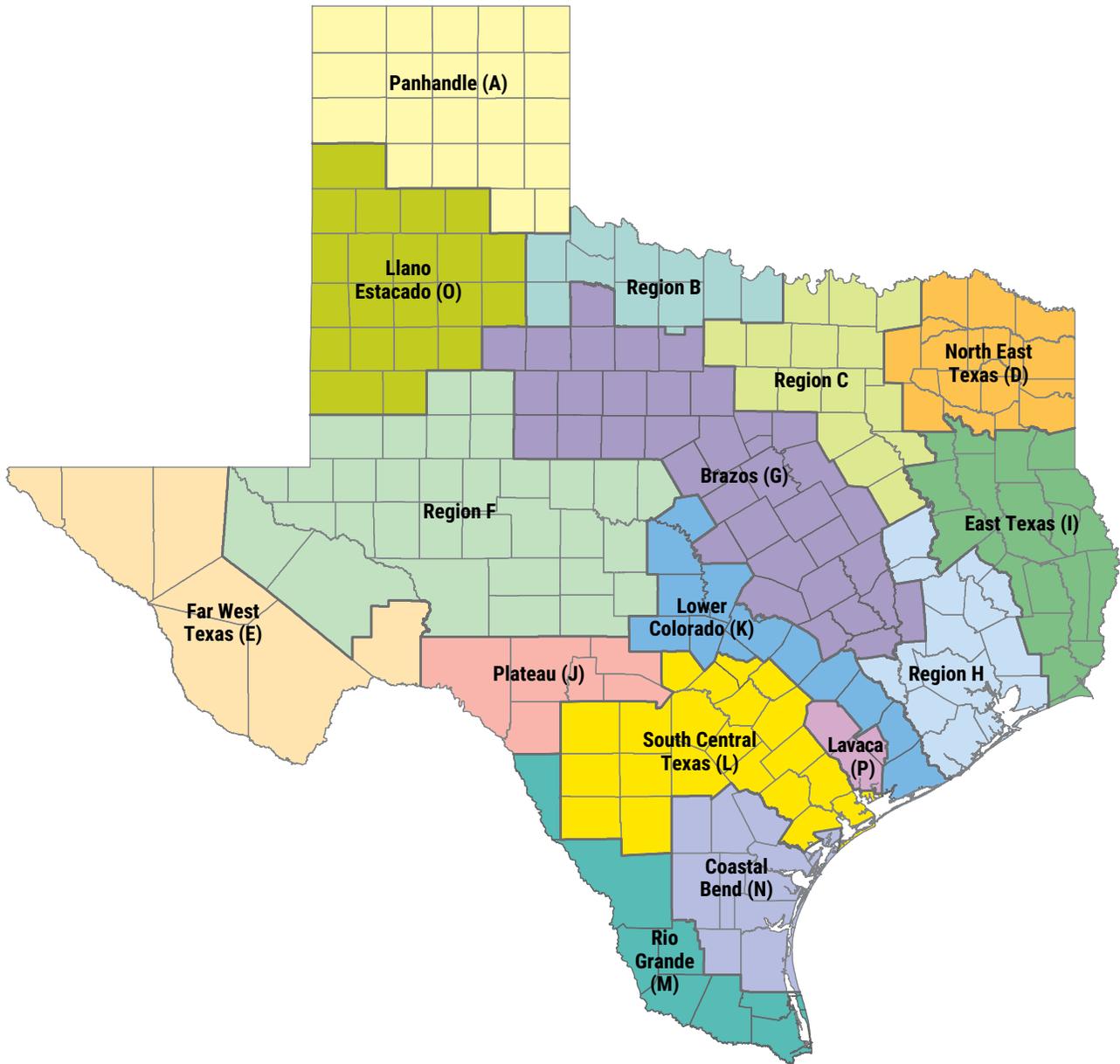
- Texas’ state water plans are based on future conditions that would exist in the event of a recurrence of the worst recorded drought in Texas’ history—known as the “drought of record”—a time when, generally, water supplies are lowest and water demands are highest.
- Details from the regional and state water plans, including summaries by region, county, and water user group, can be explored through the interactive state water plan at 2022.texasstatewaterplan.org.
- Historical water use and projected water demand data can be further explored through interactive data dashboards at www.twdb.texas.gov/waterplanning/data/index.asp.

Water is the lifeblood of Texas. It sustains the state’s booming cities and rural communities, farms and ranches, diverse economy, and natural environment. Indeed, the availability of water has always influenced patterns of settlement and economic opportunity in Texas. Due in large part to significant investments in water supply infrastructure in the mid-20th century, including many reservoirs, Texas now has dependable water supplies during most years. However, the Texas climate is famously unpredictable from one year to the next, often oscillating between extended periods of insufficient rainfall and extreme, short-lived precipitation events and flooding. The statewide drought during the 1950s is cemented in Texan legend, resulting in 244 of the state’s 254 counties being declared disaster areas and long-term demographic changes with many rural residents abandoning their farms and ranches to live in cities (NPR, 2012). This drought was punctuated by damaging floods in the spring of 1957 in every river basin in the state (TBWE, 1957). Texas’ most recent severe drought from 2010 to 2014 reminded Texans of the importance of water planning and conservation, as water supplies around the state declined significantly and 2011 took its place as the single driest and second hottest year in Texas’ modern meteorological record.

In response to the drought of the 1950s and in recognition of the need to better plan for the future, the 55th Texas Legislature created the Texas Water Development Board (TWDB) in 1957 to prepare plans and provide funding to address the state’s future water needs. In 1997, as a result of a brief but intense drought and recognition of increasing population pressure on water resources, the 75th Texas Legislature established a new, bottom-up, stakeholder-driven regional water planning process and formed 16 regional water planning areas (Figure 1-1). In this process, local stakeholders representing cities, farmers, ranchers, industries, river authorities, the environment, and other interests work together to create long-range plans to ensure Texas will have reliable water supplies during times of drought.

The 2022 State Water Plan is the fifth plan completed under the regional water planning process and the state’s 11th water plan overall. It is the culmination of the fifth cycle of regional water planning, comprising the hard work and dedication of more than 480 volunteer planning group members across Texas’ 16 regional water planning groups. With each state plan, the TWDB compiles new and updated information and recommendations from the 16 adopted regional

Figure 1-1. Regional water planning areas



water plans into one document to serve as a guide to state water policy. With each five-year cycle, the TWDB creates a comprehensive state plan that is more substantive, data driven, forward looking, transparent, and user friendly than previous plans. This is exemplified by the development of the interactive state water plan website and various online data dashboards, which are continuously enhanced for policy makers, local officials, and citizens to better engage with the water planning information that affects them.

The TWDB’s experience and commitment to continually improving the process keep Texas at the forefront of state water planning in the United States. Indeed, no other fast-growing state has produced a water plan that more clearly demonstrates how its local water suppliers can provide long-term, affordable water supplies to its residents. Sustained investments by the Texas Legislature have developed surface water and groundwater availability models that have provided constraint-based and actionable data as a basis of the planning process. Although the terms

“update” or “revision” are sometimes—rightfully—used in discussing water plans, each regional and state water plan is, in fact, a standalone plan based on a renewed look at water demands, potential shortages, and potentially feasible strategies. At the same time, the recurring nature of five-year planning cycles allows the process to respond to legislative policy changes, stakeholder input, and new methodological approaches, while remaining updated and relevant.

1.1 Regional water planning overview

Senate Bill 1, passed by the Texas Legislature in 1997, outlined an entirely new process in which local and regional stakeholders were tasked with developing consensus-driven regional plans for how to meet water needs during times of drought. The TWDB was charged with implementing the program, which meant developing rules and guidelines as well as establishing the planning regions. Senate Bill 1 stipulated that the TWDB could only provide financial assistance for water supply projects and the Texas Commission on Environmental Quality could only grant new surface water rights if they were consistent with the regional and state water plans. These incentives were important to encourage water project sponsors to actively participate in the planning process.

The 16 regional water planning areas were designated by considering river basin and aquifer delineations, political subdivision boundaries, socioeconomic characteristics, public comments, and other factors. The TWDB is required to review and update the planning area boundaries at least once every five years. These boundaries were last reviewed in October 2020, and no changes have been made since their initial establishment.

1.1.1 Regional water planning groups

Each of the 16 regional water planning areas has an associated planning group composed of local

stakeholders who volunteer their time for this process. Every five years, the planning groups are responsible for developing regional water plans that are funded primarily through legislative appropriations, administered by the TWDB, and guided by statute, rules, contracts, and input from planning group members and the general public. In accordance with the Texas Open Meetings Act, all planning groups and their committees conduct their business in meetings that are open to the public and that give the public advance notice of the time, date, location, and subject matter of the meetings.

Each planning group is required to maintain at least one representative of each of the following 12 interests:

1. The general public
2. Counties
3. Municipalities
4. Industry
5. Agriculture
6. Environment
7. Small business
8. Electric-generating utilities (also called *steam-electric*)
9. River authorities
10. Water districts
11. Water utilities
12. Groundwater management areas that fall within the planning area (where applicable)

Planning groups must have at least one voting representative from each required interest and may designate representatives for additional interests that are important to the planning area. Currently, each planning group has more than 12 voting members, with the largest having over 30. More than 480 voting members participated in the development of the 2021 regional water plans (see Acknowledgments). Planning group members serve in a volunteer capacity and are not compensated by the planning groups for their time. Planning groups also include non-voting members from the TWDB, the Texas



The North East Texas (Region D) Regional Water Planning Group unanimously adopts their draft regional water plan

Department of Agriculture, the Texas Parks and Wildlife Department, and the Texas State Soil and Water Conservation Board, as well as liaisons from adjacent planning groups and representatives of any additional interest categories deemed appropriate by the planning group, such as the Texas Commission on Environmental Quality.

The enduring success of Texas’ regional water planning process rests with the service of planning group members who dedicate many hours to ensuring the long-term viability of Texas’ water supplies. Strong leadership from planning group chairs and other long-time members, as well as the ability to attract new members who bring fresh ideas to the table, ensure the dynamic continuity of the planning process.

1.1.2 Program requirements

A regional water plan must meet all statutory, administrative rule, and contract requirements. During each five-year planning cycle, each planning group must

- maintain its membership and governing bylaws;
- designate a political subdivision of the state, such as a municipality, river authority, or coun-

cil of governments, to serve as its administrator for the purpose of arranging meetings, managing grant-funded contracts, and providing public notices (the political subdivision provides staff resources, at its region’s expense, to perform these administrative services);

- apply to the TWDB for regional water planning grant funding through its political subdivision;
- select a technical consultant(s) to serve at the direction of the planning group and to collect information, perform analyses, and prepare the regional water plan document;
- direct the development of its water plan, including making decisions about which water management strategies will be recommended;
- solicit and consider public input, conduct open meetings, and, together with its political subdivision, provide required public notices, including for public hearings on the initially prepared (draft) regional water plan;
- submit its initially prepared plan and standardized data to the TWDB for review; and
- adopt a final regional water plan and submit it to the TWDB for approval.

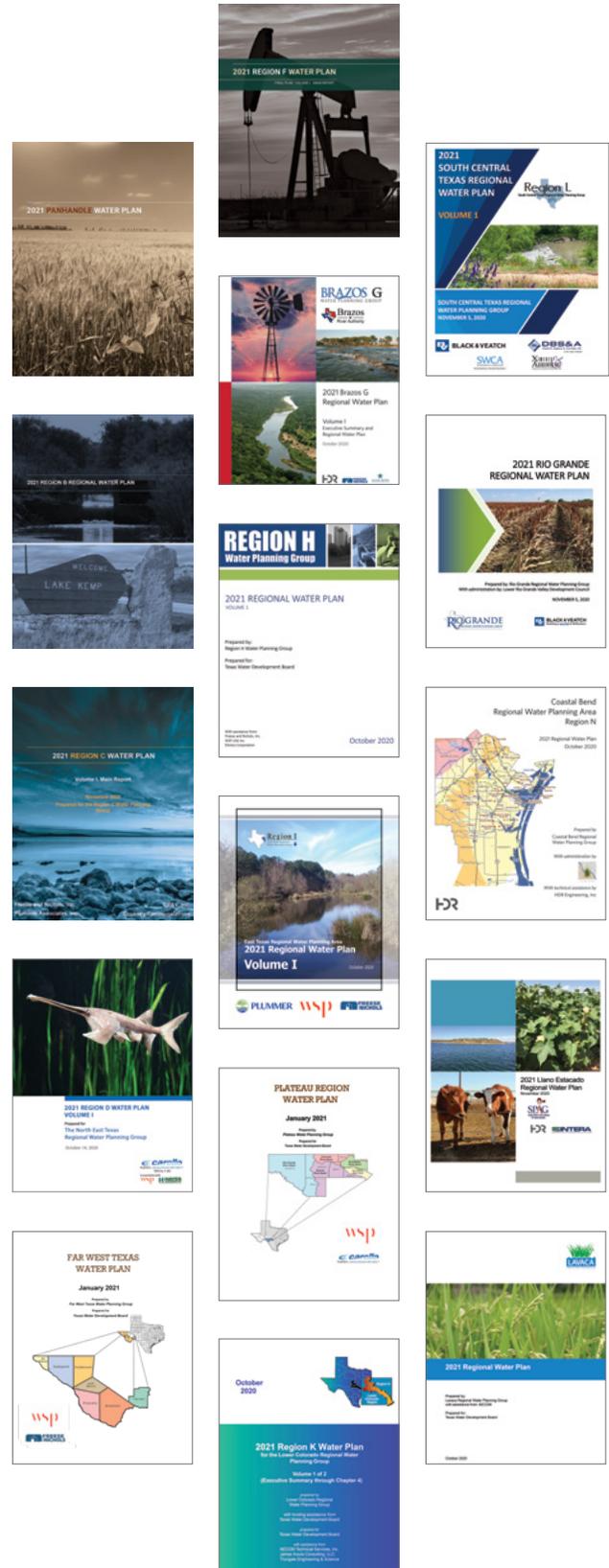
To facilitate the development of the regional water plans, each planning group is supported by

an assigned TWDB regional water planner who serves as a project manager and non-voting planning group member that attends every planning group meeting and manages the associated grant contract. The planners also provide technical and administrative assistance during meetings and throughout the development of the regional water plans to help ensure the planning groups meet their deadlines and all planning requirements.

1.1.3 Development of the regional water plans

Every five years, each of the 16 planning groups is tasked with producing long-range regional water plans that ensure water needs will be met during times of drought for the next 50 years. These plans generally follow a standard format across the regions based upon statute, administrative rules, and an established scope of work for each planning cycle.

Regional water planning is based on several fundamental parameters that guide the entire process, the most important of which is anticipating a repeat of drought of record conditions when, generally, water supplies are lowest and water demands are highest. Planning groups conduct evaluations of future water demands, existing supplies, potential water shortages, and feasible water management strategies for wholesale water providers and approximately 3,000 water user groups in six categories (municipal, manufacturing, steam-electric power generation, mining, irrigation, and livestock). Planning groups report the associated data by decade over a 50-year planning period (in this cycle from 2020 to 2070) by water user group, county, river basin, and regional water planning area. The regional plans also include drought response information, policy recommendations, information on project implementation, and a comparison to previous plans. Planning groups must also separately submit their region's prioritized list of all recommended water management strategy projects to the TWDB in support of the State Water Implementation Fund for Texas (SWIFT) prioritization



Covers of the 2021 regional water plans, www.twdb.texas.gov/waterplanning/rwp/plans/2021/index.asp

process. The prioritization at the planning group level is based on uniform standards developed by a stakeholder committee composed of the planning group chairs and approved by the TWDB.

The 16 regional water plans are the product of hundreds of meetings; the effort and many hours of hard work by the planning groups, consultants, and stakeholders; and the large amount of information that the planning groups develop along the way. Each regional plan presents information in 11 chapters with much of the underlying information entered directly into the TWDB's state water planning database.

1.1.4 Development of the state water plan

After planning groups adopt their regional water plans, they submit them to the TWDB for approval. As required by statute, the TWDB develops the state water plan based on those plans. The state water plan compiles key information from the regional water plans and serves as a guide to state water policy. It explains planning methodology, presents data for the state as a whole, identifies statewide trends, and provides recommendations to the Texas Legislature. Prior to adopting the final state water plan, the TWDB releases a draft for public comment, publishes its intent to adopt the state water plan in the Texas Register, and holds, at a minimum, one public hearing.

1.2 The interactive state water plan

The 2022 State Water Plan is supported by an interactive website (2022.texasstatewaterplan.org) that is part of the TWDB's approved and adopted plan. The interactive plan allows water users to take an up-close look at data thematically and at discrete levels not found in the electronic and bound versions of the plan. Data is presented in geographical and tabular forms with clickable links to help users navigate and

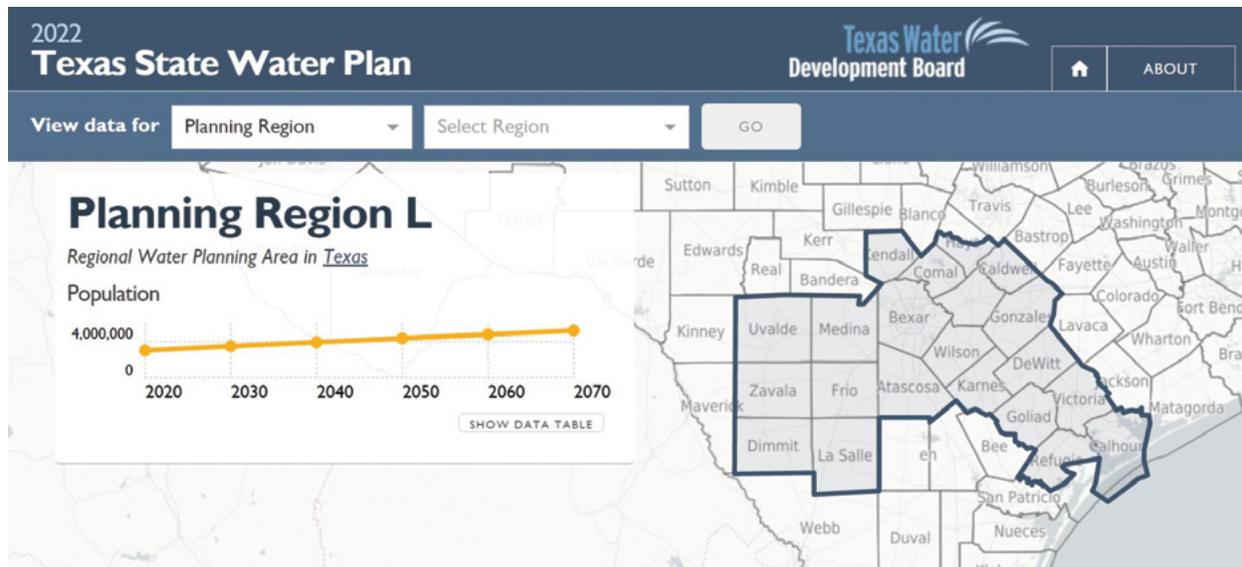
download data (Figure 1-2). The site allows users to view water sources that a particular water user group relies on today for its existing water supplies and find out what recommended strategies and water sources it will depend on in the future.

This approach to the delivery of water planning data to the public provides views at a variety of scales, from a snapshot for a single utility to the big picture outlook for the entire state. Users can view the interactive state water plan in numerous ways and from various perspectives:

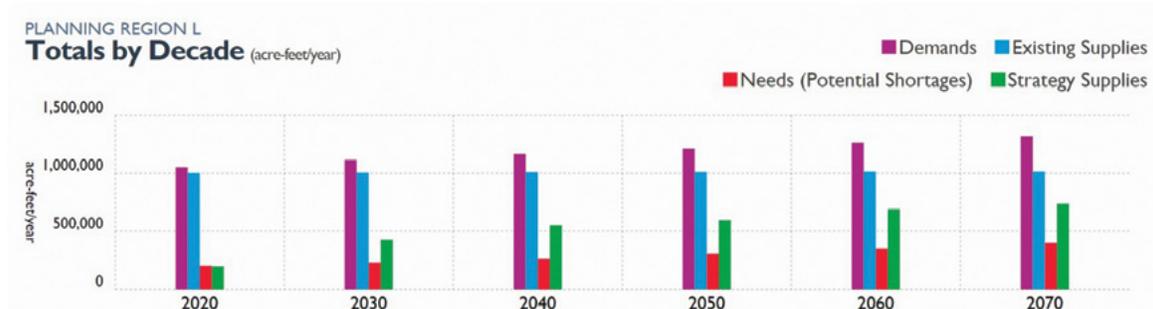
- At varying geographic scales—utility, county, region, or state
- By specific planning decades—spanning the 50-year planning horizon (2020–2070)
- By water use categories—irrigation, livestock, manufacturing, mining, municipal, and steam-electric power
- By water source—specific aquifers, reservoirs, reuse, and other supplies
- By category of planning information—projected water demands, existing water supplies, water needs, and recommended water management strategies and projects
- By type of water management strategy—to see projects by categories such as aquifer storage and recovery, direct potable reuse, or seawater desalination
- By water user—to see geographically all the water sources a user relies upon

The TWDB administers the state water planning database that facilitates the interactive state water plan. Planning groups directly populate a unique online database for each planning cycle. Planning groups rely on this database to produce portions of their regional water plans, including calculating water needs for each water user group, and to help avoid over-allocating water sources. Some of the planning data, such as water demand projections and modeled available groundwater volumes, are developed and entered directly by the TWDB. The state water planning database greatly accelerates our ability to review

Figure 1-2. View of interactive state water plan website



The South-Central Texas (Region L) Regional Water Planning Area includes all or parts of 21 counties, portions of 9 river and coastal basins, the Guadalupe Estuary, and San Antonio Bay. The largest cities in the region are San Antonio, Victoria, San Marcos, and New Braunfels. The region contains the two largest springs in Texas: Comal and San Marcos. The 2021 Regional Water Plans can be found on the TWDB website at: <http://www.twdb.texas.gov/waterplanning/rwp/plans/2021/index.asp>.



and approve the final regional plans and develop the draft state water plan.

The interactive website increases transparency, promotes awareness about water issues to the general public, and makes this critical information more accessible to a new generation of water users. During the review period for the draft 2021 regional water plans, it allowed the regions to visually present the draft regional plan data during their 18 public hearings. The interactive state water plan is also viewable on most mobile devices, and users can download data into a spreadsheet for further use. Overall, the interactive plan gives Texans the opportunity to access

and understand more information and put that information into context based on their specific needs.

1.3 New to the 2022 State Water Plan

During the fifth cycle of regional water planning, state legislators, water planning stakeholders, and TWDB staff continued to refine the process to produce more realistic, data-driven plans to guide water resources management in Texas.

1.3.1 Legislative changes since the 2017 State Water Plan

Every two years, the Texas Legislature convenes and has an opportunity to refine the iterative regional water planning process. Several bills that passed during recent legislative sessions resulted in modest changes to the fifth cycle of planning. In 2017, the 85th Texas Legislature passed three bills relevant to the planning process. The widest ranging was Senate Bill 1511, which included several provisions to the process:

- It allowed planning groups to pursue a simplified version of the planning process every other five-year planning cycle if they determine there has been no significant changes to water availability, existing supplies, or demands since the last adopted plan (the 2021 planning cycle was the first time planning groups had this option and it was not utilized, suggesting that the regions had meaningful changes to their plans).
- It required planning groups to consider the impediments to successfully implementing projects in the region (summarized in Chapter 10).
- It added one new non-voting member representing the Texas State Soil and Water Conservation Board to each planning group.
- It required certain planning group meetings be held in a central location readily accessible to the public within the planning area.
- It required further assessment of the feasibility of projects and will require removing infeasible projects by amendment in the 2026 regional water plans.
- It directed the TWDB to report on the implementation and impediments to the development of projects funded through SWIFT in the state water plan (see Chapter 10 for this information).

Because Senate Bill 1511, 85th Texas Legislature, now requires planning groups to actually amend their regional water plans if recommended water management strategies or projects become infeasible prior to the next plan adoption, including

‘infeasible in time,’⁴ the need to ensure realistic reservoir development timelines, for example, was emphasized by the TWDB in the contract guidance and at planning group meetings. Partly in response to this feasibility review, online decades for six recommended new major reservoir strategies were shifted from 2020 in the draft regional plans to 2030 in the final, adopted regional water plans.

The 85th Texas Legislature also passed Senate Bill 347, which stipulates that, in addition to planning groups, any committees or subcommittees designated by the groups are also subject to the Texas Open Meetings Act and the Public Information Act (Chapters 551 and 552, Texas Government Code). House Bill 2215 synchronizes the schedules of the state water plan and the joint groundwater planning and regional water planning cycles. This change, which was a TWDB recommendation in the 2017 State Water Plan, shifted the proposal and adoption dates for desired future conditions so modeled available groundwater values would become available earlier each planning cycle.

In 2019, the 86th Texas Legislature passed several additional bills relevant to the regional water planning process and state water plan development. House Bill 807 called for the TWDB to appoint an interregional planning council composed of members of each planning group that must meet at least once during each five-year planning cycle. The inaugural meeting was held April 29, 2020. As part of its work, the council produced a report, submitted October 16, 2020, which included recommendations for the TWDB (Interregional Planning Council, 2020). The bill also added several specific new requirements to the regional water plans:

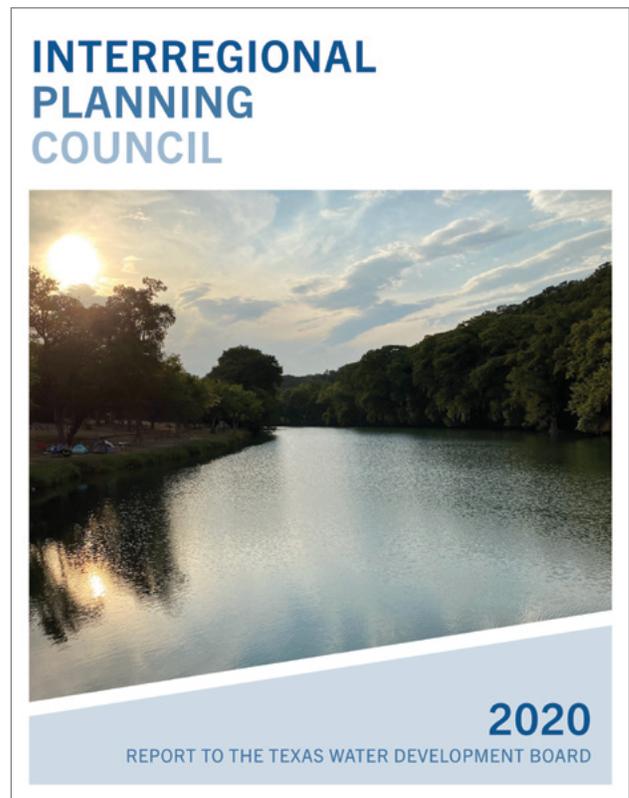
⁴ Although all projects recommended in the plan are considered technically feasible, a project may become infeasible ‘temporally’ meaning that obstacles and related delays to implementation might make it impractical to build the project quickly enough to meet water needs intended to be met in an early decade, and the project would need to be shown as meeting needs later on.

- Identify any counterproductive drought response strategies (summarized in Chapter 3)
- Provide a specific assessment regarding the potential for aquifer storage and recovery projects to meet significant identified water needs in the planning area (summarized in Chapter 7)
- Set specific per capita per day water use goals for each municipal water user group for each planning decade (highlighted in Chapter 8)
- Assess the progress in encouraging cooperation among water user groups to develop strategies that achieve economies of scale and benefit the entire region (summarized in Chapter 10)
- Encourage planning groups to provide feedback to the state regarding water planning process improvements (these policy recommendations are summarized in an ancillary document on the state water plan website, www.twdb.texas.gov/waterplanning/swp/2022/index.asp)

House Bill 721 requires the TWDB to assess aquifer storage and recovery projects and aquifer recharge projects in the state water plan or identified by other stakeholders and conduct a statewide survey to broadly identify the relative suitability of various major and minor aquifers for use in aquifer storage and recovery projects or aquifer recharge projects. The TWDB delivered this survey to state leadership in December 2020, and the results will inform the next planning cycle. House Bill 723 requires the Texas Commission on Environmental Quality to obtain or develop updated water availability models for the Brazos, Neches, Red, and Rio Grande river basins by December 2022. These new model updates are important and will be utilized to develop the 2026 regional water plans and 2027 State Water Plan.

1.3.2 New developments and process improvements

With each cycle of regional water planning, the TWDB strives to make the process more accessible, coherent, and informative for stakeholders and the public. During the fifth planning cycle, the TWDB increased opportunities for stakeholder



Interregional Planning Council report

input, including holding two work sessions with planning group chairs. However, the most significant change during this cycle was the shift to utility-based planning. In previous plans, municipal water user groups were defined mostly by political boundaries, such as city limits, rather than water utility service areas. Utility-based planning provides many benefits and allows planning groups to plan for the entities responsible for maintaining infrastructure, planning for future growth, and sponsoring the projects that are recommended in the plans. It also better aligns the planning process in a more one-to-one manner with data the TWDB collects through Water Use Surveys, Water Loss Audits, and Water Conservation Plans. Additionally, the rule changes that accompanied this shift to utility-based planning lowered the threshold for how much water entities need to provide to be classified as discrete water user groups, increasing the number of small communities identified in the plans. More information on utility-based planning as the basis for the municipal water demand projections can be found in Chapter 4.

The TWDB implemented several other significant process improvements during the fifth cycle of planning. The TWDB launched the Texas Water Service Boundary Viewer (www3.twdb.texas.gov/apps/waterserviceboundaries), an online mapping application to house the active water service boundaries for all retail water suppliers in the state and serve as a hub for related water utility information. The Viewer operates in conjunction with the TWDB’s annual Water Use Survey, which allows utility managers to review and propose modifications to boundaries every year via a mapping platform. This results in more accurate estimates of per capita water use. The TWDB also accelerated the development of the socioeconomic impact analyses prepared for the planning groups so these analyses could be included in the draft plans and subject to greater public review. Based upon results from the socioeconomic impacts analyses, the TWDB developed a drought management strategy costing tool to assist planning groups in their strategy evaluations and decision making.

The TWDB also placed a greater emphasis on visualizing planning data and making it more accessible throughout the planning process by

- launching an online planning data dashboard where users can compare population and water demand projections from previous water plans and compare adopted projections to historical water use estimates in each category;
- developing a regional data visualization map for the planning groups to reference as they developed their plans. The dynamic map displayed water needs and surpluses to identify and inform potential regionalization of projects;
- developing a data dashboard to facilitate understanding of the socioeconomic impact analyses developed for the planning groups; and
- making available the interactive state water plan platform with draft regional plan data for planning groups to utilize while reviewing their initially prepared (draft) plans and when presenting at public hearings. This improved the

transparency and understanding of plan content during the public comment period of the initially prepared plans.

1.4 Advent of regional flood planning and the first state flood plan

Following the widespread devastation from flooding caused by Hurricane Harvey as well as other recent tragic flood events around the state, the 86th Texas Legislature passed landmark legislation to address the persistent threats of flooding in Texas. In addition to providing new funding mechanisms for flood mitigation projects (the Flood Infrastructure Fund and the Texas Infrastructure Resiliency Fund), the legislation mandated that the TWDB establish and administer a statewide flood planning process, with the first state flood plan due to state leadership in 2024. The TWDB established 15 flood planning regions, appointed initial members to each group, and held initial meetings of the planning groups in October and November 2020. It is truly a testament to the success of regional water planning that the legislature chose to emulate the process to address flood risks in Texas.

There are several fundamental differences between water supply planning and flood mitigation planning, though, that necessitate a different focus of attention. Water supply planning is generally about addressing long time periods of low water supplies that unfold somewhat slowly and have their greatest impact on the economy, with potential risks to health and safety, whereas flood mitigation planning is about coping with very intense rainfall events over short time periods that quickly take lives, destroy public and private property, and disrupt the economy. In addition, flood planning groups are organized by river basin, and the underlying science, data, and methodologies are very different between these efforts. For instance, reservoir storage must be treated entirely differently. Reservoir storage

for water supply aims to keep sources as full as possible to provide water supply during times of drought, whereas reservoir storage for flood control must be kept at lower levels in preparation for the next flood event. Although water planning and flood planning are separate programs, there will be data sharing and opportunities for collaboration, such as when flood mitigation projects can provide water supply benefits.

1.5 Organization of the plan

The next chapter summarizes the TWDB’s policy recommendations to the Texas Legislature, and Chapter 3 describes Texas droughts and provides drought response information and recommendations. Chapters 4 through 7 summarize the steps to develop the regional water plans, including the population and water demand projections, existing water supply analysis, needs identification, and recommended water management strategies and projects that are the fundamental building blocks of each state water plan. Chapter 8 highlights conservation planning, programs, and implementation. Chapter 9 presents the financing needs required to implement strategies and projects recommended in the 2022 State Water Plan, based on surveys compiled by the regional water planning groups. Chapter 10 provides information on the implementation of the 2017 State Water Plan, including projects funded through SWIFT as well as a discussion of impediments to implementing projects.

Each regional water plan must be consistent with all laws, rules, and regulations applicable to water

use in the planning area. Appendix A provides additional information on water quality, drinking water, interstate waters, how surface water and groundwater are managed in Texas, and a brief history of water planning in Texas. Appendix B provides more detailed information on the processes of determining surface water and groundwater availability in the regional water plans. It also presents tabular reports summarizing annual water availability and annual existing supplies for surface water and groundwater. Appendix C summarizes annual water needs by region and water use category, and Appendix D presents information on regional socioeconomic impacts. As noted above, the adopted plan includes the online interactive state water plan, and the plan is also supported by a webpage that includes additional reference information and ancillary analyses.

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