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Commentary: The regional water planning process: a Texas success story

Bech Bruun[1]

Editor's Note: The opinion expressed in this commentary is the opinion of the individual author and not the opinion of the Texas Water Journal or the Texas Water Resources Institute.

Abstract: In 1997, in the wake of a severe, statewide drought, the Texas Legislature passed an omnibus water bill that, among other things, fundamentally changed how Texas develops its state water plans. The resulting 5-year, bottom-up regional approach to planning has since formed the basis of the last 4 state water plans. Nearly a generation after the regional water planning process began, we can now point to some significant achievements and identify key factors in the success of the process.

Keywords: Water, planning, infrastructure, state water plan

[1] Board Member and Chairman, Texas Water Development Board, Austin, Texas

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Terms used in paper

Acronym	Descriptive term
SWIFT	State Water Implementation Fund for Texas
SWIRFT	State Water Implementation Revenue Fund for Texas
TCEQ	Texas Commission on Environmental Quality
TWDB	Texas Water Development Board

INTRODUCTION

One might say that the old adage "*Life is what happens while you are busy making plans*" could be applied to the relative disconnect between water plans and water development in Texas prior to 1997. Although the state began developing state water plans in 1961, too few water projects were being implemented to address the state's drought risks and its need for adequate water supplies for a growing population. There was a significant "reality gap" between the state's water plans and what was actually being implemented.

In 1997, however, visionary state leadership created a new, cyclical, "bottom up" regional water planning process. The cyclical process ensures a realistic assessment of water needs and feasible responses to meeting those needs. At the same time, the cyclical process keeps the state water plan relevant by incorporating new information, the latest science, and recent legislative policy every 5 years. As a result, the reality gap between planning and implementation has been greatly reduced over the last 20 years.

With the experience of nearly 2 decades of regional water planning behind us and the release of the 2017 State Water Plan, our fourth state water plan under this new process, now marks a good time to reflect on what has been achieved.

Tremendous future population growth and our vibrant economy require that Texas continue to map out future water supplies and ensure that we will continue to have enough for future generations. As observed by the Texas Senate in 1997, "water, more than any other natural resource, challenges Texas' future."[1]

TEXAS WATER PLANNING HISTORY

The Texas Water Development Board (TWDB)'s predecessor agency and state water planning, in general, came about as a direct response to the drought of the 1950s, which remains Texas' worst statewide drought of record. The Water Planning Act of 1957 charged the agency with the responsibility for water resource planning, including developing state water plans, and in 1961 the agency produced the first state water plan. An observation in that plan has continued to ring true throughout the past 60 years: *"If Texans cannot change the weather, they can at least, through sound, farsighted planning, conserve and develop water resources to supply their needs."*[2]

In 1996, another severe statewide drought revealed once again Texas' vulnerability to drought and served as a catalyst in 1997 to the Texas Legislature's deliberate move to change how Texas plans for water supply. The new approach, built on a more stakeholder, regionally driven approach formalized a regional water planning process based on 16 self-governing planning groups representing 16 regional water planning areas (A–P).[3] Each planning group was required to prepare its own regional water plan on 5-year cycles. The goal was to try to improve state water planning so that more projects would be developed to meet Texas' rapidly growing water needs to provide for public health and safety and our economy under drought conditions.

The shift to a regional water planning approach was partly an indication that many of the previous state water plans were not viewed as realistic or specific enough to forecast or facilitate actual project implementation.[4] A more local approach to developing state water plans made sense considering it was (and remains) the local and regional water providers that directly implement and pay for water projects. Other than providing financial assistance programs, primarily in the form of low-interest loans, the State of Texas, does not, in general, sponsor or directly pay for state water plan projects.[5] At the same time, the regional water planning process needed to be balanced enough to develop meaningful state water plans while protecting the state's interests and upholding certain planning principles. The last 4 state water plans (2002, 2007, 2012, and 2017) have been successfully developed under the new, regional approach that develops water plans every 5 years.

The new regional planning process also fundamentally changed the dynamic of water planning by shifting the decision-making about water management strategies from the state's purview to regional water planning groups. Up until then, the state had been responsible for recommending the projects in the state water plan. The result was that large portions of the state water plans were effectively gathering dust on a shelf while water providers either proceeded differently or did not proceed at all to implement many projects.

[1] http://www.capitol.state.tx.us/tlodocs/75R/analysis/html/SB00001S.htm

[2] Texas Board of Water Engineers. 1961. A plan for meeting the 1980 water requirements of Texas. Austin (Texas): Texas Board of Water Engineers. Available from: http://www.twdb.texas.gov/publications/State_Water_Plan/1961/1961.pdf

[3] Once the "initial coordinating bodies" of each planning group were designated by the TWDB through a nomination process, each was charged with self-governance including maintaining the minimum statutorily required membership categories (counties, municipalities, industries, agriculture, environment, small business, electric generation utilities, river authorities, water districts, water utilities, the general public, and groundwater management areas). They are not considered political subdivisions of the state.

[4] Although any 50-year plan has a significant amount of uncertainty and therefore remains subject to change, it is important to both policy-makers and water providers that what is laid out in each plan is at least credibly feasible, particularly as it applies to the near-term timeframe.

[5] The TWDB takes partial ownership interest in a very limited number of larger capacity projects that are eventually bought out by sponsors as their need for water reaches the full project capacity.

The new process set Texas apart from other states primarily by

- designating regional water planning areas and regional water planning group members that develop plans in a bottom-up manner,
- basing the state water plan on the 16 regional water plans,
- requiring the development of regional and state water plans every 5 years,
- providing regular legislative appropriations, and
- using the historical drought conditions as the benchmark for the plan development.

The legislature's bold shift to regional planning meant that 16 planning groups now had the responsibility to identify the best approaches to meeting Texas' future water needs. The legislature incentivized participation in the process through water rights and the state's financial assistance programs. The Texas Commission on Environmental Quality (TCEQ) may not issue a water right unless it addresses a water supply need in a manner consistent with the regional and state water plans. Projects applying for financial assistance from the TWDB must also be consistent with the plans.

The shift to regional planning also meant that because the state water plan incorporated the regional water plans, the state would not, as a matter of course, directly add or remove specific projects as long as the planning groups developed their regional plans in accordance with statute and rules.[6] The TWDB shapes the regional and state water plans through developing and implementing its own rules and guidance and by making state policy recommendations in the state water plans. The Board is also responsible for resolving interregional conflicts and may be approached directly by any local water provider that believes its requested change to a regional plan was not sufficiently addressed by a regional water planning group.[7]

As a part of the new process, planning groups were required to evaluate how each municipal and non-municipal water user group (and numerous major water providers) would fare under drought conditions over the next 50 years by

- forecasting population and water demands;
- assessing existing water supplies;
- identifying water needs (potential shortages); and
- recommending strategies for each entity to meet those potential shortages under drought conditions.

The resulting water plans provide detailed "snapshots" of what Texas water supplies would look like if drought conditions were to recur within each of the next 5 decades. The plans recommend, in detail, feasible actions to respond to drought and address potential water shortages.

ACHIEVEMENTS

That Texas' regional water planning process has successfully produced 4 comprehensive and highly credible state water plans with relatively little controversy is an achievement in itself. Each plan is based on an enormous amount of stakeholder input and is the result of 5 years of planning effort by hundreds of planning group members and their consultants.[8] There are many dimensions to these successes that other states and countries might find enviable. Perhaps most notably, no other fast-growing state has produced a water plan that more clearly demonstrates how its local water suppliers can provide affordable water to its citizens over the long term.

More substance and less conjecture

The state water plans developed through the regional water planning process have increased the amount and quality of direct stakeholder input, which in turn provides more accurate, detailed, actionable information about very specific water sources, water users, and recommended projects than previous state water plans.

By more directly involving those responsible for implementing projects and developing detailed numerical analyses, the new plans—and hence the overall state plan—better articulate the basis for and coherent path to implementing each project. The most recent 2017 State Water Plan shows very explicitly how Texas can affordably meet nearly all of its anticipated municipal water demands for the next 50 years.[9] This conclusion does not rely on over-simplified aggregations of water demands and supplies and optimistic prose. It is based, instead, on detailed assessments of projected water demands, existing supplies that users are already connected to, and strategy recommendations for each of the more than 2,600 water users identified in this cycle of planning. The 5,500 recommended strategies are, in turn, associated with a specific water source (such as a reservoir or aquifer) that has been further evaluated to ensure that implementation of each strategy would not overextend its dedicated water source. Finally, these strategies would require 2,500 specific capital investments, each of which has an estimated cost and online date. Importantly, the vast majority of projects also have a named sponsor entity to take ownership, implement, and pay for the infrastructure.

[6] In accordance with statute (TWC § 16.053 31 TAC §§ 357, 358), the TWDB reviews and approves each plan. Throughout this document, TWC refers to Texas Water Code and TAC refers to the Texas Administrative Code.

[7] TWC § 16.054; 31 TAC 357.51

[8] The 2017 State Water Plan, at 133 pages, only summarizes the more than 20,000 pages that make up the 16 regional water plans.

[9] There are a few municipal needs that are shown as unmet by the plan but that may be significantly less depending upon future regulatory decisions and, in all cases, would not be expected to impact public health and safety.

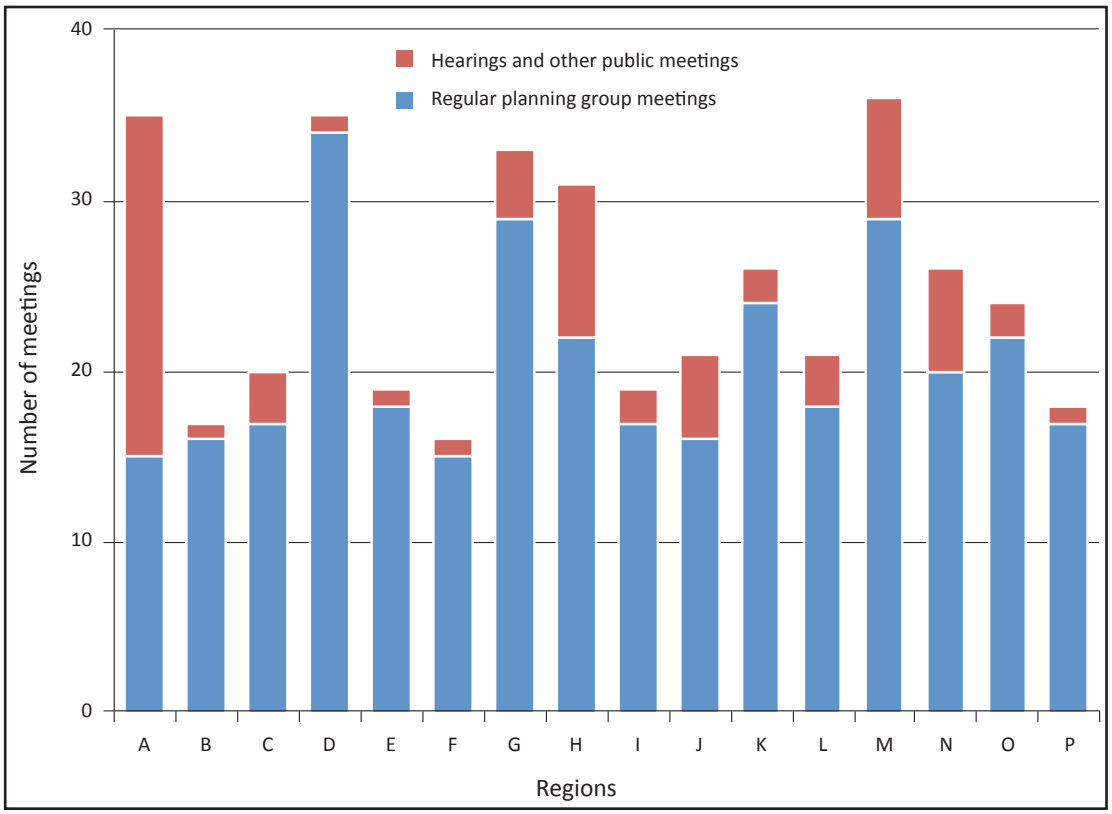

Figure 1. Number of regional planning group meetings and hearings on 2016 plans.

Local involvement and transparency

The regional water planning process requires the participation and efforts of hundreds of individuals. For example, in the last planning cycle, there were more than 450 voting members on the regional planning groups. In addition, all planning group meetings must be open to the public. The regional water planning process for the 2017 State Water Plan included approximately 400 public meetings and hearings held in the 16 regions and extensive data gathering from water users and water providers (Figure 1).[10] Most of these meetings were an integral part of developing information for the draft regional water plans, including the process of making decisions about the plan contents. The public and other stakeholders could participate in and speak at all of these public meetings. There were also 16 public hearings held in each respective region once the draft plans were prepared. Additional public meetings at which the planning groups considered and responded to public and other comments and made final changes to the plans followed those meetings. Finally, a public hearing was held on the state water plan in Austin.[11]

Comprehensive, balanced plans

As demonstrated over the last 4 planning cycles, independent planning groups are capable of operating effectively to develop sensible water plans.

A cursory comparison of the general types and shares of strategies recommended in the last 4 state water plans indicates that, at an aggregate level, planning groups are not influenced by political fads and the overall process is robust.[12] Although the terms "update" or "revision" are sometimes used in discussing water plans, each regional and state water plan is, in fact, a stand-alone plan that is based on a renewed look at water demands, potential shortages, and potentially feasible strategies.

[10] Planning groups are required to follow the Texas Open Meetings Act.

[11] In previous years, multiple hearings had been held on the state water plan, but due to the low turnout and a related internal audit recommendation, one was held. The low turnout at state water plan hearings can be attributed largely to 2 things: the level of stakeholder involvement that has already occurred at the regional levels and the generally high level of public acceptance of regional plans.

[12] As further evidence of the sensibility of the regional water plans, there were no sudden wholesale revisions or an upending of the regional water plan recommendations when the SWIFT funding program and its associated prioritization processes was overlaid *onto the existing 2012 State Water Plan*. Instead of causing disruption, the new funding source and prioritization process were integrated into the planning and implementation processes based on the same feasible projects that were already vetted and recommended by the planning groups.

Though there are seldom drastic changes in plans from cycle to cycle, the planning groups do revisit all strategies in each cycle to replace those strategies that are no longer feasible in the new plan. Even strategies that may have been recommended in previous plans must be updated, for example, to reflect updated costs, and, if appropriate, recommended anew. Not surprisingly, some strategies appear in multiple, sequential plans, whereas other strategies and projects that may have been previously recommended are not recommended in the next plan. Cycle-to-cycle changes to a region's recommended water management strategies are the result of a variety of factors. These factors include changes in each cycle's water demand projections and quantified water availability (for example, as a result of new managed available groundwater values or new drought of record conditions), completed implementation of projects, and other new or changed information.

Examples of changes between water plans that are not associated with project implementation include the following:

- A number of surface water projects, including major reservoirs, that over the years were recommended strategies in at least 1 regional water planning cycle are no longer recommended strategies. These include Bedias Reservoir, Lake 8, Little River Main-stem Reservoir, Post Reservoir, Nueces Off-channel Reservoir, and Texana Stage II Reservoir. Both the Laredo and Brownsville weir projects and a major Lower Colorado River Authority-San Antonio Water System project are no longer recommended strategies in the state water plan. On the other hand, there are new strategies in the 2017 State Water Plan to dredge Lake Lavon and Lake Wright Patman.
- The Region K seawater desalination project, located in Matagorda Count and recommended in the 2007 State Water Plan, is no longer a proposed strategy. Both the Laguna Madre and Laguna Vista seawater desalination projects recommended in the 2012 plan are not included in the 2017 plan due to feasibility issues. Between the 2012 and 2017 plans, the Freeport seawater desalination project capacity was reduced to approximately one-third its previously recommended size, and the proposed Brownsville project capacity was increased 4-fold over the previous plan.
- There is a new aquifer storage and recovery strategy recommended for New Braunfels in the 2017 State Water Plan. On the other hand, the previously proposed City of Bandera aquifer storage and recovery strategy is not in the current state water plan.
- To respond to new desired future conditions of aquifers, numerous strategies have been changed, including downsizing of projects. One clear change involves the 2012 State Water Plan strategy called *Overdraft of Trinity Aquifer* in Region C that became infeasible due to new desired future conditions and was therefore not included in the 2017 State Water Plan.

The lack of volatility between water plans is due to various factors, including the planning groups' ability to maintain their membership, strong planning group leadership, and, most importantly, the thorough regional water planning framework that guides the overall process. Throughout their work, the planning groups also benefit from local water plans and the deep knowledge and perspectives brought to the table by those water providers who will have to implement the plan.

Individual planning group members do not recommend strategies in a vacuum. The regional water planning process requires that the planning group identify, evaluate, and consider potential strategies all while requiring public input on those strategies. In addition, the process relies on certain required technical evaluations performed by professional technical consultants. Not surprisingly then, the plans for the most part have changed in a logical and reasonable fashion from one to the next.

KEY FACTORS IN WATER PLANNING SUCCESS

A number of features contribute to the success of Texas' regional water planning process, including the science-based data, the involvement of local and regional entities who will sponsor and pay for the projects, the stability of the planning process, the cyclic nature of planning, and the role of the state. The adherence to basic planning parameters and the frequent opportunity to improve the process have resulted in comprehensive, credible state water plans that provide a coherent picture of how Texas can move forward to meet its water needs. Whereas other states' water plans often include large amounts of text and limited numbers and specifics, one of the strengths of Texas' water plan is the detailed numbers that speak for themselves.

Science-based, quantitative planning

The only responsible way to ensure that cities and businesses aren't short of water is to use realistic forecasts and plan for only the amount of water that can legally and physically be pumped in drought conditions without over-allocating any water sources. The emphasis on constraint-based, numerical water planning using the best available, actionable information has obligated planning groups to explicitly recognize water resource limits and develop credible plans within those limits.

Because the regional water plans are founded on science-based, water resource constraints, they have been highly defensible and meaningful. Managing natural resources responsibly

requires translating policy decisions into numbers in the same way that producing a responsible financial budget requires a detailed balance sheet with expected income and expenditures. Thanks to significant investments by the Texas Legislature in developing surface water and groundwater models, we are well ahead of most other states in our ability to translate state and local level policy into quantifiable surface water and groundwater availabilities for each of our river basins and aquifers. Those numerical models have played a key role in shaping and legitimizing the adopted regional and state water plans.[13]

The integrity and coherency of the regional and state water plans rely on the consistent use of a variety of credible data and consistent application of widely accepted technical analyses. Municipal water demand forecasts in all 16 regional water plans, for example, are based on federal census data, a common set of statewide, historic water use data collected by the TWDB, and sophisticated population projections modeled by the State Demographer at the Texas State Data Center. Although regions have the ability to request justified changes to this projection data, the TWDB maintains the overall integrity of the statewide numbers, including limits at the county, regional, and state level, by acting as the sole arbiter of the final projections.

The regions' reservoir firm yield analyses must also follow a common methodology based on industry practice. Additionally, project cost estimates are based on a common set of assumptions and are supported by a standardized costing tool developed by the TWDB specifically for use by the regions.

The overarching framework of the regional water planning process does not permit planning groups to simply ignore unpleasant realities or to entirely sidestep the most difficult issues that require tough decisions. Statute and planning rules require that planning groups address specific water planning steps, each structured to lead to a concrete numerical outcome or recommendation. These processes have led to conflicts that must be resolved by those best suited to address them head on: regional water planning group members and their stakeholders. The resulting conflicts have been productive. Conflicts tend to improve stakeholder understanding, strengthen the basis for decision-making, and advance research and policy discussions that help avoid, or at least better inform, future conflicts.

Conflict means that there is something at stake and participants are wrestling with important water issues that probably do not have easy solutions. Acknowledging conflicts and making associated recommendations in the plans can provide stakeholders and project sponsors with greater certainty than if the issues are left unresolved indefinitely. Because regional plans cannot simply ignore disagreements or plaster over numerical discrepancies with vague and optimistic language, they must work at resolving these conflicts in a public setting, which strengthens the water plans.

Essential role of project sponsors

A natural tension exists between the local and regional providers that must implement water supply projects, the regional water planning stakeholder process, and the scale and goals of a state water plan. In the end, planning groups and those responsible for actually developing water projects naturally consider their own interests and geography. Thus far, planning groups have recommended projects, large and small, that, in the current context of water rights and water provision, are considered feasible and make the best economic and logistic sense with regard to actual implementation. As long as the cost is borne by local entities, planning groups will continue to choose strategies that they believe can be reasonably implemented and financed by local sponsors in a timely manner.

The current planning framework provides the opportunity for multi-region projects that serve large areas of Texas but does not require it. To this end, planning groups already include representation of interests outside their region and cooperate in the planning process.[14] In developing their plans, the planning groups consider water resources, including state-owned surface water, located outside the regional water planning area and may consider including water providers and water users outside their region when developing strategies. In the 2017 State Water Plan, roughly one-fifth of all new water supplies associated with recommended water management strategies in 2070 originate from water sources associated with other planning regions.[15]

The state has a clear role in setting the overall course and goals of the planning process, including providing guidance and requiring that each plan attempt to meet statewide water needs where feasible. Texas' planning framework does not promote

[13] Firm surface water supply estimates are based on the surface water models that are used for permitting and maintained by the TCEQ. Groundwater availability is limited by the requirement that regional water plans must be consistent with desired future conditions. Desired future conditions represent the desired, quantified conditions of groundwater resources, such as water levels, water quality, spring flows, or volumes, at a specified time or times in the future or in perpetuity. The vast majority of groundwater that can be pumped in drought is determined through policy decisions of conservation districts within a single groundwater management area that are then translated into modeled available groundwater values using the TWDB-approved groundwater availability models.

[14] Each planning group includes liaisons from adjacent planning groups who facilitate the sharing of information and help coordinate planning activities. The limited number of multi-region strategies is at least partly the product of well-chosen regional planning areas.

[15] Regional water planning areas serve as administrative and planning boundaries only and do not include any authority to limit other regional water planning groups, water providers, or water users' ability to maintain existing or shared water supplies or to secure additional water supplies that may be located within any other regional water planning area.

any one technology over another, for example through direct financial incentives. The Texas Water Code's agnostic approach toward both the type of technology and the scale of projects that may be recommended makes sense for a large, diverse state but also means that, in the end, strategy recommendations remain those of planning groups.[16]

Stability of planning group memberships

Planning groups remain relatively stable as bodies and continue to implement the state's regional water planning process in a conscientious manner. The groups have consistently made a good faith effort to fill member vacancies as they arise, and the membership of planning groups has generally not experienced upheaval or disruptive levels of turnover.[17] They maintain their own bylaws and adjust and replenish their membership as needed in accordance with their bylaws.

In the fall of 2016, the TWDB solicited public comments and held a public work session specifically to consider the membership and operation of the planning groups. A Board member roundtable discussion with the chairs or designated representatives of the 16 planning groups considered the public comments received and a summary of the 16 regional planning groups' existing bylaws and membership requirements.[18] Based on that discussion as well as the limited number of and nature of the public comments the TWDB received, it was apparent that there are not significant issues with the legal requirements for regional water planning group membership or widespread concerns with how planning groups maintain their membership.[19] The discussion revealed that the planning groups have flexibility to successfully recruit engaged planning group members who represent the required interest categories and have successfully accommodated statutory changes to their planning group membership. In addition, many planning groups have more than the required number of voting positions to ensure that a broader number of interests are represented on the planning groups (Figure 2).

Regular planning cycles

The regularity of 5-year regional and state planning cycles required by current statute, together with the built-in flexibility of the process, facilitates a predictable and stable planning process that rapidly incorporates legislative policy direction, new information, and innovations as they arise.

Developing regional and state water plans every 5 years encourages engagement and retention of institutional knowledge by planning group members, stakeholders, consultants, and state agency resources. Developing the same type of detailed, bottom-up regional water plans on either a more intermittent basis or on significantly longer planning cycle timeframes would at some point become very challenging as planning group members and other participants would have to be entirely reoriented to each new cycle. Extended periods of inactivity would pose practical challenges. One of those challenges would be the reduced expertise of technical consultants and agency staff that support the nuts and bolts of the planning process. The quality of the plans would reflect these drawbacks.

Cyclical planning sets up an inevitable feedback loop in which water plans and the planning process are responsive to criticisms and legislative policy changes, remain updated and relevant, and incorporate new scientific data and other improvements. The regular cycles of plan development also serve to test the viability and longevity of proposed projects. The result is that projects that no longer make sense, for example due to changing economics, are sifted out along the way. The planning process itself has been adjusted over the years so that plan content and delivery mode are continually improving.

Our agency continues to look for ways to improve the plans and add value to the process. The Interactive 2017 State Water Plan website is the most notable product of a long series of improvements in how we collect, organize, and deliver planning data. It allows stakeholders to easily explore and consume the enormous amount of planning information, which informs subsequent planning cycles.

Keeping the regional and state water plans up-to-date helps ensure continuity in funding state water plan projects**.** Because projects funded through the State Water Implementation Fund for Texas (SWIFT) program must be included in the state water plan, it is beneficial to regularly update the state water plan to ensure that stakeholders know when to participate and propose projects so that the plans contain current informa-

[16] TWC 16.053(e)(5). Planning groups are required to consider all potentially feasible strategies when addressing their future water needs. Statute does not describe the universe of potential strategy types that must be considered but does specifically name a number of categories of particular interest. Under planning rules, conservation, in particular, has a somewhat higher threshold of consideration in that after conservation is considered but is not recommended for an entity with an anticipated shortage, the planning group must also *document the reason* for not recommending conservation (31 TAC 357.34(g)((2)(B)).

[17] Each planning group has maintained and governed itself since the TWDB designated the "initial coordinating body" members and provided each with model bylaws in 1998. Each planning group membership has varied depending on the regions' preferences and other factors but must, at a minimum include at least 12 statutorily required voting membership categories, as applicable. Total planning group membership has grown from approximately 270 voting members of the initial coordinating bodies named by the TWDB to the current approximately 360 voting members.

[18] November 17, 2016, at the Stephen F. Austin building. Video available at http://texasadmin.com/tx/twdb/work_session/20161117/.

[19] Eight organizations and 3 individuals submitted comments.

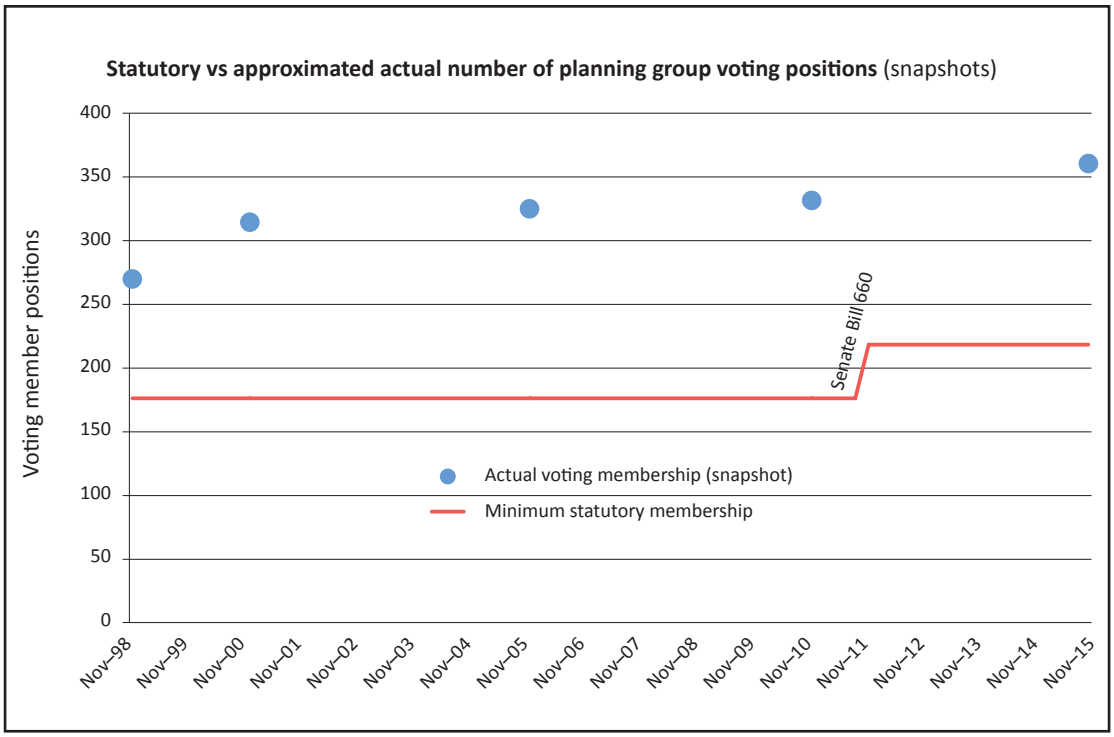

Figure 2. Number of statutory versus actual planning group voting positions over time.

tion on projects that are eligible for SWIFT.[20] The alternative would likely involve frequent but irregular amendments to the regional water plans.

Since 1997, there has been a variety of changes introduced to the plans and planning process.

Second cycle changes (2003–2007)

After criticisms of the first regional water planning cycle, most conservation water savings were shifted to the water strategy *supply* side instead of embedding it on the forecast water *demand* side of things where it had been mistakenly assumed to occur passively.[21] The second planning cycle also expanded to include the first rural water utilities incorporated recently completed TCEQ surface water availability models and the initial TWDB groundwater availability models, and required reporting of state financial assistance needed to implement the plan.[22]

Third cycle changes (2008–2012)

The third cycle of planning added new groundwater management area representatives to the planning groups and incorporated updated power and mining (including hydraulic fracturing) water demand projections in response to a rapidly changing energy market.

Fourth cycle changes (2013–2017)

The recently completed planning cycle incorporated project prioritizations required by House Bill 4 from the 84th Texas Legislature. It also included many new modeled available groundwater values statewide and took into consideration the recent 2010–14 drought conditions as well as the TCEQ's newly adopted environmental flow standards. In addition,

[20] In 2013, the Texas Legislature and Texas voters created the State Water Implementation Fund for Texas (SWIFT) and the State Water Implementation Revenue Fund for Texas (SWIRFT) and authorized a $2 billion transfer from the state's Rainy Day Fund to finance projects in the state water plan. The SWIFT program leverages SWIFT funds through the issuance of SWIRFT revenue bonds.

[21] During the first cycle of regional water planning, a portion of water savings generated through non-passive conservation strategies, beyond those anticipated to be achieved due to existing state and federal plumbing standards, was incorporated directly into the water demand projections developed by the TWDB. That approach could be interpreted to suggest that an additional lowering of per capita water use, for example, was inevitable. In response to subsequent criticisms of that approach, estimates of future non-passive water savings have since been shifted from the demand side of the planning equation to the supply side. This current approach better reflects the fact that a significant portion of future water savings will only be realized through the proactive implementation of conservation strategies by sponsors.

[22] Six river basins were completed by December 31, 1999, and remaining basins were completed by December 31, 2001.

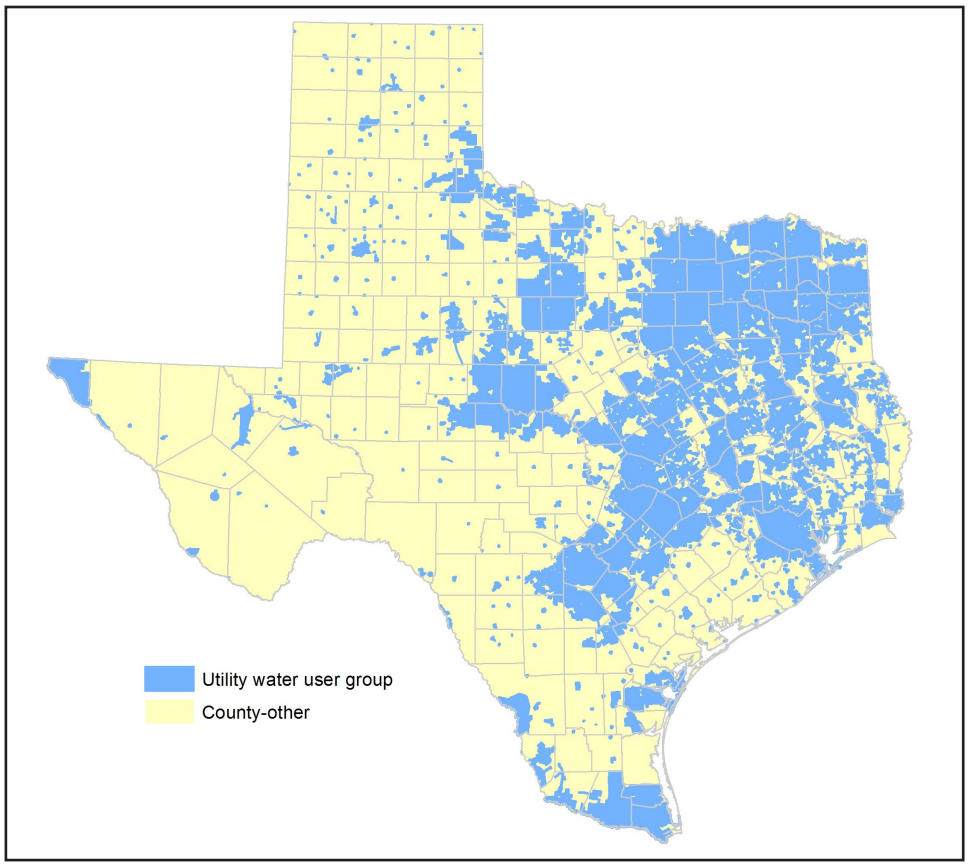

Figure 3. Statewide municipal water user group designations.

this cycle expanded on the state's drought response planning, which included requiring new information aimed at addressing the drought risks of small municipalities. Each regional plan included a chapter on drought response. Planning groups identified potential alternative water sources for small water suppliers that rely on a single source of water. The groups also identified existing emergency interconnects between water systems and potential new emergency water supply connections.

Fifth cycle changes (2018–2022)

For the fifth cycle of state and regional water planning, the agency has revised planning rules to provide an earlier opportunity for planning groups to review each other's plans to address potential interregional conflicts. In response to stakeholder concerns during the fourth cycle, the TWDB has also revised its planning rules to include a modeled available groundwater "peak factor" that ensures regional water plans have the ability to fully reflect how, under current statute, the groundwater conservation districts anticipate managing groundwater pumping in drought conditions.[23]

In addition, the TWDB responded to stakeholder input by implementing a shift to utility-based water planning instead of using the political boundaries of municipalities. This means that the next plan will include population, water demands, potential water shortages, and strategies that reflect specific retail water providers. This change will improve the understanding of the planning process, better align historical data with planning and implementation, reduce work effort, and make it easier to align state water plan project loans with sponsors and beneficiaries. This major improvement requires significant agency effort on the front-end but is expected to greatly improve the planning process. As a result, it will be easier to understand which entities actually need water and who will implement projects.

We also have also increased the granularity of information on rural water providers in the next water plan. To accomplish this, we standardized and lowered the utility threshold criteria for identifying individual municipal water user groups that will be explicitly planned for. This will shift approximately 1 million rural water users from the current aggregated "county-other"

[23] 31 TAC 357.10 (20); process 357.32(d)(3). This rule change eliminated the effect of managed available groundwater values acting as immovable, "hard caps" on groundwater *pumping* that could be reflected the regional water plans.

category (Figure 3) into their own, separate water user groups. As a result, approximately 1 million more citizens served by rural category utilities will be able to find more specific information in the plans about the water needs and recommended strategies for their communities.

Significant state role

The successful development of a coherent, credible state water plan is partly due to a strong state role in the form of a thorough statutory and administrative rule framework that requires active state involvement.

Statute, administrative rules, and agency guidance lay out certain steps and constraints to be considered before planning decisions are made. This framework includes statutory goals, fundamental planning principles laid out in administrative rules, and very specific guidance requirements for what must be calculated and presented in the plans. These requirements ensure that planning groups meet minimum levels of detail, perform prescribed analyses, and consider certain types of strategies before making recommendations. Together with the TWDB's extensive plan reviews and approval, the entire process ensures credibility and produces regional plans that combine to form a meaningful state water plan.

The TWDB continues to play an active role in overseeing and facilitating certain activities, key among them is developing and adopting all population and water demand projections. We use information from the Texas State Demographer and our historical water use survey data to develop the projections, and the drafts are vetted through the planning groups who receive public input. At the beginning of each 5-year planning cycle, the TWDB develops these statewide projections and maintains control over them throughout the process. Whereas planning groups adopt their regional water plans, the water demands are adopted well ahead of time by the TWDB's Board in consultation with our sister agencies, Texas Parks and Wildlife Department, the TCEQ, and the Texas Department of Agriculture. These projections underpin each planning cycle and must be not only well founded but widely accepted.[24]

As a knowledgeable arbiter, the TWDB maintains final control over these long-range forecasts to maintain the credibility of the water plan. Otherwise, the plan might be undermined by overinflated local projections containing over-optimistic growth projections. In doing so, the TWDB solicits and relies on stakeholders for information to strengthen and improve the accuracy of these projections. At any time, planning groups may request revisions to these projections that, if adopted by the Board, would also amend the state water plan.

We have been recently reminded of the scrutiny these projections attract and the importance of maintaining their credibility as we cooperate with the U.S. Army Corps of Engineers and the Environmental Protection Agency in support of state water plan projects that are now pursuing federal permits. Justification of projects depends partly on whether these agencies are convinced of the veracity and reasonableness of the underlying water demands.

Throughout each 5-year cycle, regional water planning groups rely on the TWDB's proactive, day-to-day technical and administrative assistance. In addition to detailed guidance documents and technical consultant support, a TWDB planning team member supports each planning group and attends every planning group meeting as a non-voting member. This TWDB staff member provides unbiased administrative and technical assistance to ensure the planning group meets deadlines and requirements. By providing answers in real time during meetings, TWDB staff has been an invaluable resource that frequently helps participants to avoid confusion, understand requirements, and expend their limited funds wisely.[25]

CONCLUSION

Texas has produced 4 state water plans through this 5-year regional planning process that take a hard look at what we could face in future droughts and very specifically address those challenges. The results of 20 years of regional planning have demonstrated

- the benefits of cyclical water planning performed at a regional level;
- that a very open, bottom-up stakeholder-driven process can be stable and robust;
- the paramount importance of good science and data, which underpin the process and plans; and
- the importance of maintaining a strong and active state role in both funding and guiding the process, including as the arbiter of population and water demand forecasts.

In addition to those tangible benefits, other equally important intangible benefits exist that result from a credible, up-to-date state water plan. For instance, bond underwriters, rating agencies, and potential bond investors beyond Texas have made it clear that having an up-to-date state water plan as the backdrop for the SWIFT loan program enhances the appeal of our bond offerings. The resulting demand for, prices of, and

[24] Partly in response to comment on the 2017 State Water Plan, the agency is in the process of updating its methods of projecting irrigation, power generation, and manufacturing water demands to improve both their quality and the ease with which they can be updated by the TWDB.

[25] Despite the growing scope and increased quality of the state and regional water plans and planning tools that the TWDB provides, the number of full-time state agency planning staff directly supporting the regional water planning program and developing the state water plan has decreased since the inception of regional water planning in 1998.

confidence in our bond sales translate to lower interest rates that the TWDB is able to pass along through our project loans.

Other benefits include an accessible and transparent water plan that Texans can understand, take ownership of, and improve upon. The very public process of regional water planning has taught many citizens about water issues and water planning. This, in turn, encourages greater involvement of stakeholders in subsequent planning cycles. It also promotes general public awareness of where their water comes from, which studies show is the best way to increase conservation efforts of Texans.

Regular planning cycles and feedback drive continual improvements in the planning process and better inform state water policies. The creation of the SWIFT financial assistance program, for example, was a vital new addition to the state's ability to implement state water plan projects. Finally, it is difficult to quantify the impact that a credible, comprehensive, and up-to-date state water plan has on Texas' ability to attract businesses and talented people.

When representatives of the 16 regional planning groups met in Austin in November 2016 to discuss the regional planning process, there was clear consensus on the success of the process. It provides the planning groups with the flexibility to determine their own solutions while also ensuring there is structure and guidance from the state.

The goal of the regional water planning process, however, is not to just produce plans. It is to guide and facilitate the development of sufficient water supply for our state's growing population and vigorous economy. The most telling question that must be answered about the regional and state water planning process, then, is this: is more water for Texas being developed because of these water plans? And the answer is a very simple, but definite, "Yes." The 2017 State Water Plan details strategies capable of producing approximately 8.3 million acre-feet of water when completed. More than $1.6 billion has already been put toward state water plan projects in just the first 2 funding cycles of the SWIFT. Those projects alone, once completed, will produce more than 1.2 million acre-feet of additional water supply for Texas. In other words, we *know* the process is working.