Interim Report

to the 85th Texas Legislature

House Committee on Natural Resources

December 2016

HOUSE COMMITTEE ON NATURAL RESOURCES
TEXAS HOUSE OF REPRESENTATIVES
INTERIM REPORT 2016

A REPORT TO THE
HOUSE OF REPRESENTATIVES
85TH TEXAS LEGISLATURE

JIM KEFFER
CHAIRMAN

COMMITTEE CLERK
BUFFY BARRETT

Committee On
Natural Resources

December 5, 2016

Jim Keffer
Chairman

P.O. Box 2910
Austin, Texas 78768-2910

The Honorable Joe Straus
Speaker, Texas House of Representatives
Members of the Texas House of Representatives
Texas State Capitol, Rm. 2W.13
Austin, Texas 78701

Dear Mr. Speaker and Fellow Members:

The Committee on Natural Resources of the Eighty-fourth Legislature hereby submits its interim report including recommendations and drafted legislation for consideration by the Eighty-fifth Legislature.

Respectfully submitted,

Jim Keffer, Chairman

Trent Ashby, Vice-Chairman

Dennis Bonnen

Tracy O. King

Eddie Lucio III

Paul Workman

Lyle Larson

Poncho Nevárez

James Frank

Kyle Kacal

DeWayne Burns

Trent Ashby
Vice-Chairman

Members: Dennis Bonnen, Tracy O. King, Eddie Lucion III, Paul Workman, Lyle Larson, Poncho Nevárez, James Frank, Kyle Kacal, and DeWayne Burns

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HOUSE COMMITTEE ON NATURAL RESOURCES

INTRODUCTION

At the beginning of the 84th Legislature, the Honorable Joe Straus, Speaker of the Texas House of Representatives, appointed eleven members to the House Committee on Natural resources (the "committee"). The committee membership included the following: Representatives Jim Keffer (Chairman), Trent Ashby (Vice-Chairman), Dennis Bonnen, Tracy O. King, Eddie Lucio III, Paul Workman, Lyle Larson, Poncho Nevarez, James Frank, Kyle Kacal, and DeWayne Burns.

During the Interim the committee was assigned nine charges by the Speaker:

1. Examine the regional and state water planning processes, with emphasis on the following:
    a. the integration of HB 4 (83R);
    b. the appropriate role of the state in ensuring that the process both supports regional goals and priorities and the water needs of the state as a whole, and how the state might encourage strategies to benefit multiple regions;
    c. the structure and operation of the regional planning groups;
    d. the interaction between the planning process and groundwater management;
    e. whether the "drought of record" remains the appropriate benchmark for planning and;
    f. any impediments to meeting the conservation, agriculture, and rural project goals set by HB 4 (83R), and possible new approaches to help meet these goals.

2. Evaluate the status of water markets in Texas and the potential benefits and challenges of expanded markets for water. Include an evaluation of greater interconnections between water systems through both engineered and natural infrastructure. Examine opportunities for incentives from areas receiving water supplies to areas providing those supplies that could benefit each area and the state as a whole.

3. Analyze the factors contributing to freshwater loss in the state, including evaporation, excess flows into the Gulf of Mexico, and infrastructure inefficiencies, and examine techniques to prevent such losses, including aquifer storage and recovery, off-channel storage, and infrastructure enhancements.

4. Evaluate the progress of seawater desalination projects near the Texas coast as a means of increasing water supplies and reducing strain on existing supplies, building on the work of the Joint Interim Committee to Study Water Desalination (83rd session). Examine the

viability of the use of public-private partnerships and of methods by which the state might facilitate such a project.

5. Monitor the use of funds made available to Texas in relation to the 2010 Deepwater Horizon oil spill. Consider approaches to maximize the benefit of these funds for the long-term stability of the coastal economy and ecosystems.

6. Evaluate the status of legislation to encourage joint groundwater planning, including HB 200 (84R), and monitor ongoing legal developments concerning ownership and access to groundwater and the impact of these developments on property rights and groundwater management.

7. Determine the sources of water used by Texans in the production of food and fiber, and examine current water delivery methods and water conservation goals for agricultural use. Evaluate whether there are more efficient and effective water-usage management practices that could be employed in the agricultural industry, and determine the impact of crop insurance requirements on producers. (Joint charge with the House Committee on Agriculture & Livestock)

8. Determine if sufficient safety standards exist to protect groundwater contamination from disposal and injection wells. (Joint charge with the House Committee on Energy Resources)

9. Conduct legislative oversight and monitoring of the agencies and programs under the committee's jurisdiction and the implementation of relevant legislation passed by the 84th Legislature. In conducting this oversight, the committee should:

    a. consider any reforms to state agencies to make them more responsive to Texas taxpayers and citizens;
    b. identify issues regarding the agency or its governance that may be appropriate to investigate, improve, remedy, or eliminate;
    c. determine whether an agency is operating in a transparent and efficient manner;
    d. identify opportunities to streamline programs and services while maintaining the mission of the agency and its programs; and
    e. review the surface water permitting process in Texas, including previous legislative attempts to modify the process, and assess the potential effects of these and other changes.

The committee has completed its hearings and investigations and has issued the following final report and recommendations. The committee wishes to express its appreciation to the

federal and state agencies, local governments, public and private interests, and concerned citizens who testified or submitted written testimony at the public hearings.

INTERIM STUDY CHARGES

Committee of the Whole

CHARGE 1: Examine the regional and state water planning processes, with emphasis on the following:

a. the integration of HB 4 (83R);
b. the appropriate role of the state in ensuring that the process both supports regional goals and priorities and the water needs of the state as a whole, and how the state might encourage strategies to benefit multiple regions;
c. the structure and operation of the regional planning groups;
d. the interaction between the planning process and groundwater management;
e. whether the "drought of record" remains the appropriate benchmark for planning and;
f. any impediments to meeting the conservation, agriculture, and rural project goals set by HB 4 (83R), and possible new approaches to help meet these goals.

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Committee of the Whole

CHARGE 2: Evaluate the status of water markets in Texas and the potential benefits and challenges of expanded markets for water. Include an evaluation of greater interconnections between water systems through both engineered an natural infrastructure. Examine opportunities for incentives from areas receiving water supplies to areas providing those supplies that could benefit each area and the state as a whole.

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CHARGE 3: Analyze the factors contributing to freshwater loss in the state, including evaporation, excess flows into the Gulf of Mexico, and infrastructure inefficiencies, and examine techniques to prevent such losses, including aquifer storage and recovery, off-channel storage, and infrastructure enhancements.

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Committee of the Whole

CHARGE 4: Evaluate the progress of seawater desalination projects neat the Texas coast as a means of increasing water supplies and reducing strain on existing supplies, building on the work of Joint Interim Committee to Study Water Desalination (83rd session). Examine the viability of the use of public-private partnerships and of methods by which the state might facilitate such a project.

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CHARGE 5: Monitor the use of funds made available to Texas in relation to the 2010 Deepwater Horizon oil spill. Consider approaches to maximize the benefit of these funds for the long-term stability of the coastal economy and ecosystems.

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CHARGE 6: Evaluate the status of legislation to encourage joint groundwater planning, including HB 200 (84R), and monitor ongoing legal developments concerning ownership and access to groundwater and the impact of these developments on property rights and groundwater management.

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Committee of the Whole

CHARGE 7: Determine the sources of water used by Texans in the production of food and fiber, and examine current water delivery methods and water conservation goals for agricultural use. Evaluate whether there are more efficient and effective water-usage management practices that could be employed in the agricultural industry, and determine the impact of crop insurance requirements on producers. *(Joint charge with the House Committee on Agriculture and Livestock)*

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Committee of the Whole

CHARGE 8: Determine if sufficient safety standards exist to protect groundwater contamination from disposal and injection wells. *(Joint charge with the House Committee on Energy Resources)*

Jim Keffer
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Dennis Bonnen
Tracy O. King
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CHARGE 9: Conduct legislative oversight and monitoring of the agencies and programs under the committee's jurisdiction and the implementation of relevant legislation passed by the 84th Legislature. In conducting this oversight, the committee should:

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b. identify issues regarding the agency or its governance that may be appropriate to investigate, improve, remedy, or eliminate;
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d. identity opportunities to streamline programs and services while maintaining the mission of agency and its programs; and
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WATER MARKETS

Public Hearing

The House Committee on Natural Resources held a public hearing on its Interim Charge #2 related to water markets on February 2, 2016 at 10:00 a.m. in Austin, Texas in the Capitol Extension, Room E2.010. The following individuals testified on the charge:

Bradley, Gary (Self)

Covey, Valerie (Self)

Kosub, Steve (San Antonio Water System)

Landry, Clay (Self)

Rubinstein, Carlos (Self)

Weatherby, Paul (Self; Middle Pecos GCD)

Waring, Colleen (Self)

Booth, Michael (Self)

Buhman, Dan (Tarrant Regional Water District)

Cobb, Burt (Hays County)

Gangnes, Michele (Self; League of independent Voters of Texas)

Grant, John (Colorado River Municipal Water District)

Hovorak, Andrew (Self)

Huffman, Laura (The Nature Conservancy)

Kramer, Ken (Sierra Club - Lone Star Chapter)

McGeary, Judith (Self; Farm and Ranch Freedom Alliance)

Murphy, James Lee (Guadalupe-Blanco River Authority)

Puckett, Jody (City of Dallas and Region C planning group)

Rice, George (Self)

Sengelmann, Greg (Gonzales county underground water conservation district)

Strickland, Wes (Water Energy Nexus for Texas)

Totten, James (Lost Pines Groundwater Conservation District)

Ward, Reta (Self)

The following section of this report related to water markets is produced in large part from the oral and written testimony of the individuals listed above.

Introduction

Fresh water supplies are said to be the next global crisis. With increasing populations, demand for water is beginning to exceed developed water supply. The challenge for Texas is similar to the rest of the world. We must provide water to a growing population and economy in the face of limited supplies while balancing with a need to protect our natural resources. Developing new sources of water by constructing reservoirs is a limited option, as the time for "digging holes and praying for rain may be past." To be sure, there will be reservoirs constructed in Texas moving forward such as the Lane City Reservoir in the Colorado River watershed and the Turkey Peak Reservoir in the Brazos River watershed, but these large projects are increasingly difficult due to physical, economic, and environmental constraints, changing land use patterns, and the emerging viability of such alternatives as water conservation, desalination, precipitation enhancement, and water marketing.

Water marketing has been proposed as one of the key strategies to meet Texas' future water needs. Several forms of water and water rights transfers including the sale and lease of water and water rights, water banking, dry-year option contracts, and redirection of conserved water may be used to move water use from one party to another.

The committee was charged with evaluating the status of water markets in Texas and the potential benefits and challenges of expanding these water. [1]

Texas Water Market Overview

Market Development - At a statewide level, the Texas water market is considered to be an early stage market but growing. The state does have two fairly active and well established regional markets that include the Edwards Aquifer and the Lower Rio Grande. However, outside of these areas market activity tends to be more sporadic and less organized. [2]

Texas Water Market Size and Trend

Bigger in Texas - Two of the largest water deals in the western United States occurred in Texas. The most recent was the $110 million water sale between Mesa Water and the Canadian River Water Authority.

On average, $58 million worth of water trades occur annually in Texas. At a national level, the Texas water market accounts for approximately 14% of the total value traded annually across all western United States water markets. That excludes river authority water sales and the large Mesa transaction, which influences the average. Since the Mesa transaction, the total Texas water market has traded between $22 million and $41 million annually. It is important to note the following: expenditures between leases and purchases were roughly equal in 2014, leasing volumes have remained relatively constant with most of those motivated by drought conditions, permanent sales of water have declined recently representing a shift in the Edwards market

activity, and river authority water supply contracts still account for the majority of volume and trade value. [3]

Market Regions and Locations

Like most states, the Texas water market is not a single market but rather a collection of highly localized markets. Each market takes on its own characteristics based on local supply and demand conditions, the types of water entitlements traded, and the regulatory environment. As a result, trading activity, and the type of trades, and pricing can vary significantly across market regions.

The two most active markets include the Edwards Aquifer and Lower Rio Grande River. Combined, these markets represent about 90% of the total value traded over the last 5 years.

Current Market Regions

Active	**Lower Rio Grande** - Active market for sales and leases of surface water rights
	Edwards Aquifer - Active market for sales and leases of groundwater entitlements
Developing	**Colorado River** - Some recent small surface water trades for municipal use with one large transaction in the last 10 years.
	Brazos River - Trading has been limited for surface but growing demand within region.
	Austin Region - High growth area with growing water demands. Limited surface water trading with some groundwater transactions.
Early Stage	**Upper Rio Grande** - Sporadic surface transactions in urbanizing area.
	Panhandle Region - Previous large trade with unclear future needs.
	Dallas Region - Highly urbanizing area with long term water needs with large water infrastructure projects.
	Houston Subsidence - Shifting supply source creating potential for market growth.

Surface Water Markets

In Texas, candidate basins for surface water markets include the Trinity, Brazos, Colorado, Guadalupe Rivers, and Rio Grande. But in terms of a market economy, where the economic decisions and pricing of a good or service is guided by a willing buyer and a willing seller, the Texas surface water market remains less than optimal. The TCEQ has a role in managing those

markets because of its supervision over waters of the state. River authorities have even more of a significant role because of their ownership of large water rights, storage, conveyance infrastructure, and wholesale water contracts. The TWDB has a role because of the central planning aspects of the state water plan for projects approval and potential for funding. Finally, for the Texas surface water market to be effective, the decision in question must be supported by a consensus of water stakeholders in each basin. All of these limit the free-market principles of our surface water market in Texas.

Role of River Authorities - River authorities provide an important role in the supply and allocation of water within the state. Each year large volumes of water are sold annually through the river authorities. These sales do represent an important part of the Texas water market, but are not considered to be conventional water rights transactions where prices are determined through arms-length negotiations.

The State could encourage development of markets within river basins and planning regions, by providing guidance to river authorities and other local agencies. But if the Texas surface water market is to truly develop, the state will need to move toward a system where economic decisions about surface water guide the interactions of buyers and sellers with little government intervention or central planning.

Groundwater Markets

Groundwater markets exist in Texas, but they are as complex as our surface water situation because of the complexity of the regulatory oversight for groundwater in the state. The Edwards Aquifer market is active because of a consistent set of rules across the aquifer and a court-mandated cap on new groundwater production. Other aquifers in the state may not develop water functioning markets in the near term because there is other water available for permitting, making the value of the water hard to determine.

In general, the transfer of groundwater within each groundwater conservation district is dependent on the particular rules of each District. In most, but not all, rules have been adopted that address transfer requirements for water produced from wells located within a district's boundaries. [4] Most of these transactions happen on a routine basis with little fanfare or controversy and create a situation for localized water markets to develop very effectively. However, in very few instances, some districts create significant hurdles for groundwater owners to market their property outside a district's boundaries. In these limited situations, the actions of a governmental body tend to retard market development and create artificial barriers for buyers and sellers.

Advantages of Water Markets

If water markets are efficient and based on the laws of supply and demand, they are able to maximize the benefits for both buyers and sellers of water.

First, markets provide incentives for efficient use of water. If economic value of water in a

market can be fixed, price signals nudge potential sellers and buyers to use water efficiently. In the absence of a market, water users fail to capture some benefits, without which those improvements may be uneconomical. In addition, transfers can provide sellers with funds necessary to achieve efficiency improvements they would not be able to implement otherwise.

Second, markets may facilitate conjunctive use of multiple sources by both sellers and buyers, and thus improve the reliability of water supplies for both.

Third, markets achieve the reallocation of water entitlements from one use to another without government mandate, since all transactions are voluntary by nature and occur between willing sellers and buyers.

Finally, and importantly, markets are the only reallocation method that protect the private property rights of sellers and third parties. [5]

Successful Market Features

In order for a market to work well, it must have certain features:

- The water rights or entitlements to be traded must be well defined and capable of being known by all parties to a transaction. That includes a central registry of rights and a common understanding of the rules governing transfers.
- Water must be made available for transfer through a method that protects the rights of third parties. The most common methods are: efficiency improvements, substitution of other water supplies, land fallowing, and releases from storage.
- The approval process must protect the interests of third parties, while being sufficiently efficient to not add undue cost or delay. Excessive transaction costs will kill potential transactions.
- There must be a method to convey the water from its original point of diversion to the new place of use. Transfers should be allowed to use natural channels, with protection for other right holders. In practice, water transfers almost always take advantage of unused capacity in existing infrastructure rather than new construction, based on cost.
- Their features must be promoted by both the creator of market rules and the participating sellers and buyers.

Experience demonstrates that markets, in whatever context, are not created according to a rigid template, although these are the common elements. It takes time to develop proper market rules and contract structures, and these must be constantly reformed to match changing hydrologic, economic, and political circumstances. In Texas, it is likely that successful markets would look different across the state, given the different mix of supplies, rights, types and ownership of the source of water, and the uses in each region. [6]

Challenges for Water Markets

The first obstacle is there is little commodity pricing for water, and what does exist is largely dependent on varying factors. Historically our state has given away its water rights at little or no cost for beneficial uses with the goal of promising economic development. This process, while successful when coupled with a rate structure based on a cost of service model, has made it difficult to build a water replacement cost into existing retail rate structures. This situation continues to this day and serves as an impediment to a "pure" market development for both surface and groundwater markets.

A second obstacle is most water planning is properly conducted at the local level; however at present conflicting goals in the planning process impede its effectiveness. Cities and other parties quite properly want to have their projects included in the State Water Plan for eligibility for Board loans. As a result there is an incentive to list as many competing projects as possible while resisting regional cooperation that might downgrade a particular project in the race for project funding priority. Furthermore, current legislation does not mandate that Regional Water Planning Groups develop a regional, integrated plan based on regional supplies.

A number of obstacles limit widespread groundwater marketing in Texas. These obstacles include both a lack of identifiable buyers and sellers and transaction costs that are often high. Another obstacle to groundwater marketing in Texas lies in the fact that there are often areas of need, without the development of substantial conveyance systems. This condition is further complicated by the fact that many potential sellers of groundwater have a limited ability to access conveyance rights-of-way to transport water to areas of need.

Also, in geographic areas not covered by a groundwater conservation district, there may be no mechanism for restricting how much groundwater may be used from the land where pumping is contemplated. The market in groundwater is, in a sense, almost totally unregulated, a condition that may generate substantial uncertainty regarding the reliability of the groundwater source.[7]

Finally, the most difficult obstacle to securing the water supply needs of a growing economy and a growing population is the lack of regional cooperation. Some critics argue we have lost the ability to cooperate on large-scale regional projects to provide economies of scale and protect the environment. When it comes to water supply projects, it often appears to be the case of every man for himself. If we work together there is a way to balance the needs of different regions in a fair and equitable manner. [8]

The Future of Water Marketing in Texas

Developing new sources of water by constructing reservoirs or by means of other similar water development projects is increasingly a difficult option due to the physical, economic, and environmental constraints, changing land use patterns, and the emerging viability of such alternatives as water conservation, brush control, desalination, precipitation enhancement, and water marketing. Water marketing has been proposed as one of the key strategies to meet Texas' future water needs. Water marketing has taken and will continue to take many forms including:

the sale and lease of water and water rights, water banking, dry- year option contracts, and redirection of conserved water to meet various water supply needs. However, water marketing is not a cure-all but one of several tools municipalities, irrigators, industry and others in Texas may utilize to meet their current and future demands for water, as it may present a new set of challenges in terms of impacts on water users in areas supplying the water.

If the experience in other western states holds true for Texas, much of the future water marketing will come by way of contract sales of currently unused water stored in large water supply projects. To a large extent, these transfers can be accomplished with minimal state administrative oversight. In addition, the future of water marketing in Texas must contend with a number of other issues such as minimizing transaction costs and uncertainties related to water transfers, increasing the number of interested buyers and sellers and the information readily available to them, and defining a public interest review of transfers that considers potential third-party impacts and protects the environment. In addition, water-marketing efforts must realize the tremendous potential of moving water from water rich areas of the state to urban centers without endangering the future economics of rural Texas and other export basins of origin.[9]

Unfortunately, the most populated areas of the state, where Texas is continuing to grow is not where our water is located. If we want to keep the Texas Dream alive and promote economic growth we must find solutions for getting water to the population centers. Water markets are part of the answer to this challenge and the state has an interest in ensuring the efficient development of them.

Recommendations

Encourage regional planning groups to work together and across regions to consider water markets when looking for new sources of water.

Direct groundwater conservation districts to set and enforce easy to digest rules for water markets in their area.

DESALINATION

Public Hearing

The House Committee on Natural Resources held a public hearing on its Interim Charge #4 related to desalination on April 26, 2016 at 9:30 a.m. in Brownsville, Texas at the Brownsville City Hall in the Commission Chambers. The following individuals testified on the charge:

Adams, Judy (Brownsville Public Utilities Board)

Aillet, Joe (Black and Veatch)

Bruciak, John (Brownsville Public Utilities Board)

Bruun, Bech (TWDB)

Cook, Phillip (Black and Veatch)

Ellison, Mark (Texas Desalination Assoc.)

Espiga, Guillermo (Poseidon Water)

Mace, Robery (Texas Water Development Board)

Murphy, James Lee (Guadalupe-Blanco River Authority)

Norris, Bill (Texas Desal Options)

Rubinstein, Carlos (Poseidon Water)

The following section of this report related to desalination is produced in large part from the oral and written testimony of the individuals listed above.

Background and Beginnings

Not only does Texas have a long history of using desalination technology as a means for increasing water supplies, the state understands the importance of utilizing private partners to bring large-scale projects on line for the benefit of Texas citizens. The first desalination demonstration project in the United States, operated by the U.S. Department of Interior's Office of Saline Water, was put into production in Freeport in 1961. The project, conducted jointly with Freeport and Dow Chemical, operated from 1961 to 1969, producing 1 million gallons per day (MGD)(~1,100 acre-feet per year (AFY). The plant supplied half of its production to the City of Freeport and the other half to Dow Chemical. The first state water plan, issued in 1961, recognized the potential of "demineralization of brackish water and sea water" and recommended researching this potential. In 1965, the Texas Water Development Board commissioned a study of the state's saline water resources and potential sites for desalination. Also in 1965, the Port Mansfield Utility District build the first municipal desalination plant in Texas used for supply, a plant that desalted brackish groundwater. Port Mansfield was the fourth city in the United States to buy and operate a desalting plant. In 1967, Dell City installed an electrodialysis unit to desalt groundwater. That plant, since upgraded, still runs today.

Beginning in 2002, the TWDB was charged with researching and recommending a large-scale seawater desalination project. The Legislature provided funding to the Board to conduct feasibility and plant studies. The TWDB has completed five studies (detailed below) and developed a guidance manual for permitting and implementation for desalination plants along the coast. The Board is due to report to the legislature on its activities after the printing of this report.

Current Conditions

As of 2012, there were 46 plants for municipal use with a capacity greater than 25,000 gallons per day. These 46 plants are capable of producing 123 MGD (about 138,000 AFY) with 50 MGD (56,000 AFY) of the capacity for brackish surface water and 73 MGD (82,000 AFY) of the capacity is for brackish groundwater. As of 2016, there are more than 200 desalination plants in Texas. **There currently are no seawater desalination plants in Texas**.

Desalination in the State Water Plan

The 2017 State Water Plan recommended water management strategies projected to provide 230,000 AFY of desalinated water to water user groups by 2070, about 2.7 percent of all new water supplies. The projects proposed include:

Freeport Seawater Desalination

- Located in Region H
- Potential supply of 11,200 AFY (10 MGD)
- Implementation decade is 2040
- Capital costs are $132,937,747

- Unit water cost is $2,454/AF (loan period) and $1,461/AF(after loan period)

San Antonio Water System

- Located in Region L
- Potential supply of 84,012 AFY (75 MGD)
- Implementation decade is 2040
- Capital costs are $1,590,590,000
- Unit water cost is $2,713/AF

Guadalupe Blanco River Authority

- Located in Region L
- Potential supply of 100,000 AFY (89 MGD)
- Implementation decade is unspecified
- Capital costs are $1,600,000,000
- Unit water cost is $2,393/AF

City of Brownsville

- Located in Region M
- Potential supply: 28,000 AF/year (25MGD)
- Implementation decade: 2020 9demonstration) and 2060 (full-scale)
- Capital costs are $56,002,000 (demonstration) and $393,497,000 (full-scale)
- Unit water cost is: $5,522/AF (demonstration) and $3,889/AF (full-scale)

City of Corpus Christi

- Located in Region N
- Potential supply of 22,420AF/year (89MGD)
- Implementation decade: 2030
- Capital costs are $248,000,000
- Unit water cost is $1,418-1,450/AF[10]

Recommended Seawater Desalination Water Management Strategies and the Supplies They Are Projected to Provide to Water User Groups

2017 State Water Plan

RWPG	Water Management Strategy	County	2020	2030	2040	2050	2060	2070
H	Freeport Seawater Desalination	Brazoria	0	0	11,200	11,200	11,200	11,200
L	San Antonio Water System Seawater Desalination	Atascosa Bexar Comal Medina	0	0	18,019	29,037	43,064	53,978
L	Guadalupe-Blanco River Authority Integrated-Water Power Project	Calhoun Victoria DeWitt Gonzales	0	0	0	0	0	0
M	Brownsville Seawater Desalination	Cameron	2,800	2,800	2,800	2,800	28,000	28,000
N	Seawater Desalination	Nueces San Patricio	0	22,420	22,420	22,420	22,420	22,420
Total Volume			**2,800**	**25,220**	**54,439**	**65,457**	**104,684**	**115,598**

The Guadalupe-Blanco River Authority Integrated-Water Power Project is projected to produce 100,000 acre-feet per year; however, this table shows supplies of water to water user groups; the Project is not shown in the water plan to provide water to a water user group.

2012 State Water Plan

RWPG	Water Management Strategy	County	2010	2020	2030	2040	2050	2060
H	Freeport Desalination Plant	Brazoria	0	0	0	0	33,600	33,600
L	San Antonio Water System Seawater Desalination	Atascosa Bexar Comal Medina	0	0	0	0	0	23,463
L	Guadalupe-Blanco River Authority Integrated-Water Power Project	Calhoun Victoria DeWitt Gonzales	0	0	0	0	0	0
M	Brownsville Seawater Desalination	Cameron	0	0	0	5,600	5,600	7,013
M	Laguna Vista and Laguna Madre Seawater Desalination	Cameron	125	125	143	449	821	889
N	Seawater Desalination	Nueces San Patricio	0	28,000	28,000	28,000	28,000	28,000
Total volume			**125**	**28,125**	**28,143**	**34,049**	**68,021**	**92,965**

The Guadalupe-Blanco River Authority Integrated-Water Power Project is projected to produce 100,000 acre-feet per year; however, this table shows supplies of water to water user groups; the Project is not shown in the water plan to provide water to a water user group.

Notes:
Volumes are cumulative from decade to decade.
Volumes shown include strategies supplying water to a water user group.
RWPG = Regional Water Planning Group

Recommendation

Desalination is not new to Texas, with more than 200 plants providing about 70,000 acre-feet per year to water user groups currently and that figure is expected to grow to more than 110,000 acre-feet per year by 2070. While the overwhelming majority of desalination projects are focused on brackish water sources currently, Texas is experiencing a renewed focus on seawater desalination projects. Through the TWDB, the state should continue to review the feasibility of seawater desalination plants. Siting a series of plants along the coast would provide a new form of drought-proof water for our growing industrial base and communities located in the area.

2010 DEEPWATER HORIZON OIL SPILL

Public Hearing

The House Committee on Natural Resources held a public hearing on its Interim Charge #5 related to the 2010 Deepwater Horizon oil spill on April 26, 2016 at 9:30 a.m. in Brownsville, Texas at the Brownsville City Hall in the Commission Chambers. The following individuals testified on the charge:

Baker, Toby (TCEQ)

Berg, William (Save RGV from LNG)

Frazier, Kyle (Texas Desalination Assoc.)

Lieberknecht, Chloe (The Nature Conservancy)

Mariscal, Rene (Brownsville Public Utilities Board)

The following section of this report related to 2010 Deepwater Horizon oil spill is produced in large part from the oral and written testimony of the individuals listed above.

RESTORE Act Summary

Congress passed the RESTORE Act to protect and restore the natural and economic resources of the U.S. Gulf of Mexico and Gulf Coast. The Act was passed in response to the 2010 Deepwater Horizon oil spill to provide funding for coastal restoration and recovery for the affected Gulf Coast States: Alabama, Florida, Louisiana, Mississippi, and Texas. In the legal aftermath of the spill, responsible parties will pay for damages caused. Through the RESTORE Act, Congress allocated 80 percent of the administrative and civil penalties related to the spill to the states and the federal government to restore and revitalize the Gulf Coast. A portion of the RESTORE Act allocation comes directly to Texas.

The biological and economic productivity of the Texas Gulf Coast is remarkable. Texas's 367 miles of Gulf shoreline and 3,300 miles of estuarine shoreline host hundreds of thousands of acres of beach and dune systems, lagoons, seagrass beds, oyster reefs, and tidal marshes. More than 95 percent of commercially and recreationally important Gulf finfish and shellfish, and 75 percent of the nation's migratory waterfowl depend on these wetlands at some point in their life cycle. These resources, in turn, support robust sport and commercial fisheries, shrimping, and tourism, and a supply a quarter of the nation's oyster harvest.

Sharing the coast are more than 6 million people who live in the 18 coastal counties of Texas. Each year more than 500 million tons of cargo traverses the Texas portion of the Gulf Intracoastal Waterway. The Port of Beaumont is the busiest military port in the world. Texas refineries, energy-related companies and chemical plants centered around Port Arthur and the Port of Houston comprise the largest petrochemical complex in the world.

Texas' allocation of RESTORE Act funds to specific coastal projects and programs will be reflected in plans developed and approved at the state and federal level. The overall purpose and eligibility for funding varies among the components of the Gulf Coast Restoration Trust Fund; however, projects or programs generally must carry out one of these five goals from the Act:

- Restore and converse habitat
- Restore water quality
- Replenish and protect living coastal and marine resources
- Enhance community resilience
- Restore and revitalize the gulf economy

The RESTORE Act created the Gulf Coast Ecosystem Restoration Council, which is composed of the governors of the five Gulf States and six federal agencies, as an independent federal agency. In 2012, Governor Rick Perry designated Commissioner Toby Baker of the Texas Commission on Environmental Quality as his designee on the Council and appointed him to lead the state's effort to implement the RESTORE Act. He continues to serve in that capacity.

The Governor also created the Texas RESTORE Act Advisory Board (TxRAB), to oversee the state's efforts. Commissioner Baker, TxRAB, and the Governor's Office will develop the Texas RESTORE related plans.

In Texas, opportunities abound to preserve, restore, and conserve truly diverse and productive lands and waters. These lands and waters, in turn, can support a robust and resilient economy. The scope and scale of the RESTORE Act make it possible to support projects with far-reaching environmental benefits. The Act also creates a unique opportunity to fund projects that will promote the advancement of the coastal economy. [11]

Funding Sources

As a result of the 2010 Deepwater Horizon Oil Spill (DWH), Texas has access to three funding sources:

- Gulf Environmental Benefit Fund, referred to as NFWF
- Natural Resource Damage Assesssment, referred to as NRDA; and
- Resources and Ecosystems Sustainability, Tourist, Opportunities and revived Economies of the Gulf Coast States Act of 2012 (RESTORE).

Gulf Environmental Benefit Fund (NFWF)

The U.S. Department of Justice entered into criminal plea bargain agreements with two of the responsible parties, BP and Transocean, for the oil spill caused by the Macondo exploratory well off the coast of Louisiana on April 20, 2010. As part of these agreements, BP agreed to pay $2.394 billion and Transocean agreed to pay $150 million in criminal penalties to the National Fish and Wildlife Foundation (NFWF). In these plea agreements, the court charged NFWF with the proper distribution and spending of the criminal fines. To that end, NFWF has established the Gulf Environmental Benefit Fund (GEBF) to provide restoration funding for the five Gulf States.

The criminal penalties are allocated among the five states as follows: 50% to Louisiana; 14% each to Mississippi, Alabama and Florida; and 8% to Texas.

Over five years, the Fund will receive a total of $1.272 billion for barrier island and river diversion projects in Louisiana; $356 million each for natural resource projects in Alabama, Florida and Mississippi; **and $203 million for similar projects in Texas**.

Plea agreements require NFWF to consult with appropriate state and federal resource managers to identify projects and maximize environmental benefits. In Texas, NFWF is consulting with the Texas Parks and Wildlife Department (TPWD), the Texas Commission on Environmental Quality (TCEQ) and the Texas General Land Office (GLO), as well as with the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration.

Government Trustees Restoring the Gulf

The Texas Trustee Implementation Group (TIG) is preparing for the next phase of restoration planning, which will ultimately result in the release of a draft restoration plan and associated National Environmental Policy Act (NEPA) documents for public review and comment in the

spring of 2017. In the meantime, the Texas TIG is reviewing restoration proposals that were submitted by the August 31, 2016 deadline.

Approximately $47.6 million is currently available for restoration project funding in Texas this year. Over the next 15 years, the Texas TIG will receive approximately $124.8 million in additional restoration funding. The current restoration planning effort may utilize all or part of these funds. The Texas TIG may propose both discrete restoration projects as well as one or more programmatic restoration efforts. Each of the projects and programmatic efforts may require multiple years to complete and they may be funded in part by restoration funds received in the future.

Restoration funds allocated to the Texas TIG must be used for five specific restoration types. Early Restoration projects are already funding bird and sea turtle restoration types. Therefore, the Texas TIG is prioritizing current restoration planning efforts on restoration types that were not addressed previously: 1) restore and conserve wetland, coastal, and nearshore habitats; 2) restore water quality through nutrient reduction (nonpoint source); and 3) replenish and protect oysters. The Texas TIG will also consider projects for engineering and design that focus on the three restoration types mentioned above. The focus will be on these restoration categories, however the Texas TIG will continue to consider any important opportunities for additional restoration and protection of avian resources and sea turtles.

Civil Penalties Funding Gulf Restoration (Restore Act)

The RESTORE Act envisions a regional approach to restoring the long-term health of the valuable natural ecosystems and economy of the Gulf Coast region. The RESTORE Act dedicates 80 percent of any civil and administrative penalties paid under the Clean Water Act by responsible parties in connection with the Deepwater Horizon oil spill to the Gulf Coast Ecosystem Restoration Trust Fund. This Fund is primarily to be used for ecosystem restoration, economic recovery, and tourism promotion in the Gulf Coast region. Following resolution of administrative and civil penalties, Texas is expected to receive at least $550 million in RESTORE funds through 2033.

The Gulf Coast Ecosystem Restoration Council (Council) is charged with helping to restore the ecosystem and economy of the Gulf Coast region by developing and overseeing the implementation of the RESTORE Act. The Council is chaired by the Secretary of the U.S. Department of Commerce and includes the Governors of the States of Alabama, Florida, Louisiana, Mississippi and Texas and the Secretaries of the U.S. Departments of Agriculture, Army, Homeland Security and the Interior and the Administrator of the U.S. Environmental Protection Agency. Toby Baker, Commissioner, Texas Commission on Environmental Quality has been designated by the Governor of Texas, as the Texas representative on the Council.

The money in the Gulf Coast Restoration Trust Fund will be allocated to the Gulf Coast states and the Gulf Coast Ecosystem Restoration Council according to the following guidelines:

- 35 percent divided equally between the five Gulf Coast States to be used for ecosystem restoration, economic development & tourism promotion **(Direct Component)**;
- 30 percent for ecosystem restoration under the Comprehensive Plan developed and approved by the Council **(Comprehensive Plan Component)**;
- 30 percent divided among the five Gulf Coast States according to a formula to implement State Expenditure Plans, which require Council approval–each Gulf state is guaranteed a minimum of 5% of the 30% allocation **(Spill Impact Component)**;
- 2.5 percent dedicated to the National Oceanic and Atmospheric Administration to establish a Gulf Coast Ecosystem Restoration Science, Observation, Monitoring & Technology Program; and
- 2.5 percent allocated to the Gulf Coast States to award grants to establish **Centers of Excellence**.

On August 28, 2013, the Gulf Coast Ecosystem Restoration Council approved the Initial RESTORE Plan. The Initial Plan was developed with input received through 14 public meetings held in the Gulf Coast area, including Texas. Over 2,300 individuals attended these meetings and approximately 41,000 public comments were received. The Initial Comprehensive Plan provides a framework to implement a coordinated region-wide restoration effort in a way that restores, protects, and revitalizes the Gulf Coast region following the DWH oil spill.

The Council and the State of Texas recognize this unique and unprecedented opportunity to implement a coordinated Gulf region-wide restoration effort. The Council's five goals included in the Initial Comprehensive Plan are: (1) Restore and Conserve Habitat – Restore and conserve the health, diversity, and resilience of key coastal, estuarine, and marine habitats. (2) Restore Water Quality – Restore and protect water quality of the Gulf Coast regions fresh, estuarine, and marine waters. (3) Replenish and Protect Living Coastal and Marine Resources – Restore and protect healthy, diverse, and sustainable living coastal and marine resources. (4) Enhance Community Resilience – Build upon and sustain communities with capacity to adapt to short- and long-term changes. (5) Restore and Revitalize the Gulf Economy – Enhance the sustainability and resiliency of the Gulf economy. That Plan is in the process of being updated.[12]

Recommendations

While it is extremely important for Texas to use the funding for conservation and restoration enterprises such as: waters and wetlands initiatives, fish and wildlife management, and coastal planning, the Committee urges Texas and the Gulf Coast Ecosystem Restoration Council to think outside the box and make creating new supplies of water for Texas a priority while continuing to improve the ecology along the coast. To offer one example, if the state were to partner with local water providers and help develop a series of desalination projects located along the length of our coast, the water supply benefits would be tremendous. Not only would the state help create new supplies of drought-proof water which would restore and protect water quality up

and down the coast, the secure supply of water would sustain communities and Gulf economies for generations to come.

To help ensure the state thinks outside the box, the Legislature should create a formal role on the Texas RESTORE Act Advisory Board (TxRAB) for individual Members to participate. The Speaker of the Texas House and the Lieutenant Governor each should be able to appoint one or more Members from their respective body to the TxRAB to provide the Legislature with a formal role in helping guide the development of the Texas RESTORE related plans.

STATE AND REGIONAL PLANNING AND PROCESSES

Public Hearing

The House Committee on Natural Resources held a public hearing on its Interim Charges #1 and #6 related to state and regional planning and processes on June 1, 2016 at 9:00 a.m. in Austin, Texas in the Capitol Extension, Room E2.010. The following individuals testified on the charge:

Charge #1:

Aaron, Dirk (Texas Alliance of Groundwater Conservation Districts)

Blasor, Scott (Palo Pinto County Municipal Water District No. 1)

Bruun, Bech (Texas Water Development Board)

Burke, John (Region K Regional Planning Group)

Choffel, Ken (Palo Pinto MWD No.1)

Cockerell, Alan (Scherz Seguin Local Government Corporation)

Harden, Bob (Texas Association of Groundwater Owners and Producers)

Harward, Heather (H2O4TEXAS Coalition)

Hendrickson, Tyler (Self)

Kramer, Ken (Sierra Club - Lone Star Chapter)

Moorhead, Bee (Texas Impact)

Nelson, Matt (TWDB)

Sledge, Brian (Self)

Weaver, Mike (Self)

Williams, C.E. (Panhandle Groundwater Conservation District)

Charge #6

French, Larry (Texas Water Development Board)

Gershon, Mike (Middle Pecos Groundwater Conservation District)

Mace, Robert (Texas Water Development Board)

McGuire, Mike (Self; Rolling Plains Groundwater Conservation District)

Neal, Greg (Republic Water Company)

Sengelmann, Greg (Gonzales county underground water conservation district)

The following section of this report related to planning and processes is produced in large part from the oral and written testimony of the individuals listed above.

Introduction

The 2017 State Water Plan is the fourth of the current water-planning era. This era began with the passage of Senate Bill 1 from 1997 (75th Legislature), and has been characterized as a "bottom-up" planning process.

Beginning in 1997, and every 5 years after, Texas has revised the state water plan in an effort to ensure there is enough water for all Texans today, and far into the future. While Texas is fortunate to have consistent population growth and an expanding business sector, the state also suffers from frequent periods of severe drought. As a result, ensuring there is enough water to meet the state's needs requires extensive planning and preparation.

Understanding this, the Texas Water Development Board was organized, and the first state water plan was written.

As the introduction to the newly adopted 2017 Texas State Water Plan shares,

"The goal of the water planning process is to ensure that we have adequate water supplies in times of drought. Water is Texas' most precious natural resource and is routinely threatened during our state's recurring periods of drought. Texas has a long history of drought, and there is no sign of that pattern changing; in fact, recent droughts remind us that more severe drought conditions could occur in the future. The drought of the 1950s is considered the "drought of record" for Texas and remains the benchmark for the water planning process."

In order to achieve the goal of adequately providing for the state's water needs the Texas Water Development Board meets every 5 years to review and revise the state water plan. The time between each of these meetings is used as an evaluation and planning period.
During this period a team is created to assess the current plan's water supply projects, the area's population trends, and it's water needs, as well as plan for potential shortages that could occur during a period of drought. One of these teams is formed in each of the 16 regional water planning areas throughout the state.

These regional teams are comprised of over 20 individuals from various sectors of the community including municipalities, industries, small businesses, utilities, agriculture, and the general public. The information gleaned by each team during this evaluation period is used to develop a regional water plan.

Once adopted, each regional plan is submitted to the Texas Water Development Board, who goes on to use this information to create the new State Water Plan. Then, the comprehensive state water plan is adopted, and serves to inform this same process that will be carried out again over the next 5 years.

The ensuing 20 years have been a time of undeniable progress in water policy. But the structure of the planning process, coupled with the dramatic multiyear drought and the continuing growth

of our economy and population, have led some to argue for a greater focus on the needs of the state as a whole rather than individual areas solving local supply issues. Some of the most frequent criticisms of the plan are the regional emphasis distracts from statewide goals, cross-regional approaches and even large-scale intraregional approaches are too infrequent, and the plan does not include strategies for all types of needs.

Texas plan remains one of the most advanced of its kind in the country. While we do have some challenges to our water supply from our state's dry periods, with this type of comprehensive water planning process, we should recognize, Texas will be able to assure its residents that they will have clean water whenever they need it for many years to come.

Regional Water Planning Groups Overview

There are 16 Regional Water Planning Groups (RWPG) each representing a different regional water planning area. The boundaries of each area are reviewed by the Texas Water Development Board (TWDB) every five years. While the Board has reviewed the boundaries, there have been no modifications since the inception of regional water planning in 1997. Each planning group must maintain, at a minimum, representatives of 12 statutorily required voting interest categories:

- public
- counties
- municipalities
- industries
- agriculture
- environmental
- small business
- electric generation utilities
- river authorities
- water districts
- water utilities
- groundwater management areas

Eleven of these interest categories require a minimum of one voting member. However, the groundwater management areas' representative category varies by region depending on how many groundwater management areas are within a region and that also have a groundwater conservation district, often requiring multiple representatives. Region K, for example is required to include six voting members representing groundwater management areas.

RWPGs may choose to add additional voting membership to represent additional interest categories, such as for economic development, or to add more members within an existing category. The planning groups generally have over 20 members, and there were a total of approximately 450 voting members across all regions involved in the previous planning cycle. Region L is the largest planning group with 30 members.

Each planning group is supported by the Texas Water Development Board (TWDB) planning team member who attends every meeting as a non-voting member and provides administrative and technical assistance to ensure the planning group meets deadlines and requirements. Each TWDB planning team member serves multiple regional water planning groups and also manages the associated grant contracts.

Other required non-voting planning group members required by statute include non-voting members representing the Texas Department of Agriculture (TDA) and the Texas Parks and Wildlife Department (TPWD), and by rule, a representative of certain water right holders or water suppliers headquartered outside the regional water planning area that provides water within the planning area or receives water from the planning area. Each planning group also includes liaisons from adjacent planning groups that facilitate the sharing of information and help coordinate planning activities.

Planning groups are required to maintain their bylaws and membership and hold publicly posted meetings. Rules include extensive public notice requirements for hearings and meetings. The process is an open, bottom-up, public process with significant opportunity for stakeholder input.

The Planning Process

The TWDB commits legislative appropriations through regional water planning grant contracts with political subdivisions that are selected by each planning group to act on their behalf. Each planning group selects a technical consultant to serve at the direction of the planning group. Each planning cycle begins with the TWDB developing draft population and water demand projections in consultation with TDA, Texas Commission on Environmental Quality (TCEQ), and TPWD. The TWDB also solicits feedback from each planning group on the population and demand figures. The TWDB then modifies the projections, as appropriate, and adopts them as the basis for the regional water plans.

The planning groups plan for approximately 2,600 water user groups in the six water use categories (municipal, including rural municipal referred to as "county - other"; manufacturing; irrigation; steam-electric; mining; and livestock) by:

- Comparing the projected demands to the existing supplies- water that is already connected to water user groups for immediate use - to identify potential supply shortages;
- Evaluating feasible strategies including supply under drought of record conditions, the costs, and impacts; and
- Recommending water management strategies including conservation and new supplies.

RPWGs develop their own plans in accordance with statute, rule, and contract. The plans are based on drought of record conditions and span a 50 year planning horizon. Drought of record conditions are when supplies are lowest and demands are generally highest. The benchmark drought of record represents very severe drought conditions that have actually been experienced and are documented with data that can be used for planning. In many areas, the drought of record remains the drought of the 1950s, but the drought of record can vary by location, for example, by

river basin.

Planning groups have the flexibility to address a variety of risks and uncertainties that are inherent to the planning process, including the risk of a drought worse than the drought of record, by:

- Using reservoir safe yields—effectively setting aside an extra year of supply as a planning buffer—when evaluating existing water supplies;
- Recommending water management strategies that, if implemented, would provide more water than may be required to meet their region's water needs (potential shortages) under drought of record conditions; and
- Leaving aside drought management measures—temporary restrictions on water use— as a last-resort response in the event of conditions worse than the drought of record.

Evaluating Water Supplies

Overall supplies are limited by what is referred to as "water availability" of the water source. Surface water availability— the firm yield of a reservoir—is evaluated using the TCEQ water availability models. Groundwater availability used in the 2016 regional plans was determined by Desired Future Conditions (DFC)—for example, conditions related to water levels or spring flows— adopted by the groundwater conservation district representatives of groundwater management areas. The TWDB translates those DFCs into modeled available groundwater volumes primarily using the groundwater availability models. The TWDB ensures that the total amount of water supplies assigned to water users sharing a particular water source in the regional water plans would not exceed the availability of that source in drought.

Approximately one-fifth of all new water supplies associated with recommended water management strategies in 2070 originate from water sources associated with other planning regions.

Other Requirements

Planning groups also survey sponsors of recommended water management strategies to estimate the amount of state financial assistance that sponsors anticipate requiring to implement their recommended projects.

In accordance with House Bill 4 (HB4), 83rd Texas Legislature, the planning groups also prioritize all the recommended projects and submit that prioritization alongside their plans. The projects are prioritized using the uniform standards that were developed by the HB4 stakeholder committee consisting of planning group chairs or their designees. The TWDB facilitated the stakeholder committee in developing the uniform standards and approved them.

TWDB responsibilities also include:

- providing data, guidance, and administrative and technical assistance to planning

- groups throughout the planning cycle;
- reviewing and commenting on the draft regional water plans;
- ensuring the resolution of interregional conflicts;
- approving the adopted regional water plans;
- developing the state water plan based on the regional water plans;
- approving amendments to regional and state water plans; and
- proposing and adopting planning rule revisions.[13]

Survey from Groundwater Conservation Districts Concerning the Planning Process

The Texas Alliance of Groundwater Districts (TAGD), which represents approximately 80% of Texas' Groundwater Conservation Districts (GCD), conducted an *Interim Charge Survey* in December 2015 concerning the Groundwater Management Area (GMA) planning process. Of TAGD's 79 GCD members, 35 completed the anonymous survey. The data should be read as informational rather than necessarily representative of all GCDs.

A. When asked whether the GMA planning process is effective, 63% of TAGD's GCD members said no, with 37% reporting yes. When asked to comment on areas of the process that are not effective, the following three issues were most frequently recorded:
    a. Timing:
        i. GMAs and Regional Water Planning Groups (RWPG)s are not in sync in adoption calendars
        ii. Data used in the State Water Plan is outdated

    b. Unintentional Consequences:
        i. The MAG is used as a regulatory cap rather than its intended use as a planning tool

    c. Lack of Funding:
        i. Restricts effective participation by smaller GCDs
        ii. Deters quality planning outcomes

When asked to provide thoughts on how the process could be improved, the following comments were provided:

1. Align the DFC approval, appeals process and MAG calculation timeline with the RWPG timeline;

2. Provide the GMAs with either adequate funding or state funded consultants to complete work;

3. Could be made more efficient by streamlining some of the administrative requirements;

4. MAGs should be treated as planning tools not caps.

B. When asked whether the Regional Water Planning process is effective, 60% of the respondents replied no, with 40% replying yes. When asked to comment on areas of the process that are not effective, the following issues were most frequently recorded:

    a. Timing:
        i. RWPG timeline needs to be adequately adjusted to the GMA/DFC approval, appeals process, and MAG calculation timeline
        ii. Limited resolution of data due to short planning cycles

    b. Participation:
        i. Lack of adequate knowledge and experience by members of the RWPGs.

    c. Unintended Consequences:
        i. Use of the MAG as a firm cap in available groundwater is not effective and restricts accurate water projections
        ii. Regional Water Plans include unrealistic water management strategies due to the requirement that all unmet needs be accounted for to produce an administratively complete Regional Water Plan
        iii. Projects of high local important do not receive prioritization or funding

When asked what should be done to make the process more effective, the following responses were provided:

1. Separate regional planning from eligibility for funding;

2. Allow plans to indicate unmet needs;

3. Include flexibility in the use of the MAG to indicate water availability.

C. When asked whether they would support moving the GMA and RWPG planning cycles from 5 to 10 years, 69% of the respondents said yes, with 31% saying no.

    When asked why they supported the idea, the respondents who answered yes provided the following comments:

    a. Cost:
        i. Unfunded GMA planning process is both costly and time consuming for GCDs

ii. Save taxpayer money to fund RWPGs

b. Data:
    i. Water demand and supply data and population numbers do not change substantially in a 5 year cycle. (This could be done in alliance with the National Census.)
    ii. Provide opportunity for the RWPGs to align timeline with the current DFC adoption
    iii. Provide opportunity for evaluation of plan before next planning cycle begins
    iv. A longer period will provide more relevant data to use for future planning efforts

When asked why they did not support the idea, respondents who answered no provided the following comments:

a. Stakeholder Involvement:
    i. 10 years is too long for objections to the DFC to be addressed

b. Knowledge:
    i. A certain degree of institutional knowledge is required to effectively engage in Regional Water Planning efforts. A 10 year cycle would naturally limit the number of members that stay beyond one planning cycle

c. Data:
    i. Areas with quickly growing populations may not be able to accurately predict in a ten year planning horizon

D. When asked to provide their FY16 Annual Budget and expectations for total expenditures on the current GMA planning process, GCDs reported having to spend a significant portion (over 5%) of their budget on the GMA planning process with some spending much more. The percentage of funds spent on the GMA planning process relative to GCD budgets indicated that the resources going into planning, and therefore we can assume the results or products of the planning, are unequally distributed. In order to facilitate a more equal approach in both quality and product in regional planning, the issue of GMA funding must be considered.

E. When asked to provide any further comments regarding issues of pressing significance to groundwater management in Texas, the following responses were provided:

a. Concern that groundwater management has become so complex that GCD annual operating budgets are predominately spent on lawyers and consultants.

b. Concern that the negative dialogue regarding curtailments detracts from the reality of a limited resources.

c. Need for further agricultural incentives to conserve groundwater.

d. Concern that underperforming districts are not held accountable.

e. Concern that the treatment of MAGs as caps necessarily inhibits effective management.

f. Need to coordinate real estate development plans with groundwater availability.[14]

Because of recent legislative action and court cases addressing the subject of private property rights in groundwater, the issue of groundwater ownership is changing. While it is clear Texans have a vested ownership right in the groundwater beneath their property, it is also clear the legislature has charged GCDs with the duty of regulating the withdrawal of that same groundwater. These somewhat differing interests ensure the legislature will need to continue to work to balance property rights with the needs of Texans for water resources.

These competing interests may also shape the state's water planning process. Currently, the state's 16 Groundwater Management Areas are responsible for developing the Desired Future Conditions within the region yet the regulations for achieving the DFC falls to the Districts within each GMA. This has the potential to create a situation where property owners in the same area may have differing sets of regulations applied to the production of their private property which will continue to lead to court challenges regarding the use of private property.

The legislature should continue to monitor court cases and ensure the statutes accurately reflect recent decisions on groundwater ownership and property rights.

Recommendations

The increasing complexity of the planning process limits its effectiveness as a planning tool for the state.

*Require regions to more thoroughly assess and address particular types of strategies or planning approaches***.**

Several of the criticisms of the planning process relate to its alleged tendency to move slowly in adopting relatively innovative water management approaches, particularly aquifer storage and recovery (ASR) and desalination. A similar criticism applies to the lack of greater regionalization in favor of more one-off, scattershot projects. One way to approach these criticisms without

adjusting the fundamental structure of planning would be to require that regions consider and assess particular approaches of strategy types. This would stop short of imposing a "top down" planning process while requiring regions to at least more fully consider alternate approaches. This idea should appeal to critics of the plan, because to the extent their criticisms are valid, those criticisms would benefit from a fair hearing and specific consideration in the process. It should also be palatable to those who defend the current planning process, because it retains regional control of the process.

Specific ideas include:

- Requiring regions who rely on new surface water supplies for a significant portion of their future needs to also specifically consider ASR as an alternative or complementary option. The same could be done for desalination, conservation, and other innovative water management strategies.

- Requiring regions to specifically assess their own degree of regionalization. Similarly, but more broadly, regions could also be asked to assess whether each project in the plan is amenable to being included in a broader, more regional approach or not. At the very least, this would begin to inject a broader perspective into planning discussions.

- Requiring a more through reexamination of "stale" projects in the plan. One of the more legitimate criticisms of the current process is that projects, particularly large new reservoirs, linger in the plan for decades, largely as "placeholders" to fill future needs on the fringes of the planning horizon. A more targeted approach could be to focus on projects that have been in the plan for more than a certain number of planning cycles and which have seen no significant progress over that same period.

Provide more flexibility for regional planning groups when updating plans.

The bottom-up planning process utilized by the state ensures local buy-in on projects included in the plan. However, the state has mandated a number of requirements for each planning group which may undermine the local nature of each RWPG's efforts. Chief among these mandates is the requirement to update each plan every five years regardless of the region's growth or changes in water user groups. The Legislature should allow RWPGs to examine the need for amending each plan based on the changes within each regional water planning area. If the population or water use within an area does not change more than five percent (5%) the RWPG should be allowed to update its plans with minimal changes and avoid some of the expensive modeling and consulting fees associated. Each RWPG should still be required to review its plan every five years, but the option of completing a full update could be a local decision based on the data available to each planning group.

Create an "interregional council" of regional planning group member.s

The Legislature should try to create more interaction between the regions and build a foundation for more emphasis on the regional cooperation as a whole in the planning process. A similar process was used in late 2013 to create the uniform regional prioritization standards required by HB 4. In that effort, the regional planning chairs met on several occasions, and the general reaction was positive. A similar, statutorily-guided approach could also require members of the regional planning groups to meet at strategic points in the planning process to discuss how strategies might overlap or be better integrated between regions. At the very least, this requirement would demonstrate the state's desire to encourage a less "balkanized" process.

Provide for direct state involvement in a large-scale, transformative seawater desalination project.

Some of the criticism of the current planning process is that it has not produced meaningful progress on any large-scale seawater desalination project. Other jurisdictions dealing with major droughts (Israel, Australia, and southern California) have turned to seawater desalination as a significant part of their responses; Texas has not. The ultimate wisdom of that course is debatable.

Two things seem relatively clear, however. One is that, based on the best predictions that can now be made, some level of large-scale seawater desalination is likely to be necessary in Texas at some point in the near future as the state continues to grow. While debates continue about exactly what level of groundwater production is appropriate, most groundwater supplies in the state are not being used sustainably. If this continues, we will soon reach the point at which the economics of seawater desalination projects and its drought-proof supply will make it an attractive, if not necessary, option.

The second reality is only a relatively narrow category of large-scale seawater desalination projects is likely to be viable in Texas any time in the near future. Such a project would need to use the desalinated water on or very near the coast, rather than take on the massive additional costs to transport the water inland. In practical terms, that likely means that a collaborative project between inland and coastal water users in the same or an adjacent river basin would be the best fit, because that collaboration would allow for sharing water up and down the basin in a way that could benefit numerous interests. This is exactly the sort of approach that the current planning process struggles to produce. While the modifications to the planning process suggested here might help change that, the state could also simply opt for a more direct approach and participate in the partial ownership of a desalination facility. While we are not aware of specific analysis, it is likely a significant state investment would be necessary to change the economic viability of a seawater desalination project. Targeted regulatory changes to facilitate a cross-regional project might also be required. The point of the recommendation would be to give various regions of the state a goal, with the reward of enhanced state financial and other support at the end.

The bottom line is that desalination projects are less likely to develop in our current planning process because of the regional nature of the process and the costs of such a project. If we are to

move toward a desalination strategy, the state is likely to have to incentivize the cost of desalination and bear some of that cost itself. Given the budget outlook facing the 85th Legislature, near-term funding options may be limited, but using a public/private partnership in this manner could be a good investment for the state and the long-term security of our water supplies.

Provide more specific direction to regions to consider the agricultural and natural resource implications of strategies.

One of the more obvious weakness of the existing planning process is the difficulty of integrating water needs with diffuse benefits, like environmental flows. One way to address this issue would be to provide more guidance to regions on what the requirements of existing law regarding protection of the "agricultural and natural resources" of the state.

Another option to achieve a similar goal would be to define the considerations that HB 4 instructed the regions to use in prioritizing their projects. The bill requires regions to consider the several factors regarding the projects in their region prioritization. Yet, HB 4 left the definition of these terms to the regional planning groups to decide, through a committee of their chairs. That lack of direction creates missed opportunities. The Legislature could better define these parameters which may provide more clarity in the planning process for newer technologies.

Require regions to set specific Gallons-Per-Capita-Per-Day (GPCPD) goals.

The state should require each region to set its own GPCPD goals as a planning tool. This change should not be punitive. Each RWPG is different and the water users within each group are different. Of course, there are some RWPGs from more arid or more rural parts of the state where the GPCPD would be different. Having each region define its own GPCPD goal will help spur further discussions about conservation and will foster competition among the regions. Requiring a GPCPD goal may also incentivize the development of conservation projects to reduce each region's goal.

Update the Water Availability Models (WAMs) to account for the new drought of record.

It is very likely the most recent drought is the new drought of record for several of the state's river basins. Updating WAMs may reveal both existing surface water supplies are less reliable during significant drought periods and future planned supplies may not be as abundant as their current designs indicate. Updating our WAMs would ensure we are using the best science available and would allow planners to incorporate fully the lessons learned over the past few years. Even though we are facing a tight budget session, the state should at least begin updating the WAMs this session and complete the process in future biennium.

CONSERVATION

Public Hearing

The House Committee on Natural Resources held a public hearing on its Interim Charge #3 related to freshwater loss and conservation on October 13, 2016 at 1:00 a.m. in Austin, Texas in the Capitol Extension, Room E2.010. The following individuals testified on the charge:

Averitt, Kip (Self)

Bruun, Bech (Texas Water Development Board)

Kramer, Ken (Sierra Club - Lone Star Chapter)

Lanford, David (Self; Simsboro Water Defense Fund)

Lindsay, David (Central Texas Water Coalition)

Mace, Robert (Texas Water Development Board)

Macias, Roberto (San Antonio Water System)

Savory, Jill (Self)

Witta, George (Self; Simsboro water defense fund)

The following section of this report related to conservation is produced in large part from the oral and written testimony of the individuals listed above.

Overall Water Budget

Texas loses a large amount of new freshwater either to the Gulf of Mexico or to other states. In a time where Texas is growing and seeking new sources of water, one of the easiest solutions is to keep the water we have. While it may be easier said than done, Texas should move to capture excess flood waters for beneficial purposes.

Texas receives 379 million acre-feet per year on average of rain (and some snow), and of that rainfall 86 percent evaporates back into the atmosphere. The remaining 13 percent runs off the landscape into our lakes and rivers. Of this 13 percent: 94 percent flows out of the state with 80 percent going into the Gulf of Mexico and 20 percent to other states, leaving about 5 percent to meet our daily water use needs.

Only about 1 percent of the total rainfall actuals recharges our aquifers.

In the water world, it is said that one part of the water cycle's loss is another part's gain. However, with Texas retaining so little of its rainfall, it's hard not to feel that we are losing much more than we are gaining. [15]

Flows out of the State

The Texas Water Development Board uses the U.S. Geological Survey stream gauge information and models to estimate flows out of the state.

In 2014 (a dry year), 23.7 million acre-feet flowed out of the state with 74 percent of that (17.5 million acre-feet) flowing into the Gulf of Mexico.

In 2015, (a wet year), 94.2 million acre-feet flowed out of the state with 66 percent (62.8 million acre-feet) flowing into the Gulf of Mexico.

As of October 1, 2016, 75.2 million acre- feet has flowed out of the state with 75 percent (56.3 million acre-feet) flowing into the Gulf of Mexico.

Between the years of 1977 to 2014, an average of 40.2 million acre-feet per year has flowed to the Gulf of Mexico. Approximately 77 percent of this water is sourced from the upper Gulf Coast basins including: Sabine-Neches, Trinity-San Jacinto, and Brazos Basins.

While we would like to keep as much water as we can in Texas, a couple of positive aspects to out-of-state flows are it helps us meet our compact requirements with other states (about 1.5 million acre-feet) and flows into the Gulf of Mexico (including flood flows) environmentally benefiting bays and estuaries, especially oysters.

Evaporative Losses from Reservoirs and Rivers

Evaporation is one of the greatest threats to water conservation. On average, since 1977, gross (total) evaporation from the major reservoirs is about 7.3 million acre-feet and net evaporation

(considers rainfall on the reservoirs) is about 5.4 million acre-feet. The average annual evaporation from principal rivers and small streams in Texas was about a million acre-feet per year.

The Texas Water Development Board worked with the City of Wichita Falls to evaluate evaporation suppression and found (with 87 percent certainty) that the technique reduced evaporation by approximately 15 percent.

Water Loss through Infrastructure

One of the largest losses of water is through dilapidated infrastructure. Water is lost through inaccurate meters, leaks, and breaks. For accountability, every five years all water providers have to submit a water loss report to the TWDB. For 2015, 2,610 out of 3,918 entities submitted reports (693 were excluded from analysis do to incomplete or obviously incorrect data). Based on the valid submittals, total water loss in Texas for 2015 was **150 billion gallons** (466,000 acre-feet) with 16 percent being from apparent losses, like inaccurate, meters and 84 percent real loss from leaks and breaks. That is about a 14.7 percent loss of our total water loss for the entire state.[16]

Recommendations

Water systems with infrastructure issues should make appropriate repairs when needed and are encouraged to apply for financial support through the Texas Water Development Board to help with the cost.

Although water loss can be mitigated, it is prohibitively expensive to have a non-leaking system. Water loss can be addressed by replacing meters, replacing pipes, promptly fixing pipe breaks and leaks, and using sector-based monitoring. If an applicant applies for financial support from the TWDB and their water loss is above a certain threshold, the entity is actually required to use part of the loan to mitigate water loss or demonstrate that they are actively addressing their water loss issues.

Texas should promote more aquifer storage and recovery projects throughout the state to prevent freshwater loss.

Aquifer storage and recovery (ASR) is the use of an aquifer to store water from a different source or location for later use. Water providers have successfully implemented ASR around the world, including about 175 locations in the United States. In Texas, there are three operating facilities serving the cities of El Paso since 1985 (using treated waste water), Kerrville since 1998 (using surface water), and San Antonio since 2004 (using aquifer water). Seven regional water planning groups have included ASR in their plans. If implemented, they would conserve 152,000 acre-feet per year by 2070. With the passing of House Bill 655 in the 84th Legislature, it is now easier to permit and operate an ASR in Texas. Texas should take every opportunity to promote more development and usage of ASRs and provide incentives for water providers who move to this newer technology.

Texas should encourage more off-channel reservoirs throughout the state to prevent freshwater loss.

Off channel reservoirs are reservoirs built away from a main stem river but may rely on main stem flows. There are 28 existing off-channel reservoirs with more than 5,000 acre feet of storage in Texas. The total capacity is about 760,000 acre-feet. They range in size from Lake Halbert's 6,033 acre-feet near Corsicana to the South Texas Project Reservoir's 202,600 acre-feet. The 2017 State Water Plan proposes the construction of an additional 14 off-channel reservoirs. The total capacity of these proposed off-channel reservoirs is about 1.2 million acre-feet. They range in size from Guadalupe River Authority's 12,500 acre-feet to Dallas Water Utility's 300,000 acre-feet. Texas should promote the creation of the additional off-channel reservoirs in the 2017 State Water Plan and provide incentives to start the projects.

ENDNOTES

[1] A Texan's Guide to Water and Water Rights Marketing, Texas Water Development Board, 2003
[2] Testimony by Clay Landry of WestWater Research before the House Natural Resources Committee on February 2, 2016
[3] Testimony by Clay Landry of WestWater Research before the House Natural Resources Committee on February 2, 2016
[4] A Texan's Guide to Water and Water Rights Marketing, Texas Water Development Board, 2003 `
[5] Testimony of Wes Strickland of Jackson Walker LLP before the House Natural Resources Committee on February 2, 2016.
[6] Testimony of Wes Strickland of Jackson Walker LLP before the House Natural Resources Committee on February 2, 2016.
[7] A Texan's Guide to Water and Water Rights Marketing, Texas Water Development Board, 2003
[8] Testimony by William West of Guadalupe-Blanco River Authority before the House Natural Resources Committee on February 2, 2016
[9] A Texan's Guide to Water and Water Rights Marketing, Texas Water Development Board, 2003
[10] Desalination in Texas by Dr. Robert Mace presented to the House Natural Resources Committee on April 26, 2016
[11] Conserve, Restore, Renew: Framework for Implementing the RESTORE Act on the Texas Gulf Coast, August 2015
[12] https://www.restorethetexascoast.org/
[13] Testimony by the Texas Water Development Board to the House Natural Resources Committee on June 2, 2016
[14] TAGD Interim Charges Survey Results from February 2016 presented to the House Natural Resources Committee
[15] Briefing Notes on Water Loses and Minimizing those Losses in Texas by Dr. Robert Mace presented to the House natural Resources Committee on October 13, 2016
[16] Briefing Notes on Water Loses and Minimizing those Losses in Texas by Dr. Robert Mace presented to the House natural Resources Committee on October 13, 2016