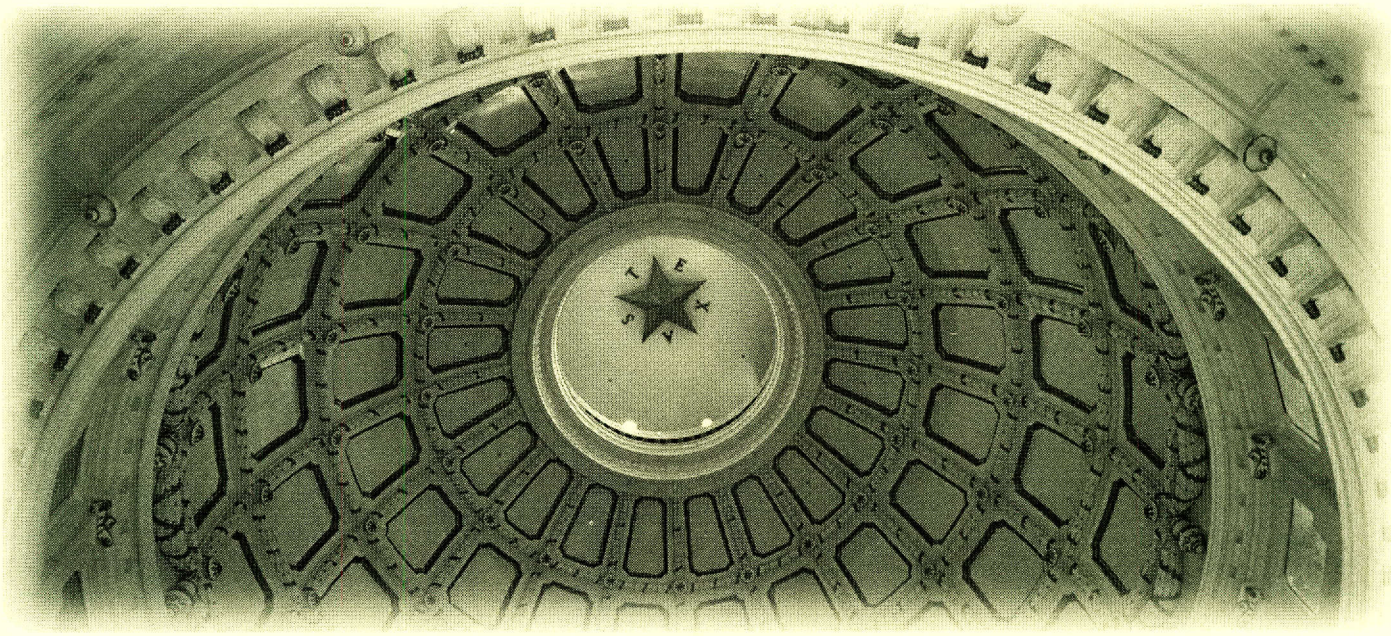

Interim Report

to the 84th Legislature

House Committee on
Natural Resources

January 2015

HOUSE COMMITTEE ON NATURAL RESOURCES
TEXAS HOUSE OF REPRESENTATIVES
INTERIM REPORT 2014

A REPORT TO THE
HOUSE OF REPRESENTATIVES
84TH TEXAS LEGISLATURE

ALLAN B. RITTER
CHAIRMAN

COMMITTEE DIRECTOR
ELIZABETH A. FAZIO

ACKNOWLEDGMENTS

The Chairman and House Committee on Natural Resources would like to acknowledge and thank several individuals whose hard work made this report possible. The work contained in this report could not have been completed without the diligence and commitment of the following individuals who served the House Committee on Natural Resources this interim:

Senior Editor and Co-Author

Elizabeth Fazio (Committee Director) □ Authored Interim Charge Number 2 related to groundwater management; Authored Interim Charge Number 3 related to land stewardship; Co-authored Interim Charge Number 4 related to aquifer storage and recovery; and Co-authored Interim Charge Number 5 related to 2010 Deepwater Horizon oil spill funds. Served as Senior Editor in all aspects of this report.

Co-Authors

Corinne Sullins (Legal Intern) □ Provided research assistane in the development of Interim Charge Number 3 related to land stewardship. Co-authored Interim Charge Number 4 related to aquifer storage and recovery; and Co-authored Interim Charge Number 5 related to deep horizon spill funds.

Assitant Editor

Austin McCarty (Paraprofessional) □ Assited in the development and layout of the Interim Report in preparation for publication.

House Committee On Natural Resources

January 5, 2015

Allan B. Ritter
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 House Committee on Natural Resources of the Eighty-Third Legislature hereby submits its interim report including recommendations and drafted legislation for consideration by the Eighty-Fourth Legislature.

Respectfully submitted,

Allan B. Ritter

Eric Johnson, Vice-Chairman

Trent Ashby

Dennis Bonnen

Bill Callegari

James M. "Jim" Keffer

Tracy O. King

Lyle Larson

Trey Martinez Fischer

Doug Miller

Eddie Lucio III

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HOUSE COMMITTEE ON NATURAL RESOURCES

INTRODUCTION

At the beginning of the 83nd 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 Allan B. Ritter (Chairman), Eric Johnson (Vice-Chairman), Trent Ashby, Dennis Bonnen, Bill Callegari, James L. "Jim" Keffer, Lyle Larson, Eddie Lucio III, Trey Martinez Fischer, Doug Miller, and Tracy O. King.

During the interim, the committee was assigned six charges by the Speaker:

1. Monitor the implementation of HB 4 (83R) and SJR 1 (83R) and the progress of the Texas Water Development Board and other entities in implementing this legislation to provide a stable, long-term funding source for the State Water Plan.

2. Evaluate the availability, management, and development of groundwater in the state. Consider the economic, environmental, and social impacts of groundwater usage and production in the agricultural, municipal, and energy sectors. In particular, examine methods to facilitate further development of brackish groundwater resources and to improve the consistency and certainty of permitting by groundwater districts without undercutting reasonable regional and local regulation of groundwater.

3. Explore opportunities to encourage voluntary protection and stewardship of privately owned lands in support of the state's water supply and to protect environmental flow needs in Texas rivers. Examine methods in which state agencies, water rights holders, and non-governmental organizations can work together through programs like the Texas Farm and Ranch Lands Conservation Program and the Texas Water Trust.

4. Examine strategies to enhance the use of aquifer storage and recovery (ASR) projects, including a review of existing ASR facilities in Texas and elsewhere.

5. Monitor the use of funds provided or made available to Texas in relation to the 2010 Deepwater Horizon oil spill, and make recommendations on the appropriate use of these funds in the future. *(Joint charge with the House Committee on Appropriations)*

6. Conduct legislative oversight and monitoring of the agencies and programs under the committee's jurisdiction and the implementation of relevant legislation passed by the 83rd 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; and

d. identify opportunities to streamline programs and services while maintaining the mission of the agency and its programs.

The committee has completed its hearings and investigations and has issued the following final report and recommendations. All interim charges including the charge to monitor the agencies and programs under the committee's jurisdiction were undertaken by the committee as a whole and no subcommittees were appointed.

Finally, the committee wishes to express its appreciation to the federal and state agencies, local governments, public and private interests, and concerned citizens who testified at the public hearings for their time and efforts on behalf of the committee.

INTERIM STUDY CHARGES

Committee of the Whole

CHARGE #1: Monitor the implementation of HB 4 (83R) and SJR 1 (83R) and the progress of the Texas Water Development Board and other entities in implementing this legislation to provide a stable, long-term funding source for the State Water Plan.

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Eric Johnson
Trent Ashby
Dennis Bonnen
Bill Callegari
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Eddie Lucio III
Trey Martinez Fischer
Doug Miller
Tracy O. King

Committee of the Whole

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Committee of the Whole

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Committee on the Whole

CHARGE #4: Examine strategies to enhance the use of aquifer storage and recovery (ASR) projects, including a review of existing ASR facilities in Texas and elsewhere.

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Committee on the Whole

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Committee on the Whole

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GROUNDWATER

PUBLIC HEARING

The House Committee on Natural Resources held a public hearing on its Interim Charge #2 related to groundwater on June 25, 2014 at 10:00 a.m. in Austin, Texas in the Capitol Extension, Room E2.010. The following individuals testified on the charge:

Gregory Ellis, Self
Billy Howe, Texas Farm Bureau
Mike McGuire, Rolling Plains Groundwater Conservation District
Dirk Aaron, Clearwater Underground Water Conservation District
Tim Andruss, Victoria County Groundwater Conservation District, Texana Groundwater Conservation District, Refugio Groundwater Conservation District, and Calhoun County Groundwater Conservation District
Kody Bessent, Kody, High Plains Water District
Joe Cooper, Lost Pines Groundwater Conservation District
John Dupnik, Barton Springs Edwards Aquifer Conservation District
Ty Embrey, Lloyd Gosselink Rochelle & Townsend, PC
William Hutchison, Self
Russell Johnson, McGinnis Lochridge & Kilgore LLP
Kathy Turner, Lone Star Groundwater Conservation District
Steve Kosub, San Antonio Water System
Robert Mace, Texas Water Development Board
Ed McCarthy, Jackson, Sjoberg, McCarthy & Townsend, LLP
Dean Robbins, Texas Water Conservation Association
Roland Ruiz, Edwards Aquifer Authority)
Greg Sengelmann, Gonzales County Underground Water Conservation District
Jason Skaggs, Texas and Southwestern Cattle Raisers Association
Brian Sledge, Sledge Fancher PLLC
Stacey Steinbach, Texas Alliance of Groundwater Districts
Michael Turco, Harris-Galveston Subsidence District
Dee Vaughan, Corn Producers Association of Texas
Hope Wells, San Antonio Water System
Doug Wierman, Self
C.E. Williams, Panhandle Groundwater Conservation District

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

INTRODUCTION

Groundwater has long been a source of supply for our domestic and livestock, agriculture, municipal, industrial, and energy needs in Texas. Despite the state's reliance on this resource, outside of agriculture, it has traditionally only been a secondary source of water because of our state's vast access to surface water. In the recent years, however, severe drought coupled with a growing population has caused pressure to grow on groundwater resources. Groundwater is relatively inexpensive and in some cases ideally located, making it readily available and easily accessible without the requirement for much infrastructure, i.e. pipelines for transportation. What was once used namely in times of emergency, is fast becoming the preferred method for water supply in this state. For this reason, a number of unresolved issues related to groundwater management are at the forefront for many landowners and purveyors.

The committee was charged, yet again, with an evaluation of the availability, management, and development of groundwater in the state. In particular, the committee has been asked to examine methods to facilitate further development of brackish goundwater resources and to improve the consistency and certainty of permitting by groundwater districts without undercutting reasonable regional and local regulation of groundwater. This report highlights some of the challenges that Texas Legislators continue to face in our state.

BACKGROUND

In 2010, the Texas House of Representatives Committee on Nature Resources produced an Interim Report to the 82nd Texas Legislature (2011) that provided an expansive overview of groundwater law in Texas and covered in detail the debate on groundwater ownership. Shortly thereafter, that legislature passed Senate Bill 332 (83rd Texas Legislature, 2011), which provided that landowners in Texas did indeed own the water beneath their land and that the management and development of groundwater was to continue under the legislature's preferred regulatory method of groundwater conservation districts.1 Following the 82nd Texas Legislature's passage of Senate Bill 332, the "groundwater ownership bill," the Texas Supreme Court released its most expansive recent opinion on groundwater ownership in the case, *Edwards Aquifer Authority v. Day*.[1] Referencing the Texas Legislature's passage of Senate Bill 332, the court went a step further and declared that groundwater ownership was a "vested" ownership right. It also simultaneously recognized that under the Conservation Amendment of the Texas Constitution,[2] the Texas Legislature had a right and duty to continue protecting the state's natural resources, including groundwater.[3] The court further stated that the legislature continues to be primarily responsible for the implementation of groundwater management,[4] including any determination of the amount of groundwater a landowner is entitled to produce, and it again recognized the legislature's "preferred method of groundwater regulation" under groundwater conservation districts (GCDs).[5] As stated in the Interim Report to the 82nd Legislature:

[1] Note here, that the final version of Senate Bill 332 was vastly different than the bill as originally filed. Ultimately, the Texas Legislature adopted the House version and did not declare groundwater ownership a "vested" right, as this analysis would have required an interpretation of the Texas Constitution, which was more appropriate for the Texas Supreme Court to determine.

> "Irrespective of how the Texas Supreme Court decides the issue of groundwater as a property right, the Court has acknowledged that GCDs have been declared by the Texas Legislature to be the state's "preferred method of groundwater regulation," and that it is the legislature's duty – not the Court's – to exercise the state's police powers and enact laws to facilitate the preservation and conservation of groundwater as a natural resource within the state as well as prevent its waste and provide for its maximum beneficial use."

The determination of property rights remains a simple separation of powers equation, whereby the Texas Supreme Court determines questions of constitutionality and the legislature determines the regulatory boundaries within that constitutionality. Although the Texas Supreme Court opined a number of management strategies that it believed might be acceptable, or otherwise unacceptable, and further likened groundwater law in the state to other more highly developed areas of law in Texas, such as oil and gas regulation, the court's decision in *Edwards Aquifer Authority v. Day* did not change the legislature's ability to continue managing and developing groundwater resources under its own statutory implementation within the bounds of the constitution. This includes the ability to continue creating regulations that in the future may or may not treat water resources like oil and gas, as well as create statutory provisions providing for methods of management that support historical use in the permitting of groundwater resources.[6] Likewise, the legislature could restructure groundwater management altogether. Whether any of these approaches could be challenged as beyond constitutional authority or for creating constitutional "takings" claims depends on the particular approach and on how it might be challenged in the courts. In summary, while *Day* answered some of the most fundamental questions about groundwater ownership, it left many questions still unanswered.

Since the opinion in *Edwards Aquifer Authority v. Day*, management and development of groundwater resources has certainly not become any less complicated or perplexing. Landowners increasingly want access to the groundwater beneath their property, whether for personal use, for sale and distribution elsewhere, or for compensation by adjoining landowners who may be using it; and GCDs continue to struggle with reasonable restrictions on groundwater pumping limits under both "vested" ownership rights and groundwater availability models (GAMs). Pressure to develop groundwater resources remains steady, especially in hotbed areas of the state with fast growing populations, while even areas that have been shown to have vast amounts of groundwater continue to tightly manage the resources. Some accuse GCDs of overregulating groundwater, and there continues to be a growing coalition who represent both landowners and purveyors who would like to see groundwater regulation more centralized and consistent—or conversely, relaxed or even nonexistent. Advocates for GCDs argue just as strongly that regulation must ensure fairness and future availability for everyone and that the vast majority of districts seek only to advance these goals. The Texas Water Conservation Association, the oldest water association in Texas, has put together a large working groundwater subcommittee of its members this interim to collaborate on a number of issues in this portion of the report. Hopefully, their efforts, along with a number of other associations, tradegroups, and water professionals, will lead to clarification for the next legislative session. In the meantime as future legislatures wade through the mud and balance the desire for access with the goal of long-term conservation, they should remain mindful of their continued responsibility under the Texas Constitution to protect and conserve groundwater resources whether in times of plenty or

scarcity and to ensure adequate water for the state as a whole. Both of these jobs remain moving targets.

Agency Oversight/ Statutory Regulation over Groundwater

Texas Water Development Board

The Groundwater Resources Division at the Texas Water Development Board (TWDB) serves as the state's centralized resource for groundwater in Texas. Its mission is to collect, interpret, and provide accurate information on the state's groundwater resources.[7] The division monitors groundwater levels and groundwater quality in the major and minor aquifers of the state and conducts groundwater modeling. It also assists, reviews, and approves groundwater management plans, including the development of desired future conditions (DFCs). The initial development of DFCs, created under House Bill 1763 (79th Texas Legislature, 2005) was completed by groundwater management areas (GMAs) in 2011. Then within each GMA, individual aquifer modeled available groundwater (MAGs) amounts were developed and reported by February 2013. These MAGs reflected the adoption of those initial DFCs and were formally delivered to the districts and Regional Water Planning Groups (RWPGs).

Status of the Joint Planning Process for Establishing Desired Future Conditions[8]

The TWDB estimates that MAG volumes will be about 500,000 acre-feet per year lower in 2020 (11.2 million acre-feet per year versus 11.7 million acre-feet per year) as compared to groundwater availability in the 2012 State Water Plan. The biggest differences are in the Pecos Valley and Edwards-Trinity (Plateau) Aquifers. This MAG is about 170,000 acre-feet per year higher, and the Carrizo-Wilcox Aquifer where its MAG is about 125,000 acre-feet per year lower. For the next round of regional water planning, and therefore the next state water plan, groundwater availability in the plans will reflect whatever the DFC was at the time the previous water plan was approved by the TWDB, unless the RWPG is willing to use a subsequently adopted DFC.

The next round of establishing DFC is currently active. Joint planning has involved reviewing the current DFCs, assessing current and projected demands, and working to identify possible adjustments to the current DFCs. The revised DFCs are due May 1, 2016. As of June 25, 2014, the status of each of the GMAs according to the TWDB was as follows:

- Groundwater Management Area 1 – Districts in the groundwater management area are meeting approximately quarterly, and they are currently considering the required factors at their meetings. The districts are anticipating having a desired future condition proposal ready before the May 1, 2016 deadline.

- Groundwater Management Area 2 – Districts in the groundwater management area have not met since December 18, 2013, and are not planning to have another joint planning meeting until December 2014.

- Groundwater Management Area 3 – Districts in the groundwater management area have not officially met since August 9, 2010; however, the Middle Pecos

Groundwater Conservation District discussed desired future conditions at a March 17, 2014 meeting. The Middle Pecos Groundwater Conservation District was the only district in the groundwater management area until Reeves County Groundwater Conservation District was created by the legislature in 2013.

- Groundwater Management Area 4 – Districts in the groundwater management area recently met to discuss how to proceed with the determination of their desired future conditions and to come up with a timeline for completion.

- Groundwater Management Area 5 – There is not a groundwater conservation district within Groundwater Management Area 5.

- Groundwater Management Area 6 – Districts in the groundwater management area meet annually. At their last meeting on January 29, 2014, the group heard a Texas Water Development Board staff presentation on the Refined Seymour Aquifer Groundwater Availability Model for Haskell, Knox, and Baylor counties. The consultant presented proposed non-relevant aquifer data for the area, but no decisions were made. Their next meeting is planned for January 2015.

- Groundwater Management Area 7 – Districts in the groundwater management area are working on a contract with their selected consultant to prepare the explanatory report. They met last on May 1, 2014, and their next meeting was September 18, 2014. They are anticipating meeting the May 1, 2016 deadline for desired future conditions proposal adoption.

- Groundwater Management Area 8 – Districts in the groundwater management area have discussed updated modeling efforts. The consultants will use the existing modeled availability groundwater values to illustrate the differences between the existing and new model in terms of water levels and water budgets. The districts will then have one month to agree on two additional predictive simulations for the purpose of evaluating possible desired future conditions. There is a separate technical group to address data and modeling efforts.

- Groundwater Management Area 9 – Districts in the groundwater management area are meeting more often in 2014 to decide on hiring a consultant and to hear discussions on relevant and non-relevant aquifers. They plan on meeting the May 2016 deadline but want to propose earlier than that if possible.

- Groundwater Management Area 10 – Districts in the groundwater management area are in negotiations with their selected consultant prepare the explanatory report. They are meeting every 2 months.

- Groundwater Management Area 11 – Districts in the groundwater management area have not met since October 2, 2013; no information about their status is available at this time.

- Groundwater Management Area 12 – Districts in the groundwater management area met June 6, 2014, to hear presentations from district consultants on the progress on desired future conditions. The districts are planning to complete their final adoption before May 1, 2016. They are planning to have stakeholder meetings to obtain input for the process.

- Groundwater Management Area 13 – The consultant for the districts has developed groundwater model runs. Districts are taking model runs to their individual boards for discussion.

- Groundwater Management Area 14 – The districts in the groundwater management area met April 30, 2014, to discuss the new Northern Gulf Coast Aquifer groundwater availability model. The consultant also presented information on preliminary model runs using the current modeled available groundwater values to quantify how the new model may change predicted aquifer drawdown.

- Groundwater Management Area 15 – The districts in the groundwater management area met on April 10, 2014. They have hired a consultant to collect pumping data for desired future condition model runs for the area.

- Groundwater Management Area 16 – The consultant for the districts in the groundwater management area has completed the model runs for possible desired future conditions, facilitated discussion on the factors, and is preparing a draft explanatory report for the districts. Their last meeting was June 24, 2014. The districts are anticipating finalizing their proposed desired future conditions this year.

Science in Support of Groundwater Availability Modeling

The TWDB develops, maintains, and runs groundwater availability models (GAMs) in support of joint planning and the development of groundwater management plans, working internally with staff, externally with contracts, and collaboratively with cooperators. To date, the TWDB staff have issued reports on the "total estimated recoverable storage" for all of the GMAs. Districts in GMAs are required to consider the total estimated recoverable storage when considering possible DFCs. Total estimated storage (not recoverable storage, which is a range between 25 – 75% of the total storage) is nearly 16.9 billion acre-feet. This estimate is very approximate and is not all fresh groundwater.

The TWDB has completed 26 GAMs out of a total of 31 needed for the aquifers of Texas. From 2001 to 2013, GAM contracts have totaled $14.4 million. This equates to an average of $359,660 per model/project with a range of $20,000 to $1 million depending on the size and complexity of the study area or research project. Currently, the TWDB has budgeted $1,440,000 for new contracts related to the GAM program for fiscal years 2014 and 2015. In total, the TWDB has tracked 462 GAM run requests since 2001 (as of June 3, 2014). Of these, 187 were in support of groundwater management plans, 93 were in support of the joint planning process, 47 were estimates of modeled available groundwater, 2 were in response to legislative

requests, and 133 were prior to categorizing the requests. Internally, the TWDB has tracked an additional 137 model related projects/tasks. Due to budget cuts in 2011, however, the agency no longer provides technical assistance in running GAMs to evaluate DFCs. Now in most instances, GCDs in GMAs have made arrangements to hire technical consultants to run models and evaluate various DFCs scenarios. Generally, these consultants also write the explanatory reports required for the DFCs submittals.

In the next round of planning, several GMAs will be using new GAMs. These include the following:

- GMAs 1 and 2 (High Plains Aquifer System Groundwater Availability Model – in development);
- GMA 8 (Trinity and Woodbine Groundwater Availability Model – in development); and
- GMA 14 (Houston Area Groundwater Model – developed by the U.S. Geological Survey and approved by the executive administrator of the TWDB as the official GAM).

Status of Evaluating Brackish Groundwater Resources

Since 2005, the TWDB has funded projects to identify and address practical challenges to implementing brackish groundwater desalination projects in Texas. The categories of projects funded include:

- Preparing guidelines for implementing brackish desalination projects;
- Improving the economics of desalination by reducing and optimizing energy use;
- Demonstrating methods for reducing the volume of concentrate;
- Seeking cost-effective methods for disposing of the concentrate; and
- Increasing knowledge of the state's brackish aquifers.

The last round of funding received from the legislature for the brackish groundwater desalination demonstration program was in 2009. With funding from the legislature in 2009, the TWDB established the Brackish Resources Aquifer Characterization System, a program to map the state's brackish resources in much greater detail to facilitate the planning and engineering of brackish groundwater desalination projects. The legislature expanded funding to this program in 2013. Additionally, the TWDB has sought funding and partnering opportunities to advance desalination issues, including several projects with the U.S. Bureau of Reclamation, including the following:

- Preparation of guidance for rapid assessment and implementation of temporary emergency supplies using desalination; and
- Development of "cost curves" to assist in the cost estimating of brackish groundwater desalination projects.

Texas Commission on Environmental Quality

The role in groundwater management by the Texas Commission on Environmental Quality (TCEQ) remains limited. The TCEQ is not directly involved in the DFC process. The TCEQ is, however, authorized for oversight of GCDs related to groundwater management plans and the joint planning process in GMAs. The TCEQ is also responsible for delineating and designating priority groundwater management areas and creating GCDs in response to landowner petitions or the the PGMA process.[9]

Status Update for Priority Groundwater Management Areas[10]

Local and legislative actions or TCEQ administrative actions to establish GCDs are still required in all or part of six counties in four Priority Groundwater Management Areas (PGMAs):

- Northwest Comal County and Southwest Travis County in the Hill Country PGMA;
- Western Briscoe County in the Briscoe, Hale, Swisher County PGMA;
- Southeast Midland County and Northeast Upton County in the Reagan, Upton, Midland County PGMA; and
- Dallas County in the North Central Texas - Trinity & Woodbine Aquifers PGMA.

During 2013 and 2014, the TCEQ Executive Director (ED) tracked legislative and local efforts to establish new GCDs in the Hill Country PGMA. The ED pursued, but ultimately withdrew administrative efforts to add parts of two counties to two separate GCDs in the Hill Country PGMA. In January 2014, the ED acknowledged that efforts are being made to resolve the issues legislatively or locally that may obviate the need for the ED's petition or may result in many of the current parties no longer having an interest, noted that, given the complexity of the case, further evaluation would be beneficial, and noted that the best course of action was to withdraw the petition and subsequently refile a new petition if local or legislative efforts are ultimately unsuccessful.

The ED's recommendation to add the PGMA portion of Briscoe County to the High Plains Underground Water Conservation District No. 1 (HPWD) went through the contested case hearing process at the State Office of Administrative Hearings (SOAH). On December 10, 2014, the TCEQ considered the administrative law judge's proposal for decision and issued an order recommending the Briscoe PGMA be added to the HPWD. Within 120 days, the HPWD board of directors will determine if the Briscoe PGMA is to be added. If they determine not to add the Briscoe PGMA, subsequent TCEQ action is required. The ED is soliciting public comments through January 30, 2015 on a draft report that recommendations the addition of the PGMA portions of Upton and Midland counties to the Glasscock GCD. Effective July 19, 2011, Section 36.0151 of the Texas Water Code provides that the TCEQ may not, before September 1, 2015, create a GCD in a PGMA county with a population greater than 2.3 million in which the annual amount of surface water used is more than 50 times the annual amount of groundwater produced. This provision applies only to Dallas County. TCEQ action regarding Dallas County may be required in accordance with Sections 35.012 and 35.013 of the Texas Water Code and Chapter

30, Section 293.19(a) of the Texas Administrative Code, if a GCD is not established through local or legislative efforts before.

Status Update on Brackish Desalinization Permitting Process

With the growing interest in desalinization, the TCEQ has taken action to facilitate streamlined approval for these facilities. In 2013, TCEQ implemented a new process that allows the use of computer modeling as an alternative to on-site pilot studies for the approval of groundwater desalination systems. This process was developed following a series of stakeholder meetings and has been documented in agency guidance. To date, TCEQ has approved 4 projects using this guidance. One of those projects, a groundwater desalination project for Mitchell County Utility Company, is a great example of the process success. This project was approved for construction in less than two weeks.

The TCEQ has initiated rulemaking to streamline the public water system treatment plan construction approval process for brackish desalination. To ensure that the new rules will provide design criteria that meet the needs of the water system for effective and reliable treatment and to meet capacity requirements, the TCEQ is meeting with interested stakeholders (engineers, water system representatives, equipment vendors, and others) to discuss requirements that will need to be addressed in design criteria in the new rules. This includes reverse osmosis system design, operation, maintenance, capacity, record keeping, and operator licensing.

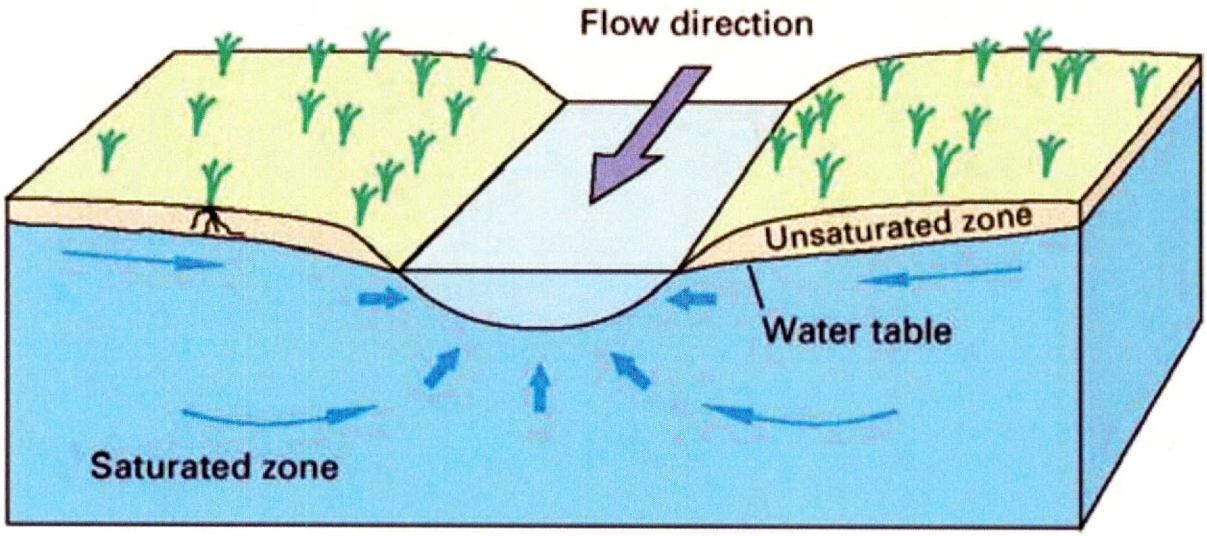
The first and second stakeholder meetings were on May 9 and June 3 of this year. Both meetings provided excellent feedback to the TCEQ for the development of new desalination requirements. There will be an official public comment period and public hearing tentatively scheduled in the Spring of 2015 after the proposed rule is published. Members of the public are highly encouraged to submit comments and are welcome to participate in the rulemaking process. The projected timeline to adopt a desalination design rule is tentatively scheduled for June 2015.

More on Groundwater Science

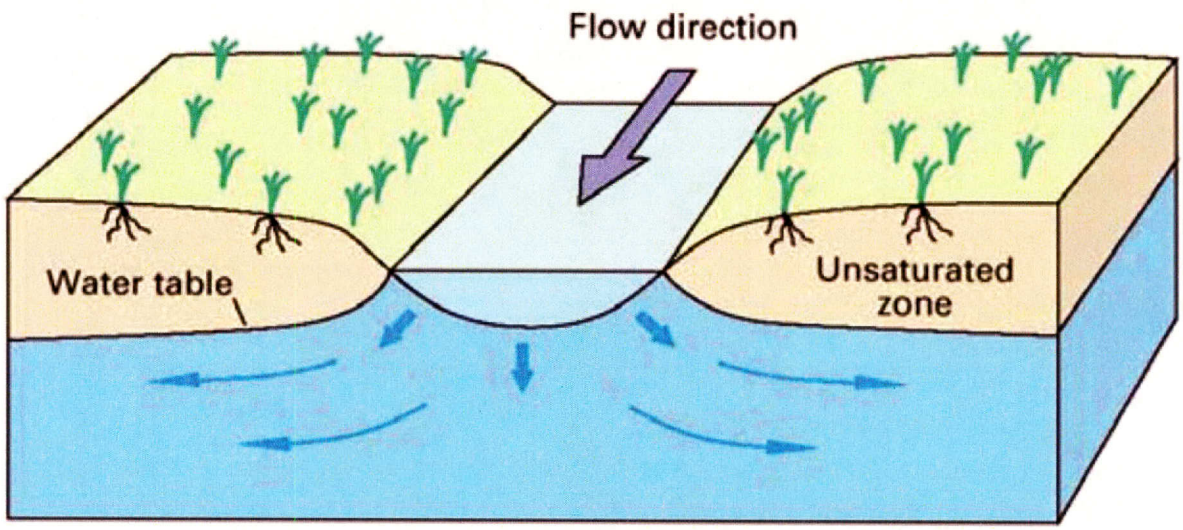
Understanding the Interaction Between Surface and Groundwater Flows

State law has always regarded, and continues to regard, surface and groundwater as separate resources subject to starkly different legal rules. In the real world, the resources are not nearly so discrete; their interconnectedness, in fact, does create some potential challenges for both groundwater and surface water regulation. Generally, groundwater pumping results in three impacts: decreased storage (groundwater level decline); induced recharge to the area (e.g. additional recharge from streams); and/or reduced natural outflow from the area (e.g. decreased spring flow or stream flow). [11] Impacts of pumping are dependent on many factors. Understanding local conditions, understanding the nature of the interaction between groundwater and surface water in an area, and understanding the nature of potential movement between fresh groundwater and brackish groundwater are becoming more important groundwater management factors in Texas.[12]

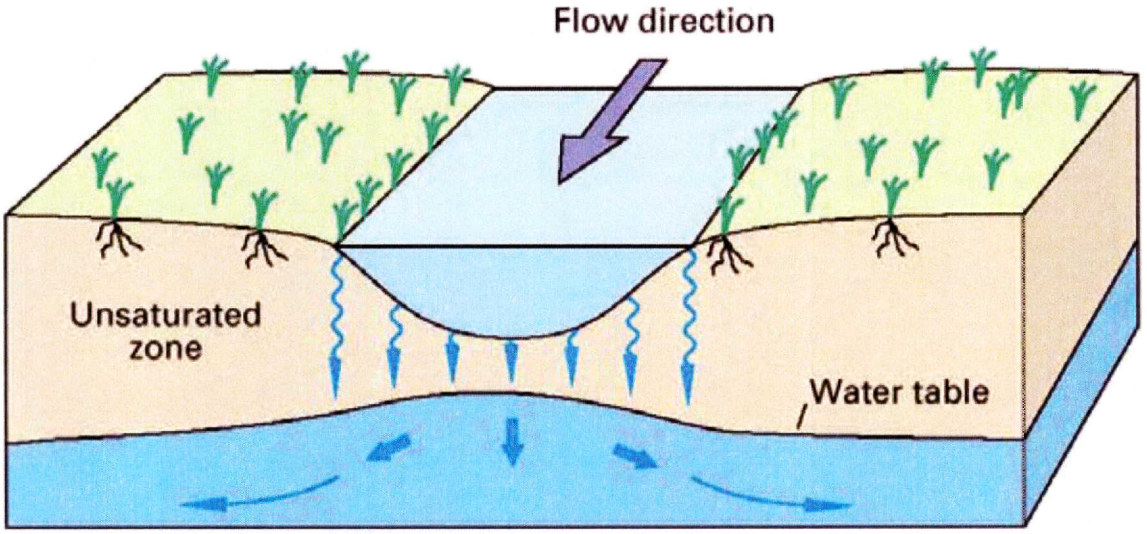
Gaining Stream (Groundwater flows into Surface Water)



Losing Stream (Stream Recharges Groundwater)



Disconnected Stream (Stream Recharges Groundwater)



In some instances, pumping can produce two completely separate results, for instance when pumping occurs from unconfined versus confined aquifers. In the Hill Country, studies were conducted using dye tracing and indicated that groundwater pumping around the Blanco River versus groundwater pumping around the Onion Creek were completely different.[13] Near the Blanco River, the base flow is from deep, artesian springs; the recharge is distant; and flow can be heavily influenced by groundwater withdrawal.[14] Near the Onion Creek, however, the base flow is from shallow, gravity (surface) springs; recharge is local, surficial; and flow is not influenced by groundwater withdrawal.[15]

The examples discussed below further illustrate the importance of understanding of local conditions, using available data and applying models appropriately to meet management objectives.[16] Therefore, more science and research is needed to keep the models updated and provide more accurate information on the following:

- groundwater/surface water interaction (some GAMs are generally adequate but need improvement);
- solute transport to better understand the interaction between fresh groundwater and brackish groundwater; and
- improvements and updates to meet new objectives (DFCs and MAGs) which were not contemplated when the models were originally developed.[17]

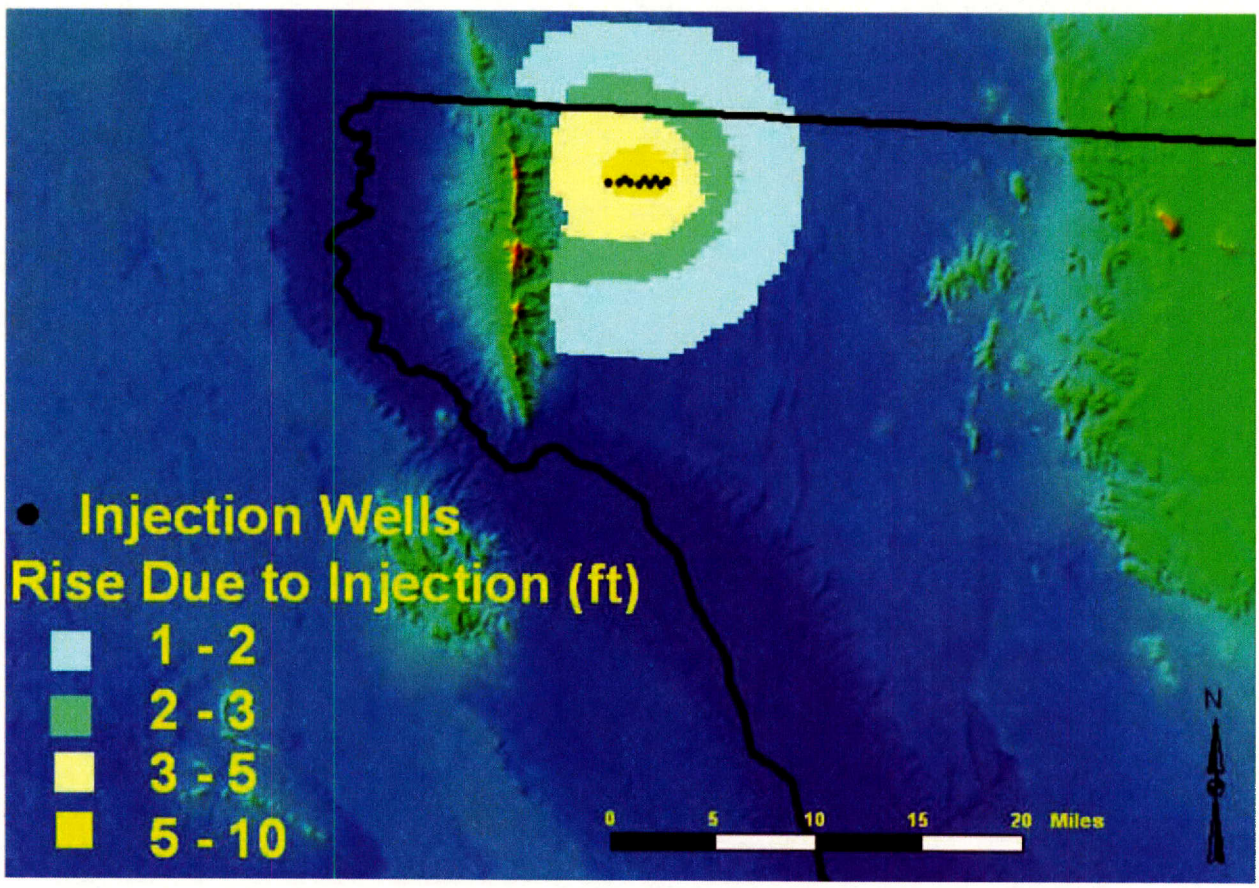
Induced Recharge Example[18]

Prior to 1940, groundwater from the Hueco Bolson provided baseflow to the Rio Grande and associated canal/drain system (1,000 to 5,000 acre-feet per year). Pumping in El Paso, and later in Ciudad Juarez, resulted in lowered groundwater levels. The Rio Grande and associated canals now act as recharge sources to the Hueco Bolson. Recharge has increased over the years

and is now about 30,000 acre-feet peryear from the surface water system. Overall induced inflow (from all sources) is about 60,000 acre-feet per year.

Reclaimed Water Recharge[19]

The El Paso reclaimed water recharge project began in the mid-1980s and is often (but incorrectly) referred/likened to an ASR project. Project recharge to the Hueco Bolson in the late 1980s and early 1990s was as much as 5,000 acre-feet per year through injection wells. In more recent years, recharge has been about 1,000 to 2,000 acre-feet per year. Reduction in recharge amounts is a result of the use of the reclaimed water for golf course irrigation and power plant cooling. Recharged water is recovered through existing wells in the area. In recent years, project recharge has been increasingly accomplished through spreading basins rather than injection wells. Analysis of groundwater level data and groundwater model analysis show groundwater level increases as shown below:



Groundwater quality changes have also been analyzed and show that the reclaimed water mixes with the native groundwater. The recharged water affects movement of nearby groundwater (fresh, brackish, and groundwater with elevated salinity from an historic dairy operation). The data analyses and model simulations have shown that a simple conceptual representation of managing a bubble of recharged water are not applicable. The analyses have demonstrated the benefits of additional managed recharge in the area. Work is underway to expand the program with seasonally available treated surface water as means to expand conjunctive use operations in El Paso.

Reduced Natural Outflow Example[20]

Recently completed work in Val Verde County focused on quantifying the potential impacts of proposed large-scale pumping of groundwater on spring flow and river baseflow. Current groundwater pumping is about 5,000 acre-feet per year in Val Verde County. A groundwater flow model was developed and used to simulate pumping of up to 150,000 acre-feet per year, which would cause drawdowns near the pumping wells in excess of 200 feet. These drawdowns represent the impact to storage. Our analysis focused on addressing a simple question: Where would the 150,000 acre-feet per year of pumped water come from?

- 33% from captured Rio Grande baseflow (i.e. stream flows would be reduced);
- 25% from reduced spring flow (most notably San Felipe Spring);
- 21% from induced inflow from other counties;
- 20% from induced recharge from Lake Amistad; and
- One percent from reduced storage.

This is an example of an area where groundwater management should include understanding issues beyond quantifying recharge or groundwater in storage due to local hydrogeologic conditions.

Brackish Groundwater Movement[21]

In aquifers where both fresh groundwater and brackish groundwater are present, it is important to understand movement of each, and the potential for interaction. Planning the Kay Bailey Hutchison Desalination Plant in El Paso required understanding the movement of fresh groundwater and brackish groundwater. In the 1980s, brackish groundwater had intruded into wells that had historically pumped fresh groundwater. Desalination plant supply wells were located to capture brackish groundwater and protect fresh groundwater wells via a hydraulic barrier that would be formed by pumping the brackish wells. Now with seven years of operational data, current work includes updating the GMA of the area to include solute transport to improve operation of the wells to achieve groundwater management objectives while reducing operational costs.

DISCUSSION AND CHALLENGES

As outlined in the Background portion of this report, groundwater is an important natural resource for the State of Texas. Effective groundwater management has been and will continue to be a balancing act based upon the increasing demand for all water resources and the preservation of those same resources, especially in times of drought. Regardless, Texas must have adequate water resources for the future to protect the environmental and economic status of the state.

Basic Functions of GCDs – Managing, Monitoring, Measuring

One of the most basic functions of a GCD is to gather the data necessary to understand the aquifer systems they regulate.[22] Each GCD must assess their goals and their management plan to determine the appropriate amount of data to collect and the level of accuracy needed for their purposes.[23] To obtain that data they must measure groundwater production.[24] Production can be measured using water meters, but it is also possible to measure production through alternative means such as calculating the well capacity and the total time the well is operated.[25] In those areas where the DFC is based on maintaining springflow (or other seasonal water level goals) accurate groundwater production measurements are more critical than in areas where the goal is managing long-term decline.[26] In many districts an annual report of total groundwater production provides all the required data.[27] In other districts, especially those with very high demand, more accurate and more frequent data measurements may be necessary.[28]

Generally, GCDs are doing a good job collecting data, which is extremely important to meet the goal of science-based regulations. Districts are charged by statute with developing scientifically-sound DFCs, implementing aquifer monitoring programs that effectively measure the response of the groundwater resources to groundwater production, and managing the groundwater resources in a manner consistent with achieving the DFCs.[29] Data must be collected over a large area (throughout the district) and for a long period of time. As the state's first groundwater conservation district, the HPWD is a perfect example of how data can help a district better manage its groundwater. The HPWD does not rely on modeling alone, instead it uses other data sources including a network of more than 1,400 water level observation wells, and most recently, an irrigation assessment program.[30] The Panhandle Groundwater Conservation District (PGCD) is another example of an extensive data collection due to monitoring and measuring. It has an extensive monitoring network of 860 wells in which water levels are measured on an annual basis, and 111 monitor wells that have quarterly water level measurements.[31] The PGCD has required metering on all new wells since 2004.[32] It has also cost-shared on meter installation on existing wells since about 2000 and to date has the majority of all operating wells metered.[33] The PGCD field staff currently reads and records all meter readings and the data is used as the technical basis for the district's management system.[34] The district also has a background water quality-monitoring program where District staff collects and analyzes some 300+ samples per year.[35]

Meters can be very expensive, and districts must be very cognizant of the cost of their regulations.[36] Fee-based districts typically require meters on non-exempt wells so they can more accurately measure usage and assess fees accordingly.[37] Although some districts charge fees based on authorized use, they also may implement a rebate program to reward conservation by refunding fees paid on unused water at the end of the year.[38] A few districts charge fees based on actual production, and those districts typically require flow meters.[39]

In other efforts, the Texas Alliance of Groundwater Districts is currently spearheading an initiative to create a GCD database website.[40] This interactive website will allow a visitor to click on an area from a map or select a county or GCD from a drop down menu and pull-up specific facts about each GCD in the state.[41] Visitors will also be able to select for certain parameters, for example to get a list of all the tax-based GCDs in the state or all the GCDs with specific regulations related to brackish groundwater.[42] The purpose of this project is to provide

water experts, researchers, policymakers, and the public with an accessible snapshot of local management strategies – including the similarities and distinctions among GCDs across the state.[43]

Challenges for GCDs: "It's tough to be a GCD"

GCDs are no strangers to the challenges that arise from groundwater management. Managing the current demand and planning for future demand remains a constant balancing act.[44] Most districts have a complex regulatory system that attempts to balance the protection of municipal systems, as well as in some cases an industrial base, in recovering their reasonable investment backed expectations in their public water systems and commercial wells, while also allowing new users an ability to tap into the aquifer underneath their land to beneficially use their fair share of the groundwater.[45] With finite supplies and a mandate from the legislature to achieve DFCs, that is a difficult balance to achieve.[46]

One of the biggest challenges is determining how to limit production (when necessary) without incurring liability.[47] GCDs are constantly trying to educate themselves and their constituents about changes in Texas water law, including the recent decisions regarding Constitutional takings claims.[48] Board members throughout the state are very cognizant of potential liability from takings claims, and are working hard to make any adjustments to their plans, rules, and permits to avoid incurring liability.[49]

Likewise, the growing pressure to allow more groundwater usage creates its own special challenges, specifically in the permit process.[50] Some feel as though GCDs are being asked to meet certain permittees' requests based on who they are or where they need the groundwater.[51] Specifically, water marketers or large-scale project developers want longer-term permits because they are making a major investment and may be selling bonds. They desire rules/permits to protect those investments that may differ from what GCDs otherwise allow.[52] Oil and gas operators want to avoid even the possibility of a lengthy contested case hearings, so they want special rules to either exempt them from all regulation or at least exempt them from protests filed by neighboring properties.[53] Finally, existing users all want to be "grandfathered" (both current demand and future growth).[54]

While everyone wants special rules in their favor, GCDs can persuasively argue that the aquifer doesn't care if you are a city, an oil company, or a farmer: the same amount of pumping at the same rate over the same period of time will have the same impact.[55] The rules and permit decisions should primarily be based on how the requested withdrawals will impact the aquifer, not on who makes the request.[56] The type of demand (municipal vs. irrigated agriculture) may impact the rate or frequency of withdrawals, and therefore have different impacts on the aquifer, but that doesn't change the fact that aquifer impact should be the determining factor.[57] While these challenges remain between the historic users and new users, regulators and permittees, regulations should be based on science – not who is getting the permit.[58]

The Standardized vs. the Individualized

Much discussion has been had in recent years on the further standardization of GCDs' rules, in addition to Chapter 36 of the Texas Water Code. Overall, standardized substantive rules

would be very difficult.[59] For instance, some areas emphasize protection of historic uses, while other areas use modified correlative rights.[60] Some areas need greater protections during drought but little to no regulation during normal rainfall/recharge patterns.[61] Last, many aquifers are quite different from one another due to elevation and thickness, and these aquifers require different regulations for different management units of the aquifer.[62]

On the other hand, from the project developer or permittee's standpoint, GCDs are sometimes viewed as emphasizing local control over the well-being of the broader area or state. These interests argue that our state's groundwater resources are now managed by one hundred different local government entities that have little jurisdictional relationship to the aquifers that they manage.[63] Locally elected directors of these districts have no incentive to manage local resources for the benefit of distant interests.[64] Board membership may change dramatically with each annual election.[65] Each entity may adopt its own rules for production and transportation of groundwater and may change those rules with 72-hours of public notice.[66]

There are, however, a number of reasons for the current local management system of Texas groundwater in the form of various district shapes and sizes, one of which is the size and shape of the aquifer.[67] Varying geologic formations, recharge rates, usage, and groundwater quality require different management strategies.[68] In addition, usage, population, and existing districts/district board composition are all of factors, which vary across the state.[69] Usage and water demand patterns must be evaluated including municipal vs. agricultural; seasonal vs. continuous; location of the use vs. location of the source.[70] Population in a district must be evaluated for concentration in a city-center or sprawl over a larger rural area.[71] Existing districts and district board composition should also be evaluated at the local level and the structure set locally, as well.[72] Many districts believe that any deviation from local regulation of groundwater would be a step in the wrong direction[73] (in addition to other unique legal challenges).

Moreover, districts must also consider the impact their rules have on the localized, regulated community. For example, a rule that requires reducing withdrawals during droughts might be fairly easy to follow for municipalities, but depending on the timing of the reductions could destroy an entire crop, and therefore an entire year's income, for a farmer.[74] Districts must ensure their rules are achievable and do not unnecessarily disrupt commerce.[75]

Furthermore, while some standardized procedural rules may be helpful, the state should avoid recreating the Texas Administrative Procedures Act. First, most districts are very efficient about issuing permits.[76] In comparison to the number of permits granted, there have been a tiny number of contested cases overall.[77] Secondly, procedures are defined by the problems to be addressed, such as: (1) minimizing interference between wells, notification of neighboring well owners is paramount; (2) protecting spring flow, notification of downstream interests is paramount; and (3) salt-water intrusion, notification of affected areas is paramount. Not every rule can be standardized for every problem.[78]

Even some permittees agree that groundwater should remain managed at the local level, stating concern that regulators in Austin will not share locals' understanding of the role the aquifer plays within each individual community and regional economy.[79] Texas has many aquifers, which vary greatly in size, recharge rate, and usage causing some to emphasize that local control through locally elected water district boards is the best way to regulate and manage

groundwater.[80] The Corn Producers Association of Texas testified that "the only thing we fear more than running out of water is increased regulation by the state."[81] The producers believe that they have been making local regulation work for more than six decades because no one has a greater stake in conserving water that those who depend on it for their livelihood.[82] They fear that state regulation of groundwater would lead to one-size-fits-all rules which do not take into account local conditions.[83] For example, the three multi-county groundwater conservation districts that cover the Panhandle all have different rules based on the needs of each district, yet each district is accomplishing the assigned goal of managing groundwater resources in accordance with state law.[84]

Ultimately, the legislature should avoid trying to turn GCDs into cookie-cutter copies of each other.[85] Setting standards that must be met is a laudable goal, but requiring that each district follow the same substantive rules would treat every aquifer formation and every community as if they are the same.[86] Standardized substantive rules would also be very difficult to implement given the vastly different histories of groundwater use in different parts of the state. More uniform procedural rules might be workable, as long as they allow differences based on the community to be regulated.[87] In conclusion, the Corn Producers Association of Texas urged the lawmakers not to adopt one-size-fits-all legislation that would deny groundwater conservation districts the flexibility that they currently have to develop their own rules for conserving and managing groundwater.[88] Instead, the producers stated that the best way the state could better facilitate management of groundwater resources is through funding for further (agricultural) research.[89]

Groundwater Management and the Ruling from *Edwards Aquifer Authority v. Day*

The most important conclusion from the *Edwards Aquifer Authority v. Day* case was a clarification of the ownership rights of landowners in Texas to groundwater[90] and that the state still retains the right to regulate groundwater use and may continue to do so through its preferred means of regulation: GCDs.[91] Specifically, the Court held that groundwater, under the absolute ownership rule, is owned by the landowner in place and is therefore a property right protected under the constitutional prohibition against taking property by a government without just compensation.[92] Russ Johnson, a Texas water law attorney, believes that this decision clarifies the nature of the ownership interest, having been previously described in the same fashion and under the same legal principle as ownership of minerals, and treats water the same as courts have treated other minerals owned in place.[93] What is still unresolved in Texas law is the extent to which GCDs, in implementing their management plans and rules, can restrict or prevent production of groundwater before crossing the line and engaging in an unconstitutional taking without compensation.[94] One thing is clear, however: groundwater in Texas is a valuable property right that must be managed and regulated by government with care and respect for the rights of its owner.[95]

The primary impact on of the *Edwards Aquifer Authority v. Day* decision, however, remains uncertain;[96] the implications for groundwater management will unfold for many years.[97] From many large permittees' perspectives, the largest single challenge for Texas' current system of groundwater management is the uncertainty and unpredictability of regulation.[98] Although groundwater is now treated like other minerals, it is simply not the same as oil or gas; the goal isn't to pump it and sell it as fast as possible.[99] It must be managed and, to some extent,

preserved for future generations.[100] Preserving aquifers to meet both current and future demand requires reasonable regulation aimed, as much as possible, at sustainable yields. Therefore, nobody is sure yet which regulations go too far.[101] Typical takings cases protect investment-backed expectations, which lean heavily in favor of historic users; however, the Court in *Edwards Aquifer Authority v. Day* opined and discouraged a permitting process based solely on historical use.[102] Additionally, nobody knows which plaintiffs will be favored: new users, historic users, or landowners who don't want to see the aquifer levels drop.[103] Ultimately, there are still many questions that remained unanswered, including:[104]

- Is one domestic and livestock well on ten acres (or another well that is generally exempt from GCD regulation by statute) enough to avoid a successful takings claim?
- Is a landowner with 10,000 acres entitled to more groundwater even though the pumping is likely to cause subsidence throughout the area?
- Do landowners who have never produced any groundwater have a justiciable interest that entitles them to protest other applications and participate in contested cases?
- Does that ownership interest also give them a right to sue districts for a taking for allowing aquifer level declines over time?

In some instances, water lawyers have changed their legal advice. Greg Ellis, a private water attorney and special district advisor, stated that he no longer suggests that a district simply stop issuing permits when actual production meets or exceeds the MAG.[105] This means that eventually existing/historic users will be cut back to make room for new users,[106] perhaps leading to a *de facto* practice of correlative rights for groundwater management across the state. Mr. Ellis also notes that the *Edwards Aquifer Authority v. Day* decision may have further created an anomaly in water law: the Rule of Capture2 prevents a landowner from successfully suing their neighbor for reducing groundwater level on his property, however, the recent Court decision may mean that the same landowner can sue the GCD created to solve the problem.[107]

From the Edwards Aquifer Authority (EAA) perspective, no operational changes have occurred. There is, however, more confusion with permit holders and landowners as to whether or not the permitting program applies to their specific situation.[108] Recently, five permit applications were filed with the EAA citing the *EAA v. Day* case. These permits were denied by the EAA board because (1) they were not timely filed under the 1996 statutory deadline and (2) the EAA has issued all permits that it is statutorily authorized to issue.[109] The EAA believes that its management plan will become clearer once the *EAA v. Bragg* takings lawsuit reaches final decision.

Are Correlative Rights the Answer?

Some landowner organizations have advocated for the development of correlative rights or "fair share" principles across the state, suggesting that Texas adopt a model similar to that in Oklahoma.[110] There, a board establishes allocations per acre for most of the aquifers within the

[2] The Rule of Capture in Texas has traditionally been a defense to lawsuit by one neighbor against another neighbor for pumping groundwater. The Rule of Capture in Texas has mostly been modified where a GCD exists and is untouched in areas that are not under a groundwater management district.

state.[111] Where allocations have not been determined, Oklahoma law allows for a default production of up to two acre-feet of water per acre subject to subsequent determination and regulation by the state.[112] The Texas Farm Bureau states that its priority next session will be to ensure legislation to recognize that each property owner, regardless if there is only a one-acre lot in a subdivision, is entitled to a "fair share" and compensated accordingly.[113] The Texas Farm Bureau further support a whitepaper[114] which states, "Some might argue that historic users have already made investments in wells, pipelines, and businesses that the State should protect by making sure they may continue to produce their historic volumes of groundwater." The paper then goes on to say that no such protection is enjoyed under the rule of capture for oil and gas.[115] The paper does not mention that in managing the state's surface water supply, however, the state follows "prior appropriation," which actually does protect most historic agricultural uses under the "first in time, first in right" doctrine.

Several existing districts do not permit by "correlative rights" but by past "historical usage in a designed period of time," coupled with projected usage based on operating permits sought by the applicants after the established historical usage time period.[116] This alternative to correlative rights is deemed a very positive and intuitive decision by the local governing boards, many of whom include local water utilities who desired more certainty in permit allocations based on well-documented water usage.[117] Some GCDs view this as a particularly good management practice in some areas, especially where a transition from large farm communities to suburban/urban towns with the expectation of large population growth in the near future.[118] Correlative rights across the state would likely have a negative impact on municipal and water supply corporations due to their limited land holdings compared to their high volume of water demand.[119]

Some districts such as the Panhandle Groundwater Conservation District use a modified correlative rights system, where production allowables are set or based on a per-acre of groundwater rights owned or controlled.[120] These modified correlative rights are subject to the continuing right of supervision though the district's depletion management program and rules. The district also utilizes 30-year term permits that are *annually* amendable through the depletion rules down to the floor rates.[121] These floor rates represent a calculation of the amount theologically allowable to meet the 50/50 DFC, if every landowner/producer was producing on every acre. These permits, where applicable, have an additional section on out-of-district water transports and are subject to additional questions and export fees.[122]

At present, the decision between correlative rights, historic use, or reasonable use as the means of issuing permits has depended mostly on the characteristics of the areas served by the district.[123] Areas with little demand and roughly equal access to groundwater can adopt a modified correlative right with very little trouble.[124] On the other hand, an area with high population, heavy irrigation, or municipal demands will likely find that a correlative right, even modified, does not provide an adequate supply for existing uses without major re-allocations of rights between landowners.[125] In those cases either reasonable use or historic use, or a combination of several strategies, has been viewed as the best option.[126]

The Planning and Permitting Process

Agency Oversight/Statutory Regulation over Groundwater

The Status of the DFC Process

Those in the groundwater community have varying opinions on the outcome and effectiveness of the DFC process created by House Bill 1763 (79th Texas Legislature, 2005). Since this Committee's last report in 2010 on the DFC process, all GMAs have adopted DFCs across the state. Through various agency petitions, legal challenges, and legislative adaptations, the very bottom-up process has evolved. In general, districts believe that the DFC process is working and will only improve, if it is allowed to cycle and improve multiple times.[127] The DFC process serves as an aquifer protection and management tool, with the MAG acting as the long-range planning component of the process.[128] Most districts believe that the legislature should avoid major changes to the planning and permitting processes, and argue that a constantly changing legislative landscape leads to regulatory uncertainty and is counterproductive.[129]

Aside from aligning the timing for submission of DFCs for incorporation into the joint planning process, there have been two other important changes:

- By removing the MAG as a permit limit, the legislature removed some of the incentive to challenge DFCs and provided the GCDs with additional flexibility to manage actual withdrawals instead of managing just the permits. Most of the aquifers (those not directly connected to spring flow, for example) can withstand the stress of exceeding the MAG for one or more years. As long as actual pumping returns to an amount less than the MAG, the aquifer is likely to recover and the district is likely to achieve its DFC.[130]
- By adding the requirement to create an explanatory report for each adopted DFC the legislature put GCDs on notice that their decisions must be supported by science-based evidence. This not only helps the GCDs with the DFC decision-making process, it helps educate both the legislature and public about the management of each aquifer.[131]

For example, permits in the Carrizo Aquifer of the Gonzales County Underground Water Conservation District exceed the MAG by 18,242 acre-feet; however, actual production has not yet exceeded the MAG, thus allowing the DFC to still be attainable.[132]

On the other hand, complaints still arise from those wishing to produce more water from the aquifers. For example, according to a summary of the State Water Plan, in 2008, groundwater accounted for 60% of the 16.1 million acre-feet of water used in the state. In 2010, groundwater supplies were about 8.1 million acre-feet of water, and that number is projected to decrease 30% over the planning horizon to about 5.7 million acre-feet per year by 2060. These numbers represent the amount of groundwater that can be produced with current permits and existing infrastructure, therefore limiting groundwater availability.[133] Under the DFC planning process (quoting the State Water Plan),

> "In the next round of regional water planning (2011 – 2016), planning groups will be required to use MAG volumes to determine water supply needs in their regions. As a result, there will be some groundwater availability estimates that are lower that the regional water planning groups' groundwater availability estimates in prior regional plans. This situation may impact the amount of water supply needs and strategies in the plan. If needs are greater or strategies cannot be implemented due to unavailable supplies, regional water planning groups and those looking to implement water management strategies will have to consider other sources of water."[134]

Advocates for the expanded use of groundwater argue that GCDs need to understand that the state needs and intends to use groundwater to meet long-term demands state-wide.[135]

In addition, some believe that the DFC process, an effort to inform policy by applying science, has had the exact opposite effect.[136] In some cases, districts reverse engineer their DFC numbers and then point to their DFCs as justification for preventing groundwater development.[137] Moreover, many GCDs and GMAs have adopted vastly different DFCs for the portion of the aquifer within their district. These different goals for the same aquifer have been approved by GMAs, resulting in widely divergent management goals and requirements in and over the same aquifer.[138] While GMAs are made up of groundwater professionals, as decision-making and planning becomes more crucial and technically difficult, some districts believe that it would help the state's process if additional funding was provided to the TWDB for much needed technical support.[139]

Lastly, there are a few other changes to the permitting and appeal process that some would like to see addressed this next legislative session. First, some want the legislature to amend the "appeal" process, expanding the appeal during the determination of the DFC and not just at the time of permitting.[140] Some GCDs argue that any change at the present time might be likely to derail the current planning process.[141] Second, some water law attorneys who often litigate on behalf of landowner/permit applicants would like to see the following sections of the Texas Water Code repealed, including:

> Section 36.066 SUITS. … (g) If the district prevails in any suit other than a suit in which it voluntarily intervenes, the district may seek and the court shall grant, in the same action, recovery for attorney's fees, costs for expert witnesses, and other costs incurred by the district before the court…
>
> Sec. 36.253. TRIAL OF SUIT. The burden of proof is on the petitioner, and the challenged law, rule, order, or act shall be deemed prima facie valid. The review on appeal is governed by the substantial evidence rule as defined by Section 2001.174, Government Code.[142]

Ed McCarthy, a water law attorney, argues that Section 36.066 should be repealed because it provides for an automatic recovery of attorney's fees in matters litigated against a GCD where the GCD wins, even if the GCD only wins in a minor portion of the lawsuit.[143] It is not the same as the loser-pays provision recently enacted in Texas because it is completely one-sided.[144] Additionally, the judge overseeing the matter is not allowed any discretion in granting these fees,

unlike other areas of Texas Civil Procedure and the Uniform Declaratory Judgment Act.[145] Furthermore, Section 36.253 provides an additional burden to landowner's recovery in lawsuit because before any litigation even occurs, it assumes that all GCD rules are valid.[146] This creates an unnecessary additional burden for the plaintiff permittee to overcome even before a court at law has ruled on the matters at-hand.[147] Instead, he argues, the plaintiff should be entitled to trial *de novo* in district court.[148]

Out-of-District and Long-Term Permitting

Another challenge among management in groundwater districts is the type and length of permitting, particularly for out-of-district users. Some argue that the legislature has created 98 different jurisdictional boundaries, which represent a substantial impediment to the development and movement of existing, usable groundwater resources for meeting the state's future water needs.[149] Senate Bill 1 (76th Texas Legislature, 1997), not only created the bottom-up approach for state water planning in Texas, it also represented the first major revision in the authority of GCDs to manage production of groundwater.[150] Among those revisions was the authority for GCDs to directly prohibit export of groundwater outside of district boundaries.[151] As a consequence, more than two dozen GCDs were proposed for creation in the 1999 Texas Legislative Session.[152] Senate Bill 2 (79th Texas Legislature, 2001) shortly followed and removed the authority of GCDs to prohibit export outside of a district's boundaries, while continuing to allow transfer or export fees.[153] Nonetheless, since the mid-1990s, more than two-thirds of the current GCDs have been created.[154]

Some believe that many were created in a desire to "protect" groundwater resources within the district boundaries from potential development for export to or transfer to urban areas in need of additional water supplies. There is a systemic view that efforts to develop and move groundwater resources to meet this demand are frustrated by GCDs' regional and parochial view of groundwater development in their area.[155] In large part, there is the belief that GCDs have considered it their mission to do only two things: (1) protect local historic and future use and (2) prevent the development of water resources for any need or use outside of district boundaries.[156] Furthermore, production permits valid for one or three or five years, issued by annually-elected boards, following rules that can change overnight, create tremendous uncertainty for would-be borrowers and lenders.[157] Excessive uncertainty is then reflected in higher interest rates and more restrictive lending terms, resulting in fewer new water projects and supplies.[158]

For example, the vast majority of the predicted increase in water demand in Texas will occur in the urban areas of the state, primarily along the I-35 corridor and the I-10 corridor. Most of the available abundant groundwater sources are not located in those immediate areas.[159] The problem in even obtaining permits for out-of-districts supply can be illustrated by the long, expensive, and unresolved application for permit filed in 2007 by End Op. L.P. to develop water in Lee and Bastrop Counties and deliver that water to Williamson and Travis Counties.[160] As of June 25, 2014, the Lost Pines District Board had not taken action on this permit application, despite what some consider abundant groundwater supplies in the region.[161]

On the other hand, Chapter 36 of the Texas Water Code currently prohibits a district from discriminating for or against an out-of-district permit in any way.[162] Advocates for GCDs believe that the pressure for exporting out-of-district usually exists because export projects involve a

major investment in pipelines and those projects frequently request special treatment in the form of extended permit terms.[163] There is no question that the state must find a way to balance the need for planning, the need to adjust groundwater withdrawal permits as necessary, and the need for certainty when large investments are required.[164] That balance, however, must include ensuring all well-owners are treated the same, without discriminating for or against anyone based on the place or purpose of use for the groundwater.[165] Providing different permit conditions based on the amount of withdrawal, the point of withdrawal, the rate of withdrawal or the pumping history (historic use) are allowed under Chapter 36 of the Texas Water Code, but those changes must be based on sound science and potential impacts to the aquifer.[166] In fact, some districts do provide out-of-district permits and those out-of-district permits make up a vast majority of total groundwater permitted. For example, in Gonzales County Underground Water Conservation District, permits total approximately 87,613 acre-feet per year with over 78% of those permits being for out-of-district purposes.[167]

With regard to long-term permitting, the districts are confronted by the need to balance competing interests: the private interest of groundwater owners and the developers to utilize and rely on a groundwater resource and the public interest of landowners and communities to prevent damage to the aquifer and conserve and preserve the groundwater resources.[168] While many out-of-district permittees are requesting longer term permits, there may not be much of a practical difference between a five-year permit and 40-year permit that is reviewed every five years because of the state's five-year planning process.[169] GCDs are required to review and re-adopt DFCs every five years, and within two years they must adopt new district management plans, and a year later adopt new rules to implement any changes.[170] A change to the DFC may mean a change in permit amounts, regardless of the permit term.[171] Many GCDs urge that any changes in permitting requirements should still ensure that districts are not handicapped in their ability to meet their statutory mandate to achieve DFCs, protect interests of existing users and owners of groundwater rights, and accomplish other statutorily prescribed or authorized permitting responsibilities.[172] Permittees and the public should understand their permit limits, including how often those permits may be adjusted based on the science of available supplies and growing demand.[173]

Ultimately, the differences in planning and permit terms are mainly within the administrative process. For example, both the Harris-Galveston Subsidence District and the Fort Bend Subsidence District issue permits annually.[174] The districts' regulatory plans set out deadlines for conversion to alternative water supplies, and special provisions are included on each permit for the two years before the conversion deadline.[175] Having to renew permits annually not only keeps the permittees aware of how much they are producing, it also keeps them aware of the approaching conversion deadline.[176] Even long-term permits like those issued by the Post Oak Savannah Groundwater Conservation District include provisions that allow them to be reviewed every five years and altered as needed to ensure achieving the DFC; despite the longer permit term, these permits are de facto five-year permits.[177] Requiring permits to be renewed on a regular basis allows both the district staff and the permittees to plan for that process.[178] Therefore, term permits are useful tools at the local, regional, and state planning levels, and as long as every pumper has to meet the same requirements, they are also fair and equitable tools.[179] While the issue of longer permit terms has been raised in practically every recent legislative session without resolution, it appears promising that a compromise that would allow for regular GCD review but provide some greater long-term certainty could be achieved.

Brackish Desalination and ASR Technologies

Among other hotbed issues in groundwater, are the pressures associated with advancing the development of brackish desalination and aquifer storage and recharge (ASR) technologies. As of late, on any water conference agenda in the state you will find at least one panel and several proponents of brackish desalination and ASR technologies. Due to the many advances made in these technologies and the continued pressure on developing groundwater resources, some are advocating for a "separation of powers" over brackish resources and ASR areas from the GCDs. As one could imagine, this too has its own challenges for the management of groundwater districts.

Brackish Desalination

In some aquifers there is a sharp distinction between fresh groundwater and brackish groundwater, but in most aquifers the difference is gradual and a matter of degree.[180] In the Gonzales County Underground Water Conservation District, the DFCs and MAGs include both fresh and brackish groundwater for all aquifers inside of the district.[181] In each of the Wilcox, Carrizo, Queen City, Sparta, and Yegua-Jackson Aquifers, fresh groundwater gradually transitions into brackish groundwater as it moves downdip away from the outcrop, and there are no distinct hydrogologic barriers separating the fresh and brackish groundwater.[182] In each of those areas where production of brackish groundwater directly impacts well-levels and flow of fresh groundwater the rules should not make any distinction.[183] In those areas where an aquifer or management unit of an aquifer are isolated from other formations such that production does not impact well-levels or fresh groundwater flow, then a completely different set of rules is not only advisable, they are likely necessary.[184] These isolated formations are typically either so brackish or so deep that most landowners cannot afford to drill for, produce and treat that groundwater, and that makes them perfect candidates for large-scale, long-term projects.[185]

Still, there are instances where the development of brackish groundwater could have serious impacts, such as in the coastal areas of Texas. Within the Gulf Coast Aquifer fresh, brackish, and saline waters exist within the same hydrogeologic unit. In these areas, more data collection and research should be required to determine if deeper parts of the Gulf Coast Aquifer system have any potential for brackish development with no subsidence risk.[186]

In other areas the fresh water versus brackish water boundary is relatively stable, such as in the Barton Springs/Edwards Aquifer Conservation District.[187] In the instance of these isolated or "confined" brackish aquifers, some suggest that the law be amended to allow, encourage, or even require GCDs to adopt more flexible rules over the following:

- exempt these formations from the DFC requirement and process, as without existing demand/production, a reasonable DFC is difficult to determine;
- allow longer-term permits and higher production rates; and
- require reductions in production, if monitoring of the isolated or confined formations began to show impact on fresh groundwater supplies.[188]

Furthermore, advocates of the development of brackish water resources suggest that the legislature should also consider protecting these isolated or confined formations from use for

waste disposal through injection wells.[189] Current laws do not recognize or anticipate any use for brackish groundwater formations above 1,000 TDS other than as receptacles for waste disposal.[190] Some argue that if a project is permitted then that formation should then be off-limits for waste disposal, at least within some reasonable distance.[191]

Many districts argue that efforts to limit GCD regulation for water projects seeking to develop poorer-quality groundwater resources should be avoided.[192] In particular, districts are aware of three broad approaches to changing the groundwater regulatory framework: wholesale deregulation, deregulation of groundwater with a certain water quality characteristic (i.e. TDS level), and the designation of special production zones with standardized rules.[193] Some district advocates argue that each of these approaches present disadvantages that far outweigh the anticipated benefits.[194] Approaches involving legislative deregulation of poor-quality groundwater resources appear to ignore hydrogeologic connections with better-quality groundwater and private-property rights protect through GCD regualtions aside from the completely arbitrary designation of qualifying characteristics.[195] Districts also express concern that approaches involving the designation of special production zones for relatively-disconnected, under-utilized poorer-quality water is redundant given the provisions of Chapter 36 of the Texas Water Code which authorize GCDs to establish management zones with rules designed to better manage groundwater resources.[196] They also worry that such designated zones would open the door to state control over historically locally controlled resources.

In so far as developing legislation to incentivize brackish desalination, many districts believe that it would be prudent to consider provisions whereby districts have the ability to enact reasonable regulations based on the unique hydraulic and geologic characteristics of each aquifer, such as the interface between fresh groundwater and brackish groundwater, in order to prevent encroachment of brackish groundwater into the freshwater supply.[197] In other words, a regulatory framework for brackish development projects should not fall under a "one size fits all" approach, but rather individual frameworks should be designed based on the best available science for each particular aquifer form which production will occur.[198]

Furthermore, in some areas it may be difficult to define "brackish, nonusable" resources really based on total dissolved solids (TDS) alone.[199] For instance in Gonzales County Underground Water Conservation District, the maximum level of brackish water used in the district for agricultural purposes is approximately 3,700 ppm TDS.[200] The City of Gonzales also uses brackish water for public supply at a level of about 2,800 ppm TDS.[201] The city blends the brackish groundwater with fresh water from the Guadalupe River.[202] Recently, the district has even had reports of oil and gas companies using brackish water up to 26,000 ppm TDS for fracking.[203] The Rolling Plains Groundwater Conservation District has similar saline wells used in irrigation techiniques, most ranging well above 1,000 TDS.[204] In these instances, the Rolling Plains Groundwater Conservation District makes no distinction in the management of these water resources; it is the owner's water, and he/she uses and he/she sees fit.[205] Ultimately, where brackish water is and can be used for similar purposes as fresh groundwater, including agricultural, public supply, and fracking, with no special requirements such as desalinization, it would be difficult to regulate the brackish water differently than fresh water.[206]

For all these reasons, it is unlikely that the best course for encouraging brackish groundwater production would be to simply delineate a TDS level that would be off limits from

GCD regulation. Responding to these concerns, advocates for brackish desalination have instead tried to focus on encouraging production of brackish groundwater in areas where it is not currently being used and could be produced with little impact on current freshwater use.

In addition, almost everyone involved in the brackish groundwater debate would agree that more research should be conducted at the local, regional, and state levels in order to determine optimal brackish formations, as well as confined and unconfined aquifers across the state. Many districts are willing to participate in studies to provide the technical analysis necessary to answer the tough geologic questions.[207] For instance, the Edwards Aquifer Authority recently collaborated with the Barton Springs Edwards Aquifer Conservation District to help fund a study in the Northern Segment of the Edwards Aquifer.[208] Collaborations like this should be encouraged.

Aquifer Storage and Recovery

In the development of ASR, science can tell us where it will work and where it will not work. For example, recognition of the unique technical problems associated with the karstic nature of the Edwards Aquifer is essential.[209] Because groundwater moves through the Edwards limestone at a fast rate, production limits must be applied to withdrawals of artificially recharged water.[210] The Edwards Aquifer Authority has already adopted rules regarding ASR that address these unique geological problems and preserve the quality of existing Edwards groundwater.[211] The district would prefer that these rules remain immune from any impact that may result from a global set of regulations that do not take aquifer-specific conditions into consideration.[212]

In addition, more collaboration among districts should also be encouraged in the development and operation of such projects.[213] Texas has some of the most successful collaborative efforts in the nation. For example, the Edwards Aquifer Authority collaborates with the San Antonio Water System (SAWS) to acquire and store leased Edwards groundwater in the Carrizo-Wilcox Aquifer.[214] Additionally, the Edwards Aquifer Authority is engaged in discussions with New Braunfels Utilities regarding potential collaboration on an ASR project that would serve the needs of the City of New Braunfels during future drought periods.[215] The Victoria County Groundwater Conservation District has also co-funded an ASR feasibility study with the City of Victoria, Lavaca-Navidad River Authority, Guadalupe Blanco River Authority, and the Port of Lavaca and funded a companion study to evaluate pump tests of public water systems to evaluate and refine transmissivity values to aid the feasibility study.[216] Based on the results of the feasibility study, it appears that a number of sites, in particular existing well sites within the City of Victoria are suitable for ASR development.[217]

Although these projects are proving to be successful, many legal questions and statutory clarifications must be considered before ASR can be completely implemented across the state.[218] For instance,

- Is ASR stored water subject to the Rule of Capture?
    - If not, why not? How is stored water more "vested" than naturally percolating water? What sort of means might be used (such as spacing) to ensure that projects do not encounter challenges based on the rule of capture?

- What are the potential water quality impacts?
    - ASR in the Gulf Coast aquifer may allow arsenic and other heavy metals to leach out of the soil, which contaminates both the stored water and existing groundwater.
- How does this affect drought rules or DFC calculations?
    - ASR artificially increases aquifer levels while injecting and causes rapid decline when withdrawing.
    - Should ASR projects be viewed outside of the MAG?

Most all districts favor additional recharge and ASR, as long as the projects do not cause harm to the aquifer or adjacent landowners.[219] An ASR project within a district's boundaries will have an effect on the aquifer's water levels, gradient, and flow path, and geochemistry, and possibly require spacing restrictions on groundwater users outside of the ASR project area.[220] For these reasons and others, districts argue that they should be involved in the permitting, regulation, and monitoring of ASR projects. If they are not involved in the permitting process, districts argue that any changes to the that process for ASR wells should still allow them to address these issues.[221]

RECOMMENDATIONS

Groundwater Management Across the State

Encourage groundwater conservation districts to maximize permitting of groundwater resources, whether for in-district or out-of-district purposes.

Avoid any legislative changes this session that would require groundwater districts to operate under "statewide" uniform substantive rules. Continue to support local control of the groundwater resources within regional efforts.

Continue to monitor the DFC, GMA, and joint planning processes, including the role of state agencies, regional planning groups, and local districts.

Long-Term Permitting

Support collaborative efforts among the groundwater community to find a reasonable legislative solution to long-term permitting and automatic renewal processes that allow permittees certainty in creating water projects while simultaneously allowing districts the ability to monitor and manage groundwater resources.

Groundwater Science and Technologies

Consider increasing financial support to state agencies and local districts for the improvement and further development of data and research that helps provide insight into the state's resources at the state, regional, and local levels.

Evaluate confined versus unconfined aquifers and the impact of the pumping of groundwater sources on springflow.

Encourage further regulatory streamlining for the permitting of brackish desalination and ASR technologies. Avoid legislation that would remove brackish groundwater from regulation based solely on TDS levels, and focus instead on finding ways to incentivize use of brackish water that would reduce pressures on fresh groundwater use while also meeting the state's growing water needs.

Support collaborative efforts among the groundwater community to create rules and procedures for the expansion of ASR facilities across the state.

LAND STEWARDSHIP

PUBLIC HEARING

The House Committee on Natural Resources held a public hearing on its Interim Charge #3 related to land stewardship on June 25, 2014 at 10:00 a.m. in Austin, Texas in the Capitol Extension, Room E2.010. The following individuals testified on the charge:

Jim Lester, Houston Advanced Research Center
Ernest, Cook, Knobloch Foundation & Trust for Public Lands
Blair Fitzsimons, Texas Agricultural Land Trust
Myron Hess, National Wildlife Federation
Laura Huffman, The Nature Conservancy
Lairy Johnson, MillerCoors
Ken Klaveness, Office of Trammell S. Crow
Rody Kuchar, Ducks Unlimited
Roel Lopez, Texas A&M
Alan McWilliams General Land Office
Matt Nelson, Texas Water Development Board
Gary Price, Self
Andrew Sansom, The Meadows Center for Water and the Environment
Jason Skaggs, Texas and Southwestern Cattle Raisers Association

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

INTRODUCTION[222]

While Texas faces severe drought and exponential growth, protecting the state's water supply is critical to ensure safe, clean water is available in the future. Additionally, ensuring that the state water supply is sufficient to support the state's natural systems is important because it provides habitat for wildlife, provides the water necessary to keep the bays and estuaries healthy, and acts as insurance for the state's water future. Overall, protecting the natural functions of land now will ensure it helps support the state's water needs in the future.

To protect the state's water supply effectively, the state must rely on successful strategies as well as introduce new strategies to protect the critical hydrologic function of our watersheds and aquifer recharge areas. Since approximately 96% of land in Texas is privately owned, voluntary stewardship is the key to protecting our land and water resources. Success in this area requires active engagement of many stakeholders including: landowners, non-profit organizations, private sector interests, local and regional governments, and the state.

BACKGROUND

Unlike most of the other western states, as much as 96% of the land area in Texas is held by private citizens who have traditionally been good stewards of property that has provided substantial benefits to the state, particularly where water is concerned.[223] This ownership pattern exists because, having entered the Union as an Independent Nation, the new state of Texas retained ownership of its public lands and promptly began selling them off to finance some of its most important functions including the construction of the Capitol itself, the Permanent School Fund, and the Permanent University Fund.[224]

Given this context, it is a troubling fact that the state of Texas loses rural and agricultural land faster than any other state. Between the years 1997 and 2007, for example, the state lost more than two million acres of valuable open space, wildlife habitat, watersheds, and recharge areas to other uses.[225]

Related to our water supply, the most significant terrestrial environmental problem that we face in Texas is the continual breakup of family lands across our state.[226] As parents pass away and descendants disagree on what to do with the family farm, as property taxes increase and as inheritance taxes come due, agricultural income declines overall.[227] This inexorable exit from the countryside not only erodes the rich culture of private land stewardship in Texas but also our ability to provide sufficient water for future generations of Texans.[228]

Agency Oversight/Statutory Regulation over Land Stewardship

Texas currently has several programs that serve to promote land conservation and stewardship at the state level. These programs include the Texas Farm and Ranch Lands Conservation Program at the General Land Office and the Texas Water Trust.

Texas Farm and Ranch Lands Conservation Program

The Texas Farm and Ranch Lands Conservation Program was created by the 79th Texas Legislature in 2005 through the passage of Senate Bill 1273 to facilitate the protection of agricultural land from fragmentation and encourage continuation of agricultural production while conserving, protecting, and enhancing state natural resources. The Commissioner of the General Land Office (GLO) chairs the Texas Farm and Ranch Lands Conservation Council, a ten member advisory council that administers the program. The advisory council consists of four ex-officio members of state and federal agencies and six members appointed by the Governor representing various aspects of the agricultural industry. Council members also assist with public awareness and identifying future funding sources.

Key Functions of the Program

The Texas Farm and Ranch Lands Conservation Program provides cash benefits to the private landowner from proceeds of the sale of long-term or perpetual conservation easements. Conservation easements maintain ownership and possession of the property with the landowner while restricting future development. The state does not hold the conservation easement, but instead the agency pairs private landowners with land trusts to establish conservation easements on the land to prevent development, sustain agricultural production, and enhance natural resources. The program provides the citizens of the state with a guarantee of open spaces free from development for future generations and protection of state natural resources. In addition to preventing conversion of Texas farm and ranch lands to non-agricultural uses, conservation easements conserve and protect water quality and quantity, as well as native wildlife and plant species habitat.

Grants and Funding

The advisory council evaluates and awards grant applicants based on submitted applications and established criteria. Applications submitted for the current funding source must be made on property that is located within the 18 Texas coastal counties and meets the requirements of "qualified open-space land," as that term is defined by Chapter 23, Subchapter D, Tax Code. In general, property that qualifies for an agricultural or wildlife use exemption qualifies for this program.

Grant applications are scored on the following criteria:

(1) Maintenance of landscape and watershed integrity to conserve water and natural resources;

(2) Protection of highly productive agricultural lands;

(3) Protection of habitats for native plant and animal species, including habitats for endangered, threatened, rare, or sensitive species;

(4) Susceptibility of the subject property to subdivision, fragmentation, or other development;

(5) Potential for leveraging state money allocated to the Program with additional public or private money;

(6) Proximity of the subject property to other protected lands;

(7) The term of the proposed conservation easement; and

(8) A resource management plan agreed to by both parties and approved by the council.

Currently, the Texas Farm and Ranch Land Conservation Program's sole source of funding for grants is the Coastal Impact Assistance Program (CIAP), which limits project locations to the 18 counties in the Coastal Bend area as depicted on the map below.

Total CIAP funding allocated to the Texas Farm and Ranch Lands Conservation Program is $6,000,000 of which $4,580,967 has been allocated to projects and $1,419,033 is available. For the remaining funding, a Request for Application has been posted in the Electronic State Business Daily and the General Land Office website for a 90-day period beginning May 1. Current funding through a CIAP grant will expire December 31, 2016 (all projects must be completed and the funding spent by that time) and no additional funding has been secured.

Completed Projects

Savannah Oaks (Ducks Unlimited)

On December 29, 2011, Ducks Unlimited acquired a conservation easement for an approximately 700-acre tract of the Savannah Oaks Ranch in Brazoria County. The Texas Farm and Ranch Lands Conservation Program contributed $400,000 in state 2007 CIAP funds. The Texas Commission on Environmental Quality's Galveston Bay Estuary Program contributed $301,000 in state 2007 CIAP funds. The estimated cost of the project is $458,000.

Bulanek Farms (Texas Agricultural Land Trust)

On July 16, 2013, the Texas Agricultural Land Trust acquired conservation easements on 363 acres of Pat Bulanek Farm Tract 1 and 300 acres of Pat Bulanek Farm Tract 2 in Brazoria County. The Texas Farm and Ranch Lands Conservation Program contributed $878,000 in CIAP funds. The estimated cost of the project is $878,000.

On-going Projects

Tomlinson Farms (Texas RICE)

On May 13, 2014, Texas RICE acquired a conservation easement on 804.52 acres of Tomlinson Farms located 5.7 miles to the northeast of Palacios in Matagorda County. The Texas Farm and Ranch Lands Conservation Program contributed $256,500 in CIAP funds. The conservation easement has been purchased. Texas RICE is drafting the final report and installing the required CIAP signage at the site. The estimated cost of the project is $256,500.

Lone Pine Farms (Galveston Bay Foundation)

The Galveston Bay Foundation will use $1,238,467 to purchase conservation easements on 575.02 acres of Lone Pine Farms Tract 1 and 521.94 acres of Lone Pine Farms Tract 2. The properties are located approximately 2.5 miles southeast of Danbury in Brazoria County. The Galveston Bay Foundation is working to complete the required due diligence. The estimated cost of the project is $1,238,467.

Willow Glen Planation (Texas Land Conservancy)

The Texas Land Conservancy will use $1,750,000 to purchase an agricultural conservation easement on 3,120 acres of Willow Glen Plantation in Brazoria County. The Texas Land Conservancy is working to complete the required due diligence. The estimated cost of the project is $1,750,000.

Texas Water Development Board[230]

Texas Water Bank

In 1993, the Texas Legislature established the Texas Water Bank (Water Bank) to facilitate the transfer, sale, or lease of water and water rights throughout the state. Water right holders may formally deposit their water right in the bank or simply list it in the Water Right Registry.

The Texas Water Development Board (TWDB) administers the Water Bank. To date, there has been only one official Water Bank transaction that was executed while the water right was still on deposit and therefore required that a Water Bank fee be paid to TWDB. There are currently 8 water rights on deposit in the Water Bank.

Texas Water Trust

In 1997, the Texas Legislature established the Texas Water Trust (Water Trust) within the Texas Water Bank. In the Water Trust, water rights are held for environmental flow maintenance purposes. Water Trust water rights are dedicated to environmental needs, including in-stream flows, water quality, fish and wildlife habitat, or bay and estuary inflows.

The TWDB administers the Water Trust. Water rights held in the Water Trust are not subject to cancellation or forfeiture, either for a period of time specified by contract or in perpetuity. The TWDB waives all fees for deposits to the Water Trust, although the other agencies may or may not. Texas Commission on Environmental Quality (TCEQ) waives a portion of the fees associated with amending a water right that will be deposited in the Water Trust. TCEQ watermaster fees are also waived if deposited in the Water Trust for at term of at least 20 years.

The process of making a Water Trust deposit involves:

(1) Contacting the TWDB to relate the details of an existing water right and an intention to make a Trust deposit;

(2) Meeting with TWDB to establish the terms of deposit including, the trust contract for the deposit;

(3) Obtaining a permit amendment through TCEQ to add an "in-stream" use designation to the existing water right permit use;

(4) Notification of and, as necessary, consultation with Texas Department Agriculture (TDA) and TPWD prior to accepting Trust deposits; and,

(5) Acceptance by TWDB of the depositor's Water Trust Deposit application in accordance with the Trust contract and based on TCEQ's approval.

Deposit of a water right in the Water Trust may or may not involve transfer of the permit ownership.

Since its inception, there have been two deposits made to the Water Trust. The first involved two water rights on the Rio Grande for a total of 1,236 acre-feet in deposit. The owner of these irrigation water rights donated them to Texas Parks and Wildlife Department (TPWD) which acquired a change of use amendment to the water rights at TCEQ and deposited the water rights in the Water Trust in 2003. The second deposit was in 2006 and for 33,000 acre-feet, which was approximately half of an existing hydroelectric water right. It was amended to add "in-stream use" and was deposited by Texas State University. The university retained ownership of the water right located on the San Marcos River in the Guadalupe River Basin. Water rights may be deposited in the Water Trust for a specified term or in perpetuity. Both of these Water Trust deposits were made in perpetuity.

Texas State Soil and Water Conservation Board[231]

The Texas State Soil and Water Conservation Board (TSSWCB) has programs that provide technical assistance and grants to landowners. These programs provide the opportunity for landowners to learn and absorb the costs of the type of on-the-ground land management that have been successful in protecting water quality and quantity. The agency is governed by a seven member board of directors. Five of the board members are elected by delegates from each of five

regions of the state's 216 local soil and water conservation districts. Since the conclusion of the 78th Legislative Session, two members are to be appointed by the Governor.

The agency is responsible for numerous natural resource conservation efforts, the most prominent of which is serving as the lead state agency for the prevention, management, and abatement of nonpoint source pollution resulting from agricultural and silvicultural activities. As a result the majority of the agency's programs and services aim to improve and protect *water quality*, although the TSSWCB is also responsible for assisting landowners with water conservation. Other responsibilities include the prevention of soil erosion, control of floods, maintaining the navigability of waterways, the preservation of wildlife, protection of public lands, and providing information to landowners regarding the jurisdictions of the TSSWCB and the TCEQ related to nonpoint source pollution. The TSSWCB has no regulatory functions; all of the agency's programs and services are voluntary in nature.

Water Quality Management Plan

The main conservation planning program the TSSWCB administers is the Water Quality Management Plan (WQMP) program. This program comes from Senate Bill 503 of the 73rd Legislative Session in 1993. This program is administered through a partnership between the 216 soil and water conservation districts in Texas and the TSSWCB. It is a voluntary program that emphasizes implementation of the management practices contained within the United States Department of Agriculture – Natural Resources Conservation Service's (NRCS) Field Office Technical Guide. Landowners may apply for cost-share assistance through this program. The cost-share funding for this program is available through annual appropriations from the Texas Legislature. In 2001 the 77th Texas Legislature passed Senate Bill 1339, which required poultry facilities in Texas to operate in accordance with a WQMP certified by the TSSCWB.

Water Enhancement Program

Scarcity and competition for water have made sound water planning and management increasingly important. With Texas' population expected to grow by 82% in the next 50 years, the availability of water supplies is essential for not only the Texans of today but also for those of tomorrow. Noxious brush, detrimental to water conservation, has invaded millions of acres of rangeland and riparian areas in Texas, reducing or eliminating stream flow and aquifer recharge through interception of rainfall and increased evapotranspiration. Brush control has the potential to enhance water yield, improve soil conservation, protect water quality, and manage invasive species. In order to help meet the State's critical water conservation needs and ensure availability of water supplies, in 2011 the 82nd Texas Legislature established the Water Supply Enhancement Program (WSEP) administered by the TSSWCB, with the purpose of increasing available surface and groundwater through the selective control of brush species that are detrimental to water conservation (e.g., juniper, mesquite, saltcedar). The TSSWCB collaborates with SWCDs, and other local, regional, state, and federal agencies to identify watersheds across the state where it is feasible to implement brush control in order to enhance water supplies. The TSSWCB uses a competitive grant process to rank feasible projects and allocate WSEP grant funds, giving priority to projects that balance the most critical water conservation need of municipal water user groups with the highest projected water yield from brush control.

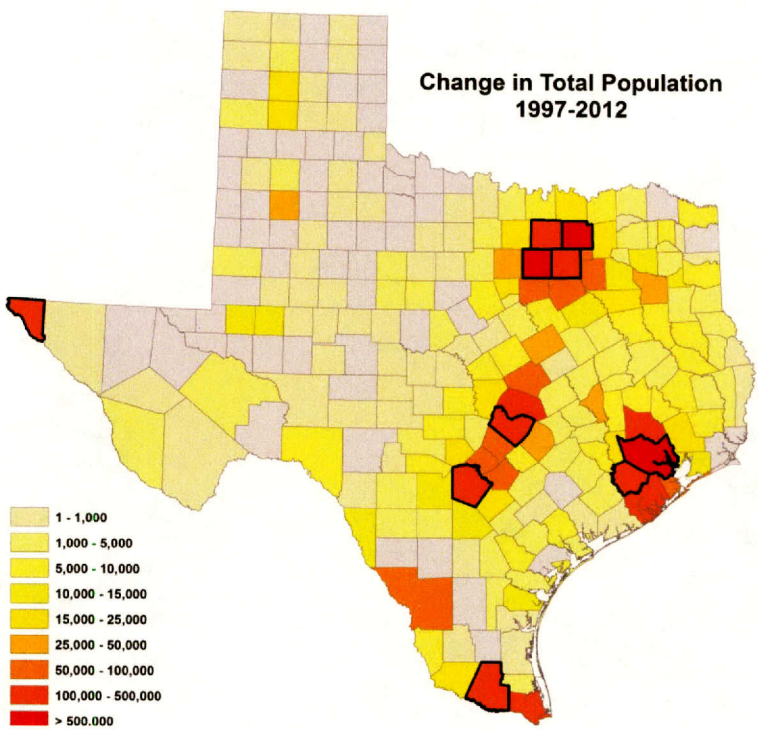
Soil and Water Conservation Grants

In the Conservation Implementation Grant program funding is allocated from the TSSWCB to 216 soil and water conservation districts for the purpose of financing their efforts to provide conservation implementation assistance to agricultural producers. For the conservation matching-fund grant program funding is allocated from the TSSWCB to 216 soil and water conservation districts on a dollar for dollar matching basis. To receive funding under this program, a soil and water conservation district must raise funds from sources other than the State or earnings from State funds.

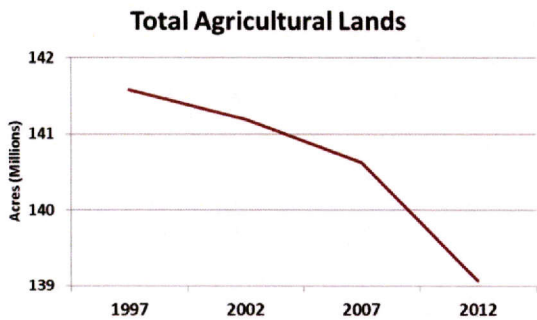
DISCUSSION AND CHALLENGES

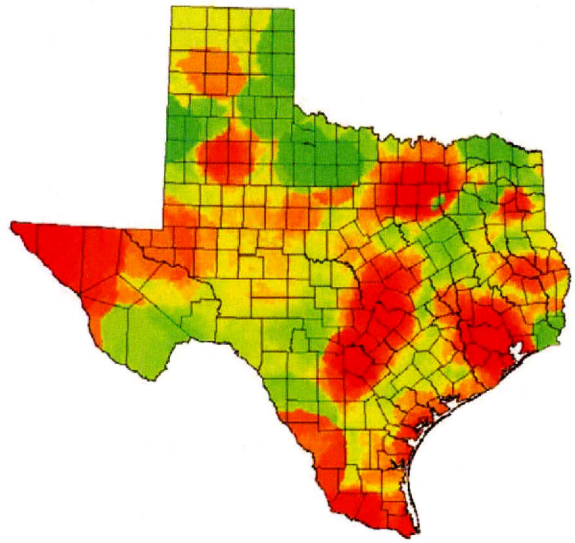
Texas Land Trends[232]

Texas A&M University through the Institute of Renewable Natural Resources recently conducted a study on Texas Land Trends from years 1997 – 2012. What it found was that the more than 25 million people residing in Texas (and growing) over 171 million acres of land which is 96% privately-owned offers challenges to sustaining rural working lands and natural resources. Over 15 years, the population has increased 36%, at a pace of 500,000 people per year. Sixty-five percent of this population occurred within the top ten populated counties.

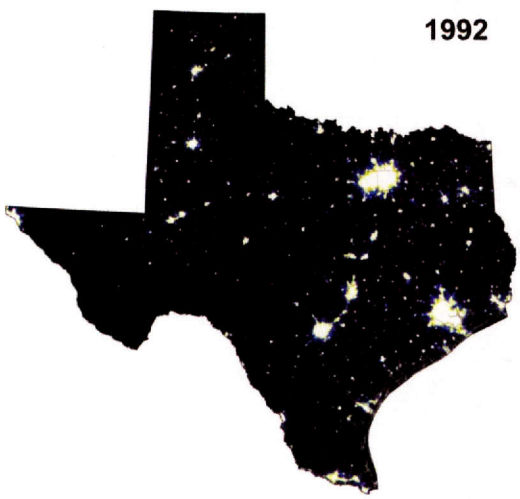


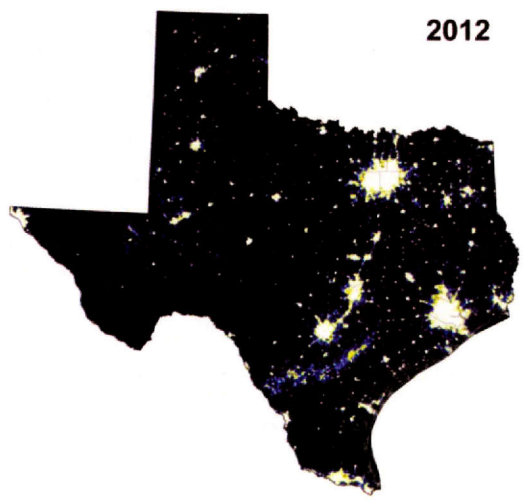
During that same period, agricultural land losses amount to 2.5 million acres at a pace of 160,000 acres per year.

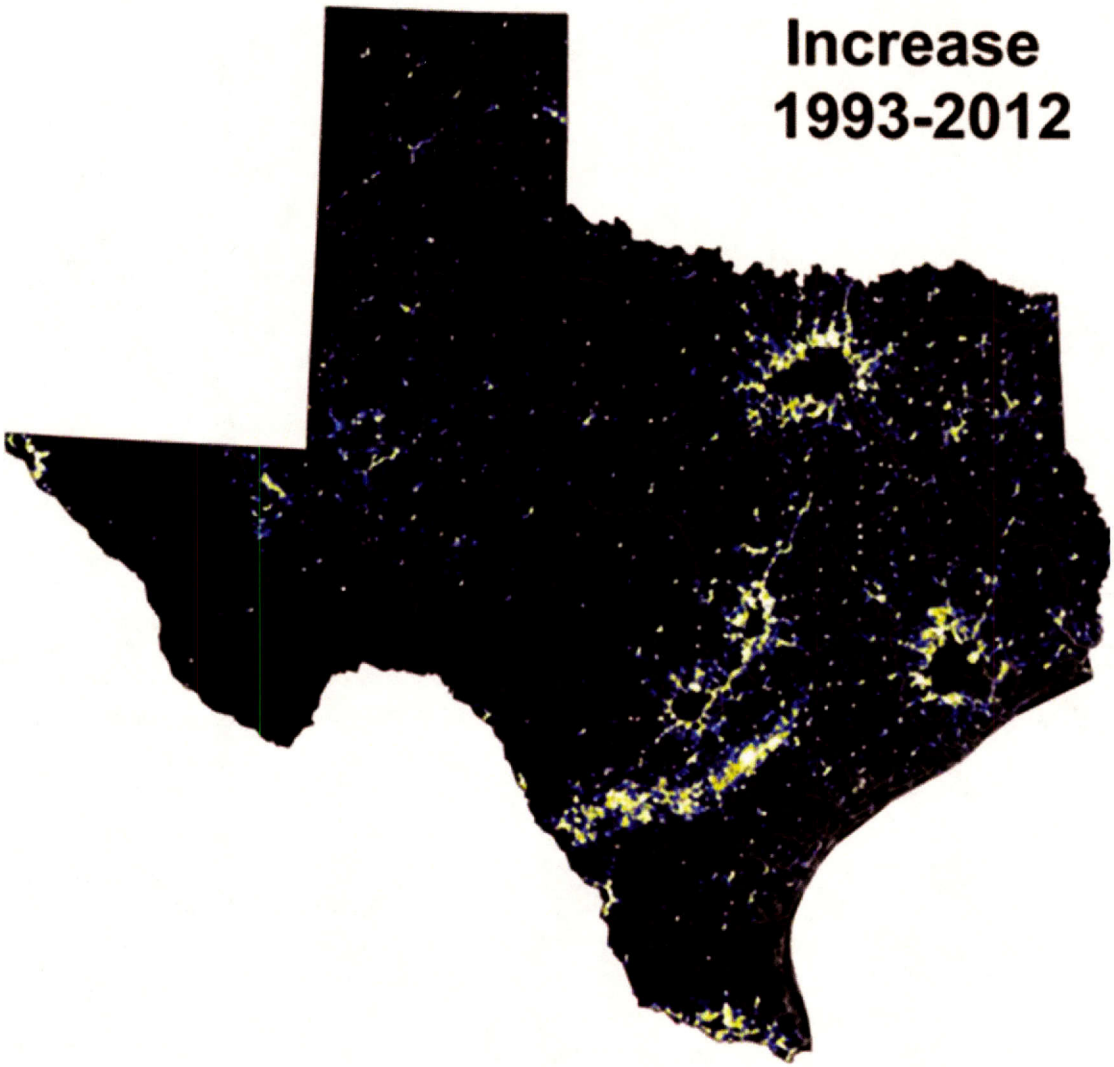




Rural and working lands play an unseen yet critical role in water/food sustainability and national/ energy security. Most notably, due to agricultural land losses over this time period, aquifer recharge zones also lost 930,000 acres. During the same time, oil and gas leases in the state have double from 2 million to 4 million. In the Eagle Ford Shale alone, there has been an estimated increase of 23,000 well pads and an increase of 84,000 acres for production (data set from 1993 – 2014) with 65% of construction occurring 2011 – 2014. The graphs below depict the change in night time illumination in Texas since 1992.







Effective conservation will require innovation solutions to sustaining private rural working lands. Above all, voluntary protection and stewardship of privately-owned rural lands is key to the state's water supply. Continued and renewed support of state programs, however will also play a key role in sustaining land (water) conservation and stewardship efforts. This can be accomplished through both market-driven conservation programs, as well as support of land-based conservation programs across the state.

Agency Oversight/Statutory Regulation over Land Stewardship[233]

The state already has several programs that provide funding and technical assistance to landowners to advance land conservation that can benefit water resources. Continued and increased support and funding for these programs is one opportunity to get land stewardship to scale.

General Land Office

The Texas Farm and Ranch Land Conservation Program

The Farm and Ranch Land Conservation Program at the GLO provides funding for conservation easements. Conservation easements have been a successful protection tool in locally funded water protection programs in central Texas.[234] The first purchased easement through this program was for a rice farm near Danbury, Texas.[235] Prior to the easement being established, the family received unsolicited offers on the land at five-figure numbers per acre.[236] Rody Kuchar, a fourth generation rice farmer at the Savannah Oaks Ranch said that he knew what money like that could mean both positively and negatively for the family.[237] Instead, his family chose to place a conservation easement on the farm.[238] After the five year process, Ducks Unlimited became the eventual easement holder, and Mr. Kuchar's family was able to protect the land in perpetuity as a working farm and open land.[239]

For that reason, the same groups that created the Texas Agricultural Land Trust also supported legislation in 2005 to create the Texas Farm and Ranch Lands Conservation Program.[240] Modeled on programs found in approximately 25 other states, the program was put into place as a tool to respond to natural resource policy priorities.[241] The thought was that state dollars would be stretched by matching federal conservation easement purchase programs offered by the USDA.[242] Instead, the program has been limited to funds that the GLO has allocated through the federal CIAP, meaning that the program can currently only function in coastal areas.[243]

If used for its intended purpose, the Texas Farm and Ranch Lands Conservation Program offers a way to address the alarming problem of fragmentation and loss of rural land.[244] When we lose open space, when land is paved over or divided into smaller and smaller pieces, it can have profound impacts on the recharge zones of our aquifers or the health of our rivers and streambeds.[245] The 142 million acres of farms, ranches and timberlands that make up the private lands in this state are critical to our water security.[246] Yet, aside from local programs in Austin and San Antonio, we do not have the means to protect the working lands that provide our water.[247] Texas needs to provide incentives for families to stay on the land and to keep stewarding those critical resources.[248] Stewardship requires active management. While agricultural producers today do receive open space valuation for property taxes, the Texas A&M Land Trends study is a clear indication that it is not sufficient to slow the loss of land that impacts our water resources.[249]

Discussions about funding the Texas Farm and Ranch Lands Conservation Program have always included the question of where will the money come from and how much is needed.[250] The answer to the question of how much money is needed to have an impact on the state's water resources lies in the Texas A&M Land Trends study update.[251] It is a well-suited study to provide a rational, data-supported answer for the next legislature.[252] With meaningful funding, the Texas Farm and Ranch Lands Conservation Program, and by extension private lands conservation, could be a very efficient player in the whole strategy for ensuring the state's water security.

Texas Water Trust

Similar to other state created programs, the Water Trust suffers from a lack of funding. There are no appropriations or specific agency budget items directly associated with the program.[253] The Water Trust activities are managed by water planning staff who have other primary duties.[254] Due to the lack of funding available for the program, there are currently no other pending Water Trust deposits.

Land Stewardship Strategies

Land Stewardship: Providing Water for Texas[255]

Texas farmers and ranchers have a long history of voluntarily conserving the natural resources entrusted to them. Living off the land provides a great incentive to conserve and make the most of available resources. Today, Texas farmers and ranchers produce more food, fuel, and fiber than ever on a greatly reduced number of acres, while using no more water than was used in the 1950's. In addition, wildlife management on working ranches has resulted in the conservation and recovery of a number of wildlife species.

Due to the prolonged drought in Texas, many of the state's farmers and ranchers have sought to aggressively adopt innovative technologies and on-farm conservation practices to combat the impacts of drought and improve profitability. Some of these conservation practices, such as grazing management, cover crops, and wildlife habitat enhancement, are lower-cost management practices that can have subtle impacts when implemented on thousands of acres. Other practices, like irrigation efficiency improvements and targeted brush control, provide a greater benefit to Texas' water resources, but can be very costly to farmers and ranchers.

Unfortunately, as more Texans move from rural to urban areas they generally become less mindful of their reliance on the land and its natural cycles as well as the variety of benefits they derive from the voluntary stewardship provided by private landowners throughout the state. As a result, many today do not recognize that land stewardship, which provides water for Texas, is a responsibility that should be shared by all Texans. Key concepts to understanding this important link include:

- Ground and surface water supplies originate with the rain that falls on the land and is captured by complex, large-scale ecological processes involving many variables including plants, animals, soils, and geology. When these processes function optimally, floods are reduced, aquifers are replenished, and water is released more slowly and steadily into springs, streams, rivers, lakes and eventually our bays and estuaries.

- When the natural processes are working well across millions of acres of productive agricultural, forest, wildlife and recreational lands the contribution to the state's water supply can be tremendous, "creating" more water for all Texans.

- The rainfall soaks into the ground as opposed to running off and carrying soil and sediment. The absorbed groundwater reappears as springs which drain into creeks, streams and rivers, which eventually feed the bays and estuaries, thus providing a base flow of water for all Texans. Land stewardship on millions of acres, combined with community conservation efforts, translates into what may be the most significant contribution to water conservation today.

- Finally, and perhaps most importantly, voluntary land stewardship allows Texans to consider water at its origins, not just at its destination.

The state should encourage voluntary land stewardship – on a grand scale – as one of the cornerstone solutions for water issues in Texas because it is complementary, cost-effective, sustainable, efficient, environmentally sensitive, multi-faceted and manageable. The efforts of private landowners are vitally important because the presence of voluntary land stewardship helps maximize the effectiveness of all other water management strategies.

Local and Regional Watershed Protection

Protecting land over aquifers and adjacent to rivers is one way we protect our water for future needs. Austin and San Antonio have established Water Protection Funds, which are citizen-approved public investments in strategies to protect water quality or quantity, and create practical, land-based water conservation incentives, as well as community involvement and buy-in.[256] Both these programs purchase development rights in sensitive areas to help protect the cities' water and natural resource needs.

San Antonio serves as a good example of land protection that provides water quality benefits that double as an effective water supply strategy and also highlights an effective partnership between government, landowners, and non-profits.[257] The Edwards Aquifer serves as the primary source of drinking water for south-central Texas.[258] Its waters feed springs, rivers, and lakes and sustain diverse plant and animal life, including rare and endangered species.[259] The recharge and contributing zones of the Edwards replenish the aquifer, and protecting those zones allows San Antonio to avoid expensive water treatment costs, therefore protecting its future water supply.[260]

The Nature Conservancy (TNC) protects land over the Edwards Aquifer through land acquisition and conservation easements made possible by the locally approved funding for these activities.[261] Conservation easements highlight how we can incentivize land conservation with water benefits with private landowners; they protect land while allowing owners to retain many private property rights and to live on and use their land, while at the same time potentially providing them with tax benefits.[262] Since 2000, central Texans have voted to invest almost $800 million in these water protection strategies.[263] TNC has helped these local governments protect 21% of the Edwards Aquifer's recharge zone, its most sensitive area.[264]

Non-profit organizations play an important role in land conservation, as well. As discussed previously, the Texas Agricultural Land Trust (TALT), for example, is a private, non-profit 501(c)(3) founded in 2007 by leaders from statewide agricultural and landowner organizations, including the Texas and Southwestern Cattle Raisers, Texas Farm Bureau, and

Texas Wildlife Association.[265] The TALT is the only land trust in Texas whose sole focus is the conservation of agricultural lands and native wildlife habitats.[266] Its mission is to conserve the Texas heritage of agricultural lands, native wildlife habitats, and natural resources.[267] Today, TALT today holds conservation easements on 225,000 acres throughout Texas and advocates for financial incentives that encourage landowners to stay on the land and continue their stewardship.[268]

Since 1996, another non-profit entity, the Trust for Public Land (TPL) has helped state and local public officials create more than $35 billion in new public funding for land conservation across the United States.[269] The TPL have helped pass more than 450 ballot measures from coast to coast and secure state legislative approval of funding annually.[270] Over the past two decades, the TPL has commissioned over 200 public opinion surveys to inform their work helping public officials design ballot measures and legislation.[271] According to this research, the top reason voters are willing to reach into their wallets to support increased funding for land conservation is to protect drinking water supplies and the water quality of rivers, lakes, streams, and beaches.[272] In Texas, the TPL has concluded that protecting the state's water resources by protecting working farms and ranches via conservation easement is an approach that should be appealing to the public and consistent with a belief that private land stewardship is the preferred route to protecting natural resources in the state.[273]

Based on the TPL's research, there is little hope of making significant progress to implement an ambitious plan without the state having significant funding dedicated towards that purpose.[274] Texas can look towards many models in developing an approach to create the substantial state funding that will be needed to advance private land stewardship at a significant scale, including bond measures and tax dedications.[275] Going a step further, the ability to execute that plan is greatly enhanced if the state provides financial incentives to encourage local governments to establish their own sources of dedicated funding for working lands conservation via ballot measure.[276] At present, there is no dedicated source of state funding in Texas to encourage private stewardship of working lands.[277]

Another non-profit, the Houston Advanced Research Center (HARC), is a part of George Mitchell's legacy on sustainability science, working on water, energy, and air issues.[278] The HARC's founder created one of the best examples of maintaining ecosystem services subsequent to development in the development of the Woodlands community.[279] This community was based on a "design with nature" concept.[280] Some components of this community that pertain to protecting the water-related ecosystem include: conserving large tracts of forest, which increase groundwater recharge; and excluding building in floodplains, which decreases flood damages.[281] The HARC has also collaborated in the Bayou Greenway Initiative, increasing water-related ecosystem service benefits along the region's ten major bayous and helped create several wetlands projects, including in the City of Beaumont (600 acres), North Texas Municipal Water District (2,000 acres of wetlands), and Tarrant Regional Water District (2,600 acres).[282] The HARC believes that further collaborative efforts should be made in protecting water recharge zones, pursuing in educational campaigns, and creating economic incentives for landowners.[283]

Private Watershed Protection[284]

As a non-profit, TNC also raises private funds through individuals and corporations to actualize on-the-ground land management that supports watershed protection. These types of activities include managing TLC properties, sharing knowledge, and working with landowners to enter into conservation easements to provide the same protection on private land. Proper land stewardship supports effective water filtration – maintaining and restoring the natural function of the land – which contributes to both quality and quantity. Some of the land stewardship strategies that TNC employs to provide water benefits include:

(1) native prairie restoration through prescribed fire and replanting;

(2) grazing management; and

(3) removal of water-sucking invasive and exotic species.

Water Stewardship Strategies

Ensuring that the state of Texas' rivers, streams, and aquifers have adequate supply is essentially an insurance policy for the state's future.[285] Overuse of these resources prevents the state from supporting support a growing economy, and the first indication of this is when those resources can't adequately support healthy ecosystems. These water supplies are inherently interconnected.[286] Rivers and aquifers flow into and out of one another and the overuse of either ground or surface water detrimentally affects the other.[287] There are existing and emerging strategies to ensure that enough water stays in our aquifers and streams to support future supply and in-stream flows needs.[288]

Texas has three strengths in the water planning arena as a result of legislative leadership: a statewide water plan, in-stream flows legislation, and recently approved financing for the water plan.[289] The integration of these pieces is integral to their overall success.[290] Many advocates for enhanced stewardship opportunities argue that connecting in-stream flows needs with the existing water planning process is both practical and essential, and that there are several opportunities to improve the link between in-stream flows needs and planning, particularly in the post-House Bill 4 era. These include:

(1) recognizing that in-stream flows needs are a statewide priority that have real benefits to our long-term water security;

(2) more effectively stitching in-stream flows into the identified needs in the water plan; and

(3) ensuring that we take every opportunity available to advance water supply projects that provide water not just to paying municipal, agricultural, and industrial users but also to our natural resources – our insurance for the future.[291]

While the state is ultimately responsible for ensuring the protection of all water resources, there are other good stewards in the private landscape that are also ensuring the achievement of

protecting the state's water resources. Corporate entities also engage in local and regional efforts to conserve and steward the land. The MillerCoors factory in Fort Worth, Texas is one of the largest private, corporate stewards of water and land conservation in the North Texas Region.[292] Within the walls of the Fort Worth brewery, MillerCoors decreased the amount of water to brew beer to 3.28 barrels of water per barrel of beer.[293] For comparison, some breweries in the United States use six barrels of water to produce a single barrel of beer.[294] The MillerCoors brewery in Fort Worth also returns an average of 63% of the water it purchases from the City of Fort Worth back to the city after being processed through its own wastewater treatment facility.[295] A portion of this water is reused for irrigation purposes and discharged into the Trinity River, where 40% of the state's population relies on water to meet their needs.[296] Outside the walls of the brewery, MillerCoors recently collaborated with TNC to build its showcase barley farm in Idaho's Silver Creek Valley to pilot new farming techniques that save water while still producing quality barley.[297] A similar program was created in Colorado's San Luis Valley.[298] In Texas, MillerCoors partnered with the Gary and Sue Price on their ranch to create the first demonstration site of Water As a Crop.[299]

Gary and Sue Price are the owners of the 77 Ranch near Blooming Grove, Texas, where the Blackland Prairie in the North Pasture is some of the last unbroken sod in the region; land that has never been plowed.[300] Today, less than one percent of this habitat remains untouched and contains nearly 160 plant species.[301] Here, the goal is sustainability.[302] It has been said, "Don't pray for rain, unless you are ready to receive it." If landowners plan right, that rain will grow grass and water livestock and none of it will be lost before it has served its purpose.[303] Then, it can go downstream to serve the water needs of others. Part of the Prices' conservation plan is also partnering with other such as the Natural Resources Conservation Service (NRCS) and Soil and Water Conservation Districts (SWCD).[304] Over the past 75 years, the organizations have developed one of the most advanced sources of local-based conservation experts and technical service delivery systems in the nation.[305] Working with other landowners, these collaborative efforts are able to leverage federal, state, local, and private resources to maximize the impact of implementing conservation for positive impacts on not only water resources but on the environment as a whole.[306]

Other Innovations: Water Markets[307]

Broadly, a water market is a mechanism that creates private, financial incentives to use water more efficiently or to conserve water for in-stream flows purposes, similar to the water trust, but alternatively funded and based on market conditions. There are exciting opportunities when applying this concept to purchasing water dedicated to in-stream flows. In-stream flows are an integral component to keeping our Gulf of Mexico bays and estuary systems intact. Texas is currently situated to receive a game-changing flow of restoration money as a by-product of the devastating Deepwater Horizon oil spill. Funds will flow through three different mechanisms: the National Fish and Wildlife Foundation, the RESTORE Act, and the Natural Resources Damages Act.

All of these funding streams are intended to advance restoration projects that benefit the Gulf, including providing in-stream flows that support that system. TNC and other organizations are advocating for projects that identify critical river basins that feed the Gulf and would fund the purchase of water rights in those basins to ensure a healthy flow to the Gulf. In these strained

budgetary times, this is an exciting and innovative way in which we leverage criminal and civil penalties associated with the spill to increase flows. These water rights would be held for environmental purposes, similarly to how the Nature Conservancy currently holds land for conservation purposes.

The difference between this strategy and the Water Trust, as it is currently structured, is that a water market would allow the state to strategically and proactively identify the places and water rights that will get us the most bang-for-the-buck and then pursue those rights on the free market. Private non-profit organizations may also be interested in acquisition of these rights, in which case the state's role would be to ensure that such transactions comply with state law – and, more broadly, that the state is responsive to efforts to enhance water security in new and innovative ways.

RECOMMENDATIONS

Provide a state-supported revenue source to support current programs at the state level and incentivize landowners to conserve and steward land.

Examine other ways to expand incentives for landowners to steward and conserve natural resources through potential tax deductions or land valuation exemptions for activities like water conservation and management.

Enhance legislative oversight on the use of BP funds to ensure that those funds benefit Texas' coastal ecosystems – a goal that ties into this charge as well.[3]

3 See also the committee's recommendations regarding the interim charge to monitor the use of funds provided or made available to the state in regard to the 2010 Deepwater Horizon spill.

AQUIFER STORAGE AND RECOVERY

PUBLIC HEARING

The House Committee on Natural Resources held a public hearing on its Interim Charge #4 related to the science of aquifer storage and recovery projects on June 25, 2014 at 10:00 a.m. in Austin, Texas in the Capitol Extension, Room E2.010. The following individuals testified on the charge:

James Dwyer, CH2M Hill
Norman Johns, National Wildlife Federation
Darren Thompson, San Antonio Water System

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

INTRODUCTION

As the drought intensifies across the nation, the importance of exploring new water resources and technological advancements in the collection and storage of freshwater is at an all-time high. One such technology is known as aquifer storage and recovery (ASR), a water storage technology that under the right circumstances can provide a reliable, sustainable supply of water while protecting the stored water resource from the detriments of surface storage. As with all technologies, it must be carefully studied and appropriately match existing needs with geological compatibility. There is no one solution to meeting the state's growing water demands, but ASR is one viable technology that should be given adequate consideration as the state continues to develop its water resources.

BACKGROUND

The Process of Storing Water Beneath the Surface

ASR is the injection of water supplies into aquifer formations that have the ability to store water until such time that it is needed to meet peak needs, long-term growth, or emergency conditions.[308] In general, ASR optimizes the use of all water resources available to a region over long periods of time, acts as an environmentally friendly method of storing drinking water because much of the land above the ASR can continue its prior use, and represents a powerful tool to the state for the protection of endangered species.[309] The water is usually stored relatively deep, in a confined aquifer. ASR does not create new water, but instead stores water for future use.[310] Therefore, the practice requires a source of water.

ASR projects provide storage of water from many different sources, including conventional water treatment plants, desalination plants, surface water, groundwater, and reclaimed water. A broad range of storage zones are also utilized for ASR, including (1) fresh, brackish, and saline aquifers, (2) confined, semi-confined, and unconfined aquifers, (3) sand, clayey sand, gravel, sandstone, limestone, dolomite, basalt, conglomerates, and glacial deposits, and (4) vertical "stacking" of storage zones.[311]

ASR wells can operate at a depth varying from 30 to 2,700 feet. The storage interval thickness ranges from 20 to 400 feet. The storage zone total dissolved solids (TDS) range from 30 mg/L to 39,000 mg/L and the storage volumes range from 100 acre-feet to 270,000 acre-feet. Additionally, wells should be located in seasonal low pressure areas such as the top of a hill or the end of a long transmission pipeline to maintain pressure, flow, and water quality in a distribution system.[312]

Water Storage Quality

Possible sources of water may include groundwater, brackish groundwater, surface water, recycled water, and sea water. In Texas, the water injected into the storage aquifer must meet federal drinking water standards so that it may be pumped out and directed to meet drinking water needs immediately. In effect, this limits the amount and rate the water can be stored to the

capacity of the water treatment plant. For this reason, non-potable uses, such as irrigation or some industrial areas, ASR may not be a cost-effective solution.[313]

Location

To date, ASR has a well-established history of success where it has been implemented. CH2M HILL, for example, has completed over 70 projects (at least 40 that are operating) in the United States, the first in 1983 in Florida.[314] Most projects are located in coastal areas where groundwater resources have been impacted by saltwater intrusion and where population growth has been greater than inland areas.

In addition to physical location, the implementation of a viable ASR system in Texas requires an intermittent source of potable water and an economical storage zone.[315] Seasonal applications store excess water in the winter, when landscape irrigation is at a minimum (and water treatment plants have excess capacity).[316] The water can then be recovered to meet peak irrigation demands in the summer months, often when surface water flows decline. Several ASR projects in Texas store water during wetter years for recovery during times of drought. Regions in Texas that have adapted ASR technology include the following:

- *El Paso Water Facilities*: In operation since 1985, the El Paso Water Facilities house the only reuse ASR system in Texas. Excess reuse is recharged to the Hueco Bolson Aquifer, which supplies approximately 50% of El Paso Water Utilities' potable water supply. The effluent is analyzed for tubidity, nitrates, total organic carbon, pH, alkalinity, ozone residual, and chlorine residual. In recent years, there has been no excess for storage from the Fred Hervey Water Reclamation Plant.[317]

- *Upper Guadalupe River Authority (Kerrville)*: In operation since 1995, the Upper Guadalupe River Authority hosts the state's first potable ASR project, including two ASR wells with 2.5 million gallons per day (mgd) total capacity. The project acts as an alternative to large off-channel surface reservoir.[318]

- *San Antonio Water System (SAWS)*: In operation since 2004, the San Antonio Groundwater System hosts the state's first groundwater ASR project. Surplus water from the Edwards Aquifer is stored in the remote Carrizo Aquifer, which in turn enhances regional Edwards Aquifer reliability.[319]

- *Corpus Christi Aquifer Storage and Recovery District*: The Corpus Christi Aquifer Storage and Recovery District was created in 2005 to "develop and protect municipal aquifer storage areas created by the City of Corpus Christi." Currently, there are no operating ASR wells in the District.[320]

CH2MHill conducted a preliminary assessment of the suitability of Texas aquifers for ASR development to provide guidance on the availability of storage zones throughout the state. The assessment did not consider project-specific applications outlined previously and only major aquifers were considered to be economically viable for large-scale projects. The screening for potential ASR development areas was limited to the following storage zone characteristics:

- Confined aquifers to contain the stored water and protect form surface contamination (although several of the major aquifers displayed on the Texas Water Development Board map are listed as unconfined, in reality the hydrostratigraphy is such that there is usually fine-grained confining strata above the target aquifer zones);

- Less than 2,000 feet to the base of the target aquifer to limit well cost;

- TDS less than 3,000 mg/L to increase recoverability for potable use; and

- Adequate distance from the edge of the formation to avoid losing stored water to seeps and springs and to minimize interference of existing users.

The result of the assessment concluded that parts of the state do not have a storage zone suitable for large-scale projects. In addition, many portions of the state, particularly in the arid West and High Plains, do not typically have excess treated surface water available for storage.[321]

Agency Oversight/Statutory Regulation over Aquifer Storage and Recovery

Texas Water Development Board

Currently, the Texas Water Development Board (TWDB) does not provide regulation over ASR. To begin with, the TWDB is not a regulatory agency. Instead, the TWDB supports regions in developing their regional water plans that will be incorporated into a statewide water plan for the orderly development, management, and conservation of the state's water resources by studying Texas' surface and groundwater resources. Their role in the regional and state water planning process includes: reviewing regional water plans in accordance with agency rules and guidelines; resolving interregional conflicts; approving regional plans; developing state water plans; and providing funding for strategy implementation. Currently, the TWDB only provides scientific support on groundwater availability. However, the TWDB has begun the process of identifying ASR available areas through a preliminary assessment using several factors and characteristics.

In the late-1980s through the mid-1990s, the TWDB received funding to help communities conduct planning studies to look at the potential for ASR at Kerrville, Laredo, Brownsville, and San Antonio, as well as along the Sabine River. The conditions in each case appeared favorable. In fact, the Kerrville study evolved into an actual, successful project in Kerrville.

Texas Commission on Environmental Quality

Similarly, the Texas Commission on Environmental Quality (TCEQ) does not provide direct regulation over ASR. The TCEQ manages the quality of the water for water supply systems and controls surface water rights. Although the TCEQ is a regulatory agency, it does not provide regulation for the permitting of groundwater. Instead, individual groundwater conservation districts are tasked with the management of groundwater.

Some of the current applicable laws that might impact ASR implementation can be found in Chapter 11 (Water Rights) and Chapter 27 (Injection Wells) of the Texas Water Code. Furthermore, many of the rules governing ASR well construction and operation are contained in Chapter 331 (Underground Injection Control) of the Texas Administrative Code.

Groundwater Conservation Districts

The permitting for groundwater in Texas is done under Texas Water Code, Chapter 36 and is managed by local groundwater conservation districts (GCDs). However, Chapter 36 provides very little guidance on how districts should treat permitting for ASR projects. In general, GCDs are beginning to consider the use of ASR, but rules regarding ASR are often done on a project by project basis and vary from district to district.[322]

DISCUSSION AND CHALLENGES

The Process of Storing Water Beneath the Surface[323]

One of the keys to the success of an ASR project is forming and maintaining the buffer zone. Once the buffer zone has been formed, subsequent recovery efficiency should be close to 100%. It is measured in terms of "MG/MGD of recovery capacity," or "days." Typical values are 50 to 350 days, depending primarily on hydrogeology, water quality, and anticipated recovery duration. Once formed, the buffer zone should not be recovered since it risks causing a substantial deterioration in recovered water quality. In most applications of ASR, the quality of the water stored is very similar to the quality of the water recovered, even where the native groundwater has significantly differing quality.[324] This is possible because mixing only occurs at the margin of the stored water that is created by the buffer zone.[325]

The amount of buffer zone will depend on the geological formations of the available aquifer. In some cases, a minimal buffer zone may be required and in other cases a much larger buffer zone may be required. The amount of buffer zone will determine the amount of water that can be extracted from a particular ASR location. In turn, this will determine the cost effectiveness of any potential ASR location.

Water Storage Quality

ASR is a viable alternative water storage technique, but consideration of water-rock interaction is important to the water quality of the stored water. There is some concern with the potential loss of recoverable water and increase in cost associated with the release of metals into the subsurface aquifer. When freshwater is injected into an unconsolidated brackish formation, the water comingles. If dissimilar waters are introduced into an aquifer, selective leaching and/or mineral dissolution may release metals or elements, including arsenic, into the injected water.[326] Water that has been polluted with arsenic or other harmful elements can still be recovered with additional flushing of the water. However, this process can significantly increase the cost of the ASR project. Thus, while ASR could theoretically be pursued anywhere in the

state, it can become costly if you do not have the right geological formations and water quality available.

Location

Beneath the Ground[327]

The most recent 2012 State Water Plan, Water for Texas does not rely heavily on ASR as a state water management strategy. Instead, new resevoirs, often built by damming surface rivers and streams, are emphasized as a major part of the plan. There is an ongoing discussion regarding whether the use of ASR would eliminate the need for these surface water reservoirs. ASR proponents argue that surface water reservoirs capture water quickly, but such reservoirs often have high evapotranspiration and seepage losses, as well as high negative impacts to the surface of the land. They believe that a detrimental aspect of surface water reservoirs is the great loss of water that they cause via evaporation, especially during a drought. For example, in the severe drought year of 2011, evaporation losses ranged from nearly three feet in east Texas to almost seven feet in west and north Central Texas. Even higher losses, both in the long term and during extreme conditions, occur in far western areas of the state. The location of these evaporation rates roughly corresponds to areas for which new reservoir projects are proposed in the state water plan. Some even argue that the water lost to evaporation represents a permanent loss from the system that is not then immediately available for direct human use or maintenance of fish and wildlife resources. Moreover, some also believe that there are aquifers nearby that are proposed for local-scale ASR in the state water plan, which could be tapped for larger scale ASR utilization and thereby eliminate some or all of the losses that would be associated with the surface water reservoir. They state that widespread use of ASR avoids the evaporation that a dam and surface water reservoir on a river or stream, or even in an off-channel configuration, is subject to. Thus by avoiding this wide scale evaporation, the state can achieve a degree of "drought-proofing" for the water supply, and some alleviation of the escalating competition for scarce surface waters among users, which often takes place at the expense of our state's fish and wildlife heritage.

Furthermore, ASR projects also occupy less land and can be built in increments. Proponents of ASR argue that the use of ASR reduces the surface footprint of water storage. While surface reservoirs actually occupy the space on the surface of the land, ASR utilizes the subsurface area of the land with minimal invasion the surface property. As a result, the above surface land can be used to cattle grazing, farming, construction of buildings, etc. Additionally, surface reservoirs occupy a large volume of land and cannot be easily expanded in response to growing need. Unlike many other water management strategies, ASR seems to possess a "scalability advantage" in that subsurface reservoirs can be gradually expanded over time as need grows without substantially increasing the footprint on the land. Ultimately, ASR projects, where feasible, can often store much larger volumes of water with little or no evaporative losses.

On the other hand, the location of the ASR comes with some drawbacks. First, the collection of water into a confined aquifer requires help from the surface because often aquifers recharge and recover water slowly. If water is stored in a confined aquifer, then the water must be collected from another source. Often this requires another aquifer as the source of the water or surface water catchment in the form of small off-channel reservoirs. Hence, the use of surface

reservoirs is not automatically avoided in the ASR process. Therefore, a combination of ASR wells and surface reservoirs is required to provide effective water storage.

Additionally, if source water is from a surface supply, others argue that the state should consider avoiding undue impacts to that donor stream or river by considering some reasonable application of environmental flow standards. Lastly, some suggest that ASR systems may have high energy usage due to pumping water from the source stream, treating that water, then pumping the water into the storage aquifer, and then later, withdrawing those stored waters. Therefore, effort should be made to couple ASR systems with alternative energy sources or at least use traditional electric power primarily at off-peak times.

Variations in Geological Formations

There are particular areas in the state of Texas that are uniquely suited for ASR. The key technical issue that drives ASR is identifying a receiving geological formation to store the needed water. Knowing the chemical composition of the underlying formation, the injected water, and the existing groundwater sources is essential prior to beginning an ASR project. Geophysical methods, such as those used in oil and gas exploration, hold some promise for determining aquifer suitability for ASR. Theoretically, storage capacity and the location of possible conduits for water migration could be determined with these types of tests once a target site is determined.[328]

On the other hand, while ASR could theoretically be pursued anywhere in the state, it can become costly if you do not have the right geological formations and water availability. Total storage volume (TSV) is an estimate of the volume that has to be placed into storage so that the recovery efficiency is 100%, or as close to 100% as the site can achieve. The TSV is composed of two parts: (1) the volume actually needed for recovery, and (2) the volume needed in the buffer zone separating the storage bubble from the native water quality in the aquifer. If the surrounding native water quality is excellent, the buffer zone volume may be quite small. However, if the surrounding aquifer is very poor water quality, the buffer zone volume may be large.[329] Once the TSV is reached, it should theoretically be possible to recover the full amount needed. In a geologically ideal location, the buffer zone volume will result in very little water loss, thereby reducing the cost and use of resources. However, in areas that are not geologically ideal, the cost of an ASR system may be increased. As a result, the cost benefit of an ASR project can be analyzed on a sliding scale; as the location of the ASR project becomes less geologically ideal, the cost of the project increases.

Finally, the withdrawals of previously stored water should take into account normal movement and losses of waters from the receiving aquifer so as not to overdraft that aquifer. This must be addressed both at the design stage and upon implementation through careful monitoring of movement of injected water.

Agency Oversight/Statutory Regulation over Aquifer Storage and Recovery

Texas Water Development Board[330]

Studies continue to be expanded in central Texas and along the coastal regions. For instance, there are 13 study areas around Dallas for ASR sites. These studies were motivated by the 2011 drought's evaporation losses. In addition, subsidence issues in the Houston area continue to be evaluated geologically to see if the area is conducive to ASR. There are indications that if water is stored in the Gulf Coast Aquifer, subsidence would also stop in that area.[331] In these studies, the feasibility of ASR generally considers the following factors:

- Application: drought or seasonal;
- Recharge water quality;
- Well depth and yield;
- Storage zone groundwater quality;
- Storage zone mineralogy; and
- Groundwater migration.

Overall, ASR shows up in six of the 16 regional water planning groups' plans as a future water management strategy, but out of all the projects listed in the state water plan, ASR only accounts for about 81,000 acre-feet per year by 2060.[332]

In November 2008, the TWDB issued a Request for Qualifications for a Priority Research Project related to an assessment of ASR in Texas. In response to that request, this research went through a series of logical steps to: (i) determine why ASR has been successful for at least three Texas utilities; (ii) determine why ASR is not being implemented to a greater extent in Texas and what unique features have made it more attractive in other areas within the U.S. and overseas; and (iii) recommend public policy, technical, and legal changes to facilitate implementation of ASR in Texas. The study concluded that the principal challenges for ASR in the United States have been the legal and regulatory frameworks, which in many states have not yet caught up with the technical application of this technology. The same is true in Texas where the lack, or perceived lack of ability to protect the stored water, is one of the greatest identifiable impediments to ASR implementation.[333]

Texas Commission on Environmental Quality

According to at least one report, there is not significant oversight or rules in place to incentivize the use of ASR in Texas.[334] Although some believe that several of the current statutes governing ASR are reasonable and adequately protect the aquifers and public health, some of the statutes which might govern ASR projects might also be considered restrictive and outdated. An example of statutory language that is seen as adequately protective of subsurface water quality includes Texas Water Code §11.154 (c), which states:

> c) ... The commission shall consider whether:
>
> (1) the introduction of water into the aquifer will alter the physical, chemical, or biological quality of native groundwater to a degree that the introduction would:

(A) render groundwater produced from the aquifer harmful or detrimental to people, animals, vegetation, or property; or
(B) require treatment of the groundwater to a greater extent than the native groundwater requires before being applied to that beneficial use;

(2) the water stored in the receiving aquifer can be successfully harvested from the aquifer for beneficial use; and ...

Examples of overly restrictive and outdated laws and regulations include Texas Water Code §11.153, which states:

(b) ... pilot project to provide the commission and the board further opportunity to evaluate the storage of appropriated water in aquifers for subsequent retrieval and beneficial use.
(c) After considering the success of the project and the criteria set out in Section 11.154, the commission shall determine whether to issue a permit or permit amendment authorizing the continued storage of appropriated water in the aquifer.

In addition, Texas Water Code §11.154 states:

(b)1(D) ... comply with the rules governing the injection, storage, and withdrawal of appropriated water stored in the reservoir or subdivision that are adopted by each district that has jurisdiction over the reservoir or subdivision.

The first citation requires all projects to complete a pilot study without regard to the numerous successful project completed since the law was passed in 1998. The second requires all projects, regardless of the source of the stored water, comply with applicable groundwater conservation district rules. Some believe that this requirement is particularly problematic for project sponsors since many districts have no rules pertaining to ASR, which leaves projects at risk of having to comply with existing production restrictions that do not recognize the benefits of storage. Also, some districts with rules require a fixed percentage of water remain in the aquifer which could tend to escalate the operational costs for ASR.

Finally, the most restrictive regulation mirrors federal law. Texas Administrative Code §331.184 (e) requires, "The quality of water to be injected must meet the quality criteria prescribed by the Commission's drinking water standards as provided in Chapter 290 of this title (relating to Water Hygiene) [30 TAC Ch 290]." This is a higher standard than the more rational non-degradation requirement effectively precludes the storage of raw water surface water or high quality reuse water in brackish or saline aquifers where the native groundwater would require membrane treatment for most uses.

Groundwater Conservation Districts

Some believe that overall, oversight of ASR should be given to the TCEQ in order to ensure that large-scale ASR projects are managed on a statewide level by statewide standards. On the other hand, groundwater is so localized and individual to the locality and region that

others remain convinced that GCDs can still maintain control over ASR permitting with some general statutory guidelines.

RECOMMENDATIONS

Consider streamlining state statutory regulations to incentivize the implementation of aquifer storage and recovery projects in the state, where feasible.

Develop a mechanism for the clear determination of the reasonable ownership rights of water stored in aquifer storage projects, considering adequate, necessary buffer zones and existing ownership rights.

Continue to monitor and evaluate the science of aquifer storage and recovery technologies across the state and globally.

2010 DEEPWATER HORIZON OIL SPILL FUNDS

PUBLIC HEARING

The House Committee on Natural Resources and the House Appropriations Subcommittee on Articles IV, V, VI met jointly and held a public hearing on Interim Charge #5 related to the use of funds provided to the state in relation to the 2010 Deepwater Horizon Oil Spill on May 21, 2014 at 10:00 a.m. in Austin, Texas in the Capitol Extension, Room E1.030. The following individuals testified on the charge:

Toby Baker, Texas Commission on Environmental Quality
Maria Hernandez, Legislative Budget Board
Chase Kronzer, Legislative Budget Board
Mike Morrissey, Office of the Governor
Robin Riechers, Texas Parks and Wildlife Department
Jason Thurlkill, Legislative Budget Board
Jeff Wolverton, Texas Comptroller

The following section of this report on the appropriation of funds provided to the state in relation to the 2010 Deepwater Horizon Oil Spill is produced in large part from the oral and written testimony of the individuals listed above.

INTRODUCTION

The committee was charged with monitoring the use of funds provided or made available to Texas in relation to the 2010 Deepwater Horizon oil spill and making recommendations on the appropriate use of the funds in the future. On April 20, 2010, a gas release and subsequent explosion occurred on the Deepwater Horizon oilrig working on the Macondo exploration well for British Petroleum (BP) in the Gulf of Mexico. When the flow of crude oil was stopped on July 15, 2010, an estimated 200 million gallons of oil had been released into the ocean, resulting in the largest offshore spill in American history. In anticipation of the environmental impacts that the Deepwater Horizon oil spill could cause to the Texas gulf shoreline, as well as to other gulf states, the federal government in cooperation with BP initiated the formation of multiple funds for the restoration and protection of natural resources along the gulf coastline.

This report outlines the background of the revenue streams available as a result of the Deepwater Horizon oil spill and provides vital analysis/ discussion of issues current to the effective restoration of the state's natural resources damaged by the oil spill.

BACKGROUND

Overview of National Restorative Programs and Deepwater Horizon Oil Spill Funds

There are multiple programs that exist to provide assistance in the restoration and protection of our natural resources in and along the coastal waters of the United States. Previously existing programs include the National Resources Damage Assessment and National Fish and Wildlife Foundation and newly created programs include the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act. The state of Texas receives funds to restore and protect natural resources damaged by the Deepwater Horizon Oil Spill through these restorative programs and subsequently dedicated revenue streams.

National Resources Damage Assessment

The Oil Pollution Act (OPA), signed into law in August of 1990, improved the nation's ability to prevent and respond to oil spills by establishing provisions that enable government agencies to evaluate the impact of oil spills. In addition to expanding the federal government's ability to assess oil spills, the OPA also established provisions to provide the money and resources necessary to respond to oil spills.[335] Responsibility for acting on behalf of the public lies with designated federal, state, tribal, and foreign natural resource trustees.[336] OPA directs trustees to (1) return injured natural resources and services to the condition they would have been in if the incident had not occurred and (2) recover compensation for interim losses of such natural resources and services through the restoration, rehabilitation, replacement, or acquisition of equivalent natural resources or services. The National Oceanic and Atmospheric Administration (NOAA) published a final rule to guide trustees in assessing damages to natural resources from a discharge of oil. The rule provides a blueprint that enables natural resource trustees to focus on significant environmental injuries, to plan and implement efficient and effective restoration of the injured natural resources and services, and to encourage public and responsible party involvement in the restoration process. The rule establishes a process known as

National Resource Damage Assessment (NRDA), designed to rapidly restore injured natural resources and services to the condition that would have existed had the spill not occurred and to compensate the public for the losses experienced from the date of the spill until the affected natural resources and services have recovered.[337]

The Deepwater Horizon NRDA Trustee Council is comprised of Texas Trustees and Federal Trustees.[338] The Texas Trustees are Texas Parks and Wildlife Department, Texas Commission on Environmental Quality, and General Land Office. The Federal Trustees are the National Oceanic and Atmospheric Administration, the U.S. Department of Interior, the Environmental Protection Agency, the U.S. Department of Agriculture, and the U.S. Department of Defense.[339] As trustees, these government agencies evaluate damage to natural resources in three stages: Pre-Assessment, Injury Assessment, and Restoration.[340] During the Pre-Assessment stage, agencies assess damages to natural resources. As part of the Injury Assessment stage, agencies determine harm, remedies and compensation. Finally, during the Restoration stage, agencies implement a restoration plan.[341]

National Resources Damages Assessment is an ongoing process. At the conclusion of the evaluation, a federal court may decide total damages or, alternatively, a settlement could be reached.[342] In relation to the Deepwater Horizon Oil Spill, neither of these alternatives has yet been accomplished. To jumpstart the governmental response in the meantime, BP agreed to set aside$1 billion for early restoration projects.[343] Three hundred million dollars was distributed to the U.S. Department of the Interior and NOAA for gulf projects. One hundred million dollars was distributed to each federal trustee. Another $500 million were distributed to the five affected gulf states to be allocated evenly between them. The state of Texas, therefore, received up to $100 million from BP to be directed towards early restoration projects.[344]

All funds granted to Texas as a result of this revenue stream are held in the Deepwater Horizon Oil Spill Trust, an escrow account, and their use and distribution is governed by a legal agreement between BP and the trustees.[345] In accordance with the legal agreement, the funds may be transferred to an account specified by the trustees in order to fund early restoration projects.[346] As specified by the agreement, trustees must select projects that: (1) restore, rehabilitate, or replace injured natural resources and (2) address an injury associated with the spill.[347] Examples of projects that meet these criteria include the restoration of dunes, marshes, barrier islands, oyster reefs, wildlife habitats, beaches, and recreational access.[348]

In late January of 2014, a notice of Early Restoration projects was published for comment, including five projects in Texas totaling $18.4 million.[349] The final decision regarding these projects was finalized in the fall of 2014.[350]

National Fish and Wildlife Foundation

In 2013, a federal court approved criminal plea agreements from BP and Transocean arising out of the Deepwater Horizon Oil Spill.[351] As a result of these agreements BP will provide $2.394 billion and Transocean will provide $150 million over the next six years to the Gulf Environmental Benefit Fund at the National Fish and Wildlife Foundation, a congressionally chartered conservation non-profit organization.[352] The National Wildlife Foundation maintains accounts for each affected state and is responsible for allocating and distributing these funds.[353]

The plea agreements designate the amount of funding each affected state will receive and how the funds may be used.[354] Of the $2.544 billion supplied to the Gulf Environmental Benefit Fund, the state of Louisiana will receive $1.272 billion, the states of Alabama, Florida, and Mississippi will receive $356 million each, and the state of Texas will receive $203.5 million.[355] The funds distributed to the state of Texas will be made available from April 2013 to February 2018 in the following increments:[356]

April 2013	$12.6 million
February 2014	$28.2 million
February 2015	$27.1 million
February 2016	$24.0 million
February 2017	$40.0 million
February 2018	$71.5 million
TOTAL	**$203.5 million**

As the National Fish and Wildlife Foundation collects settlement payments, it will work with Texas natural resources agencies (including the Texas Parks and Wildlife Department, the General Land Office, and the Texas Commission for Environmental Quality) to select projects.[357] The chosen projects must: (1) remedy harm and eliminate or reduce the risk of future harm to Gulf natural resources and (2) remedy harm to resources where there has been injury to, destruction of, loss of, or loss of use of those resources due to the spill.[358] In the selection process, coastal habitats, barrier islands, beaches, marshes, coastal bays and estuaries, oysters, fish, bird, marine mammals, and sea turtles will be prioritized above other projects.[359]

In December 2013, the National Fish and Wildlife Foundation allocated $8.8 million for projects in Texas. These funds have subsequently been distributed to the grantees.[360]

The RESTORE Act

On July 6, 2012, Congress signed into law the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies (RESTORE) Act of the gulf states.[361] The RESTORE Act directs 80% of Clean Water Act civil and administrative penalties arising out of the Deepwater Horizon Oil Spill to the Gulf Coast Ecosystem Restoration Trust Fund for the purpose of ecosystem restoration, economic recovery, and tourism promotion in the Gulf Coast region.[362] The primary purpose of the of the RESTORE Act is to channel these fines to mitigation of the impact of the oil spill and increased resilience across the Gulf Coast to future disasters. At some point, the federal courts may determine final penalties, but as of May 2014, total penalties have not been assessed.[363] The funds may be distributed to any coastal zones that border the Gulf, as well as any lands or watersheds within 25 miles of such a coastal zone. In general, all Texas coastal counties are eligible to receive funding.[364]

The RESTORE Act funds are distributed according to a developed RESTORE Act Distribution Formula. In accordance with the formula, 20% of the penalties from the Clean Water Act are distributed into the Oil Spill Liability Trust Fund, a federal account for oil spill costs.[365] The remaining 80% are distributed into the Gulf Coast Ecosystem Restoration Trust Fund in various capacities.[366] This fund is comprised of 5 components, commonly called

"buckets," each with a different use and formula. Thirty-five percent of the funds will be directed to the first bucket, the "Direct Component," to be split evenly among the affected states (Alabama, Florida, Louisiana, Mississippi, and Texas).[367] Thirty percent of the funds will be directed to the "Comprehensive Plan Component" to implement a comprehensive plan organized by the RESTORE Act council.[368] Finally, 30% of the funds will be directed to the "Spill Impact Component" based on a formula that includes oiled shoreline, distance from Deepwater Horizon Rig, and coastal population.[369] The remaining 5% will be allocated and distributed equally between the NOAA's Science Programs and the Centers for Excellence for research at selected institutions in each Gulf state.[370]

The "Direct Component" of the Restoration Trust Fund is the most discretionary component.[371] States, counties, and parishes can generally utilize these funds as they see fit, so long as they can be justified under the broad "eligible activities" requirement. Funds directed into this component may be used for the following activities: (1) restoration and protection of natural resources, (2) mitigation of damage, (3) implementing a federally-approved marine, coastal, or conservation management plan, (4) workforce development and job creation, (5) state park improvements in coastal areas, (6) infrastructure that benefits the economy or ecological resources, (7) coastal flood protection, (8) tourism and seafood promotion, and (9) planning assistance and administration.[372] In addition to these restrictions, the U.S. Treasury must develop regulations to manage and audit funds, as well as oversight requirements.[373] The receipt of the funds is further conditioned on each state submitting to the U.S. Treasury a Multi-Year Implementation Plan prior to the distribution of the monies.[374]

The "Comprehensive Plan Component" of the Restoration Trust Fund corresponds to the creation of the Gulf Coast Ecosystem Restoration Council (RESTORE Council), a council of state-federal representatives established by the RESTORE Act.[375] The RESTORE Act established the governor of Texas as a council member, and the governor may in turn designate a representative to the council.[376] Texas Governor Perry has designated TCEQ Commissioner Toby Baker as Texas' representative.[377] Additional members of the Council include the governors of other affected states, and the Secretaries of the U.S. Department of Commerce, Agriculture, Army, Homeland Security, and the Interior, along with the Administrator of the U.S. EPA.[378] The Secretary of Commerce is the RESTORE Council Chair.[379] The RESTORE Council is tasked with creating a comprehensive plan, identifying projects, approving state plans, as well as additional duties.[380] The RESTORE Council adopted its Initial Comprehensive Plan on August 28, 2013, with the goal of establishing restoration goals, outlining project solicitation and evaluation processes, and discussing the State Expenditure Plan approval process.[381] In the Initial Comprehensive Plan, the RESTORE Council established five restoration goals: (1) restore and conserve habitat, (2) restore water quality, (3) replenish and protect living coastal and marine resources, (4) enhance community resilience, and (5) restore and revitalize the gulf economy.[382] Since the Comprehensive Plan Component is more restrictive than the Direct or Spill Impact Components, the council aims to prioritize projects that restore and protect Gulf natural resources.[383] The RESTORE Council is still developing the process to solicit and review projects.

The funds directed toward the "Spill Impact Component" are divided among gulf states using a formula that takes into account the proportion of shoreline oiled, distance from the Deepwater Horizon rig, and the population of coastal counties.[384] The RESTORE Council, however, has not yet finalized this formula.[385] Texas will receive no less than 5% of the funds

distributed to this component, which may be used for the same types of projects as the Direct Component.[386] As in the Direct Component, the projects must contribute to the economic and ecological recovery of the Gulf and complement the Comprehensive Plan.[387] Furthermore, the state must submit a State Expenditure Plan, which the council must approve in order to receive the monies.[388] The RESTORE Council is still developing the process and procedures for the submission of State Expenditure Plans.[389]

Finally, in addition to the three buckets described above, 2.5% of RESTORE Act funds will be directed to the Gulf Coast Ecosystem Restoration Science Program, where the National Oceanic and Atmospheric Administration will operate a program that may include marine and estuarine research, ecosystem monitoring, ocean observation, data collection, assessments, pilot programs, and cooperative research.[390] Additionally, 2.5% of the Restoration Trust Fund will be directed to the Centers for Excellence Research Grants, in which, through a competitive process, each state will select centers from public or private institutions.to conduct research.[391] The grants will fund science, technology, and monitoring related to: coastal sustainability, restoration, and protection; ecosystems; offshore energy; economic development; and observing, mapping, or monitoring the Gulf.[392]

To effectively implement the RESTORE Act's goals, Governor Perry also recently established the Texas RESTORE Act Advisory Board (TxRAB) and appointed Toby Baker as Chair of the Board.[393] TxRAB members have been tasked with assisting in the development of the required RESTORE Act plans, as well as with providing guidance and counsel regarding the allocation of RESTORE Act funds.[394] In addition to the Governor's Office of Economic Development and Tourism, the following agencies were s elected to serve on TxRAB:[395]

1. Texas Commission on Environmental Quality
2. Texas Comptroller of Public Accounts
3. Texas Department of Agriculture
4. Texas Department of Transportation
5. Texas General Land Office
6. Texas Parks and Wildlife
7. Texas Public Utility Commission of Texas
8. Texas Workforce Commission
9. Texas Railroad Commission
10. Texas Water Development Board

BP State of Texas Agreement

In addition to the funds discussed above, BP agreed in September 2010 to pay the state of Texas $5 million for costs the state incurred due to the spill.[396] The agreement is not tied or

connected to any of the other revenue streams or any existing law.[397] Furthermore, it is not in lieu of any other settlement or litigation.[398] The agreement states that the Office of the Governor has discretion regarding the expenditure of the funds.[399] In September 2010, BP transferred $5 million to the Comptroller of Public Accounts; those funds are now held in General Revenue Account 5149.[400] In September 2013, the Governor's Office granted $1 million to TCEQ to hire a consultant to develop the RESTORE Act state plan.[401]

DISCUSSION AND CHALLENGES

Texas Implementation of National Restorative Programs and Deepwater Horizon Oil Spill Funds

National Resources Damage Assessment

Agency Expenditures

The Texas General Land Office (GLO) reports having received $466,000 in reimbursements through the Natural Resource Damage Assessment (NRDA) for costs to use the agency's equipment during and after the spill. Reimbursements received include amounts for: (1) use of the wildlife husbandry trailer, which was deployed to Gulfport, Mississippi from May 6, 2010 through August 2, 2010; (2) the use of the Wildlife Rehabilitation Trailer, which was deployed to Gulfport, Mississippi from May 6, 2010 through October 7, 2010; (3) the replacement of one generator; (5) the use of a fire boom; and (6) related personnel and travel costs. The agency is still tabulating whether it has outstanding claims eligible for the NRDA reimbursements.[402]

The Texas Parks and Wildlife Department (TPWD) reports total costs from April 4, 2010 through September 30, 2013 of $955,930, which are eligible for reimbursement. TPWD reports most costs are for personnel and other operating costs that occurred working with the NRDA trustees on early restoration activities. The agency has received a reimbursement for most of this and will provide a breakout of total reimbursements received to date and the remaining outstanding amount.[403]

The Texas Commission on Environmental Quality (TCEQ) has been reimbursed $486,476 from BP for expenses incurred through March 31, 2013. In addition, the agency has sent BP a letter of demand for reimbursements related to expenditures incurred through September 30, 2013 for $77,939. There will likely be an additional letter of demand for reimbursement of expenses incurred between October 1, 2013 and March 31, 2014; however, these expenses have not yet been billed to BP so the final amount has not been calculated.[404]

Early Restoration Projects (Awarded)[4]

In May 2014, the following five projects totaling $18,382,688 were offered for approval of NRDA funding:

Galveston Island State Park Beach Redevelopment Project

The proposed Galveston Island State Park Beach Redevelopment Project includes construction of multi-use campsites, tent campsites, beach access boardwalks, an equestrian trailhead, and restroom and shower facilities on the beach side of the park, located on Galveston Island, Texas. The cost of the proposed early restoration project is $10,745,060.[405]

Sea Rim State Park Improvements Project

The proposed Sea Rim State Park Improvements Project includes construction of two wildlife-viewing platforms located at Fence Lake and Willow Pond, one comfort station, and one fish-cleaning shelter within the park located on the upper Texas coast, southwest of Port Arthur. The cost of the proposed early restoration project is $210,100.[406]

Freeport Reef Project

The proposed Freeport Reef Project would replace predesigned concreted pyramids in 120 acres of an existing artificial reef site approximately 6 miles from Freeport, Texas in 55 feet of water. The cost of the proposed early restoration project is $2,155,365.[407]

Matagorda Reef Project

The project would create a new 160-acre artificial reef site approximately 10 miles offshore of Matagorda County, Texas in 60 feet of water. The cost of the proposed early restoration project is $3,486,398.[408]

Ship Reef Project and Corpus Reef Project

The project would enhance fishing and diving opportunities by sinking a 200+ foot long ship to create an artificial reef approximately 60 miles offshore of Galveston, Texas in 135 feet of water. The cost of the proposed early restoration project is $1,785,765, in addition to $3 – 4 million from the TPWD Artificial Reef Program.[409]

If the above Ship Reef Project is logistically not feasible, the project will be replaced with the Corpus Reef Project. The project would place predesigned concrete pyramids in 120 acres of a newly created artificial reef site approximately 11 miles from Packery Channel, near Corpus Christi Bay, Texas in 73 feet of water. The cost of the proposed early restoration project is $1,785,765.

[4] These five projects were approved in the fall of 2014 by the Deepwater Horizon Trustee Council and BP.

National Fish and Wildlife Foundation

Gulf Environmental Benefit Fund Restoration Projects (Awarded) – 2013[410]

Sea Rim State Park Coastal Dune Restoration

The TPWD was awarded $189, 400 in November 2013 for the Sea Rim State Park Coastal Dune Restoration. The project proposes to restore 5.3 miles of dune habitat by placing sand fencing and planting native dune vegetation to trap wind-blown sand and accelerate natural dune recovery. The placing of sand fencing and appropriate signage will also reduce impacts of off-road vehicles on the recovering dune field. Planting dune grass will provide immediate benefits to wildlife often seen using dune habitat at the park, including mottled ducks, marsh hawks, and marlins. The location of the project is in Jefferson County, Texas, approximately 20 miles south of Port Arthur.

Galveston Island State Park Marsh Restoration and Protection

The TPWD was awarded $2,489,200 in November 2013 for the Galveston Island State Park Marsh Restoration and Protection. The project includes two components: creating 30 acres of marsh via dedicated dredging and placement of appropriate sediments within the Carancahua Cove area and engineering and design of rock breakwaters within the Carancahua and Dana Cove areas. The created marsh is expected to provide high-quality habitat for resident and migratory birds in the area as well as for important fish and aquatic invertebrate species. The project is located within the Galveston Island State Park in the back-bay marsh of Galveston Island.

West Galveston Bay Conservation Corridor Habitat Preservation

Scenic Galveston, Inc., partnering with Galveston Bay Estuary Program, Galveston Bay Foundation, and TPWD, was awarded $4,075,000 in November 2013 for the West Galveston Bay Conservation Corridor Habitat Preservation. The project proposes to acquire a permanent easement on a contiguous 3,200 acres tract of estuarine emergent marsh, open water, prairie depressional wetlands and upland prairie habitat. The tract is located within the West Bay Conservation Corridor in close proximity to 6,500 acres of conserved habitat. The growing aggregate of permanently protected properties comprises a habitat corridor complementary to three federal refuge system complexes in the Galveston Bay vicinity. The gently sloped complex provides accommodation space for wetlands to migrate landward as sea levels rise. The project aims to preserve endangered undisturbed habitat in perpetuity for the benefit of twenty bird species of concern and estuarine-dependent fishery species.

Oyster Reef Restoration in East Bay

The TPWD, partnering with Coastal Conservation Association Texas, was awarded $840,000 for the Oyster Reef Restoration in East Bay. The project funding will be utilized to add thirty acres of suitable cultch material to a planner 130-acre reef restoration project at Middle Reef, Pepper Grove, and Hanna's Reef to provide settling substrate for oyster larvae and promote reef growth. Leveraged funds include $2 million from the Coastal Impact assistance Program and

$500,000 from the Coastal Conservation Association. The project is located in the East Bay of the Galveston Bay Estuary.

Gulf Coast Migratory Waterfowl Habitat Enhancement

Ducks Unlimited was awarded $1,250,000 in November 2013 for the Gulf Coast Migratory Waterfowl Habitat Enhancement. The project will create freshwater wetland habitat on private lands in the Texas Chenier Plain and Mid-Coast to address habitat deficits in this important migratory bird region of the coast. The project will establish a minimum of 3,000 additional acres of permanent wetlands and enroll 20,000 acres of agricultural lands to be flooded seasonally to support migratory waterfowl, shorebirds, and waterbirds. Funds will be leveraged with grants from the Natural Resource Conservation Service, U.S. Fish and Wildlife Service and TPWD.

Gulf Environmental Benefit Fund Restoration Projects (Awarded) – 2014[411]

Powderhorn Ranch

The Texas Parks and Wildlife was awarded $34,493,800 in August 2014 for Powderhorn Ranch. Powderhorn Ranch is a contiguous tract of 17,351 acres of coastal property in Calhoun County on Matagorda Bay in the Coastal Bend of Texas that includes more than 11 miles of tidal bay front sheltering near shore sea grass beds and mollusk reefs, thousands of acres of emergent wetlands including extensive tidal marshes, bayous, fresh and intermediate potholes, and wet prairie that support waterfowl, shore and wading birds. Furthermore, the ranch supports thousands of acres of mature live oak forest and tall grass prairie. Texas Parks and Wildlife Department, The Conservation Fund, and The Nature Conservancy have worked closely with the Texas Parks and Wildlife Foundation (TPWF) to combine $15 million in private funds with $20 million in bridge funds to make this $49.5 million project possible with a 3-year commitment of assistance from the National Fish and Wildlife Foundation (NFWF). Eleven million dollars has been awarded in 2014 NFWF funding.

Coastal Heritage Preserve Initiative: Bayside Acquisition and Easement

Artist Boat, Inc. was awarded $,632,500 in November 2014 for Coastal Heritage Preserve Initiative. This project includes the acquisition of 99 acres of critical bayside, barrier island habitat in the West Galveston Bay complex. As part of the larger 360-acre initiative, this project protects and enhances essential breeding, nesting, feeding and cover habitat for numerous avian and aquatic species, including protected migratory and endangered bird species. Sandwiched between canal subdivisions, this project represents a unique opportunity to create in perpetuity a preserve for the rapidly-vanishing barrier island ecosystem.

Virginia Point Shoreline Protection and Marsh Construction

Scenic Galveston, Inc. was awarded $2,000,000 in November 2014. The project will construct over two miles of rock breakwater to protect the 1,500-acre Virginia Point Preserve and restore nearly 25 acres of marsh. The project protects critical habitat and feeding grounds for dozens of species of birds, and estuarine-dependent species including shrimp, red drum and

blue crab. Matching funds are available from a $600,000 CEPRA grant and $1 million CIAP grant.

Oyster Lake Shoreline Protection

The Galveston Bay Foundation was awarded $1,200,000 in November 2014. The project will provide protection of 4,700 feet of fragile shoreline and critical coastal marsh habitat in West Galveston Bay. The project will protect and restore coastal wetlands within Oyster Lake and West Bay. The most critical section of this eroding shoreline has been protected using reefballs, however, the continued erosional loss of shoreline separating Oyster Lake and West Bay has caused the loss of intertidal marsh and this will implement additional shoreline protection. Matching funds are available from a $270,000 CEPRA grant and $80,000 in Galveston Bay Estuary Program funding.

Greens Lake Shoreline Protection and Marsh Construction

Ducks Unlimited, Inc. was awarded $125,000 in November of 2014. The project funding supports the surveying, engineering and design work necessary for protecting, restoring and enhancing Greens Lake wetland habitats located on the northern shore of West Bay. The project focus is to develop project plans for the potential reconstruction of the mouth of Greens Lake, protecting Greens Lake and adjacent ICWW shorelines which will ultimately protect and restore 5100 acres of fragile coastal marsh habitat, sea grass, tidal channels and oyster beds in West Galveston Bay.

Dollar Bay-Moses Lake Shoreline Enhancement and Restoration

The Galveston Bay Foundation was awarded $130,3000 in November 2014. The funding will provide for the engineering and design work necessary to develop project design plans to continue the enhancement and restoration of shorelines and construction of wetlands within the Dollar Bay-Moses Lake complex on the west side of Galveston Bay. The area has lost wetland habitat due to historical subsidence and high erosion rates. The project goal is ultimately protect approximately 4,000 linear feet of shoreline adjacent to the 2,300 acre Nature Conservancy Texas City Prairie Preserve shoreline and 30 acres of adjacent coastal marsh habitat in Dollar Bay.

Egery Flats Marsh Restoration

The Coastal Bend Bays & Estuaries Program was awarded $1,587,000 for Egery Flats Marsh Restoration in November 2014. The project would The project will restore hydrology and reduce salinity to enhance over 600 acres of emergent marsh, submerged aquatic vegetation, and tidal flats at Egery Flats in the Aransas Bay complex. The project is expected to result in 300 acres of restored estuarine marsh habitat . Emergent wetlands would be planted on approximately 10 acres of existing non-vegetated shoreline areas with the proper elevation conditions.

Nueces Bay Rookery Islands Restoration

The Coastal Bend Bays & Estuaries Program was awarded $1,145,500 for the Nueces Bay Rookery Islands Restoration project. The project would restore 3 of Nueces Bay's most utilized rookery islands, located south of Whites Point at the western end of the bay, by adding 1.22 acres and enhancing 4.2 acres of colonial water bird nesting habitat. Island elevations would be increased and shorelines would be expanded utilizing barged gravel, sand, shell and /or clay materials placed upon and adjacent to the islands which have been ringed by erosion control structures.[412]

Anahuac National Wildlife Refuge Coastal Marsh Acquisition

The Conservation Fund was awarded $4,363,200 in Nov. 2014 for this project. The project will protection nearly 2,000 acreage of estuarine emergent wetlands, tidal flats, and coastal habitat in East Galveston Bay through a combination of acquisition and donated easements. The project location is located on Bolivar Peninsula near the Anahuac National Wildlife Refuge and this investment adds to the strategic mosaic of coastal and near-shore habitats where over 100,000 acreage are already protected.

The RESTORE Act

While the RESTORE Act funding has not been disbursed, stakeholder groups have expressed interest in the use and application of these funds. For example, the City of Corpus Christi asserts that focused funding targeting water resource improvements (quality and quantity) is the best investment that RESTORE Act funds can be applied to in order to help accomplish the admirable environmental and economic resiliency and sustainability goals of Deepwater Horizon restoration.[413] Similarly, the R Street Institute's Policy Study No. 13 embraces several key elements of the RESTORE Act, including localism, controlling the growth of government, and a pro-growth, pro-environmental emphasis. Further, the R Street Institute recommends that adherence to several principles will result in an implementation process that is faithful to the intent of the RESTORE Act and provides sound economic value.[414] Such principles include:

- Projects should aim to provide public goods or at least remedy market failures by providing public goods like infrastructure under a cost benefit analysis;
- Projects should have a direct and tangible connection to the areas impacted by the spill;[415]
- Projects should demonstrate specifically how they qualify as increasing economic sustainability by either reducing future economic costs or improving incentives for households and firms in making future decisions;[416]
- Projects that mitigate or ameliorate damage should be prioritized;[417]
- Projects should be justifiable on sound economic grounds measured here by the value created for citizens and taxpayers, not the number of jobs created; and[418]

- The decision-making and implementation process should be completely transparent.[419]

BP Agreement

As of August 31, 2013, the General Revenue Account, BP Oil Spill Texas Response Grant Fund had a balance of $5,085,745.67. The account earned $20,871.63 in interest during the 2013 state fiscal year. Plans are underway for the development of a Texas website to provide information regarding the RESTORE Act, and to assist with the submission of proposed projects by the public. Some of the funds received from BP will be used to develop the website and to set up a grant program to help restore the ecosystems and economy of the Texas Gulf Coast.[420]As of the hearing on May 21st, the TCEQ reported expenses of $22,207 on in-state and out-of-state travel to attend meetings related to the RESTORE Act, and the TCEQ had received $1 million from the Governor under the BP Agreement for these RESTORE Act travel expenses, as well as further work on development of the website.

Challenges of National Restorative Programs and Deepwater Horizon Oil Spill Funds

At the hearing on May 21st, several challenges were presented which related to the future of the revenue streams. Primarily, the funds available through the NRDA and the NFWF are available currently, while the amount of funds available through the RESTORE Act is indeterminable at this time given the ongoing legal proceedings and negotiations of the proposed rules.

In addition, the state is in flux as it strives to organize, manage, and distribute the available monies to appropriate projects. Effective restoration of the coastline requires the state to actively solicit RESTORE Act-funded project suggestions based upon public input. To this end, representatives of the state, acting as members of TxRAB, are conducting listening session along the coast seeking public input.[421] They are working to develop a framework document with the goal of highlighting the value of Texas' coast and outlining the state's efforts to implement the RESTORE Act effectively.[422] Furthermore, the TCEQ has activated a website under the domain name "restorethetexascoast.org" to provide information to the public on activities associated with Texas' response to the Deepwater Horizon spill.[423] Specifically, the website should supply the public with relevant funding opportunities as well as facilitate the state's ability to accept project suggestions.[424]

Lastly, the successful implementation of the RESTORE Act requires the state to establish procedures to efficiently accept, review, approve, and manage grants funded with the use of the RESTORE monies.[425] Simultaneously, the state must continue to communicate with various entities, including the Office of Attorney General, to ensure that Texas' interest are properly considered and addressed.[426]

RECOMMENDATIONS

Continue to monitor the progress and recommendations of the oversight agencies regarding the function and administration of the funds provided to the state in relation to the 2010 Deepwater Horizon Oil Spill.

Enhance legislative participation through the appointment of legislative members to certain governor created and appointed councils.

Increase transparency through implementation of reporting requirements of the distribution and receipt of the funds provided to the state in relation to the 2010 Deepwater Horizon Oil Spill.

ENDNOTES

[1] *Edwards Aquifer Authority v. Day*, 369 S.W.3d 814 (Tex. 2012).

[2] TEX. CONST. ART. XVI, § 59.

[3] Consistent with the holding in *City of Corpus Christi v. City of Pleasanton*, 276 S.W.2d 798, 803 (Tex. 1955).

[4] Previously explained as the legislature's duty "to pass all laws necessary to protect, enhance, and preserve natural resources of the state, including its groundwater." Oral and Written Testimony of Edmond R. McCarthy, Jr., Jackson, Sjoberg, McCarthy & Wilson, L.L.P., Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, April 15, 2010.

[5] Formerly recognized under *Sipriano v. Great Spring Waters of America*, 1 S.W.3d 75, 79 (Tex. 1999); *see* TEXAS WATER

CODE § 36.0015.

[6] See Edwards Authority Act….., which provided for the 1995 ??? adjudication of groundwater rights in the Edwards Aquifer region.

[7] Texas Water Development Board, http://www.twdb.state.tx.us/groundwater/index.asp.

[8] Oral and Written Testimony of Robert Mace, Texas Water Development Board, Public

Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June

25, 2014.

[9] More information on the TCEQ involvement in groundwater management can be found in a previous report to the 82nd Texas Legislature, Texas House of Representatives Committee on Natural Resources, December 2010.

[10] Email from Isaac Jackson, Legislative Liaison, Texas Commission on Environmenatl Quality, to Elizabeth Fazio, Committee Director, House Committee on Natural Resources (Dec. 11, 2014 (9:43 AM CST).

[11] Oral and Written Testimony of William Hutchison, Professional Engineer and Professional Geoscientist, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[12] *Id.*

[13] Oral and Written Testimony of Doug Wierman, Professional Geoscientist, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[14] *Id.*

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[16] Oral and Written Testimony of William Hutchison, Professional Engineer and Professional Geoscientist, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[17] *Id.*

[18] *Id.*

[19] *Id.*

[20] *Id.*

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[22] Oral and Written Testimony of Greg M. Ellis, Attorney, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[23] *Id.*

[24] *Id.*

[25] *Id.*

[26] *Id.*

[27] *Id.*

[28] *Id.*

[29] Oral and Written Testimony of Tim Andruss, General Manger, Victoria County Groundwater Conservation District, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[30] Oral and Written Testimony of Kody Bessent, Legislative Affairs Director, High Plains Groundwater Conservation District, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

[31] Oral and Written Testimony of C.E. Williams, General Manger, Panhandle Groundwater Conservation District, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[32] *Id.*

[33] *Id.*

[34] *Id.*

[35] *Id.*

[36] Oral and Written Testimony of Greg M. Ellis, Attorney, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[37] *Id.*

[38] *Id.*

[39] *Id.*

[40] Oral and Written Testimony of Stacey Steinbach, Executive Director, Texas Alliance of Groundwater Districts, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[41] *Id.*

[42] *Id.*

[43] *Id.*

[44] Oral and Written Testimony of Greg M. Ellis, Attorney, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[45] Oral and Written Testimony of Kathy Jones, General Manager, Lone Star Groundwater Conservation District, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[46] *Id.*

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[48] *Id.*

[49] *Id.*

[50] *Id.*

[51] *Id.*

[52] *Id.*

[53] *Id.*

[54] *Id.*

[55] *Id.*

[56] *Id.*

[57] *Id.*

[58] *Id.*

[59] *Id.*

[60] *Id.*

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[62] *Id.*

[63] Oral and Written Testimony of Steve Kosub, Senior Water Resources Counsel, San Antonio Water System, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

[64] *Id.*

[65] *Id.*

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[67] Oral and Written Testimony of Greg M. Ellis, Attorney, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[68] Oral and Written Testimony of Kody Bessent, Legislative Affairs Director, High Plains Groundwater Conservation District, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin,

Texas, June 25, 2014.

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[70] *Id.*

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[74] Oral and Written Testimony of Greg M. Ellis, Attorney, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[75] *Id.*

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[78] *Id.*

[79] Oral and Written Testimony of Dee Vaughan, Board Member, Corn Producers Association of Texas, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

[80] *Id.*

[81] *Id.*

[82] *Id.*

[83] *Id.*

[84] Oral and Written Testimony of Dee Vaughan, Board Member, Corn Producers Association of Texas, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

[85] Oral and Written Testimony of Greg M. Ellis, Attorney, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

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[89] *Id.*

[90] Oral and Written Testimony of Russell S. Johnson, McGinnis, Lochridge & Kilgore L.L.P., Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[91] Oral and Written Testimony of Dirk Aaron, General Manger, Clearwater Underground Water Conservation District, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

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[93] *Id.*

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[98] *Id.*Oral and Written Testimony of Steve Kosub, Senior Water Resources Counsel, San Antonio Water System, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

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[100] *Id.*

[101] *Id.*

[102] *Id.*

[103] *Id.*

[104] *Id.*

[105] *Id.*

[106] *Id.*

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[108] Oral and Written Testimony of Roland Ruiz, General Manager, Edwards Aquifer Authority, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

[109] *Id.*

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[111] *Id.*

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[113] Oral and Written Testimony of Billy Howe, State Legislative Director, Texas Farm Bureau, Public Hearing,

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[114] Mike V. Powell (2006), *Texas Groundwater Conservation Districts from the Landowner's Perspective.*

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[117] *Id.*

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[119] Oral and Written Testimony of Joe Cooper, General Manger, Lost Pines Groundwater Conservation District, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

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[131] *Id.*

[132] Oral and Written Testimony of Greg Sengelmann, General Manager, Gonzales County Underground Water District, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

[133] Oral and Written Testimony of Russell S. Johnson, McGinnis, Lochridge & Kilgore L.L.P., Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

[134] *Id.*

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[137] *Id.*

[138] *Id.*

[139] Oral and Written Testimony of Roland Ruiz, General Manager, Edwards Aquifer Authority, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

[140] Oral and Written Testimony of Greg M. Ellis, Attorney, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

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[142] Oral and Written Testimony of Ed McCarthy, Partner, Jackson, Sjoberg, McCarthy & Townsend, LLP, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

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[150] *Id.*

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[154] *Id.*

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[165] *Id.*

[166] *Id.*

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[188] Oral and Written Testimony of Greg M. Ellis, Attorney, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas June 25, 2014.

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[190] *Id.*

[191] *Id.*

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[193] *Id.*

[194] *Id.*

[195] *Id.*

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[201] *Id.*

[202] *Id.*

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[229] Oral and Written Testimony of Alan McWilliams, Director of Uplands Surface Leasing, General Land Office, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

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[231] Written Testimony of Rusty Ray, Public Affairs Specialist, Texas State Soil and Water Conservation Board, Public Hearing, Texas House of Representatives Committee on Natural Resources, Austin, Texas, June 25, 2014.

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[242] *Id.*

[243] *Id.*

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[249] *Id.*

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