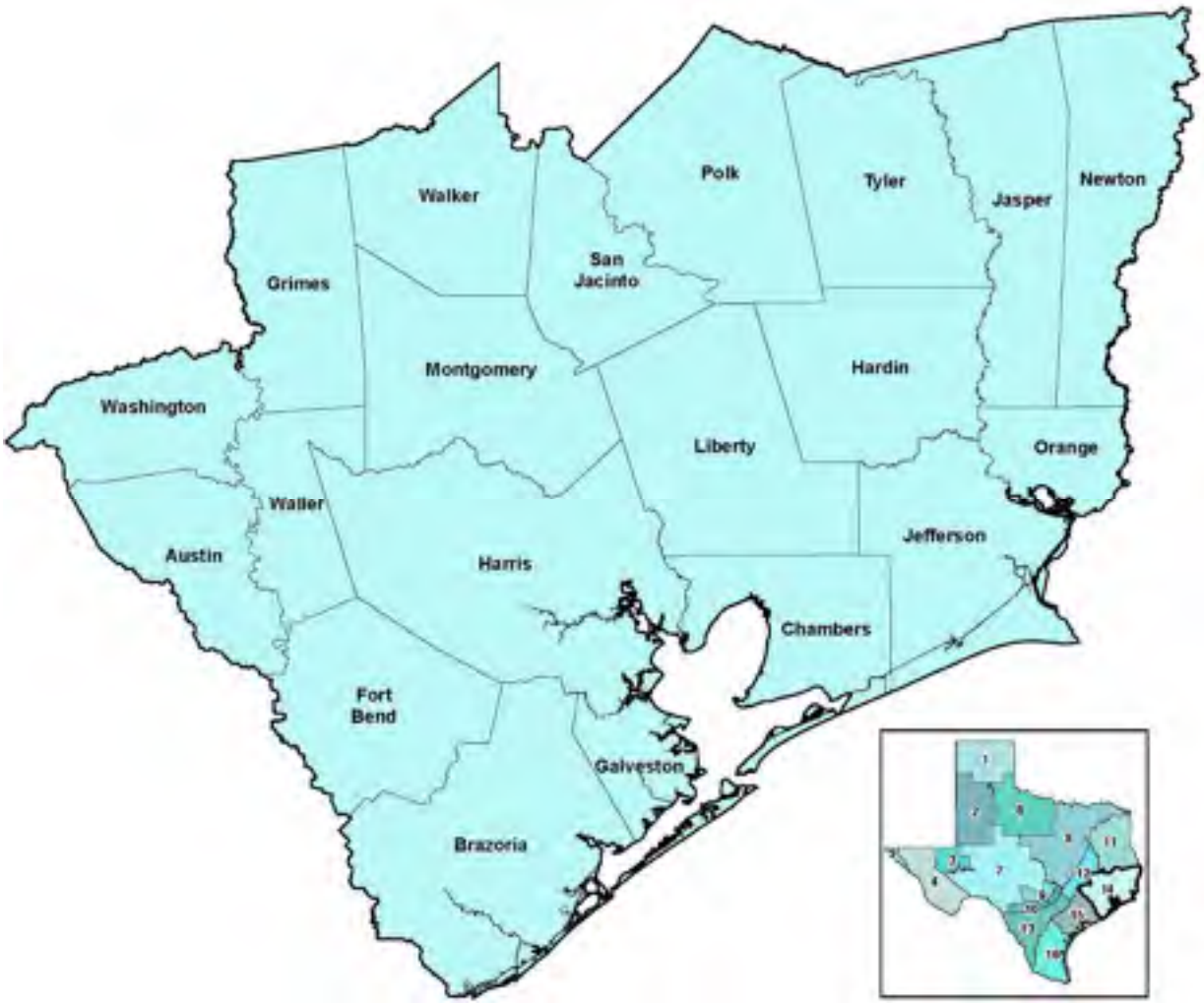

Desired Future Conditions Explanatory Report

Prepared by Groundwater Management Area 14

With assistance from

Mullican & Associates
Freese and Nichols, Inc.

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1.0 EXECUTIVE SUMMARY

District Representatives in Groundwater Management Area 14 ("GMA 14") developed this Explanatory Report as part of the requirements included in Texas Water Code Section 36.108, as part of the joint-planning process for the current round of joint planning (September 1, 2010 – May 1, 2016). This GMA 14 Explanatory Report contains two main elements required in statute for the joint-planning process: the desired future conditions ("DFCs") statement for all relevant aquifers that was adopted by District Representatives for GMA 14 during a regularly scheduled meeting on April 29, 2016, and documentation of all data, analyses, and supporting materials including policy and technical issues considered by the District Representatives of GMA 14 from July 26, 2013, through April 29, 2016 All required considerations included in Texas Water Code Section 36.108 (d)(1-9) are included in this GMA 14 Explanatory Report.

The Texas Water Development Board ("TWDB") has made available an "Explanatory Report Checklist," which it uses to determine administrative completeness with respect to the requirements of statute and administrative rules. To facilitate this review by the TWDB, a populated Explanatory Report Checklist is included in *Appendix A*.

Groundwater conservation districts ("GCDs") located within a groundwater management area are required to meet at least annually to jointly review each other's management plans and consider proposals to adopt new or amended DFCs (Texas Water Code Section 36.108(c)). A DFC is "the desired, quantified condition of groundwater resources (such as water levels, spring flows, or volume) within a management area at one or more specific future times as defined by participating groundwater conservation districts within a groundwater management area as part of a joint-planning process." (31 Texas Administrative Code Section 356.10(6))

The TWDB designated the Northern Gulf Coast Aquifer System, made up of the Chicot Aquifer, the Evangeline Aquifer, the Burkeville Confining Unit, and the Jasper Aquifer, along with small portions of other major and minor aquifers, as GMA 14 (Figure 2-1). Included within GMA 14 are the following counties and GCDs:

Districts	Counties
Bluebonnet GCD	Austin
	Grimes
	Walker
	Waller
Brazoria County GCD	Brazoria
Lone Star GCD	Montgomery
Lower Trinity GCD	Polk
	San Jacinto
Southeast Texas GCD	Hardin
	Jasper
	Newton
	Tyler
Other	
Fort Bend Subsidence District	Fort Bend
Harris-Galveston Subsidence District	Galveston
	Harris
No district	
	Chambers
	Jefferson
	Liberty
	Orange
	Washington

GMA 14 District Representatives first adopted DFCs in 2009. The GCDs in GMA 14 are required to adopt proposed 2016 DFCs before May 1, 2016. The District Representatives began joint-planning meetings focused on the review and adoption of updated DFCs in April of 2013, and held an additional ten meetings to develop proposed DFCs for each relevant aquifer in GMA 14. At their June 24, 2015, meeting, the District Representatives unanimously adopted the "RESOLUTION FOR THE APPROVAL OF PROPOSED DESIRED FUTURE CONDITIONS FOR ALL AQUIFERS IN GROUNDWATER MANAGEMENT AREA 14." The Resolution, along with supporting materials considered prior to adoption of the Resolution, was submitted to the individual GCDs on July 6, 2015. All of the Districts subsequently posted the public notices for individual GCD public hearings on the proposed DFCs as required by Texas Government Code Chapter 551 and by Texas Water Code Section 36.108(e). Copies of the public notices given for all required public hearings are contained in *Appendix B*. Subsequently, at their April 29, 2016, meeting, the District Representatives adopted the "RESOLUTION FOR THE APPROVAL OF DESIRED FUTURE CONDITIONS FOR ALL AQUIFERS IN GROUNDWATER MANAGEMENT AREA 14."

This Explanatory Report documents that the District Representatives in GMA 14 have considered all of the elements required by Texas Water Code Section 36.108(d-3) in establishing the 2016 DFCs by:

(1) identifying each desired future condition;

(2) providing the policy and technical justifications for each desired future condition;

(3) documenting that the factors under Texas Water Code Section 36.108(d) were considered by the districts along with how the adopted desired future conditions impact each factor;

(4) listing other desired future condition options considered, if any, and the reasons why those options were not adopted; and

(5) discussing reasons why recommendations made by any advisory committee and relevant public comments received by the districts were or were not incorporated into the desired future conditions.

The primary tools for analyzing groundwater conditions and for groundwater management are computer simulations or models. Computer models are the preferred means of assessing the effects of past, current, and future pumping and droughts on groundwater availability. Modeling involves developing and using computer programs to estimate future trends in the amount of water available in an aquifer and is based on hydrogeologic principles, actual aquifer measurements, and stakeholder guidance. In correspondence dated February 18, 2014, the TWDB formally approved the updated Houston Area Groundwater Model[1] ("HAGM") as the official Groundwater Availability Model ("GAM") for the Northern Segment of the Gulf Coast Aquifer System[2] ("Northern Gulf Coast Aquifer GAM") (*Appendix C*). The 2016 DFCs adopted are the result, in part, of the modeling prepared by the GMA's consultants using the updated Northern Gulf Coast Aquifer GAM.

Texas Water Code Section 36.108(d) requires GCDs to consider eight factors and other relevant information before adopting proposed DFCs and to prepare a report documenting that the factors were considered. The eight factors are discussed below.

[1] Kasmarek, M.C., 2012, Hydrogeology and simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast Aquifer System, Texas, 1891–2009 (ver. 1.1, December 2013): U.S. Geological Survey Scientific Investigations Report 2012–5154, 55 p., http://dx.doi.org/sir20125154; and Freese and Nichols, 2013, "Regional Groundwater Update Project – Final Report," *for* Harris-Galveston Subsidence District, Fort Bend Subsidence District, and Lone Star Groundwater Conservation District, http://hgsubsidence.org/wp-content/uploads/2013/07/Regional_Groundwater_Update_Project-Report-6-2013.pdf, 24 p.

[2] https://www.twdb.texas.gov/groundwater/models/gam/glfc_n/glfc_n.asp

1. AQUIFER USES AND CONDITIONS

The Gulf Coast Aquifer System is a predominant source of water for all of GMA 14. Groundwater data was obtained from the TWDB, which maintains records and reports of groundwater use, water wells, and other relevant data. The District Representatives received presentations from its technical consultants of the modeled effects of the adopted DFCs on existing aquifer uses and conditions.

2. WATER SUPPLY NEEDS AND WATER MANAGEMENT STRATEGIES

The District Representatives considered the water supply needs (the amount of projected water demand beyond existing supplies) and water management strategies (new water supplies to meet water supply needs) for GMA 14. Specifically, information on water supply needs and water management strategies from the 2011 Regional Water Plans and the 2012 State Water Plan was considered. GMA 14 includes parts of Regional Water Planning Areas G (Brazos), H, and I (East Texas). The reports show most future water supplies will be from sources other than groundwater.

3. HYDROLOGIC CONDITIONS

The District Representatives considered presentations and reports on the total estimated recoverable storage ("TERS"), average annual recharge, inflows and discharge. After the District Representatives began the work for the 2016 DFCs, the TWDB provided the TERS numbers for GMA 14, a required consideration in establishing the DFCs. TERS is the estimated amount of groundwater within an aquifer that accounts for recoverable storage scenarios that range between 25 percent and 75 percent of the porosity-adjusted aquifer volume. The District Representatives also considered potentiometric surface contour maps showing the current aquifer/hydrologic conditions. All of this information was used to set the adopted DFCs.

4. ENVIRONMENTAL FACTORS

The District Representatives considered the potential impacts by the DFC options on environmental factors such as spring flow and other interactions between groundwater and surface water. Available information from the models and other technical resources were presented. The District Representatives determined there are limited interactions between the aquifer systems as a whole and surface water within the region encompassing GMA 14.

5. SUBSIDENCE

Subsidence is a major factor in GMA 14. The GMA 14 consultants spent considerable time and effort to evaluate potential impacts by the DFCs on subsidence. The only means of preventing subsidence is stabilizing groundwater levels throughout the Gulf Coast Aquifer

System. The District Representatives concluded that the only means of stabilizing groundwater levels is to limit groundwater production.

6. SOCIOECONOMIC IMPACTS

The District Representatives considered the socioeconomic impact analysis provided by the TWDB to Water Planning Regions G, H, and I, for the 2011 Regional Water Plans. In addition, GMA 14 reviewed the socioeconomic impact data used by the Subsidence Districts in formulating their Regulatory Plans. While there are economic impacts to limiting groundwater production, the negative socioeconomic impacts of lower water quality, higher groundwater production costs and subsidence support the adopted DFCs.

7. PRIVATE PROPERTY RIGHTS

The District Representatives in GMA 14 extensively considered the potential effects of the DFCs on the interests and rights in private property. It was recognized that there are many property owners competing to pump groundwater and that excessive withdrawals can cause land subsidence, increased pumpage costs, and the lowering of water tables. District representatives reported individually on the impacts of the DFCs on private property rights and how GCD Management Plans and Rules have been developed to protect private property rights.

8. FEASIBILITY OF ACHIEVING THE DFCs

The District Representatives considered groundwater modeling and information about historic use, current and projected supplies, projected water demands, and applicable rules, regulations, and laws to determine that the DFCs are feasible. The GCDs and Subsidence Districts have adequate authority to implement regulations necessary to achieve the adopted DFCs.

9. OTHER RELEVANT INFORMATION

The GMA 14 District Representatives considered other material and relevant information as reflected in the materials contained in this Explanatory Report.

CONCLUSION

The District Representatives in GMA 14 have extensively reviewed and evaluated the adopted 2016 DFCs and determined that they are reasonable.

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2.0 INTRODUCTION AND FUNDAMENTALS OF THE JOINT-PLANNING PROCESS

In Texas, the legislature has declared groundwater conservation districts ("GCDs") as the preferred method of groundwater management.[3] Local GCDs are required to manage, preserve, and protect the groundwater resources within their jurisdiction pursuant to their statutory powers and duties as set forth in Chapter 36 of the Texas Water Code and their respective enabling legislation. In 2005, the Texas Legislature passed legislation that created a joint-planning process by which GCDs located within a groundwater management area must conduct joint planning to develop Desired Future Conditions ("DFCs"). These DFCs describe how the GCDs in the management area want the groundwater resources of the region to look in the future. GCDs are statutorily obligated to regulate the production of groundwater on a long-term basis to achieve the DFCs for the applicable aquifer so that water is available for future generations of existing and new users.[4]

A groundwater management area ("GMA") is a geographic area designated and delineated by the Texas Water Development Board ("TWDB") under Chapter 35 of the Texas Water Code as an area suitable for management of groundwater resources.[5] The TWDB designated a total of sixteen (16) GMAs, which together cover the entire State of Texas. The TWDB designated the area encompassing all of Austin, Brazoria, Chambers, Fort Bend, Galveston, Grimes, Hardin, Harris, Jasper, Jefferson, Liberty, Montgomery, Newton, Orange, Polk, San Jacinto, Tyler, Walker, Waller, and Washington counties as Groundwater Management Area No. 14 ("GMA 14").[6] GMA 14 is located along the Upper Texas Gulf Coast, and groundwater management efforts for GMA 14 are primarily focused on the Gulf Coast Aquifer System.

The Bluebonnet Groundwater Conservation District (Austin, Grimes, Walker, and Waller counties), Brazoria County Groundwater Conservation District (Brazoria County), Lone Star Groundwater Conservation District (Montgomery County), Lower Trinity Groundwater Conservation District (Polk and San Jacinto counties), and Southeast Texas Groundwater Conservation District (Hardin, Jasper, Newton, and Tyler counties) are GCDs located wholly in

[3] TEX. WATER CODE § 35.0015 (West 2015).
[4] TEX. WATER CODE § 36.1132. *Compare* Act of May 30, 1993, 73rd Leg., R.S., ch. 626, 1993 Tex. Gen. Laws 2350, as amended, and TEX. WATER CODE Ch. 36.
[5] TEX. WATER CODE § 35.004(a), Act of May 23, 2005, 79th Leg., R.S., ch. 970, 2005 Tex. Gen. Laws 3247.
[6] One small change to the GMA 12 and GMA 14 boundaries was made by the TWDB during the current round of joint-planning in that the small portion of Brazos County originally assigned to GMA 14 was moved to GMA 12, so that all of Brazos Valley GCD is now located in GMA 12. *See* TWDB correspondence from Kevin Patteson, Executive Administrator to Alan Day, General Manager, Brazos Valley GCD, dated November 25, 2013.

the boundaries of GMA 14 (see Figure 2.1). As required by Chapter 36 of the Texas Water Code, and further described herein, these GCDs have engaged in joint planning and, in that regard, have adopted DFCs for the groundwater resources underlying GMA 14. The Fort Bend Subsidence District (Fort Bend County) and Harris-Galveston Subsidence District (Harris and Galveston counties), special districts created by the Texas Legislature to regulate groundwater withdrawals for the purpose of preventing land subsidence, and other stakeholders within GMA 14 from Chambers and Washington counties also contributed to the joint-planning process. These stakeholders participated in an unofficial role to aid in the development of the DFCs by providing the District Representatives in GMA 14 important information and data relevant to their respective counties that are otherwise not represented by the GCDs in the GMA joint-planning process.

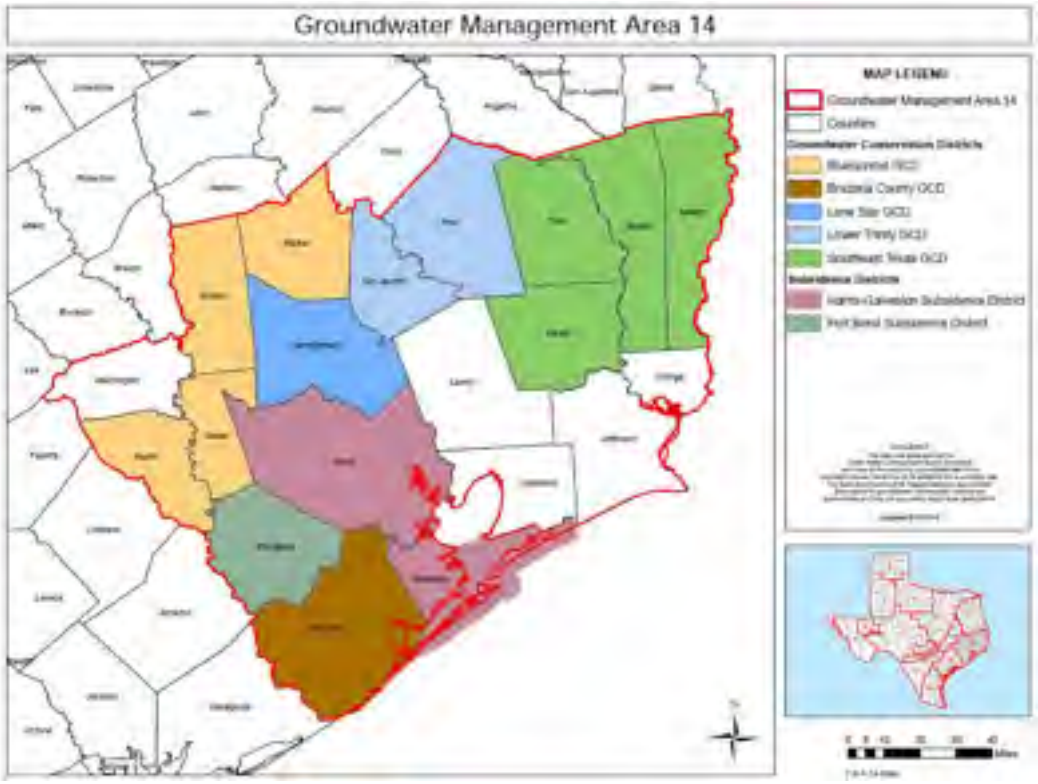

Figure 2-1 – Map illustrating GMA 14 boundary, counties, groundwater conservation districts, and subsidence districts[7]

The joint-planning process for coordination of groundwater management activities by GCDs was first amended by the Texas Legislature to include the requirement to establish DFCs with the passage of House Bill ("HB") 1763 in 2005.[8] HB 1763 amended Chapter 36, Texas

[7] Source TWDB: See http://www.twdb.texas.gov/groundwater/management_areas/maps/GMA14_GCD.pdf.
[8] Act of May 24, 2005, 79th Leg., R.S., ch. 970, 2005 Tex. Gen. Laws 3247.

Water Code, to require representatives of GCDs located within a GMA to meet and adopt DFCs for the aquifers underlying the GMA no later than September 1, 2010, and every five years thereafter.[9] After the first round of DFCs were adopted by the initial 2010 deadline, the joint-planning process was significantly expanded with the passage of Senate Bill ("SB") 660 in 2011.[10] In order to allow GCDs more time to meet the new statutory requirements established by SB 660, and to allow for the completion of several major GAM updates, the deadline for adopting proposed DFCs for the second round of joint-planning was extended to May 1, 2016, by the passage of Senate Bill 1282 in 2013.[11]

Texas Water Code Section 36.108 provides the current requirements applicable to this second round of joint planning and DFC development. As set forth in the statute, representatives from each GCD within the same GMA are required to meet as a committee, at least annually, to consider each other's groundwater management plans, accomplishments in the GMA, and proposals to adopt new or amend existing DFCs. At least every five years, the GCD representatives must meet to consider groundwater availability models and other data and information for the GMA and propose for adoption DFCs for the relevant aquifers within the GMA.[12]

In developing proposed DFCs, the GCDs must consider nine statutory factors: (1) the aquifer's uses or conditions within the management area, including conditions that differ substantially from one geographic area to another; (2) the water supply needs and water management strategies included in the state water plan; (3) hydrogeological conditions; (4) other environmental impacts such as spring flow and other interactions between groundwater and surface water; (5) the impact on subsidence; (6) socioeconomic impacts reasonably expected to occur; (7) the impact on the interests and rights in private property; (8) the feasibility of achieving the DFC; and (9) any other relevant information.[13] After consideration of these factors, the representatives of the GCDs in the GMA ("District Representatives") must approve by a two-thirds vote proposed DFCs.[14]. The proposed DFCs must provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and preventing of waste of groundwater and control of subsidence in the GMA.[15]

[9] TEX. WATER CODE ANN. § 36.108(c)–(d-1) (West 2010).
[10] Act of May 29, 2011, 82nd Leg., R.S., ch. 1233, 2011 Tex. Gen. Laws 3287
[11] Act of May 20, 2013, 83rd Leg., R.S., ch. 786, § 1, 2013 Tex. Gen. Laws 2001 (codified at TEX. WATER CODE § 36.108(d-5)).
[12] TEX. WATER CODE ANN. § 36.108(c),(d) (West 2015).
[13] § 36.108(d)(1-9).
[14] § 36.108(d-5).
[15] § 36.108(d-2).

Once approved by the District Representatives in the joint-planning committee, the proposed DFCs are sent to the individual GCDs within the GMA, and a 90-day public comment period begins.[16] During the 90-day public comment period, each GCD is required to hold a public hearing on any proposed DFCs relevant to that GCD.[17] After the public hearing, each GCD is required to compile for consideration at the next joint-planning meeting a summary of the relevant comments received, suggested revisions to the proposed DFCs, and the basis for the suggested revisions.[18] The joint-planning committee is required to reconvene to review the summary reports prepared by the GCDs, consider proposed changes to the DFCs, and finally adopt DFCs by a two-thirds vote of all the District Representatives in the GMA.[19] Upon final adoption, the joint-planning committee is required to prepare and submit an Explanatory Report to the TWDB and the individual GCDs. [20]

This joint-planning process established by HB 1763 in 2005 and amended by SB 660 in 2011 is a public, transparent process, where all planning decisions are made in open, publicly noticed meetings in accordance with provisions of Texas Water Code Chapter 36. GMA 14 began this joint-planning process in 2010. Over the course of several years, the District Representatives in GMA 14 held multiple joint-planning meetings, and in a coordinated effort to manage the groundwater resources, adopted DFCs for the relevant aquifers in GMA 14. A timeline of the GMA 14 joint-planning process and significant events, including but not limited to the development of the updated groundwater availability model, the consideration of model run results, the consideration of information applicable to each of the statutory factors, the approval of proposed DFCs, the public comment period, and the adoption of DFCs, is provided in *Appendix D*.

This Explanatory Report provides an official record demonstrating compliance with all statutory requirements applicable to the joint-planning process and the adoption of DFCs. As part of this Explanatory Report, documentation of all meetings conducted by the joint-planning committee and the individual GCDs in GMA 14, including duly posted GMA 14 meeting agendas, approved GMA 14 meeting minutes, individual GCD public hearing notices, and individual GCD meeting minutes documenting individual public hearings, is included in *Appendix B*. This documentation establishes that through appointed District Representatives, the GCDs in GMA 14 participated in joint planning and held multiple joint-planning committee meetings over the course of several years to develop DFCs as required by statute. As described in the agendas and meeting minutes, the GCDs considered the statutory criteria required prior

[16] § 36.108(d-2).
[17] § 36.108(d-2).
[18] § 36.108(d-2).
[19] § 36.108(d-3).
[20] § 36.108(d-3).

to the adoption of proposed DFCs, and properly adopted proposed DFCs in accordance with procedural requirements.[21] Upon receipt of the proposed DFCs, the individual GCDs properly provided a 90-day public comment period and held hearings as evidenced by the public hearing notices and minutes.

Also, as part of the record included in this Explanatory Report by reference, are the five individual GCD Summary Reports prepared and presented at the October 28, 2015, GMA 14 joint-planning meeting. These Summary Reports contain documentation of all public comments received by the individual GCDs at each of the five public hearings on the proposed DFCs, along with any recommendations for changes to the proposed DFCs offered by the individual GCDs that were considered by the GMA 14 joint-planning committee.[22] On April 29, 2016, the District Representatives adopted DFCs for the groundwater resources in GMA 14, as further described in Section 3.0 of this Explanatory Report.

[21] The District Representatives also adopted an administrative procedural process consistent with Chapter 36, Texas Water Code, including the procedural requirements currently in place under Section 36.108, for the consideration, proposal, and adoption of DFCs to ensure the development of a clear administrative record that not only supports the DFCs ultimately adopted, but also addresses any DFCs considered but not adopted, in a manner that is sufficient for inclusion in this Explanatory Report as required by Texas Water Code Section 36.108(d-3). See *Appendix T* for administrative procedures adopted by GMA 14 District Representatives.

[22] These Summary Reports are available by request from each of the GCDs in GMA 14, but are not physically included in this Explanatory Report due to the combined length of each report (in excess of 1,000 pages). To request a specific Summary Report, please request from the individual GCD General Manager.

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3.0 GMA 14 DESIRED FUTURE CONDITIONS

The following Statements of Desired Future Conditions is excerpted from GMA 14 Resolution2016-01-01. The resolution in its entirety is presented in *Appendix E*. This resolution was adopted by GMA 14 District Representatives, after providing notice as required, on April 29, 2016. GMA 14 DFCs are based on model results utilizing the updated Northern Gulf Coast Aquifer Groundwater Availability Model (Northern Gulf Coast GAM), which was designated by TWDB as the official model of record for GMA 14 (Appendix C). GMA 14 utilized predictions of pumping contained in a predictive simulation referred to as Northern Gulf Coast GAM Run 2. All technical guidance necessary to review and reproduce the Northern Gulf Coast GAM Run 2 is included in Appendix F.

3.1 FORMATIONS OF THE GULF COAST AQUIFER

DFCs for the Gulf Coast Aquifer System adopted by GMA 14, as documented by and incorporating herein Northern Gulf Coast GAM Run 2, at two scales, which do not differ substantively in their application: the first being for GMA 14 in its entirety; the second being to better facilitate the management and conservation of groundwater resources at the individual GCD level, after considering the statutory criteria set forth under Texas Water Code Section 36.108(d), on a county-by-county basis. DFCs for GMA 14 for the Gulf Coast Aquifer System are as follows:

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 28.3 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 23.6 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 18.5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 66.2 feet after 61 years.

3.1.1 Austin County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 23 feet after 61 years.

- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 76 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Austin County should not exceed approximately 2.83 feet by the year 2070.

3.1.2 Brazoria County (BCGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 27 feet after 61 years.

3.1.3 Chambers County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 32 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 30 feet after 61 years.

3.1.4 Grimes County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 6 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 52 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Grimes County should not exceed approximately 0.12 feet by the year 2070.

3.1.5 Hardin County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 21 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 27 feet after 61 years.

- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 29 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 89 feet after 61 years.

3.1.6 Jasper County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 41 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 46 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 40 feet after 61 years.

3.1.7 Jefferson County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 15 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 17 feet after 61 years.

3.1.8 Liberty County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 27 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 29 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 25 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 120 feet after 61 years.

3.1.9 Montgomery County (LSGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 26 feet after 61 years.

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 34 feet after 61 years.

3.1.10 Newton County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 35 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 45 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 44 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 37 feet after 61 years.

3.1.11 Orange County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 14 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 16 feet after 61 years.

3.1.12 Polk County (LTGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 26 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 10 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 15 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 73 feet after 61 years.

3.1.13 San Jacinto County (LTGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 22 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 19 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 19 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 108 feet after 61 years.

3.1.14 Tyler County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 35 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 30 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 62 feet after 61 years.

3.1.15 Walker County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 9 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Walker County should not exceed approximately 0.04 feet by the year 2070.

3.1.16 Waller County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 39 feet after 61 years.

- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 40 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 101 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Waller County should not exceed approximately 4.73 feet by the year 2070.

3.1.17 Washington County

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 1 foot after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 16 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 48 feet after 61 years.

3.1.18 Formations in Fort bend, Galveston, and Harris Counties

GMA 14 efforts to determine DFCs are primarily an aquifer water-level-based approach to describe the regional and local desires for the aquifer beneath them. The GMA process requires GCDs to determine the DFCs for the entire GMA, regardless of whether each county is included within a GCD. The Fort Bend Subsidence District ("FBSD") and the Harris-Galveston Subsidence District ("HGSD"), operating in Fort Bend County and Harris and Galveston counties, respectively, regulate groundwater for the purpose of ending land surface subsidence within their jurisdiction. The two Subsidence Districts are not subject to Chapter 36, are not GCDs, and operate under separate enabling legislation that is different from the typical GCD. Therefore, in an official context these three counties are "unrepresented" but the GCDs within GMA 14 must still determine the DFC for these counties.

Both FBSD and HGSD have participated in an unofficial role to aid the GCDs within GMA 14 with their evaluation of Fort Bend, Galveston and Harris County information. The groundwater pumpage within these three counties even though regulated is still greater than the sum of all other counties within GMA 14.

FBSD and HGSD recognize that the projected groundwater pumpage from these three counties will impact the decisions of GMA 14 throughout a large portion of the area. FBSD and HGSD have provided considerable historical and projected groundwater pumpage data and details of regulations to assist GMA 14 in incorporating these counties in the overall GMA 14 DFCs. FBSD and HGSD cannot, however, present DFCs for these three counties in terms of aquifer water-level changes over time. The FBSD and HGSD regulations do not specifically

address water levels nor do they designate a specific pumping limit. Rather, the regulations are based on limitations of groundwater as a percentage of total water demand. The percentage of groundwater to total water demand is decreased over time, as total water demand increases.

The goal of both FBSD and HGSD is to end land surface subsidence, which is caused by humankind's pumpage of groundwater. There is a clearly established link between the over-pumpage of groundwater and land surface subsidence. The DFCs within the aquifer beneath Fort Bend, Galveston, and Harris counties has no easily defined relationship to water levels. The DFC for FBSD and HGSD is the reduction and halting of the compaction of clay layers within the aquifer caused by the over-pumpage of groundwater. Stated more simply, the DFC for these three counties is that future land surface subsidence be avoided. That stated, HGSD and FBSD have adopted regulations, updated most recently in 2013[23], that require the reduction of groundwater pumpage and the conversion to alternate source waters balanced against the realistic ability of the permittees to achieve compliance with these regulations. This effort was accomplished with the aid of the HAGM and information specific to the population projections and future water demands within FBSD and HGSD.

Within HGSD, from central to southeastern Harris County and all of Galveston County (Regulatory Areas 1 and 2), virtually all permittees have achieved compliance with previous and current HGSD regulations. Subsidence has been halted and water levels within the aquifer have risen dramatically in these areas. However, in northern and western areas of Harris County (Regulatory Area 3), the HGSD regulations have allowed groundwater pumpage to continue until the required reductions in 2010, 2025, and 2035. With these scheduled reductions in groundwater pumpage, subsidence will slow dramatically and even be halted with water levels stabilizing and in later years rising.

Within FBSD, from central to northern and eastern Fort Bend County (Regulatory Area A), the regulations call for reductions of groundwater pumpage in 2014/2016, and 2025. Similar to HGSD's Regulatory Area 3, subsidence within FBSD Regulatory Area A will slow dramatically and even be halted with water levels stabilizing and in later years rising.

In both HGSD and FBSD, because of the percentage based approach to regulations, groundwater pumpage will increase until scheduled reductions in milestone years (ex: 2010, 2014/2016, 2025, and 2035). In between milestone years, groundwater pumpage will increase with the assumed increase in total water demand from a predicted increase in population. In

[23] The HGSD District Regulatory Plan is *available at* http://hgsubsidence.org/wp-content/uploads/2013/07/HGSD-2013-Regulatory-Plan-with-Amendment.pdf; the FBSD District Regulatory Plan is *available at* http://www.fbsubsidence.org/docs_reports/2015/20130828_FBSD_Regulatory_Plan_ADOPTED_(FINAL).pdf

order to demonstrate the DFC of these three counties using water-level changes, the area of previous groundwater-to-alternative water conversions must be separated from future conversions and each annual time step must be depicted.

The HGSD and FBSD have submitted to GMA 14 their current regulations and projected groundwater pumpage projections through the year 2070. This data has been divided into the grid cells/layers relative to the NGCGAM and utilized by the GCDs in development of their DFCs.

Groundwater pumpage within GMA 14 from Fort Bend, Galveston, and Harris counties is regulated by FBSD and HGSD, non-GCD governmental agencies (the only GMA in Texas with this occurrence), and the missions of HGSD and FBSD are very different from GCDs and do not fit well with a water-level designed DFC process). The groundwater pumpage projections developed in recognition of the HGSD and FBSD regulatory plans have been utilized without adjustment by GMA 14 in the DFC process. Therefore, the DFCs adopted by GMA 14 are consistent with the HGSD and FBSD regulatory plans.

3.2 NON-RELEVANT AQUIFERS

TWDB rules[24] allow for portions of major or minor aquifers to be classified as non-relevant if their aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition. After review, District Representatives in GMA 14 have classified all portions of the following aquifers located within GMA 14 boundaries as non-relevant aquifers for the purposes of Joint-planning; (1) Carrizo Sand Aquifer, (2) Queen City Aquifer, (3) Sparta Aquifer, (4) Yegua-Jackson Aquifer, and (5) all river alluvium aquifers.

[24] Title 31, Texas Administrative Code Section 356.31 (b) see http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=10&ch=356&rl=31

4.0 POLICY AND TECHNICAL JUSTIFICATIONS

The "policy and technical justifications for each DFC"[25] are embodied by, and not differentiable from, the careful consideration and balancing by the GMA 14 District Representatives of all of the technical and policy information that was considered in working through the statutory criteria as set forth in Section 5 of this report. There is no stand-alone policy justification or technical justification that can be easily identified and presented as the sole policy or technical reason that the GMA 14 District Representatives ultimately decided on the DFCs that were adopted. The balancing of all the various information required to be considered by statute and the balancing of competing interests and the exercise of discretion in performing that balancing act is the justification for the adopted DFCs. Nonetheless, set forth below are some of the policy and technical justifications that can be gleaned from the information considered by GMA 14 in its evaluation and adoption of the DFCs.

4.1 POLICY JUSTIFICATIONS

The most important task for GMA 14 District Representatives in developing and adopting DFCs is to carefully consider all available information related to the aquifers and their past, present, and future use—including, without limitation, all information related to the statutory considerations set forth in Section 5 of this report—and to achieve an appropriate balance of those criteria using their best judgment and discretion. From a policy perspective, a number of key considerations emerge from that balancing act that justify the adopted DFCs.

Heavy growth in population and water demand in GMA 14 have outstripped the ability of the aquifers to keep pace—they are being slowly depleted. Depleting the aquifers harms the property rights of those currently pumping groundwater, those who hope to pump groundwater in the future, and those whose property may be damaged by subsidence. The task for the GMA 14 District Representatives therefore becomes determining how much of that depletion, if any, should occur in each layer of the aquifer and in each geographic area of the region between now and 2070, and how to best avoid damaging any private property rights.

The two overriding policy justifications for the DFCs adopted by GMA 14 are socioeconomic considerations and impacts on private property rights. All of the other technical information and policy issues feed into these two essential considerations, which themselves are inextricably tied to one another.

[25] TEX. WATER CODE § 36.108 (d-3)(2) (West 2015).

The primary economic and private property impact analyses that were considered by the GMA 14 District Representatives that justify the adoption of the DFCs were the impacts of those DFCs on the economic costs to landowners of producing groundwater. The evidence clearly indicates that economic considerations, and their inseparability from protection of private property rights, are the controlling factor behind the selection of the adopted DFCs. The amount of groundwater located under the geographic area defined by GMA 14 is ultimately not a controlling consideration. It is indisputable that it is impossible to physically produce all of the groundwater in the aquifers, even if the GMA 14 District Representatives desired to allow it to be produced. It is also indisputable that if water levels continue to drop the economic costs associated with producing groundwater and, in some instances, treating it for beneficial use, will ultimately control whether it can actually be produced long before the question of how much can be physically produced comes into play. Thus, the economic costs associated with groundwater production and use dictate how much groundwater should be produced during the planning horizon. Those economic costs fall into two primary areas in GMA 14: (1) the economic cost to the individual landowner to drill a well and produce groundwater of a sufficient quality and in sufficient quantities as to be beneficial to the landowner; and (2) the economic cost to the individual landowner of the preservation of the value of their surface estates as that value is impacted by groundwater production from the common groundwater reservoir, especially in terms of land subsidence.

When considering the economic cost to individual landowners to drill a well and produce groundwater, a number of factors were considered. How much an individual landowner has to pay to drill a producing water well is largely driven by how deep the well must be drilled to reach the groundwater. How much an individual landowner has to pay to lift the water from the pump to the land surface is also a consideration, not only in terms of the cost to properly equip the well with the appropriate pump and the wiring to go all the way down the well bore, but also in terms of the ongoing cost of energy to lift the water. Also, the water needs to be of a sufficient quality that it can be either used for its beneficial purpose without treatment or with economically affordable treatment, and water quality tends to diminish as water levels decline in the aquifer and landowners are forced to produce ever-deepening groundwater resources. And, finally, the amount of groundwater that the water well will yield at the land surface, when weighed along with the other considerations, is almost always an important consideration, if not the controlling consideration, for a landowner in determining whether drilling a well is economically feasible for the intended purpose.

The vast majority of groundwater produced in GMA 14 comes from the subcrop areas of the various layers of the Gulf Coast Aquifer where confining conditions create artesian pressure and push groundwater into and up water well bores and to water well pumps. That fact is what makes the Gulf Coast Aquifer in GMA 14 such a beneficial water supply resource

to the overlying landowners. Without preservation of that artesian pressure, the costs of drilling a well, equipping the well, lifting the water to the surface, the huge impacts to well yields, and in some cases water quality degradation would simply render the option of a water well economically infeasible to most landowners as a source of water supply. And for large numbers of landowners throughout GMA 14, it is the only water supply option available to their properties. Without water being economically available on their properties, the negative impacts to the landowners' property values in most situations are enormous and devastating.

Individual landowners have differing needs for groundwater and widely differing abilities to produce it. Some landowners, such as large municipal water suppliers and industrial users, have the financial wherewithal to drill the deep multi-million-dollar water wells necessary to chase falling water levels, to lift that water to the surface and to treat it, if necessary. Other landowners, such as individual homeowners, small businesses, and farmers who must irrigate crops, do not have the financial resources to drill deep wells and treat lower quality water, and must necessarily rely on the preservation of artesian conditions and the ability to drill water wells that are affordable to drill, equip, and produce in order to realize the benefits of their private property investments. Even landowners who do not drill their own water wells but rather rely upon a public water system count on their monthly water bills from the supplier to be affordable.

Existing water-well owners have made investments in their water wells and the economic activities that those wells support, and have reasonable expectations that those investments will continue to be recovered in the foreseeable future. Many of those investments have been made in reliance on the preservation of artesian conditions. If water levels fall too low, they may have to endeavor to re-equip their wells and lower their pumps to chase falling water columns. In many instances, the pumps simply cannot be lowered any further and the well will have to be drilled deeper or abandoned altogether, resulting in huge negative economic losses for the well owners.

Future well owners and landowners also have an expectation of being able to drill affordable water wells on their properties. The same considerations set forth above apply to this class of property owners, whether they be individual homeowners in a rural area with limited financial resources or huge regional water authorities who must answer to their ratepayers. Virtually all of them, both existing and future, both large and small, count upon the availability of quality water in sufficient quantities at a reasonable depth from the land surface. In GMA 14, by and large, this means preservation of artesian conditions in the subcrop of the Gulf Coast Aquifer and preservation of an adequate amount of saturated thickness in its outcrop throughout the joint-planning period.

Another major economic consideration of the DFCs, especially in the coastal regions of GMA 14, is the impact of groundwater production on land subsidence. For the better part of

the last half-century, the coastal areas of GMA 14 have been working diligently to address the issues associated with land subsidence and the devastating economic losses to landowners and their private property investments from the periodic widespread flooding associated with that land subsidence. Groundwater production has clearly been demonstrated to be the primary cause of land subsidence, and millions upon millions of dollars have been invested in researching the amount of groundwater that can be produced in the region as weighed against the correlating subsidence of the land surface and its disastrous economic consequences. The GMA 14 District Representatives carefully considered this important factor and the research and data supporting it in developing and adopting the DFCs.

The DFCs adopted by GMA 14 strikes the appropriate balance of preservation of those artesian conditions, and of the preservation of the saturated thickness of the water levels in the outcrop areas of the aquifer layers. This balance allows for the economically feasible production of groundwater and the prevention of land subsidence. These DFCs, in light of the economic and private property impacts to all landowners in the region, are therefore justifiable adoptions.

4.2 TECHNICAL JUSTIFICATIONS

It is impossible to articulate the technical justifications for the adopted DFCs in terms that are not intricately connected to the policy justifications set forth above. Rather, the technical information considered by the GMA 14 District Representatives in balancing the competing interests associated with the establishment of the DFCs and evaluating the various interests and economic costs to landowners associated with groundwater production both drive and support those policy justifications.

As set forth in Section 4.1, the adopted DFCs are primarily focused on achieving the appropriate balance of all of the statutory criteria required to be considered by maintaining appropriate water levels in all areas of GMA 14, whether in terms of maintaining appropriate artesian levels in the subcrop areas of the aquifer's layers or water table levels and saturated thickness in the outcrop areas. In that regard, while this section will highlight a number of the technical justifications for the adopted DFCs, all of the technical information set forth under Section 5 of this report was considered by the GMA 14 District Representatives in their development and adoption of the DFCs and will not be restated in its entirety in this section.

The GMA 14 District Representatives relied heavily upon the use of the HAGM (Northern Gulf Coast GAM), which was developed by the U. S. Geological Survey (USGS) in cooperation with the Harris-Galveston Subsidence District, the Fort Bend Subsidence District, and the Lone Star Groundwater Conservation District, in the development and adoption of the

DFCs.[26] The Northern Gulf Coast GAM simulates groundwater flow and potentiometric surface declines in the northern Gulf Coast Aquifer in the GMA 14 region, and (in conjunction with the Subsidence Module) land-surface subsidence. It is presently the best available technical tool for modeling different groundwater-production scenarios in GMA 14 and the resulting impacts to the various layers of the Gulf Coast Aquifer in terms of water level declines in both the subcrop and outcrop areas of the aquifer, and impacts to the land surface from the resulting subsidence. The utilization of this tool by the GMA 14 District Representatives, which represents the best available science at the present time, to consider the impacts of pumping throughout the GMA 14 region and the extensive review by the GMA 14 District Representatives of contour maps of the potentiometric surfaces of the various aquifers within GMA 14 and of the predicted impacts on land subsidence provides technical justification for the adopted DFCs.

The GMA 14 District Representatives also considered both the current and planned future uses of the Gulf Coast Aquifer in the region, projected population and water demand growth over the joint planning horizon, and identified water supply needs and water management strategies from the approved regional and state water plans. The information considered represents the best available information on these topics. By and large, the adopted DFCs are consistent with the recommended water management strategies in the approved regional and state water plans that rely on groundwater from the Gulf Coast Aquifer, which strategies were formulated after consideration of the current and planned future uses of the aquifer and the projected population growth, water demand growth, and identified water supply needs over the ensuing 50-year planning period. Therefore, the DFCs adopted by the GMA 14 District Representatives are technically justified.

The GMA 14 District Representatives also considered the environmental impacts of the adopted DFCs in terms of impacts to spring flows and interaction with surface water resources. Because it was determined that there is negligible interaction between the northern Gulf Coast Aquifer System and spring flows and surface water resources, the water level declines associated with the adopted DFCs are technically justified.

The GMA 14 District Representatives also carefully considered the total estimated recoverable storage (TERS) estimates for the Gulf Coast Aquifer that were provided by the executive administrator of the TWDB. As set forth in greater detail later in this report, because the GMA 14 District Representatives determined the maintenance of artesian conditions in the subcrop was a primary consideration for the protection of private property rights and

[26] Kasmarek, M.C., 2012, Hydrogeology and simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast Aquifer System, Texas, 1891–2009 (ver. 1.1, December 2013): U.S. Geological Survey Scientific Investigations Report 2012–5154, 55 p., http://dx.doi.org/sir20125154.

mitigation of economic impacts to landowners in being able to affordably access groundwater in the establishment of the DFCs, and because artesian conditions are largely eliminated long before a question of how much total recoverable storage is actually in the aquifer if economic costs to produce were of no consideration, the adopted DFCs are technically justified.

4.3 RESPONSE TO COMMENTS

As part of the joint-planning process in GMA 14, five issues were discussed on numerous occasions that warrant documentation in this Explanatory Report. The issues are:

(1) the establishment of DFCs on the basis of geographic area;

(2) the failure to factor economic and hydrologic constraints into the calculation of TERS;

(3) the evaluation of socioeconomic impacts of proposed DFCs;

(4) historical water use estimates for the Gulf Coast Aquifer System by formation, i.e., Chicot, Evangeline, and Jasper; and

(5) the development of DFCs for unprotected counties (counties not incorporated into a GCD).

Another issue discussed early in this round of joint planning is the need to potentially revisit the use of general head boundary conditions in the Northern Gulf Coast Aquifer GAM.

On June 24, 2015, GMA 14 District Representatives approved the adoption of proposed DFCs for the Gulf Coast Aquifer System in GMA 14. The proposed DFCs provided acceptable drawdown levels for each subdivision of the Gulf Coast Aquifer (the Chicot, Evangeline, Burkeville, and Jasper formations/aquifers) throughout the GMA and for each county located within GMA 14, as well as acceptable land subsidence levels. The acceptable levels of drawdown for each subdivision of the Gulf Coast Aquifer were measured in terms of water level drawdowns over the current planning cycle measured in feet from 2009 estimated water levels. As required by Texas Water Code Section 36.108(d-2), the proposed DFCs were subsequently distributed to the individual GCDs in GMA 14. A period of not less than 90 days was provided to allow for public comments on the proposed DFCs, and during this comment period, each GCD held a public hearing on the proposed DFCs.[27]

The GCDs in GMA 14 evaluated all comments received, including a claim that the adoption of different DFCs for different geographic areas over the same aquifer—along the boundaries of political subdivisions—was not authorized by law, and as such the proposed DFCs were legally and hydrogeologically insufficient. The comments suggested that the proposed DFCs would cause GCDs to adopt different regulatory schemes, including different production limits, allowing landowners producing groundwater in GCDs with less restrictive

[27] See TEX. WATER CODE ANN. § 36.108(d-2) (West 2015)

regulations to unfairly drain groundwater from landowners in adjacent GCDs with more restrictive regulations potentially causing a regulatory taking of property by the GCDs.

First, the selected DFCs cover the entirety of each aquifer subdivision throughout GMA 14. Once the aquifer-wide DFC is selected, the average drawdown for each county and each GCD is then calculated. The commenters mistakenly interpreted these calculations as separate DFCs for each county instead of the calculated average of the GMA-wide DFCs.

The adoption of DFCs by GCDs, pursuant to the requirements and procedures set forth in Texas Water Code Chapter 36, is an important policy-making function. DFCs are planning goals that state a desired condition of the groundwater resources in a GMA in the future in order to promote better management of those resources on a long-term basis. GCDs are authorized to utilize different approaches in developing and adopting DFCs based on local conditions and the consideration of other statutory criteria as set forth in Texas Water Code Section 36.108.

Second, Texas Water Code Section 36.108(d)(1) contemplates and authorizes the adoption of different DFCs for different geographic areas over the same aquifer, and that area may be based on the boundaries of political subdivisions. The statute expressly and specifically *directs* GCDs "to consider uses or conditions of an *aquifer* within the management area, including conditions that differ substantially from one geographic area to another" when developing and adopting DFCs.[28] The use of the singular "aquifer" in this context clearly demonstrates that the Legislature intended that the uses and conditions in different geographic areas *over the same aquifer* were to be considered when adopting DFCs.

Third, Texas Water Code Section 36.108(d-1) provides that GCDs may establish different DFCs for:

1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of the management area; *or*

2) *each geographic area overlying an aquifer in whole or in part* or subdivision of an aquifer within the boundaries of the management area.[29]

The Legislature's addition of the phrase "in whole or in part" makes it clear that GCDs may establish a "different" DFC for a geographic area that does not cover a whole aquifer but only part of that aquifer. Moreover, the plain meaning of the term "geographic area" in this context clearly includes an area defined by political boundaries such as those of a GCD or a

[28] Id. § 36.108(d)(1) (emphasis added).
[29] Id. § 36.108(d-1) (emphasis added).

county.[30] Any other reading of "geographic area" in Texas Water Code Section 36.108(d-1) would be highly strained and contrary to the obvious intent of the larger statute.[31]

Such statutory authorization has also been recognized by the Texas Water Development Board (TWDB). In 2009, after GMA 1 adopted different DFCs for different geographic areas over the same aquifer (the Ogallala Aquifer) along the boundaries of political subdivisions, Mesa Water, LP and G&J Ranch (collectively the "Petitioners") filed a petition with the TWDB to appeal the reasonableness of the adopted DFCs.[32] Petitioners made the same complaints in opposition of the DFCs adopted by GMA 1 raised in the comments received in GMA 14. In their appeal of the DFCs adopted by GMA 1, Petitioners argued that, overall, the DFCs had no scientific basis and that the DFCs should be uniform on an aquifer-wide basis to ensure all areas and landowners receive "equal treatment." However, on February 17, 2010, the TWDB considered and approved its staff's recommendation that the DFCs adopted by GMA 1 were reasonable.[33] The TWDB staff's analysis concluded that political boundaries, such as county lines, can be used to define geographic areas for different DFCs provided that aquifer uses and conditions support the designation of the areas. In reaching this conclusion, TWDB staff addressed private property rights, stating that "[t]o one degree or another, all DFCs adopted by groundwater conservation districts potentially impact the exercise of private property rights."[34] The TWDB staff explained that "beyond outright prohibition, the impact on private property rights involves the balancing of competing interest."[35]

During the joint planning process for GMA 14, District Representatives considered uses and conditions of the Gulf Coast Aquifer System, as required by Texas Water Code Section 36.108(d)(1). District Representatives studied uses and conditions for each subdivision of the Gulf Coast Aquifer System, including the Chicot, Evangeline, Burkeville, and Jasper, for each county located within GMA 14. Evidence was provided and considered that demonstrated different types of uses of groundwater, differences in historic pumping, and different

[30] See Morales v. Liberty Mutual Insurance Co., 241 S.W.3d 514, 517-18 (Tex. 2007) (stating that a particular term is to be considered and interpreted in the context of the entire statutory provision).
[31] See McIntyre v. Ramirez, 109 S.W.3d 741, 745 (Tex. 2003) (stating that it is improper to give an undefined statutory term a meaning that is out of harmony or inconsistent with other provisions in the statute).
[32] See TEX. WATER CODE ANN. § 36.108(l) (West 2009).
[33] See Texas Water Development Board, Report on Appeal of the Reasonableness of the Desired Future Conditions Adopted by Groundwater Management Area 1 for the Ogallala and Rita Blanca Aquifers (February 10, 2010) available at http://www.twdb.texas.gov/groundwater/petitions/doc/GMA1/2009_Petitions/Mesa_G&J_Ranch/TWDB_Staff_Report_GMA1_Petitions_02-10.pdf.
[34] Id. at 4 (citing TEX. WATER CODE ANN. § 36.002 (West 2009) ("Ownership and rights of the owners of the land. . . in groundwater are hereby recognized, and nothing in this code shall be constituted as depriving or divesting the owners . . . of the ownership or rights, except as those rights may be limited or altered by rules promulgated by a district.") (Emphasis added).
[35] Id.

environmental conditions that were distinguishable in the various geographic areas of GMA 14 and described conveniently by reference to the counties (a more detailed discussion of these considerations is included below in the discussion of aquifer uses and conditions in *Section 5.1*). For these reasons, in developing proposed DFCs, District Representatives in GMA 14 found it reasonable to adopt GMA-wide DFCs, then calculate the effective DFC for each geographic area over each subdivision of the Gulf Coast Aquifer System using the political boundaries of the counties. This finding was further supported by other relevant factors considered by District Representatives in GMA 14, including:

(1) the heavy utilization by the TWDB and the regional water planning groups in the state and regional water planning processes of information and data related to water supply and demand and other demographic information on a county-by-county basis;

(2) the ability of the public to identify the boundaries of the geographic areas delineated; and

(3) the ability of the GCDs—the responsible planning and regulatory entities created along county boundaries by the Texas Legislature—to achieve the DFCs, as mandated by law.

Also, as part of the joint planning process, District Representatives in GMA 14 considered impacts to private property rights and interests in groundwater, as required by Texas Water Code Section 36.108(d)(7). The Gulf Coast Aquifer System is a finite resource that replenishes at a lower rate than is required to meet all current and projected water demands. Accordingly, the consideration of impacts to private property rights necessitated the careful balancing of competing interests, such as the protection of the property rights of existing well owners (and their ability to realize their reasonable investment-backed expectations from their wells) with the protection of the property rights of other landowners (who have yet to drill water wells on their properties). The potential future harm to landowners along adjacent county lines were weighed against the real and present economic harm to existing groundwater users in certain areas of GMA 14 where groundwater levels continue to decline as demands exceed available, sustainable supplies, such as is the case in Montgomery County. In balancing all sectors, District Representatives found that the proposed DFCs were reasonable, as was establishing the average aquifer decline based on political boundaries of the counties.

Finally, the comments that suggested the proposed DFCs will result in a taking of property are not only speculative but counter to the fundamental principles in support of local groundwater management and regulation by GCDs. In Texas, the Legislature has declared GCDs as the preferred method of groundwater management.[36] Unlike the statewide regulation of oil and gas, local GCDs are required to manage and protect the groundwater resources within their jurisdiction pursuant to their statutory powers and duties as set forth in Texas

[36] See TEX. WATER CODE ANN. § 36.0015 (b)

Water Code Chapter 36 and their respective enabling legislation. The adoption of DFCs, whether GMA-wide or county-by-county, does not prevent individual GCDs from adopting different regulatory plans based on local conditions, level of demand, type of demand, frequency of demand, and communities in each GCD.

The GCDs in GMA 14 each prepared a Summary Report inclusive of all relevant comments received during the 90-day public comment period regarding the proposed DFCs, any suggested revisions to the proposed DFCS, and the basis for the revisions. The GCDs' Summary Reports were submitted to GMA 14 for further review by the District Representatives at a joint-planning meeting held October 28, 2015. At this meeting, District Representatives of GMA 14 considered and approved non-substantive changes to the proposed DFCs. The DFCs that were considered and proposed for final adoption, inclusive of all non-substantive changes, provided acceptable drawdown levels for each hydrogeologic subdivision of the Gulf Coast Aquifer System, including the Chicot, Evangeline, Burkeville, and Jasper, on two different scales—on an aquifer-wide basis for the entire geographic extent of the aquifer subdivisions in GMA 14 and on a county-by-county geographic basis, in light of the various considerations set forth above—and acceptable land subsidence levels, as applicable, for certain counties located within GMA 14. These proposed DFCs, inclusive of acceptable drawdown levels on an aquifer-wide scale and a county-by-county basis, were finally adopted by the District Representatives in GMA 14 on April 29, 2016, at a properly noticed joint-planning meeting.

In June of 2014, as required by amendments to Texas Water Code Chapter 36 resulting from passage of Senate Bill 660 in 2011, the executive administrator of the TWDB submitted the initial report on total estimated recoverable storage (TERS) to GMA 14 District Representatives. While GMA 14 District Representatives were cognizant of the enormity of this new responsibility assigned to the TWDB, significant concerns were raised during public comments and by GMA 14 District Representatives regarding the lack of usefulness of this information for two primary reasons. First, in the TWDB analysis, there were no constraints placed on the recoverability analysis due to the obvious and inevitable negative economic impacts that will result with the reduction and elimination of artesian pressures in systems like the Gulf Coast Aquifer. Based on input from GMA 14 District Representatives and technical presentations received during the 90-day public comment period, the negative economic impacts resulting from the elimination of artesian pressures from the Gulf Coast Aquifer System, a dynamic projected to occur with less than one percent of the TERS volume being produced, will clearly result in the elimination of the Gulf Coast Aquifer System as a viable water resource for almost all water use sectors. These economic impacts are, in part, driven by the negative impacts on well yields that will result with the inevitable conversion from confined to unconfined conditions as water levels are lowered due to over-pumping. The

analysis provided in the TERS report to GMA 14 by the TWDB shows the calculations did not factor in either economics or hydrology. GMA 14 District Representatives strongly encourage the TWDB to conduct necessary science to better constrain future estimates of TERS, taking into consideration the negative impacts of economics and hydrology on the volumes of water that can reasonably be expected to be recovered from storage.

Another technical issue discussed by GMA 14 District Representatives was the lack of available socioeconomic impacts information directly appropriate for the joint-planning process (see *Section* 5.6 below for results of GMA 14's consideration of socioeconomic impacts). It was noted that the only consistently available quantitative socioeconomic impact analysis for water planning in Texas is the analysis of socioeconomic impacts on cities and other major water use sectors resulting from not meeting current and future water supply needs. This analysis is an outgrowth of the regional water planning process created by the passage of Senate Bill 1 in 1997[37] and codified in Texas Water Code Sections 16.051 and 16.053. More importantly, this analysis is performed on an ongoing basis by the TWDB and updates are provided to the 16 regional water planning groups at the conclusion of each five-year planning cycle.

This analysis executed and provided by the TWDB to the regional water planning groups is designed to answer a somewhat different question than the factor to be considered in the joint-planning process by Texas Water Code Section 36.108 (d)(6), which requires District Representatives in a GMA to consider the socioeconomic impacts reasonably expected to occur for a proposed DFC. No uniform quantitative analysis has been performed by the TWDB or any other entity to answer this specific question. There are multiple reasons for the absence of quantitative socioeconomic impact analysis. The most important being that, as GMA 14 District Representatives determined during the joint-planning process, any potential socioeconomic impacts that may occur, either positive or negative impacts, will be the result of the specifics of an individual GCD's regulatory approach to achieve the DFC, not the DFC itself. Therefore, the requirements of this element of the joint-planning process should be revisited to better clarify what is practicable with respect to the socioeconomic impacts of proposed and adopted DFCs.

Throughout the joint-planning process in GMA 14, consistent historical water use data by the primary units of the Gulf Coast Aquifer System (Chicot, Evangeline, and Jasper) was not well established. Within individual GCDs significant progress has been made in the recent past to improve the quality of water use data by aquifer. However, especially in counties without GCDs, water use data is often simply reported as "Gulf Coast Aquifer," "local aquifer" or "other" if the respondent to the TWDB's Water Use Survey is not informed as to the

[37] Act of June 2, 1997, 75th Leg., R.S., ch. 1010, 1997 Tex. Gen. Laws 3610.

hydrostratigraphic unit being produced by the individual well. In future joint-planning efforts, and as the Northern Gulf Coast Aquifer GAM is updated, it will be increasingly important that better resolution on pumping volumes from the discrete hydrostratigraphic units is available for model calibration.

Finally, District Representatives in GMA 14 spent considerable time and effort to encourage the participation of all counties that do not have a GCD (unprotected counties) in the joint-planning effort. Individual District Representatives contacted leaders in each of the unprotected counties to encourage their participation in the joint-planning process. While it is recognized that Chambers and Washington counties did participate throughout this round of joint planning and provided valuable insight into local issues in their respective counties, the reality is that the joint-planning process, as currently designed, suffers from the lack of any participation in the GMA 14 efforts by Jefferson, Liberty, and Orange counties. Especially with the new incentives for water project financing now available from the TWDB, the ramifications of DFCs adopted for these unprotected counties may have significant consequences in the future on municipalities in these unprotected counties. In addition, the lack of financial participation by these unprotected counties does not relieve the GMA from the responsibility of planning for the areas, thus creating a financial hardship on the GCDs in GMA 14 to meet statutory requirements for the joint-planning process in the unprotected areas. GMA 14 District Representatives support another look at this issue by future Texas Legislatures to ensure that all water users in Texas are fairly and adequately considered during future joint-planning efforts.

5.0 FACTORS CONSIDERED FOR DESIRED FUTURE CONDITIONS

Texas Water Code Section 36.108 (d)(1 – 8), require GCDs to consider the impacts of proposed DFCs on the following eight factors. The results of GMA 14 District Representatives' considerations required by Section 36.108 (d)(1– 8) have been summarized below. *Table 5-1* provides a chronology for GMA 14 meetings during which each of the eight factors were formally considered. Posted meeting agendas and minutes are included in *Appendix B*.

Table 5-1 – GMA 14 schedule for discussing relevant factors related to selection of Desired Future Conditions

Factor	Meeting Date								
	4/13	5/13	6/13	9/13	4/14	6/14	9/14	11/14	6/15
(1) Aquifer Uses and Conditions				✓					✓
(2) Water Supply Needs and Strategies				✓					✓
(3) Hydrological Conditions						✓			✓
(4) Other Environmental Impacts						✓			✓
(5) Impacts on Subsidence						✓			✓
(6) Socioeconomic Impacts							✓		✓
(7) Impacts on Private Property							✓		✓
(8) Feasibility of Achieving DFC								✓	✓
(9) Other Relevant Factors				○		○	○	○	○

5.1 AQUIFER USES OR CONDITIONS

Texas Water Code Section 36.108(d)(1) requires District Representatives in a GMA to consider "aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another." District Representatives in GMA 14

first examined this factor on September 18, 2013 and then again on June 24, 2015. During this consideration, GMA 14 District Representatives considered aquifer uses, both historical and projected, along with historical, current, and projected aquifer conditions.

Groundwater represents a significant source of supply within GMA 14, due to its historical abundance relative to demand, easy accessibility and high quality. Access to reliable groundwater supplies has, in the past, allowed many parts of GMA 14 to avoid the development of other, more costly, alternative supplies. However, this pattern has changed over time for the more populous counties where the need for water supplies exceeded sustainable levels of groundwater production, as recognized by local GCDs and Subsidence Districts. In Harris County and the rapidly growing suburban counties like Fort Bend and Montgomery counties, municipal growth has largely driven the conversion from historically utilized groundwater supplies to alternative water supplies, primarily through the conversion to surface water sources. In other locations, such as Brazoria and Jefferson counties, non-municipal demands such as manufacturing have converted from groundwater to alternatives such as surface water and saline water supplies.

This section of the Explanatory Report focuses on historical and current use or production of groundwater for meeting demands within GMA 14. For the purposes of this analysis, data was obtained from the TWDB through their Water Use Survey[38] and Groundwater Database, and other sources of estimates, in order to depict the current status of groundwater pumpage in GMA 14 for the purpose of considering the balance of resource use and protection when considering proposed DFCs. Data was summarized from the years 2001 through 2011 to illustrate average conditions, absent of temporary trends in water use brought about by short-term climate effects (both droughts and above normal precipitation).

Groundwater use in GMA 14 is from a variety of aquifers that are recognized by the TWDB but are primarily related to pumpage from the Gulf Coast Aquifer System. Due to the fact that historical water use data for the Gulf Coast Aquifer System has not been consistently discretized to the individual aquifers (sometimes also referred to as formations) that make up the Gulf Coast Aquifer System, those being the Chicot Aquifer, Evangeline Aquifer, Burkeville Confining Unit, and Jasper Aquifer, for the purposes of this discussion on aquifer use, pumping estimates will be reported at the broader "Gulf Coast Aquifer System" level. As demonstrated in *Figure 5-1* and *Table 5-2* and *Table 5-3*, the Gulf Coast Aquifer System is the most significant source of groundwater supply within each county in GMA 14. In total, the Gulf Coast Aquifer System has provided 85.44 percent of the total volume of groundwater pumped in GMA 14 for the reporting period of 2007 – 2011 (*Table 5-3*). However, it should be noted that the second most significant source is reported by the TWDB as "Other/Unknown Aquifer," with

[38] See http://www.twdb.texas.gov/ to access TWDB Historical Groundwater Pumping Database.

13.81 percent of the total groundwater pumped for the same reporting period. This is due to the reality that historically, entities, when submitting their water use surveys to the TWDB, often do not know the specific hydrogeologic unit from which their groundwater is being produced. Alternatively, in some cases a well may be screened over multiple aquifers. As a result, the water use survey respondent will enter in "Other" as the source when not specifically known. It is generally accepted that a large share of this "Other" supply is actually Gulf Coast Aquifer System water. All of the other aquifers for which groundwater pumped is recorded in the TWDB's Water Use Survey and Groundwater Database individually represent less than one percent of the total groundwater pumped in GMA 14 for the 2007 – 2011 reporting period.

Groundwater use within GMA 14 is also dominated largely by municipal pumpage. In some counties, this is driven by the overall nature of water demands. From 2007 – 2011, average municipal groundwater pumpage accounted for 79.6 percent of total groundwater pumpage. Of this groundwater pumpage, Harris County accounts for 41.06 percent, followed by 11.40 percent in Fort Bend County and 11.36 percent in Montgomery County (*Figure 5-2* and *Table 5-4*). However, in most counties where other demands such as manufacturing or steam-electric power generation represent a sizable portion of the overall water demand, groundwater use continues to be dominated by municipal production because of the way that these communities have evolved over time. The expansion of municipal demands throughout much of GMA 14 has been accomplished through the development of local, non-regional infrastructure including wells and small wastewater facilities. In contrast, the development of large, industrial centers has often been done in conjunction with the development of significant surface water facilities. This is an important distinction in that the historical groundwater use estimates included in this section do not include water use for the large industrial centers and steam-electric power generation facilities. Two exceptions to this trend are Jasper and Waller counties, which demonstrate manufacturing and irrigation as their primary groundwater uses, respectively. *Figure 5-2* and *Table 5-4* summarizes this trend throughout GMA 14.

This Explanatory Report will combine the reported "Gulf Coast Aquifer" and "Aquifer-Other" amounts as all having been produced from the Gulf Coast Aquifer.

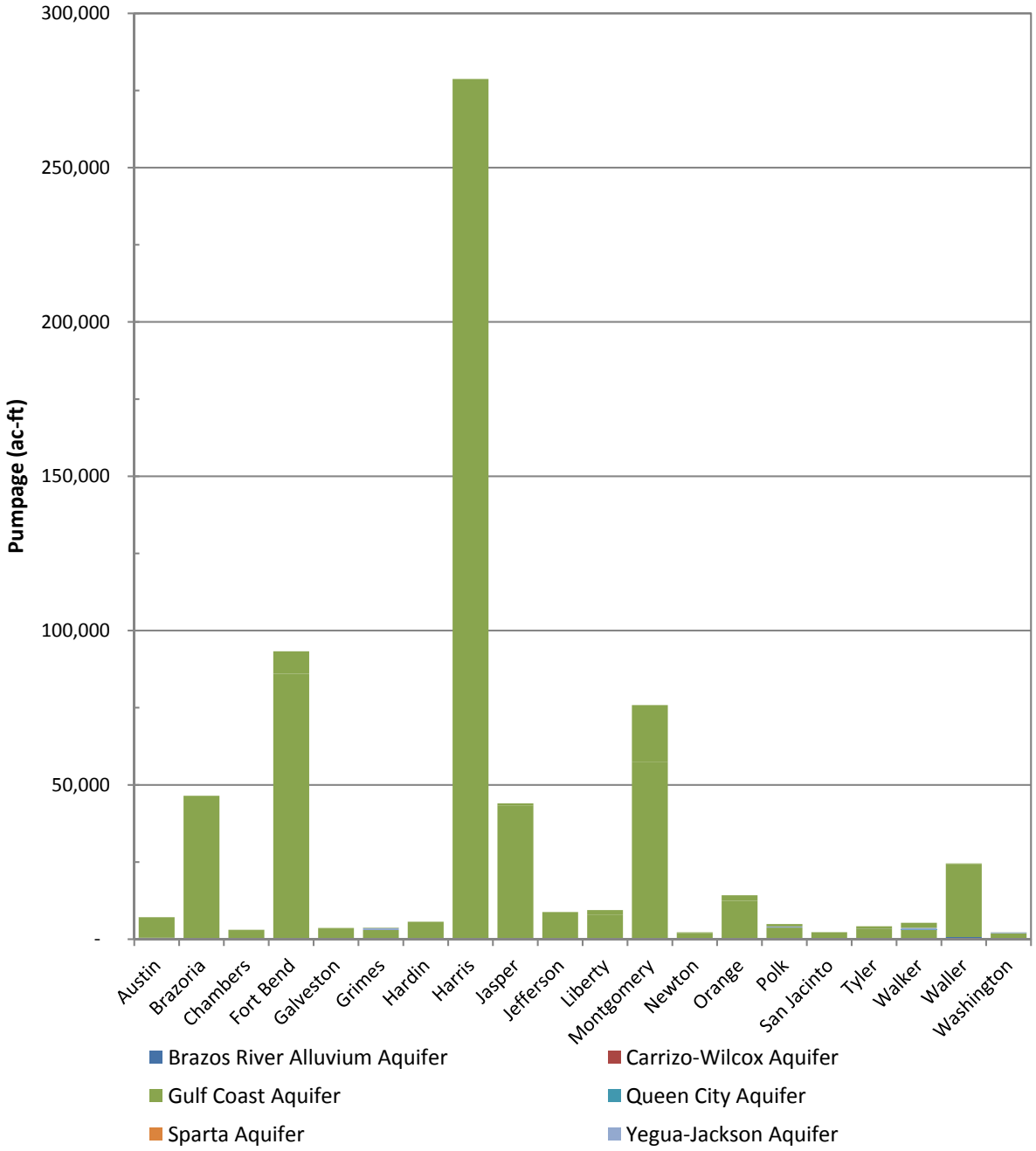

Figure 5-1 – GMA 14 groundwater reported pumpage by aquifer: 2007-2011 annual average. Gulf Coast Aquifer is combined with "other" aquifers in this graphic, as discussed above.

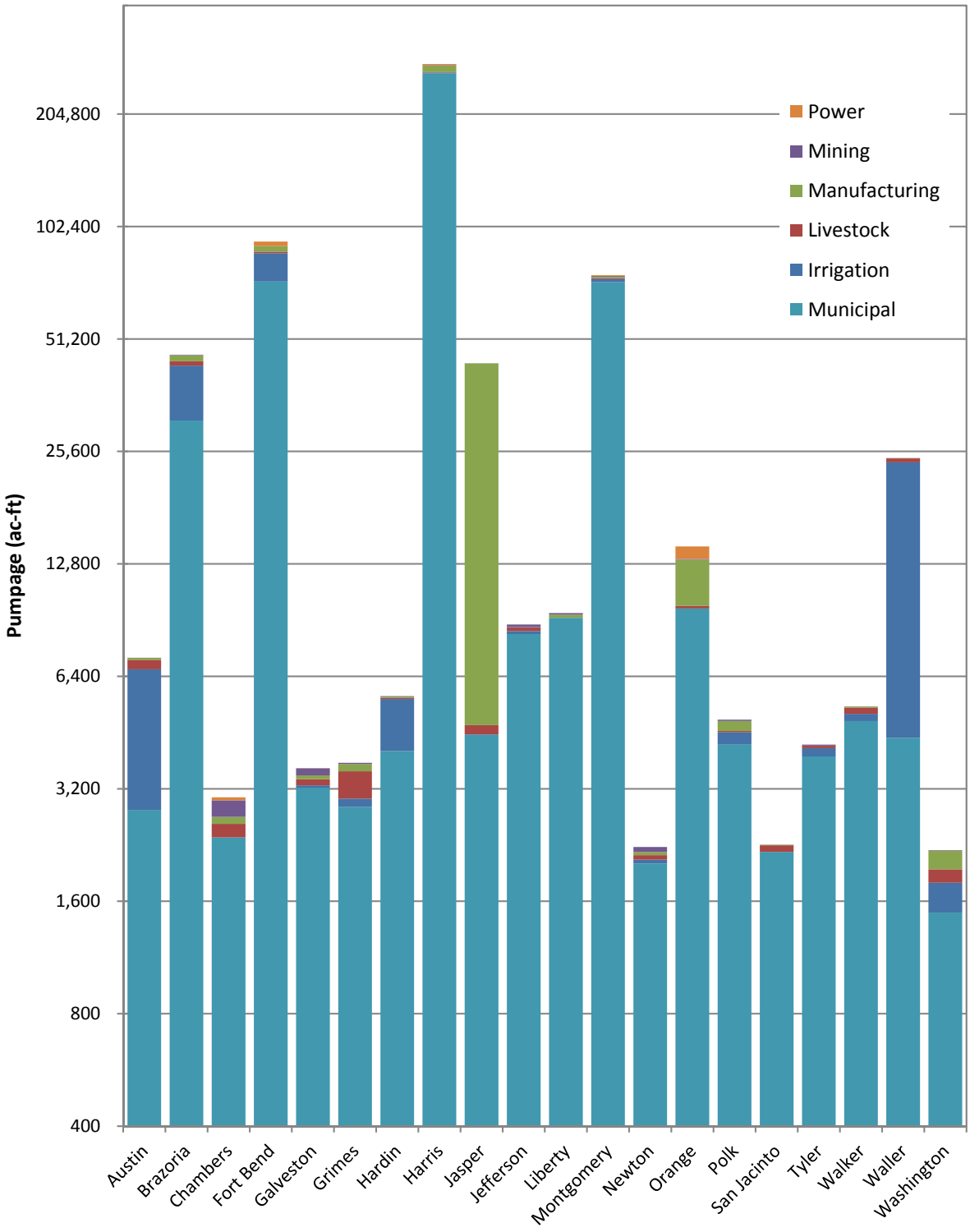

Figure 5-2 – GMA 14 groundwater pumpage by county: 2007-2011 averages.

Similarly, the same trend in municipal use from the Gulf Coast Aquifer System can be recognized throughout the extent of GMA 14. *Figure 5-3* demonstrates the portion of groundwater production originating from each aquifer by water use category.

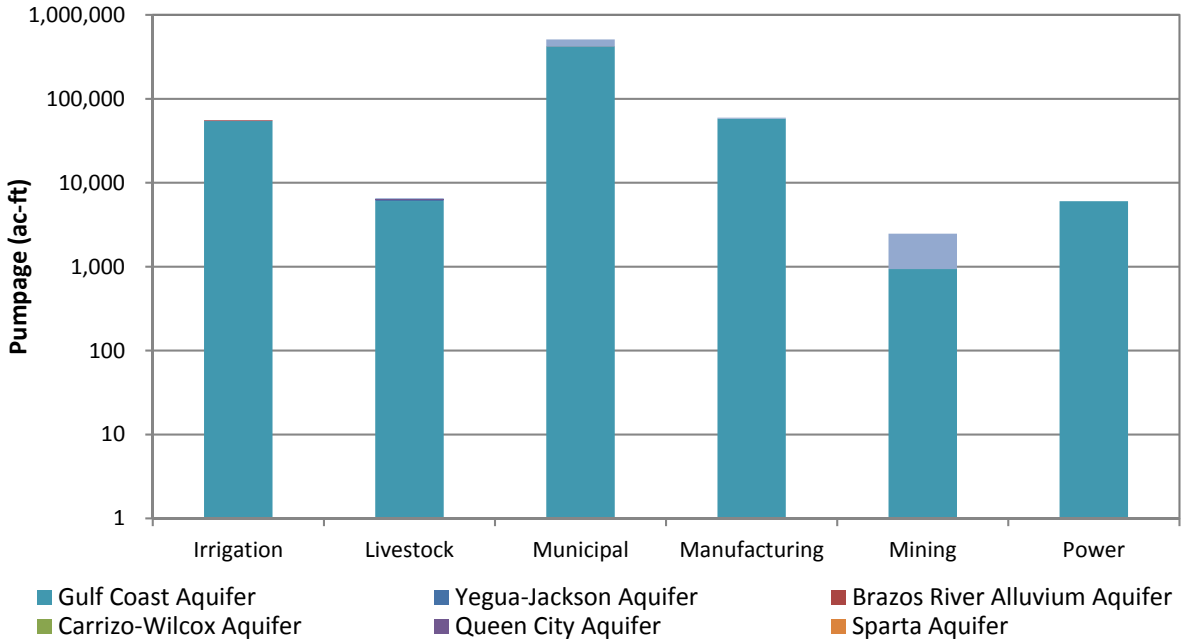

Figure 5-3 – GMA 14 groundwater pumpage reported by aquifer and use: 2007-2011 annual average

The distribution of groundwater use or pumpage throughout the Gulf Coast Aquifer System within GMA 14 is heavily centered on the historical users of groundwater throughout the region. *Figure 5-4* illustrates how this pumpage is distributed in the counties making up GMA 14. Harris County represents the largest producer of water from the aquifer, followed by Fort Bend and Montgomery counties with their rapidly expanding populations. Neighboring Brazoria and Waller counties also represent significant concentrations of groundwater usage. An exception to this pattern is within Jasper County, which represents the highest level of production and use from the Gulf Coast Aquifer among the eastern counties of GMA 14.

In establishing DFCs, GMA 14 District Representatives had discussions specific to the question of how to balance the needs of meeting current and projected water use needs with the GCD purpose statement included in Texas Water Code Section 36.001 which states, in part, "In order to provide for the conservation, preservation, protection, recharging and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions and to control subsidence caused by withdrawal of water from those groundwater resources or their

subdivisions … groundwater conservation districts may be created as provided by this chapter." Detailed descriptions of groundwater use were included in the supporting materials presented to GMA 14 during the course of the development of DFCs. This information is presented in *Appendix G.*

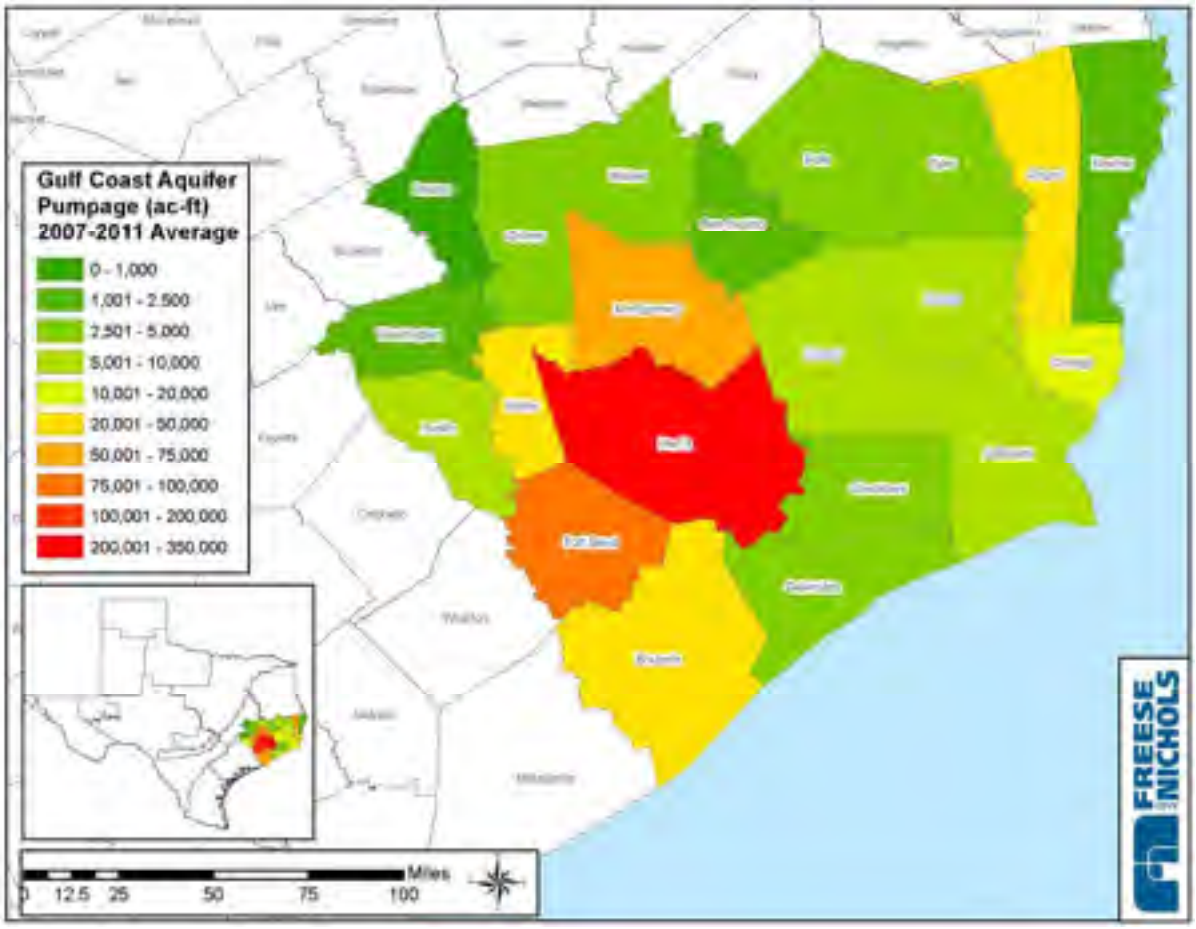

Figure 5-4 – Gulf Coast Aquifer pumpage reported by County within GMA 14: 2007-2011 annual average

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Table 5-2 – Historical groundwater pumpage by aquifer for counties in GMA 14 (in acre-feet per year)

County	Aquifer	Groundwater Pumpage by County and Formation (ac-ft)											
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Austin	Brazos River Alluvium	971	872	455	620	878	709	368	395	407	357	465	684
	Gulf Coast	12,770	11,597	7,721	9,290	9,589	8,962	6,696	6,514	6,935	7,210	5,825	6,611
	Other	193	173	90	123	175	137	74	78	84	76	99	112
	Unknown	-	-	-	-	-	-	-	-	-	4	8	6
	Subtotal	*13,934*	*12,643*	*8,266*	*10,032*	*10,642*	*9,808*	*7,138*	*6,987*	*7,426*	*7,647*	*6,398*	*7,413*
Brazoria	Gulf Coast	35,807	31,125	31,166	31,462	26,573	26,332	36,061	38,202	54,980	48,202	43,763	27,687
	Other	-	-	-	-	40	-	-	-	-	66	6,779	11,944
	Unknown	-	-	-	-	-	-	-	-	143	167	190	147
	Subtotal	*35,807*	*31,125*	*31,166*	*31,462*	*26,612*	*26,332*	*36,061*	*38,202*	*55,123*	*48,435*	*50,732*	*39,778*
Chambers	Gulf Coast	5,253	4,155	4,245	4,594	3,774	2,714	2,657	3,447	3,595	1,782	3,042	1,490
	Other	-	-	-	-	-	-	-	-	-	-	895	913
	Unknown	-	-	-	-	-	-	-	-	-	-	9	4
	Subtotal	*5,253*	*4,155*	*4,245*	*4,594*	*3,774*	*2,714*	*2,657*	*3,447*	*3,595*	*1,782*	*3,946*	*2,407*
Fort Bend	Brazos River Alluvium	5,043	3,208	2,932	3,110	-	-	-	-	-	-	-	-
	Gulf Coast	94,619	79,702	78,921	82,152	70,461	79,944	95,207	82,870	92,369	107,244	74,283	73,165
	Other	-	-	-	-	-	-	-	42	-	-	10,463	25,904
	Unknown	-	-	-	-	-	-	-	-	24	33	43	31
	Subtotal	*99,662*	*82,910*	*81,853*	*85,262*	*70,461*	*79,944*	*95,207*	*82,913*	*92,393*	*107,277*	*84,789*	*99,101*
Galveston	Gulf Coast	8,231	7,612	7,243	6,780	2,850	2,886	2,032	1,552	1,944	2,913	3,400	7,715
	Other	-	-	-	-	-	-	-	-	-	-	101	228
	Unknown	-	-	-	-	-	-	-	-	70	78	86	71
	Subtotal	*8,231*	*7,612*	*7,243*	*6,780*	*2,850*	*2,886*	*2,032*	*1,552*	*2,014*	*2,991*	*3,587*	*8,014*
Grimes	Brazos River Alluvium	96	91	73	40	40	71	200	139	126	61	72	67
	Gulf Coast	3,605	3,510	3,537	3,451	2,914	3,460	3,926	3,523	3,822	3,687	2,449	969
	Other	486	412	410	379	29	51	228	166	124	67	205	134
	Sparta	5	5	4	4	-	-	-	-	-	-	-	-
	Unknown	-	-	-	-	-	-	-	-	-	-	17	106
	Yegua-Jackson	134	75	78	71	66	130	280	277	297	300	382	1,779
	Subtotal	*4,327*	*4,092*	*4,102*	*3,945*	*3,049*	*3,712*	*4,635*	*4,105*	*4,369*	*4,114*	*3,125*	*3,054*
Hardin	Gulf Coast	19,074	18,576	18,715	17,283	15,451	17,046	17,512	7,499	7,811	6,645	4,490	1,783
	Other	-	-	-	-	-	-	7	6	6	8	9	-
	Unknown	-	-	-	-	-	-	-	-	35	23	12	5
	Subtotal	*19,074*	*18,576*	*18,715*	*17,283*	*15,451*	*17,046*	*17,519*	*7,505*	*7,853*	*6,676*	*4,512*	*1,788*

County	Aquifer	Groundwater Pumpage by County and Formation (ac-ft)											
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Harris	Gulf Coast	385,584	332,616	302,190	313,866	260,515	317,231	267,003	243,928	287,891	308,138	138,199	157,277
	Other	-	-	-	-	2,858	10,627	12,535	11,301	708	2,696	116,900	123,620
	Unknown	-	-	-	-	-	-	-	-	693	762	832	697
	Subtotal	*385,584*	*332,616*	*302,190*	*313,866*	*263,373*	*327,859*	*279,538*	*255,229*	*289,293*	*311,596*	*255,930*	*281,593*
Jasper	Gulf Coast	52,381	52,024	52,505	51,110	38,678	54,671	50,897	49,485	47,327	44,642	39,796	34,766
	Other	-	-	-	-	-	-	19	3	4	56	1,131	2,914
	Unknown	-	-	-	-	-	-	-	-	-	-	13	80
	Subtotal	*52,381*	*52,024*	*52,505*	*51,110*	*38,678*	*54,671*	*50,915*	*49,489*	*47,332*	*44,698*	*40,940*	*37,760*
Jefferson	Gulf Coast	2,051	3,270	3,242	3,276	1,177	1,037	1,957	1,685	1,769	12,608	12,691	14,299
	Other	-	-	-	-	-	-	-	-	-	-	360	411
	Unknown	-	-	-	-	-	-	-	-	58	60	63	51
	Subtotal	*2,051*	*3,270*	*3,242*	*3,276*	*1,177*	*1,037*	*1,957*	*1,685*	*1,827*	*12,668*	*13,113*	*14,761*
Liberty	Gulf Coast	13,388	14,165	13,749	13,087	9,128	7,374	11,321	10,342	10,807	10,865	4,509	3,480
	Other	2	-	-	-	-	-	-	-	-	-	4,345	2,437
	Unknown	-	-	-	-	-	-	-	-	117	121	125	114
	Subtotal	*13,389*	*14,165*	*13,749*	*13,087*	*9,128*	*7,374*	*11,321*	*10,342*	*10,924*	*10,986*	*8,979*	*6,031*
Montgomery	Gulf Coast	55,699	52,494	55,514	54,925	46,006	57,259	65,626	63,211	70,002	72,629	41,307	40,364
	Other	-	-	-	-	-	-	1,635	204	-	505	39,944	49,495
	Unknown	-	-	-	-	-	-	-	-	380	386	392	388
	Subtotal	*55,699*	*52,494*	*55,514*	*54,925*	*46,006*	*57,259*	*67,260*	*63,414*	*70,382*	*73,520*	*81,643*	*90,247*
Newton	Gulf Coast	2,814	2,573	2,576	2,612	1,678	3,717	2,727	2,379	2,231	2,199	2,075	818
	Other	-	-	-	-	-	-	140	-	-	-	478	655
	Unknown	-	-	-	-	-	-	-	-	69	73	77	125
	Subtotal	*2,814*	*2,573*	*2,576*	*2,612*	*1,678*	*3,717*	*2,867*	*2,379*	*2,300*	*2,272*	*2,630*	*1,598*
Orange	Gulf Coast	17,530	17,658	17,818	16,300	12,675	13,033	16,900	15,552	15,461	15,225	8,466	7,500
	Other	-	-	-	-	-	-	-	-	-	-	4,321	4,467
	Unknown	-	-	-	-	-	-	-	-	68	74	79	70
	Subtotal	*17,530*	*17,658*	*17,818*	*16,300*	*12,675*	*13,033*	*16,900*	*15,552*	*15,529*	*15,299*	*12,865*	*12,037*
Polk	Gulf Coast	4,006	4,081	4,233	4,257	3,077	3,421	4,734	4,347	4,232	4,372	3,153	2,708
	Other	1,115	1,117	1,089	1,332	623	791	871	774	726	612	808	706
	Unknown	-	-	-	-	-	-	-	-	23	20	16	132
	Yegua-Jackson	9	5	4	4	4	3	411	339	374	380	558	212
	Subtotal	*5,130*	*5,202*	*5,326*	*5,593*	*3,704*	*4,215*	*6,016*	*5,460*	*5,355*	*5,384*	*4,536*	*3,758*
San Jacinto	Gulf Coast	3,294	2,922	2,981	2,938	3,433	2,186	3,257	2,913	3,020	2,912	1,521	943
	Other	-	-	-	-	-	-	6	5	6	6	6	-
	Unknown	-	-	-	-	-	-	-	-	-	-	4	1
	Subtotal	*3,294*	*2,922*	*2,981*	*2,938*	*3,433*	*2,186*	*3,263*	*2,918*	*3,025*	*2,918*	*1,531*	*944*

County	Aquifer	Groundwater Pumpage by County and Formation (ac-ft)											
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Tyler	Gulf Coast	3,704	3,793	3,848	3,805	3,011	3,223	4,440	3,975	3,839	4,110	3,372	2,062
	Other	-	-	-	-	-	-	6	252	-	-	1,713	1,509
	Unknown	-	-	-	-	-	-	-	-	22	18	14	78
	Yegua-Jackson	-	-	-	-	-	-	10	8	9	11	13	-
	Subtotal	*3,704*	*3,793*	*3,848*	*3,805*	*3,011*	*3,223*	*4,456*	*4,235*	*3,870*	*4,139*	*5,113*	*3,649*
Walker	Carrizo-Wilcox	-	-	2	1	-	-	-	-	-	-	-	-
	Gulf Coast	4,726	4,171	4,156	4,448	4,652	3,664	4,247	3,854	3,387	4,041	2,273	1,685
	Other	989	727	1,036	1,027	924	1,081	960	970	1,087	1,073	2,533	2,457
	Queen City	26	13	13	13	13	19	23	21	37	36	26	26
	Unknown	-	-	-	-	-	-	-	-	-	-	7	3
	Yegua-Jackson	26	13	13	13	13	19	218	108	105	479	1,873	497
	Subtotal	*5,766*	*4,925*	*5,219*	*5,501*	*5,602*	*4,784*	*5,448*	*4,952*	*4,616*	*5,628*	*6,712*	*4,668*
Waller	Brazos River Alluvium	808	915	936	827	871	780	692	501	699	716	825	865
	Gulf Coast	28,298	31,542	31,736	28,077	26,888	24,392	22,113	16,130	23,679	24,378	26,289	27,705
	Other	208	215	218	204	212	213	238	185	193	204	270	227
	Unknown	-	-	-	-	-	-	-	-	-	2	4	2
	Subtotal	*29,314*	*32,673*	*32,890*	*29,108*	*27,970*	*25,385*	*23,043*	*16,815*	*24,571*	*25,299*	*27,388*	*28,799*
Washington	Brazos River Alluvium	250	182	183	112	114	96	78	58	57	48	66	104
	Gulf Coast	3,337	2,896	3,099	2,721	1,747	1,742	2,376	2,032	2,073	2,112	1,698	1,301
	Other	97	106	119	72	-	-	-	-	-	-	-	-
	Unknown	-	-	-	-	-	-	-	-	4	7	10	14
	Yegua-Jackson	12	12	12	15	14	14	163	137	151	168	870	52
	Subtotal	*3,696*	*3,197*	*3,413*	*2,920*	*1,876*	*1,852*	*2,617*	*2,227*	*2,285*	*2,335*	*2,644*	*1,471*

County	Aquifer	Groundwater Pumpage by County and Formation (ac-ft)											
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GMA 14	Gulf Coast	756,172	680,482	649,196	656,434	544,276	634,295	621,688	563,440	647,176	685,914	422,602	414,328
	Yegua-Jackson	181	105	107	104	98	166	1,082	870	935	1,338	3,696	2,540
	Brazos River Alluvium	7,169	5,269	4,579	4,708	1,903	1,655	1,338	1,093	1,289	1,181	1,429	1,720
	Carrizo-Wilcox	-	-	2	1	-	-	-	-	-	-	-	-
	Queen City	26	13	13	13	13	19	23	21	37	36	26	26
	Sparta	5	5	4	4	-	-	-	-	-	-	-	-
	Other	3,091	2,751	2,961	3,138	4,860	12,901	16,719	13,986	2,940	5,369	191,360	228,132
	Unknown	-	-	-	-	-	-	-	-	1,706	1,828	2,001	2,125
	Total	**766,643**	**688,624**	**656,862**	**664,400**	**551,150**	**649,036**	**640,849**	**579,409**	**654,083**	**695,666**	**621,114**	**648,870**

Table 5-3 – Historical groundwater pumpage statistics for 2007-2011 by aquifer for counties in GMA 14 (in acre-feet per year)

County	Aquifer	2007-2011 Summary Statistics (ac-ft.)			
		Average	Median	Maximum	% of Total Average
Austin	Brazos River Alluvium	462	407	684	0.07%
	Gulf Coast	6,619	6,611	7,210	1.03%
	Other	90	84	112	0.01%
	Unknown	4	4	8	0.00%
	Subtotal Austin	7,174	7,413	7,647	1.12%
Brazoria	Gulf Coast	42,567	43,763	54,980	6.65%
	Other	3,758	66	11,944	0.59%
	Unknown	129	147	190	0.02%
	Subtotal Brazoria	46,454	48,435	55,123	7.26%
Chambers	Gulf Coast	2,671	3,042	3,595	0.42%
	Other	362	-	913	0.06%
	Unknown	3	-	9	0.00%
	Subtotal Chambers	3,036	3,447	3,946	0.47%
Fort Bend	Brazos River Alluvium	-	-	-	0.00%
	Gulf Coast	85,986	82,870	107,244	13.44%
	Other	7,282	42	25,904	1.14%
	Unknown	26	31	43	0.00%
	Subtotal Fort Bend	93,295	92,393	107,277	14.58%
Galveston	Gulf Coast	3,505	2,913	7,715	0.55%
	Other	66	-	228	0.01%
	Unknown	61	71	86	0.01%
	Subtotal Galveston	3,632	2,991	8,014	0.57%
Grimes	Brazos River Alluvium	93	72	139	0.01%
	Gulf Coast	2,890	3,523	3,822	0.45%
	Other	139	134	205	0.02%
	Sparta	-	-	-	0.00%
	Unknown	25	-	106	0.00%
	Yegua-Jackson	607	300	1,779	0.09%
	Subtotal Grimes	3,754	4,105	4,369	0.59%
Hardin	Gulf Coast	5,646	6,645	7,811	0.88%
	Other	6	6	9	0.00%
	Unknown	15	12	35	0.00%
	Subtotal Hardin	5,667	6,676	7,853	0.89%
Harris	Gulf Coast	227,087	243,928	308,138	35.49%
	Other	51,045	11,301	123,620	7.98%
	Unknown	597	697	832	0.09%
	Subtotal Harris	278,728	281,593	311,596	43.56%
Jasper	Gulf Coast	43,203	44,642	49,485	6.75%
	Other	822	56	2,914	0.13%
	Unknown	19	-	80	0.00%
	Subtotal Jasper	44,044	44,698	49,489	6.88%

County	Aquifer	2007-2011 Summary Statistics (ac-ft.)			
		Average	Median	Maximum	% of Total Average
Jefferson	Gulf Coast	8,610	12,608	14,299	1.35%
	Other	154	-	411	0.02%
	Unknown	46	58	63	0.01%
	Subtotal Jefferson	8,811	12,668	14,761	1.38%
Liberty	Gulf Coast	8,001	10,342	10,865	1.25%
	Other	1,356	-	4,345	0.21%
	Unknown	95	117	125	0.01%
	Subtotal Liberty	9,452	10,342	10,986	1.48%
Montgomery	Gulf Coast	57,503	63,211	72,629	8.99%
	Other	18,030	505	49,495	2.82%
	Unknown	309	386	392	0.05%
	Subtotal Montgomery	75,841	73,520	90,247	11.85%
Newton	Gulf Coast	1,940	2,199	2,379	0.30%
	Other	227	-	655	0.04%
	Unknown	69	73	125	0.01%
	Subtotal Newton	2,236	2,300	2,630	0.35%
Orange	Gulf Coast	12,441	15,225	15,552	1.94%
	Other	1,758	-	4,467	0.27%
	Unknown	58	70	79	0.01%
	Subtotal Orange	14,256	15,299	15,552	2.23%
Polk	Gulf Coast	3,762	4,232	4,372	0.59%
	Other	725	726	808	0.11%
	Unknown	38	20	132	0.01%
	Yegua-Jackson	373	374	558	0.06%
	Subtotal Polk	4,899	5,355	5,460	0.77%
San Jacinto	Gulf Coast	2,262	2,912	3,020	0.35%
	Other	5	6	6	0.00%
	Unknown	1	-	4	0.00%
	Subtotal San Jacinto	2,267	2,918	3,025	0.35%
Tyler	Gulf Coast	3,472	3,839	4,110	0.54%
	Other	695	252	1,713	0.11%
	Unknown	26	18	78	0.00%
	Yegua-Jackson	8	9	13	0.00%
	Subtotal Tyler	4,201	4,139	5,113	0.66%
Walker	Carrizo-Wilcox	-	-	-	0.00%
	Gulf Coast	3,048	3,387	4,041	0.48%
	Other	1,624	1,087	2,533	0.25%
	Queen City	29	26	37	0.00%
	Unknown	2	-	7	0.00%
	Yegua-Jackson	612	479	1,873	0.10%
	Subtotal Walker	5,315	4,952	6,712	0.83%
Waller	Brazos River Alluvium	721	716	865	0.11%
	Gulf Coast	23,636	24,378	27,705	3.69%
	Other	216	204	270	0.03%
	Unknown	2	2	4	0.00%
	Subtotal Waller	24,574	25,299	28,799	3.84%

County	Aquifer	2007-2011 Summary Statistics (ac-ft.)			
		Average	Median	Maximum	% of Total Average
Washington	Brazos River Alluvium	67	58	104	0.01%
	Gulf Coast	1,843	2,032	2,112	0.29%
	Other	-	-	-	0.00%
	Unknown	7	7	14	0.00%
	Yegua-Jackson	276	151	870	0.04%
	Subtotal Washington	2,192	2,285	2,644	0.34%
GMA 14	Gulf Coast	546,692	563,440	685,914	85.44%
	Yegua-Jackson	1,876	1,338	3,696	0.29%
	Brazos River Alluvium	1,342	1,289	1,720	0.21%
	Carrizo-Wilcox	-	-	-	0.00%
	Queen City	29	26	37	0.00%
	Sparta	-	-	-	0.00%
	Other	88,357	13,986	228,132	13.81%
	Unknown	1,532	1,828	2,125	0.24%
	Total	639,828	648,870	695,666	100.00%

Table 5-4 – Historical groundwater pumpage statistics by water use sector for 2007-2011 for counties in GMA 14 (in acre-feet per year)

County	Use	2007-2011 Groundwater Pumpage Summary (ac-ft)			
		Average	Median	Maximum	% of Total Average
Austin	Irrigation	3,874	3,634	5,303	0.61%
	Livestock	405	379	521	0.06%
	Municipal	2,808	3,031	4,013	0.44%
	Manufacturing	84	84	110	0.01%
	Mining	4	4	8	0.00%
	Power				0.00%
	Subtotal Austin	*7,174*	*7,413*	*7,647*	1.12%
Brazoria	Irrigation	12,465	14,508	20,827	1.95%
	Livestock	1,200	1,210	1,241	0.19%
	Municipal	30,969	31,468	33,143	4.84%
	Manufacturing	1,691	1,475	2,816	0.26%
	Mining	130	147	190	0.02%
	Power				0.00%
	Subtotal Brazoria	*46,454*	*48,435*	*55,123*	7.26%
Chambers	Irrigation				0.00%
	Livestock	207	212	219	0.03%
	Municipal	2,372	2,332	3,534	0.37%
	Manufacturing	112	107	156	0.02%
	Mining	289	9	729	0.05%
	Power	56	37	120	0.01%
	Subtotal Chambers	*3,036*	*3,447*	*3,946*	0.47%
Fort Bend	Irrigation	13,928	14,940	18,600	2.18%
	Livestock	824	829	924	0.13%
	Municipal	72,932	73,523	84,407	11.40%
	Manufacturing	2,928	2,934	3,286	0.46%
	Mining	66	50	113	0.01%
	Power	2,616	2,587	2,821	0.41%
	Subtotal Fort Bend	*93,295*	*92,393*	*107,277*	14.58%
Galveston	Irrigation	47		208	0.01%
	Livestock	127	122	150	0.02%
	Municipal	3,221	2,549	7,711	0.50%
	Manufacturing	81	91	112	0.01%
	Mining	154	214	241	0.02%
	Power	2	2	4	0.00%
	Subtotal Galveston	*3,632*	*2,991*	*8,014*	0.57%
Grimes	Irrigation	146	75	333	0.02%
	Livestock	553	502	698	0.09%
	Municipal	2,865	3,087	3,544	0.45%
	Manufacturing	164	182	207	0.03%
	Mining	25		106	0.00%
	Power	1	1	2	0.00%
	Subtotal Grimes	*3,754*	*4,105*	*4,369*	0.59%

County	Use	2007-2011 Groundwater Pumpage Summary (ac-ft)			
		Average	Median	Maximum	% of Total Average
Hardin	Irrigation	1,520	1,436	2,245	0.24%
	Livestock	46	44	53	0.01%
	Municipal	4,042	5,487	5,712	0.63%
	Manufacturing	43	35	75	0.01%
	Mining	15	12	35	0.00%
	Power				0.00%
	Subtotal Hardin	*5,667*	*6,676*	*7,853*	0.89%
Harris	Irrigation	1,628	1,411	2,511	0.25%
	Livestock	841	804	955	0.13%
	Municipal	262,729	264,181	297,272	41.06%
	Manufacturing	10,612	10,245	11,855	1.66%
	Mining	992	835	1,760	0.15%
	Power	1,925	1,893	2,092	0.30%
	Subtotal Harris	*278,728*	*281,593*	*311,596*	43.56%
Jasper	Irrigation	12		30	0.00%
	Livestock	264	197	437	0.04%
	Municipal	4,462	4,509	4,892	0.70%
	Manufacturing	39,287	39,389	44,446	6.14%
	Mining	19		80	0.00%
	Power				0.00%
	Subtotal Jasper	*44,044*	*44,698*	*49,489*	6.88%
Jefferson	Irrigation	155		650	0.02%
	Livestock	183	190	203	0.03%
	Municipal	8,305	12,261	13,840	1.30%
	Manufacturing	25	33	55	0.00%
	Mining	143	136	215	0.02%
	Power				0.00%
	Subtotal Jefferson	*8,811*	*12,668*	*14,761*	1.38%
Liberty	Irrigation				0.00%
	Livestock				0.00%
	Municipal	9,179	10,087	10,653	1.43%
	Manufacturing	178	212	255	0.03%
	Mining	95	117	125	0.01%
	Power				0.00%
	Subtotal Liberty	*9,452*	*10,342*	*10,986*	1.48%
Montgomery	Irrigation	1,356	244	5,753	0.21%
	Livestock	552	546	614	0.09%
	Municipal	72,668	71,816	82,805	11.36%
	Manufacturing	579	687	726	0.09%
	Mining	311	387	392	0.05%
	Power	376	597	657	0.06%
	Subtotal Montgomery	*75,841*	*73,520*	*90,247*	11.85%

County	Use	2007-2011 Groundwater Pumpage Summary (ac-ft)			
		Average	Median	Maximum	% of Total Average
Newton	Irrigation	47	50	137	0.01%
	Livestock	58	49	84	0.01%
	Municipal	2,020	2,142	2,280	0.32%
	Manufacturing	42	52	52	0.01%
	Mining	69	73	125	0.01%
	Power				0.00%
	Subtotal Newton	*2,236*	*2,300*	*2,630*	0.35%
Orange	Irrigation				0.00%
	Livestock	152	156	182	0.02%
	Municipal	9,724	10,323	10,992	1.52%
	Manufacturing	3,260	3,157	4,055	0.51%
	Mining	58	70	79	0.01%
	Power	1,062	1,062	1,142	0.17%
	Subtotal Orange	*14,256*	*15,299*	*15,552*	2.23%
Polk	Irrigation	324	342	595	0.05%
	Livestock	37	35	44	0.01%
	Municipal	4,211	4,767	4,995	0.66%
	Manufacturing	289	282	426	0.05%
	Mining	38	20	132	0.01%
	Power				0.00%
	Subtotal Polk	*4,899*	*5,355*	*5,460*	0.77%
San Jacinto	Irrigation				0.00%
	Livestock	90	83	116	0.01%
	Municipal	2,169	2,825	2,948	0.34%
	Manufacturing	8	9	10	0.00%
	Mining	1		4	0.00%
	Power				0.00%
	Subtotal San Jacinto	*2,267*	*2,918*	*3,025*	0.35%
Tyler	Irrigation	205	175	437	0.03%
	Livestock	61	60	80	0.01%
	Municipal	3,905	3,999	4,644	0.61%
	Manufacturing	4	2	11	0.00%
	Mining	26	18	78	0.00%
	Power				0.00%
	Subtotal Tyler	*4,201*	*4,139*	*5,113*	0.66%
Walker	Irrigation	220	117	570	0.03%
	Livestock	202	199	221	0.03%
	Municipal	4,858	4,652	5,882	0.76%
	Manufacturing	33	32	67	0.01%
	Mining	2		7	0.00%
	Power				0.00%
	Subtotal Walker	*5,315*	*4,952*	*6,712*	0.83%

County	Use	2007-2011 Groundwater Pumpage Summary (ac-ft)			
		Average	Median	Maximum	% of Total Average
Waller	Irrigation	19,553	20,070	23,599	3.06%
	Livestock	593	538	753	0.09%
	Municipal	4,381	4,429	4,748	0.68%
	Manufacturing	25	22	34	0.00%
	Mining	24	2	110	0.00%
	Power				0.00%
	Subtotal Waller	*24,574*	*25,299*	*28,799*	3.84%
Washington	Irrigation	301	250	509	0.05%
	Livestock	154	152	160	0.02%
	Municipal	1,493	1,742	1,888	0.23%
	Manufacturing	238	254	369	0.04%
	Mining	7	7	14	0.00%
	Power				0.00%
	Subtotal Washington	*2,192*	*2,285*	*2,644*	0.34%
GMA 14	Irrigation	55,781	57,634	62,500	8.72%
	Livestock	6,547	6,595	7,000	1.02%
	Municipal	509,312	514,953	566,088	79.60%
	Manufacturing	59,682	58,224	66,363	9.33%
	Mining	2,468	2,289	3,214	0.39%
	Power	6,038	5,998	6,576	0.94%
	Total	**639,828**	**648,870**	**695,666**	**100.00%**

The current or historic condition of an aquifer may be evaluated in a number of ways. In regions with regional-dipping, predominantly confined aquifers such as the Gulf Coast Aquifer System, the relative measurements of artesian pressures in the aquifer (measurements of artesian pressure as expressed in static water levels below land surface or above mean sea level in a well) have been determined by many GMAs in Texas to be the most effective metric for long-range planning purposes. For joint planning in GMA 14, the District Representatives reviewed contour maps of the potentiometric surface of the various aquifers within GMA 14 as a representation of current aquifer conditions. Historical pumpage, along with the natural geology of the formations, resulted in patterns of potentiometric groundwater surface elevations throughout the aquifers that vary from county to county across the GMA. The pattern of these contours was used by GMA 14 District Representatives to evaluate aquifer conditions as part of the joint-planning process.

As the primary groundwater-bearing unit within GMA 14, the Gulf Coast Aquifer System has experienced significant declines in local and regional water levels that correspond to the high levels of pumpage discussed above. In general, this is within and surrounding Harris County in the more urbanized areas of GMA 14, including Fort Bend, Galveston, and Montgomery counties. Local and regional depressions mapped on the potentiometric surfaces across the four primary formations (Chicot, Evangeline, Burkeville, and Jasper aquifers) within the Gulf Coast Aquifer System generally track the location of greatest pumpage within each

formation; the center of the cones of depression in the lower-lying layers like the Jasper Formation (Aquifer) occur north of the cones for the overlying layers like the Chicot Formation. *Figure 5-5*, *Figure 5-6*, and *Figure 5-7* represent both measured and simulated contours of the potentiometric surface across the Chicot, Evangeline, and Jasper formations, respectively. Contours are presented to extend the geographic extent of measured data across the entirety of the northern Gulf Coast Aquifer System and GMA 14. This data is adapted from Kasmarek, 2012[39]. Presentation materials considered by GMA 14 District Representatives and inter-local partners are included in its entirety in *Appendix H*.

39 Kasmarek, M.C., 2012, Hydrogeology and simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast Aquifer System, Texas, 1891–2009 (ver. 1.1, December 2013): U.S. Geological Survey Scientific Investigations Report 2012–5154, 55 p., http://dx.doi.org/sir20125154.

Figure 5-5 – Simulated and measured water level elevation contours in the Chicot Formation, 2009.

Figure 5-6 – Simulated and measured water level elevation contours in the Evangeline Formation, 2009.

In areas of high historical groundwater use, subsidence has been a significant factor related to aquifer conditions. *Figure 5-8* represents available measured and simulated data of subsidence for the Northern Gulf Coast Aquifer System. Note the high levels of historical subsidence centered in the vicinity of Harris and Galveston counties with impacts extending into neighboring areas.

Figure 5-7 – Simulated and measured water level elevation contours in the Jasper Formation, 2009.

Figure 5-8 – Simulated and measured subsidence contours occurring in the Gulf Coast Aquifer System, 2009.

The dominating reliance on the Gulf Coast Aquifer System generally results in less significant patterns in conditions of other aquifers within GMA 14. *Figure 5-9* represents measured contours within the Carrizo Sand Aquifer, which crosses the northern portion of GMA 14. Significant declines in the formation are generally seen in the area north of GMA 14 where the aquifer is a more significant source of water supply. The water level elevations within GMA 14 are dictated more by geology than patterns of usage, as was demonstrated in the Gulf Coast Aquifer System. This data is taken from Dutton and others, 2003[40]. Similar trends are recognized in the Queen City and Sparta Aquifers as shown in *Figure 5-10* and *Figure 5-11*, which are taken from Kelley and others, 2004[41]. Water level elevation data was also available for the Upper and Lower Yegua and Jackson formations from Deeds and others, 2010[42] Water

[40] Dutton, A. R., Harden, B., Nicot, J. P., and O'Rourke, D., 2003, Groundwater Availability Model for the Central Part of the Carrizo-Wilcox Aquifer in Texas: The University of Texas at Austin, Bureau of Economic Geology, Final Technical Report prepared for the Texas Water Development Board, 405 p.

[41] Kelley, V. A.,, Deeds, N. E., Fryar, D.G., Nicot, J.P., Jones, T., Dutton, A. R., Bruehl, G., Unger-Holtz, T., and Machin, J.L., 2004, Groundwater availability models for the Queen City and Sparta Aquifers: INTERA, Inc., Final Technical Report prepared for the Texas Water Development Board, 867 p.

[42] Deeds, N. E., Singh, T. Y. A., Jones, T. L., Kelley, V. A., Knox, P. R., and Young. S. C., 2010, Final Report Groundwater availability model for the Yegua-Jackson Aquifer: Final Technical Report prepared for the Texas Water Development Board, 582 p.

level elevation data for the Upper Jackson, Lower Jackson, Upper Yegua, and Lower Yegua area shown below in *Figure 5-12* through *Figure 5-15*, respectively.

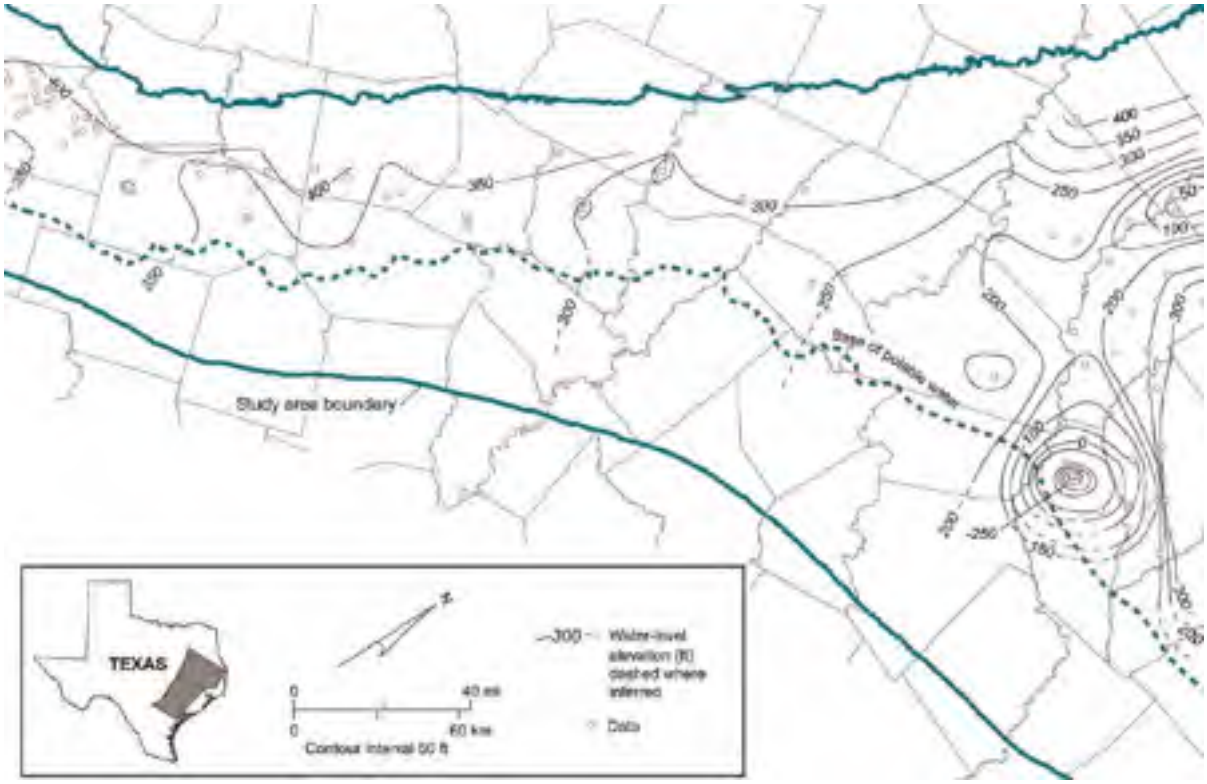

Figure 5-9 – Water level elevation contours in the Carrizo Sand Aquifer based on water level measurements from 1987 – 1990[43]

[43] Map reproduced from Dutton, A. R., Harden, B., Nicot, J. P., and O'Rourke, D., 2003, Groundwater Availability Model for the Central Part of the Carrizo-Wilcox Aquifer in Texas: The University of Texas at Austin, Bureau of Economic Geology, Final Technical Report prepared for the Texas Water Development Board, 405 p

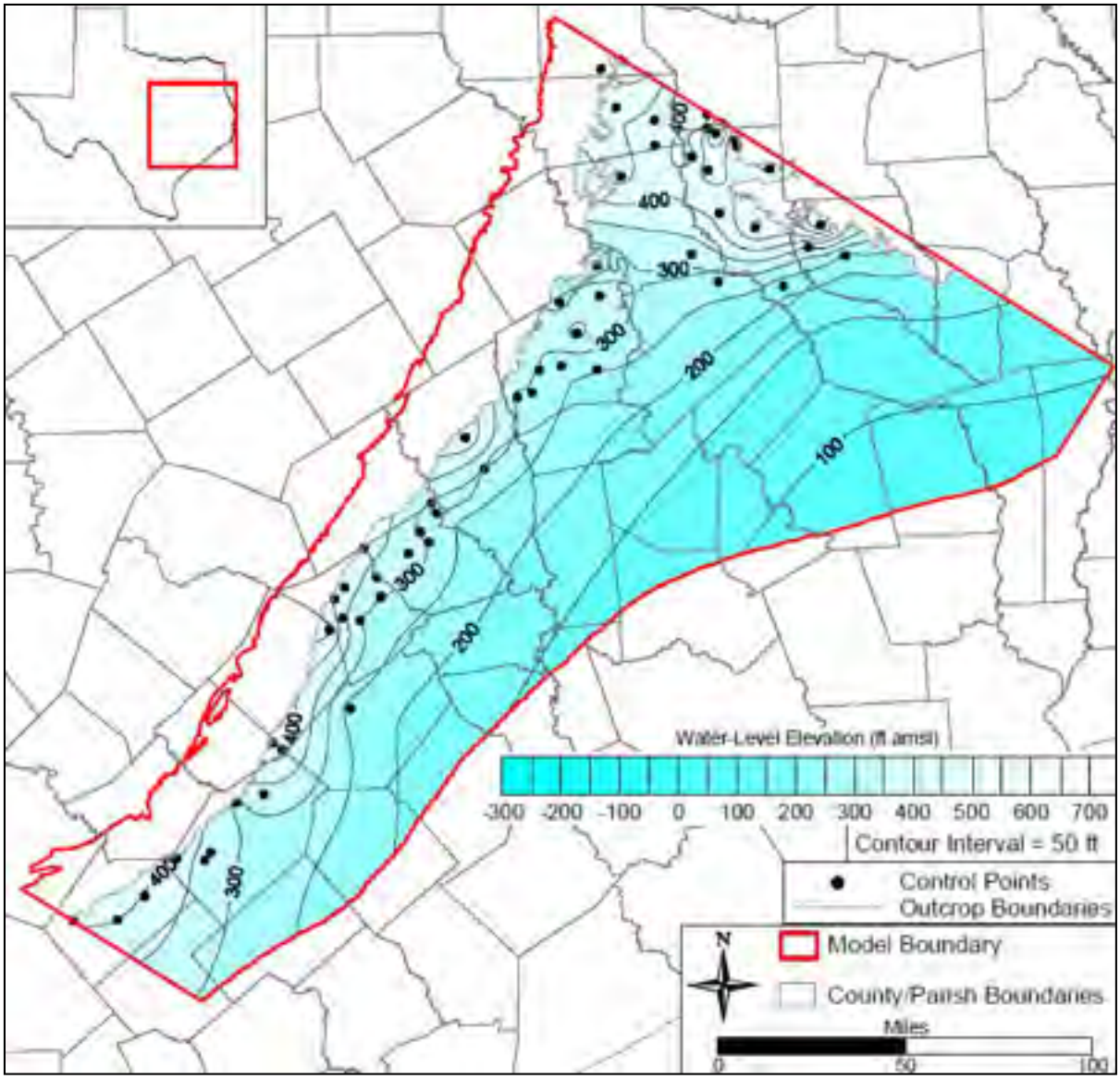

Figure 5-10 – 1999 estimated elevation contours in the Queen City Aquifer[44]

[44] Map from Kelley, V. A., Deeds, N. E., Fryar, D.G., Nicot, J.P., Jones, T., Dutton, A. R., Bruehl, G., Unger-Holtz, T., and Machin, J.L., 2004, Groundwater availability models for the Queen City and Sparta Aquifers: INTERA, Inc., Final Technical Report prepared for the Texas Water Development Board, 867 p.

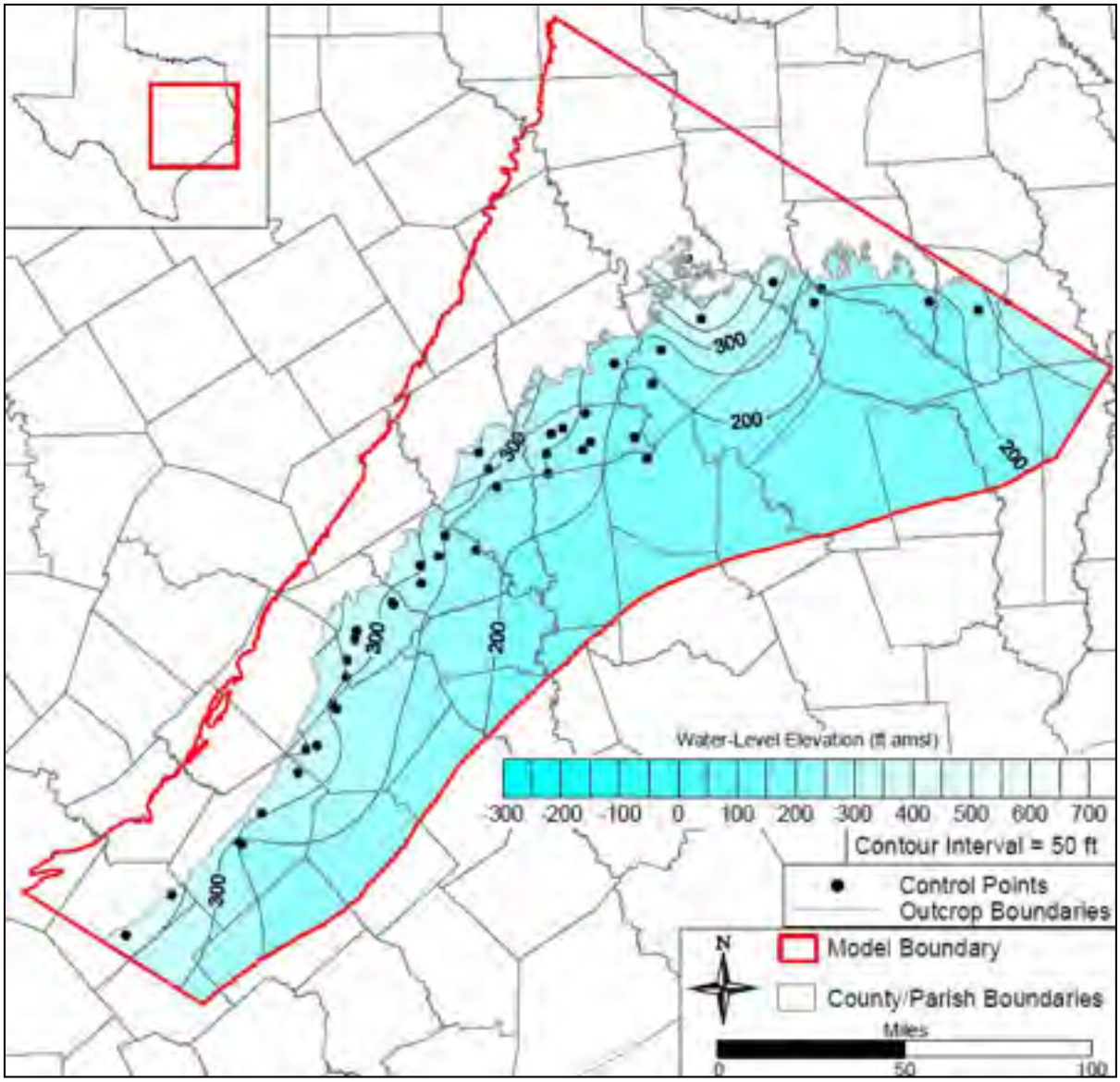

Figure 5-11 – 1999 estimated elevation contours in the Sparta Aquifer[45]

[45] Map from Kelley, V. A., Deeds, N. E., Fryar, D.G., Nicot, J.P., Jones, T., Dutton, A. R., Bruehl, G., Unger-Holtz, T., and Machin, J.L., 2004, Groundwater availability models for the Queen City and Sparta Aquifers: INTERA, Inc., Final Technical Report prepared for the Texas Water Development Board, 867 p.

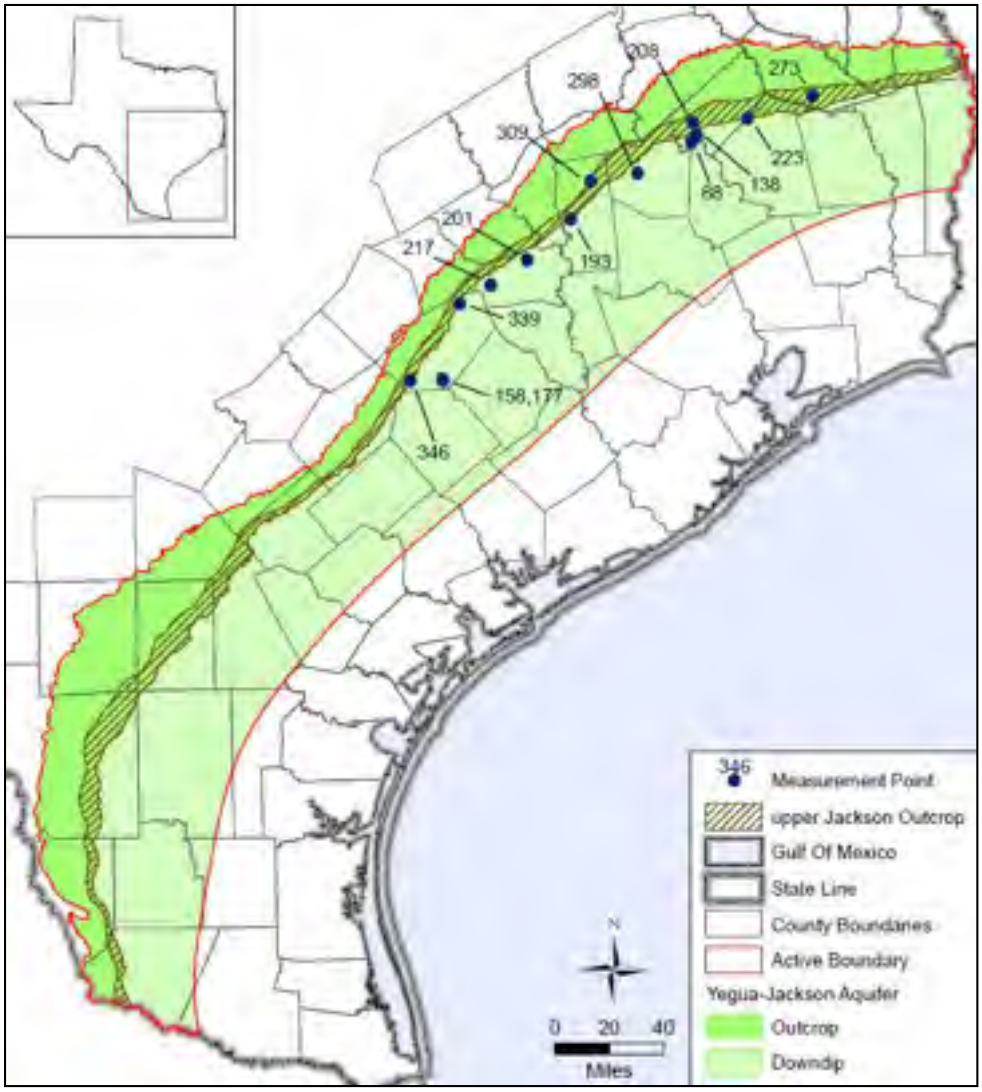

Figure 5-12 – 1997 estimated elevations in Upper Jackson Formation[46]

[46] Map from Deeds, N. E., Singh, T. Y. A., Jones, T. L., Kelley, V. A., Knox, P. R., and Young. S. C., 2010, Final Report Groundwater availability model for the Yegua-Jackson Aquifer: Final Technical Report prepared for the Texas Water Development Board, 582 p.

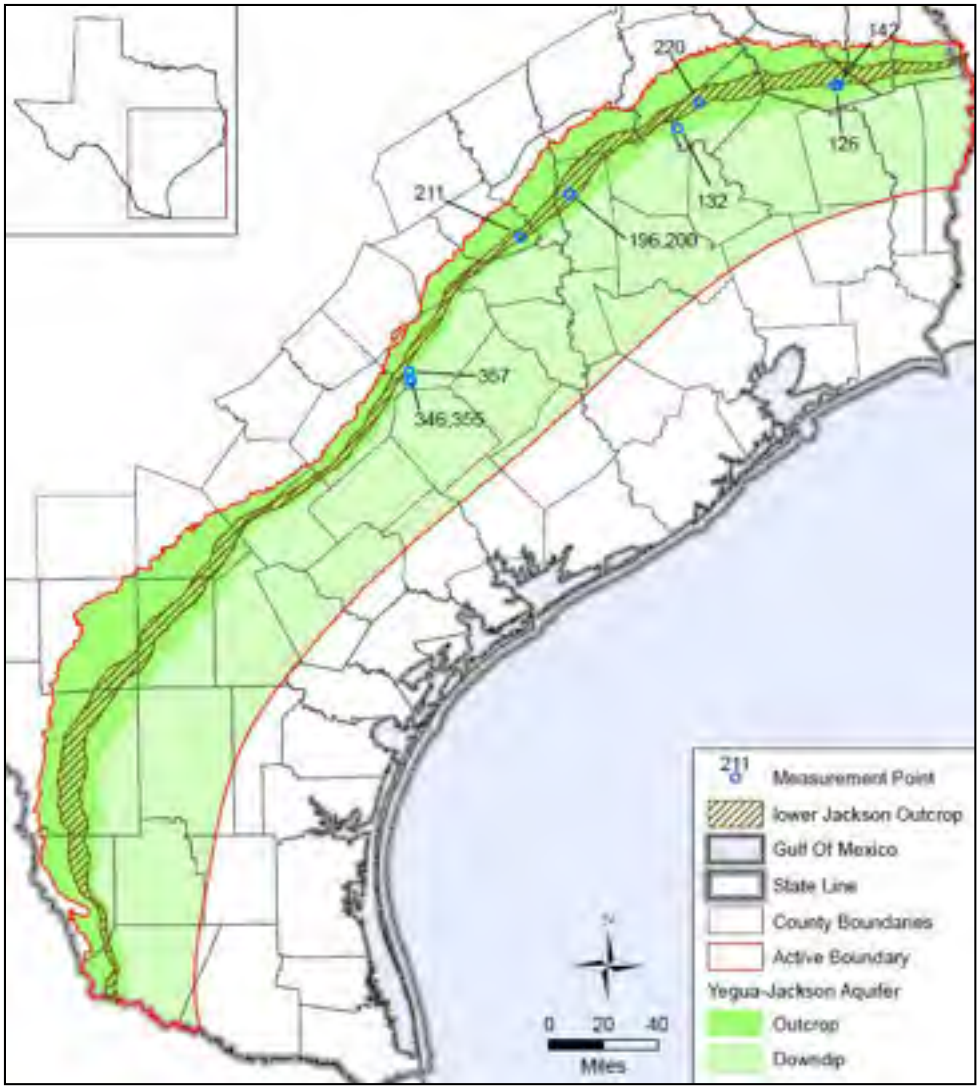

Figure 5-13 – 1997 estimated elevations in Lower Jackson Formation[47]

[47] Map from Deeds, N. E., Singh, T. Y. A., Jones, T. L., Kelley, V. A., Knox, P. R., and Young. S. C., 2010, Final Report Groundwater availability model for the Yegua-Jackson Aquifer: Final Technical Report prepared for the Texas Water Development Board, 582 p.

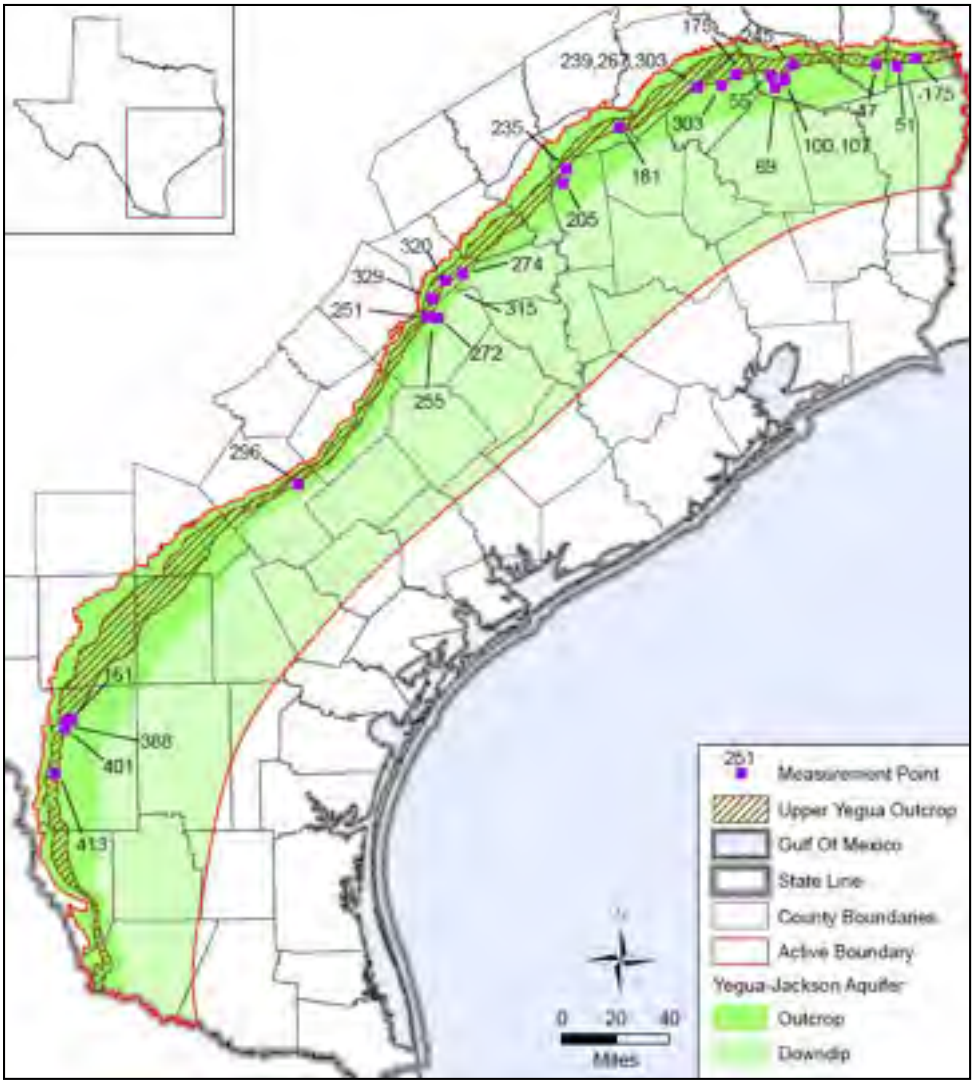

Figure 5-14 – 1997 estimated elevations in Upper Yegua Formation[48]

[48] Deeds, N. E., Singh, T. Y. A., Jones, T. L., Kelley, V. A., Knox, P. R., and Young. S. C., 2010, Final Report Groundwater availability model for the Yegua-Jackson Aquifer: Final Technical Report prepared for the Texas Water Development Board, 582 p.

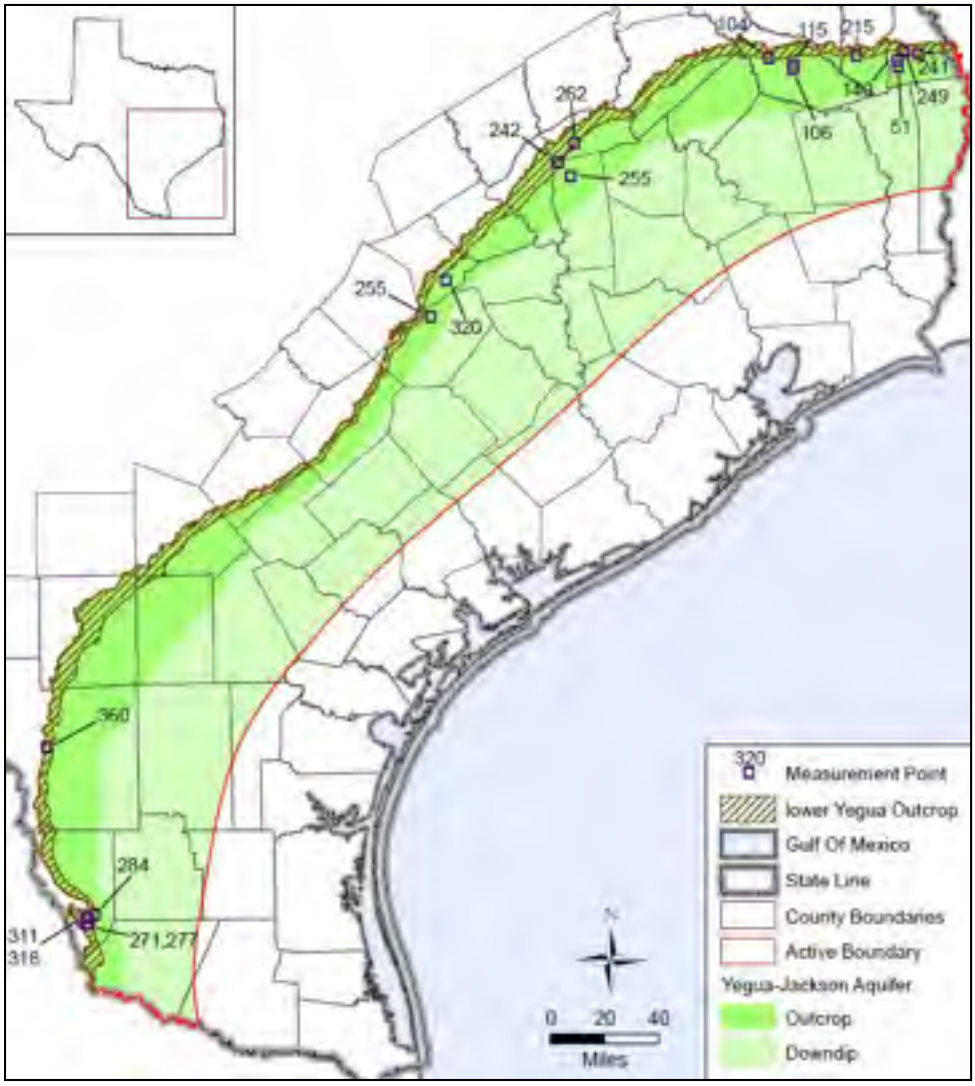

Figure 5-15 – 1997 estimated elevations in Lower Yegua Formation[49]

5.2 WATER SUPPLY NEEDS AND WATER MANAGEMENT STRATEGIES

Texas Water Code Section 36.108 (d)(2), requires District Representatives in a GMA to consider the water supply needs and water management strategies included in the state water plan. In order to meet this requirement, the District Representatives in GMA 14 considered the continued population growth in the area, all water supplies needs, and recommended water

[49] Deeds, N. E., Singh, T. Y. A., Jones, T. L., Kelley, V. A., Knox, P. R., and Young. S. C., 2010, Final Report Groundwater availability model for the Yegua-Jackson Aquifer: Final Technical Report prepared for the Texas Water Development Board, 582 p.

management strategies included in the 2011 regional water plans[50] and the 2012 State Water Plan.[51] Applicable information for this factor is included in its entirety in *Appendix I*.

GMA 14 is centered over one of the most diverse, demographically dynamic regions of the State of Texas. Although the 20 counties making up GMA 14 represent less than 10 percent of the land mass of Texas, the approximately 6,529,891 people living in the area of GMA 14 in 2010 (see Table 5.5) represent 25.7 percent of the State's total population, and over the 50-year planning horizon, GMA 14 is projected to increase to 11,958,683 people, representing an 83 percent increase in the population in the region. A review of the individual county population projections, however, documents that this distribution of population in GMA 14 is not uniform throughout the area. Harris County is the most populous county in GMA 14 (and the most populous county in Texas) with 4,078,231 people in 2010, followed by Fort Bend, and Montgomery counties with 550,121 and 453,369 people, respectively (see Table 5.5)). Fourteen of twenty counties in GMA 14 recorded populations of less than 100,000 people in 2010, with the two least-populous counties in GMA 14, Newton and Tyler counties, recording 16,008 and 24,744 people, respectively. During the joint-planning process District Representatives paid close attention to both current and projected population projections, both in urban and rural areas. In GMA 14, this examination of current and projected population highlights the significant differences that exist between urban and rural demographics. This difference, especially with respect to municipal water use, is widely variable in GMA 14.

Table 5-5 – Population projections for GMA 14 included in the 2012 State Water Plan[52]

County	2012 State Water Plan Projected Population					
	2010	2020	2030	2040	2050	2060
AUSTIN	27,173	30,574	32,946	34,355	35,031	35,958
BRAZORIA	305,649	354,708	401,684	444,981	490,875	538,795
CHAMBERS	34,282	40,786	46,838	52,083	57,402	62,850
FORT BEND	550,121	719,737	893,875	1,090,710	1,348,851	1,643,825
GALVESTON	268,714	284,731	294,218	298,057	300,915	302,774
GRIMES	26,635	30,073	32,785	34,670	36,176	37,657
HARDIN	54,504	59,115	61,211	63,381	65,627	67,954
HARRIS	4,078,231	4,629,335	5,180,439	5,731,543	6,282,647	6,833,751

[50] Brazos G Regional Water Planning Group, 2011, Brazos G Regional Water Plan, http://www.twdb.texas.gov/waterplanning/rwp/plans/2011/index.asp. Region H Regional Water Planning Group, 2011, Region H Regional Water Plan, http://www.twdb.texas.gov/waterplanning/rwp/plans/2011/index.asp. East Texas Regional Water Planning Group, 2011, East Texas Regional Water Plan, http://www.twdb.texas.gov/waterplanning/rwp/plans/2011/index.asp.

[51] Texas Water Development Board, Water for Texas – 2012: The State Water Plan, 299 p., http://www.twdb.texas.gov/waterplanning/swp/2012/index.asp.

[52] Texas Water Development Board, Water for Texas, 2012 Texas State Water Plan.

County	2012 State Water Plan Projected Population					
	2010	2020	2030	2040	2050	2060
JASPER	38,445	40,897	42,344	42,712	42,712	42,712
JEFFERSON	259,700	270,686	280,590	288,225	295,924	310,478
LIBERTY	81,930	94,898	107,335	119,519	132,875	147,845
MONTGOMERY	453,369	588,351	751,702	931,732	1,169,199	1,444,999
NEWTON	16,008	16,731	16,825	17,329	17,849	18,385
ORANGE	90,503	94,274	95,818	96,473	97,843	98,836
POLK	48,072	54,897	60,401	64,478	68,247	71,928
SAN JACINTO	27,443	32,541	36,617	39,159	40,630	41,299
TYLER	24,744	28,513	30,937	31,866	31,866	31,866
WALKER	70,672	77,915	81,402	80,547	80,737	80,737
WALLER	41,137	51,175	62,352	74,789	89,598	106,608
WASHINGTON	32,559	35,253	36,973	37,908	38,747	39,426
TOTAL	6,529,891	7,535,190	8,547,292	9,574,517	10,723,751	11,958,683
STATE TOTAL	25,388,403	29,650,388	33,712,020	37,734,422	41,924,167	46,323,725
GMA 14 PERCENT of STATE TOTAL	25.7%	25.4%	25.4%	25.4%	25.6%	25.8%

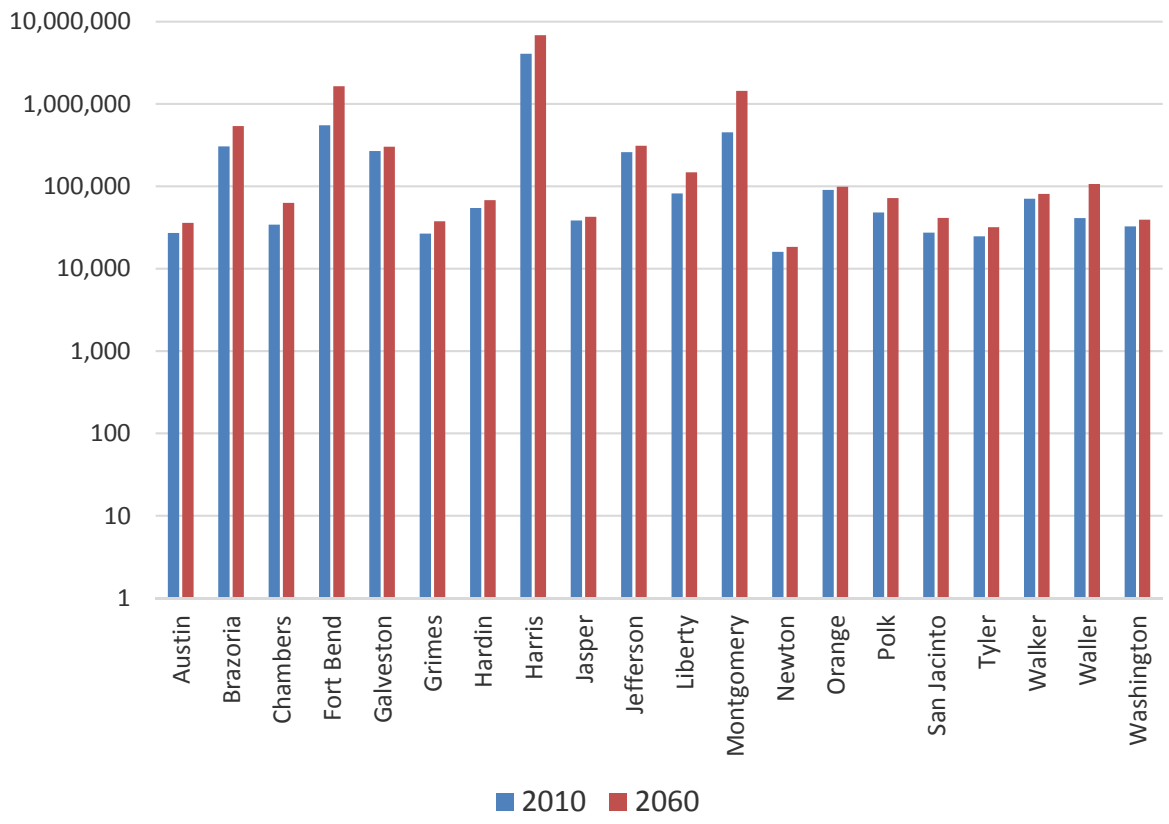

Figure 5-16 – Population projections by county for GMA 14. Population projections are for 2010 and 2060. Note, scale of this graphic is logarithmic in order to document populations in less populated counties.

In Texas, the overall "water needs" for a region, as defined within the Texas State Water Plan, are the demands (based on water demand projections developed during the water-planning process for 6 major water use sectors) that cannot be met with existing supplies. These existing supplies may be inadequate to satisfy demands because of natural conditions (e.g., sustainable supply of an aquifer or firm yield of a reservoir) or infrastructure limitations (e.g. inadequate diversion, treatment, or transmission capacity). A review of the future water management strategies within a region gives some insight into the potential future supply to meet an identified need. Therefore, future groundwater management strategies identified in the 2012 Texas State Water Plan indicate the potential future demand for groundwater in addition to currently utilized supplies.

GMA 14 comprises an area spanning Regional Water Planning Areas G (Brazos G), H, and I (East Texas). Data from the 2012 Texas State Water Plan for each of these regions was used to develop data summaries for consideration by the GMA 14 District Representatives and

interlocal agreement partners. *Figure 5-17* illustrates the growth of total demands and needs (demands not met by existing supplies) within GMA 14 for the three regional water planning areas (G, H, and I). The columns in this figure demonstrate the availability of existing groundwater and other water (surface water, reuse, conservation) supplies in dark and light blue colors, respectively. Future water management strategies based on groundwater and other water supplies are shown in dark and light red colors, respectively. Generally, it can be seen in this figure that the majority of future water supplies will originate from sources other than groundwater supplies and that this ratio of new groundwater supplies to other options will be far below that currently making up existing regional water supplies.

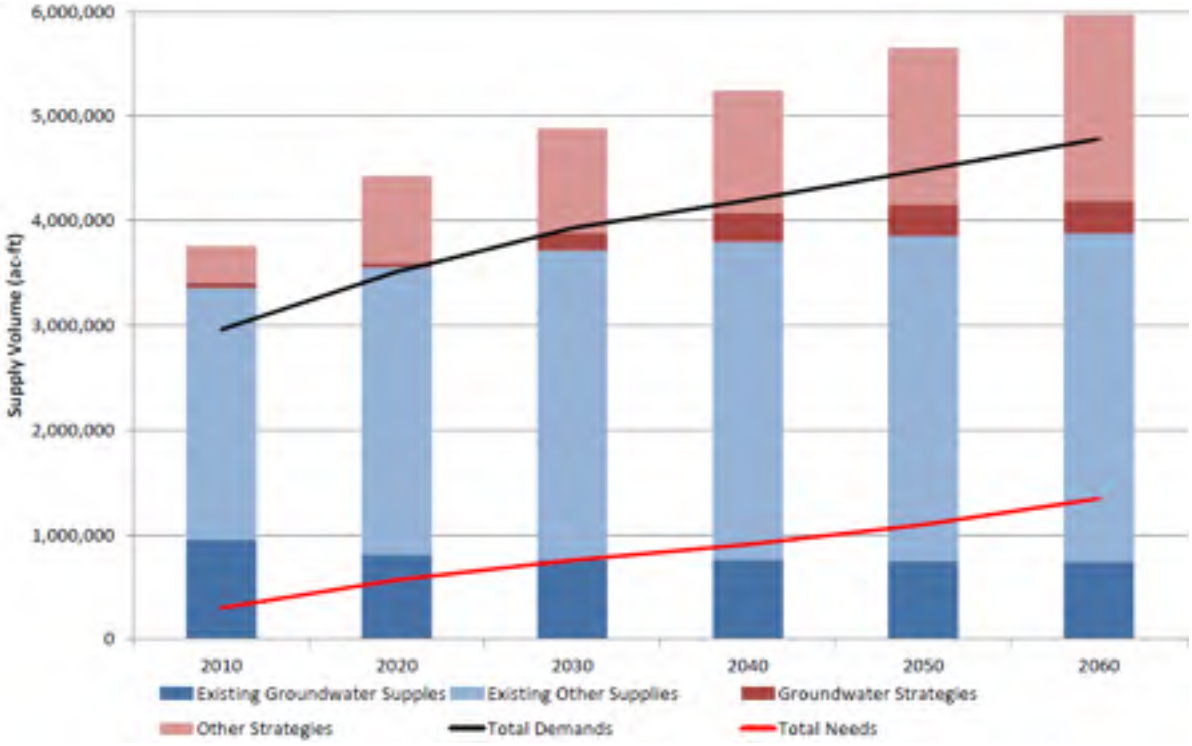

Figure 5-17 – Projected supplies and strategies from the 2012 Texas State Water Plan

The trend toward other water supplies in lieu of expanded groundwater continues at the county level of all counties anticipating significant need for additional water supplies over the course of the planning horizon (*Figure 5-18*).

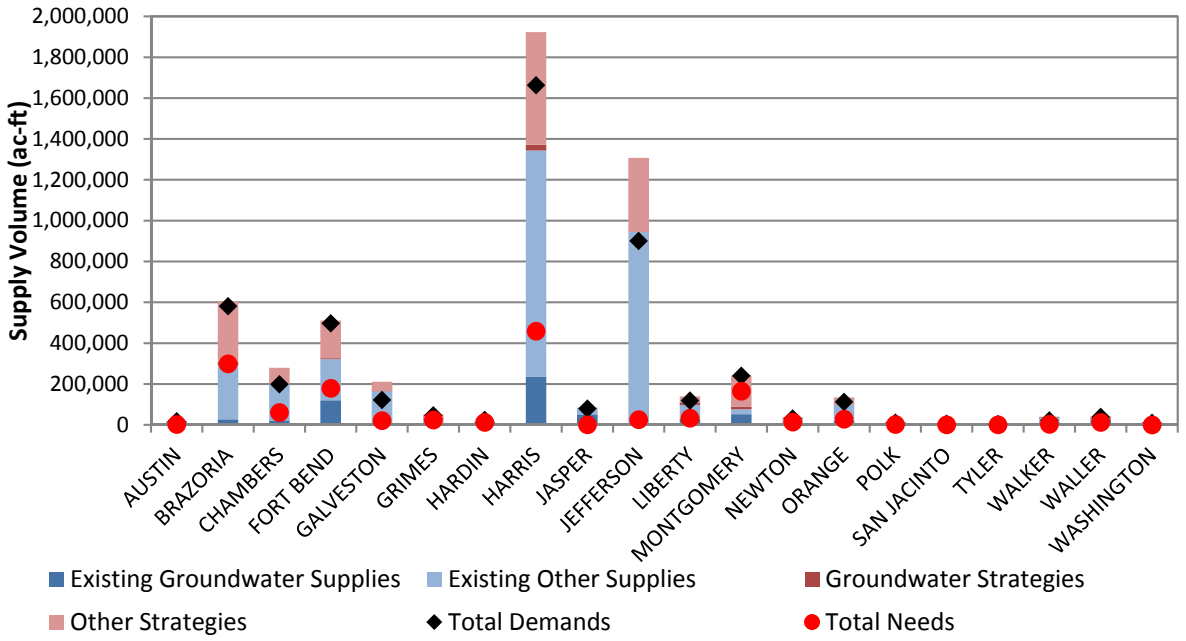

Figure 5-18 – Projected year 2060 supplies and strategies from the 2012 State Water Plan

5.3 HYDROLOGICAL CONDITIONS

Texas Water Code Section 36.108 (d)(3) requires District Representatives in a GMA to consider hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage (TERS) as provided by the executive administrator, and the average annual recharge, inflows, and discharge. As part of the joint-planning process, District Representatives in GMA 14 reviewed and considered estimates of TERS, inflows, outflows, recharge, and discharge for all relevant aquifers based on results from the most recently adopted groundwater availability models (GAMs) and technical assessments from the TWDB. The principal GAM utilized in this analysis was the Northern Gulf Coast Groundwater Availability Model or Northern Gulf Coast GAM. Estimates of TERS were provided by the TWDB executive administrator for review and consideration during the joint-planning process, as required by statute. The technical materials focused on hydrological conditions, including estimates of TERS, inflows, outflows, recharge, and discharge for all relevant aquifers, presented and considered by the District Representatives in GMA 14, are included in their entirety in *Appendix J*.

The hydrostratigraphy utilized in the Northern Gulf Coast GAM for the Gulf Coast Aquifer System is documented in the following *Figure 5-19*. Of the five hydrostratigraphic units utilized in construction of the Northern Gulf Coast GAM, the Chicot, Evangeline, and Jasper aquifers are recognized as the primary water-bearing resources in GMA 14.

Although this section is focused on the consideration of hydrological conditions, it is noted, however, that there are no significant differences between this requirement in Texas Water Code Section 36.108 (d)(3) and the requirements contained in Texas Water Code Section 36.108 (d)(1) to consider "aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another," at least with respect to "hydrologic conditions." As discussed in *Section 5.1* above, there are several ways to express and evaluate hydrological conditions in an aquifer. As discussed in *Section 5.4*, hydrologic conditions may be evaluated based on spring flows, the volume of water remaining in storage in areas of unconfined conditions, the measurements of artesian pressures in the aquifer in regional-dipping and predominantly confined aquifers, and in certain coastal areas on levels of land-surface subsidence. As discussed in *Section 5.1* and in *Figure 5-5* through *Figure 5-15* above, GMA 14 District Representatives reviewed contour maps of the potentiometric surface of the various aquifers within GMA 14 as a representation of current aquifer/hydrologic conditions. Historical pumpage, along with the geology of the formations, have resulted in patterns of potentiometric (water) surface elevations throughout the aquifers that vary from county to county across the GMA. The pattern of these contours was used by GMA 14 District Representatives to evaluate aquifer/hydrologic conditions as part of the joint-planning process.

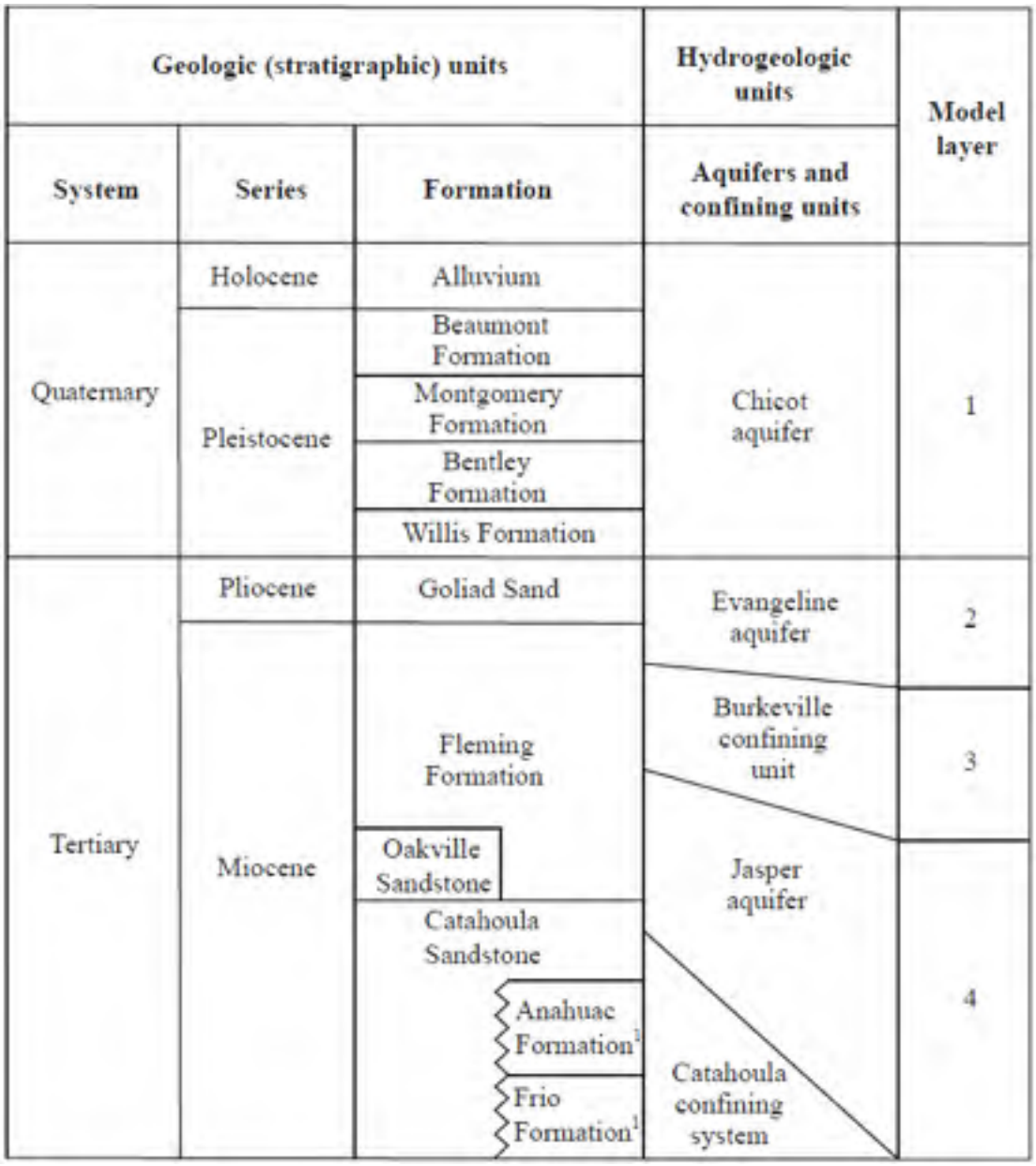

Figure 5-19 – Hydrostratigraphic column utilized in development of the Northern Gulf Coast GAM [53]

With the release of the initial report of TERS, as provided by the TWDB[54], GMA 14 District Representatives invested significant time in consideration of the TERS and the ramifications of

[53] Kasmarek, M.C., 2012, Hydrogeology and simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast Aquifer System, Texas, 1891–2009 (ver. 1.1, December 2013): U.S. Geological Survey Scientific Investigations Report 2012–5154, 55 p., http://dx.doi.org/sir20125154.

[54] Wade, S., Thorkildsen, D., and Anaya, R., 2014, GAM Task 13-037: Total estimated recoverable storage for aquifers in Groundwater Management Area 14: Texas Water Development Board, 35 p.

those estimates on proposed DFCs. For a more detailed reference to these discussions, the reader is referred to the meeting minutes included in *Appendix B*. The TERS report prepared and provided by the TWDB is reproduced in its' entirety in *Appendix K*. TERS volumes, in acre-feet, for GMA 14 for the Gulf Coast Aquifer System, based on this report is 2,776,000,000 acre-feet. *Figure 5-20* provides a county by county comparison of the TERS values included in Wade and others, 2014).

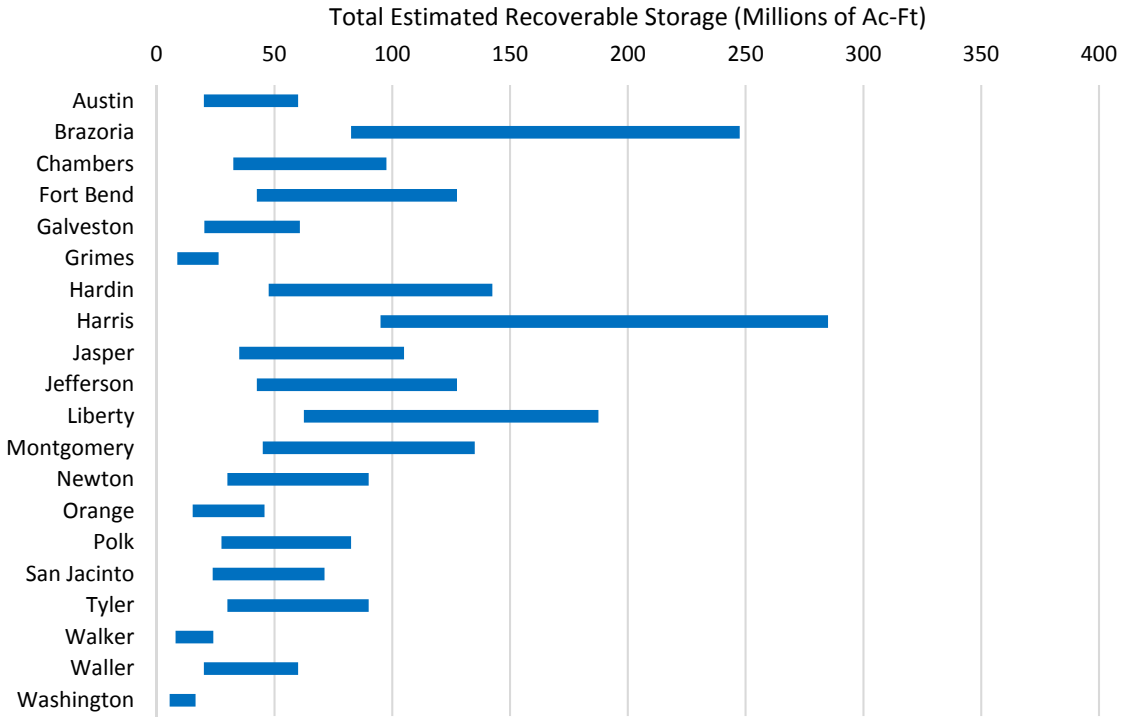

Figure 5-20 –Total Estimated Recoverable Storage by county

Following release of the initial TERS report by the TWDB, the estimates were again provided to GMA 14 by the TWDB in a slightly different format, wherein estimates are divided into unconfined and confined storage. The following graphic (*Figure 5-21*) is taken from Wade and others (2014) and is reproduced here to illustrate the differences in confined and unconfined storage. *Table 5-6* and *Table 5-7* include the additional breakdowns of TERS into confined and unconfined storage provided by the TWDB. One of the more notable conclusions that GMA 14 District Representatives made with regards to the TERS data was that while the Gulf Coast Aquifer System in GMA 14, as reported by the TWDB in Table 5.7, contains 2,776,000,000 acre-feet in total storage, only 10,952,354 acre-feet, equivalent to 0.39 percent, is in confined storage.

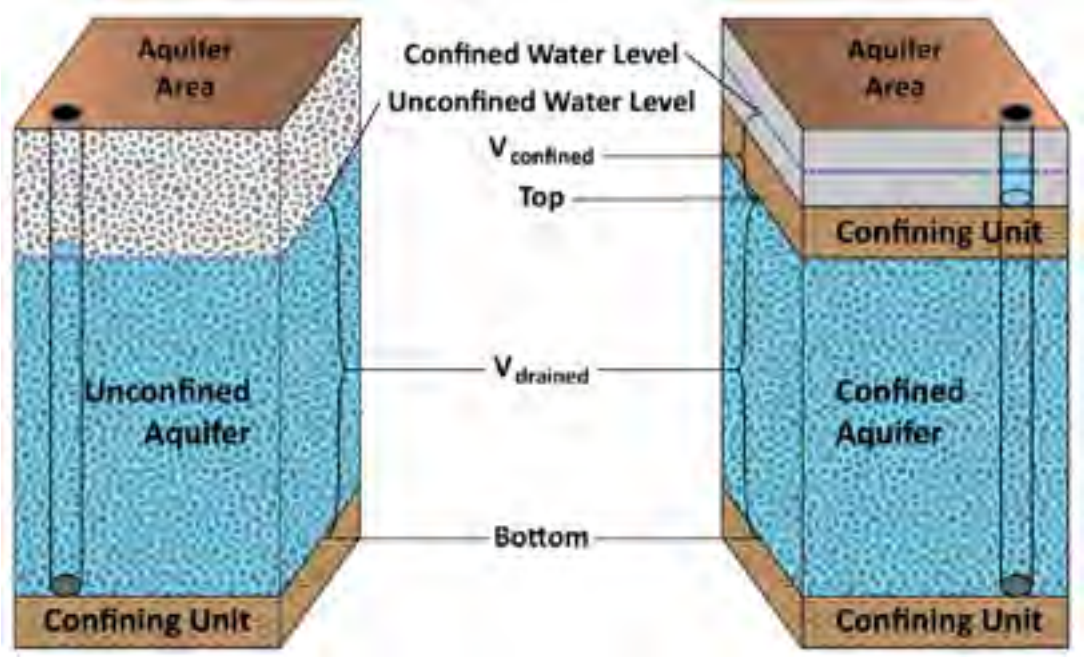

Figure 5-21 – Illustration of relevant hydrological features on which TERS analysis is based

Table 5-6 – Total estimated recoverable storage separated into unconfined and confined components by county for the Gulf Coast Aquifer System within GMA 14[55]

County	Unconfined Storage (acre-feet)	Confined Storage (acre-feet)	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
Austin	79,623,694	271,616	80,000,000	20,000,000	60,000,000
Brazoria	331,167,468	353,328	330,000,000	82,500,000	247,500,000
Chambers	133,220,055	110,414	130,000,000	32,500,000	97,500,000
Fort Bend	169,317,122	278,931	170,000,000	42,500,000	127,500,000
Galveston	81,060,010	64,662	81,000,000	20,250,000	60,750,000
Grimes	34,519,292	349,720	35,000,000	8,750,000	26,250,000
Hardin	186,491,653	597,418	190,000,000	47,500,000	142,500,000
Harris	378,374,831	928,622	380,000,000	95,000,000	285,000,000
Jasper	134,045,649	1,477,803	140,000,000	35,000,000	105,000,000
Jefferson	167,257,677	176,416	170,000,000	42,500,000	127,500,000
Liberty	252,446,158	503,245	250,000,000	62,500,000	187,500,000
Montgomery	177,162,460	459,467	180,000,000	45,000,000	135,000,000
Newton	117,797,063	1,307,452	120,000,000	30,000,000	90,000,000
Orange	61,007,322	74,590	61,000,000	15,250,000	45,750,000
Polk	104,012,585	1,270,347	110,000,000	27,500,000	82,500,000

[55] Data provided via email communication from Cindy Ridgeway, TWDB, to Kathy Turner Jones, Lone Star GCD, dated August 19, 2015, regarding additional information pertaining to confined and unconfined TERS in GMA 14.

County	Unconfined Storage (acre-feet)	Confined Storage (acre-feet)	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
San Jacinto	94,096,911	674,636	95,000,000	23,750,000	71,250,000
Tyler	122,555,582	1,084,621	120,000,000	30,000,000	90,000,000
Walker	31,581,118	369,472	32,000,000	8,000,000	24,000,000
Waller	79,788,799	197,751	80,000,000	20,000,000	60,000,000
Washington	21,389,164	401,842	22,000,000	5,500,000	16,500,000
Total	**2,756,914,613**	**10,952,354**	**2,776,000,000**	**694,000,000**	**2,082,000,000**

Table 5-7 – Total estimated recoverable storage separated into unconfined and confined components by groundwater conservation district for the Gulf Coast Aquifer System within GMA 14[56]

Groundwater Conservation District (GCD)	Unconfined Storage (acre-feet)	Confined Storage (acre-feet)	Total Storage (acre-feet)	25 percent of Total Storage (acre-feet)	75 percent of Total Storage (acre-feet)
No District	635,320,376	1,266,508	640,000,000	160,000,000	480,000,000
Bluebonnet GCD	225,512,903	1,188,558	230,000,000	57,500,000	172,500,000
Brazoria County GCD	331,167,468	353,328	330,000,000	82,500,000	247,500,000
Fort Bend Subsidence District	169,317,122	278,931	170,000,000	42,500,000	127,500,000
Harris-Galveston Coastal Subsidence District	459,434,842	993,283	460,000,000	115,000,000	345,000,000
Lone Star GCD	177,162,460	459,467	180,000,000	45,000,000	135,000,000
Lower Trinity GCD	198,109,496	1,944,983	200,000,000	50,000,000	150,000,000
Southeast Texas GCD	560,889,946	4,467,294	570,000,000	142,500,000	427,500,000
Total	**2,756,914,613**	**10,952,354**	**2,780,000,000**	**695,000,000**	**2,085,000,000**

Note: The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

In addition to the consideration of TERS, GMA 14 District Representatives also considered the water budgets for each aquifer in GMA 14, including recharge from land surface (as quantified by General Head Boundary in the Northern Gulf Coast Aquifer GAM), pumpage, lateral inflows, leakage to an upper unit, leakage from an upper unit, leakage to a lower unit, leakage from a

[56] Data provided via email communication from Cindy Ridgeway, TWDB, to Kathy Turner Jones, Lone Star GCD, dated August 19, 2015, regarding additional information pertaining to confined and unconfined TERS in GMA 14.

lower unit, discharge to the surface (as quantified by General Head Boundary in the Northern Gulf Coast Aquifer GAM), and lateral outflows. An example of the county/aquifer specific water budgets for Austin County is included below in *Figure 5-22*. In Austin County, the volumetrically dominant aquifer is the Evangeline Aquifer. Other observations from this illustration of the water budgets in Austin County include (1) pumping from the Chicot Aquifer is a very small part of the water budget, (2) recharge to the Chicot Aquifer from land surface is almost equal to the amount of leakage from the Chicot Aquifer to the Evangeline Aquifer, and (3) lateral inflows in to the Chicot Aquifer in Austin County are almost twice the lateral inflows into the Evangeline Aquifer. Similarly prepared water budgets for the remaining 19 counties in GMA 14 are presented in *Appendix L*.

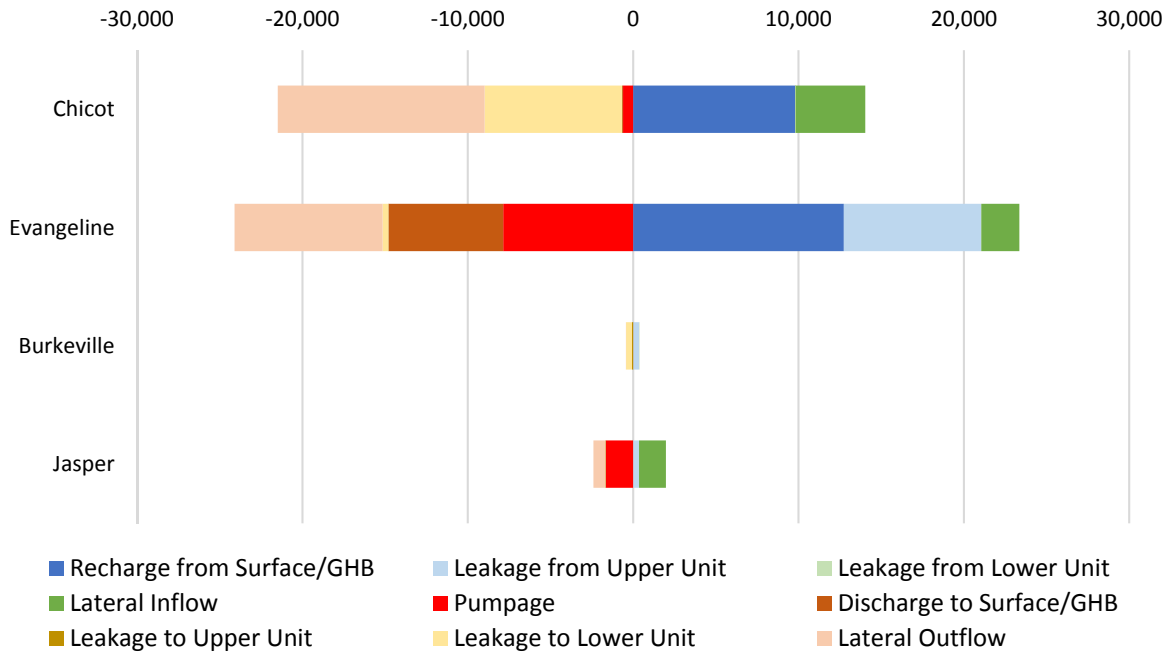

Figure 5-22 – Example water balance for Austin County

Estimates of TERS, water budgets, and aquifer conditions (based on potentiometric surface maps) for the minor aquifers in GMA 14 were also considered by the District Representatives. This information is included in *Appendix K* and *Appendix L*. However, since all minor aquifers in GMA 14 have been declared as non-relevant for joint-planning purposes (see *Section 0* below), no further discussion of these minor aquifers is included in this section focused on the consideration of hydrological conditions in GMA 14.

Throughout the later stages of the GMA 14 joint-planning efforts, significant comments were received from stakeholders with regards to the appropriate role that the estimates of TERS should have in establishing DFCs. A more detailed discussion on these comments is provided in Section 8.0 of this Explanatory Report. As stated therein, the GMA 14 District

Representatives carefully weighed all comments received on the issue of TERS and ultimately decided, for a number of reasons, that due to other considerations, in particular the negative socioeconomic impacts of subsidence, TERS has no practical application in the GMA 14 joint-planning process or in groundwater management of the Gulf Coast Aquifer System.

5.4 ENVIRONMENTAL FACTORS

Texas Water Code Section 36.108 (d)(4) requires District Representatives in a GMA to consider environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water. This requirement was met by reviewing applicable scientific literature including information contained in scientific literature published for relevant aquifers in GMA 14. In addition, environmental issues presented in applicable 2011 regional water plans were also considered. Information presented and considered by GMA 14 District Representatives on this factor is included in its entirety in *Appendix M*.

The primary focus of this factor was on surface water – groundwater interaction. After a review of available literature, in particular Kasmarek (2012)[57], it was determined that there is insignificant interaction between surface water bodies (streams, rivers, and lakes) and aquifers in the Northern Gulf Coast Aquifer System. As a result, there is no significant surface water/groundwater interaction modeled in the Northern Gulf Coast GAM utilizing the MODFLOW "stream package." Consequently, there is no tool available to provide any quantitative analysis of the interaction between surface water and groundwater for the Gulf Coast Aquifer system. As part of the considerations made by GMA 14 District Representatives, however, it was noted that groundwater and surface water interaction occurs on a very limited basis, based on USGS and TWDB studies. In addition, Lower Colorado River Authority studies conducted to the southwest of GMA 14 have shown that surface water and groundwater interaction is limited to the shallow groundwater system and the Colorado River, and that similar conditions could occur in GMA 14.

5.5 SUBSIDENCE

Texas Water Code Section 36.108 (d)(5) requires District Representatives in a GMA to consider the impacts of proposed desired future conditions on subsidence. The impact of proposed DFCs on subsidence are clearly more significant in GMA 14 than in any other GMA in Texas. The importance of subsidence, and more importantly, the prevention of future subsidence, is illustrated in *Figure 5-8*, which illustrated actual measured subsidence in the Harris and Galveston areas greater than 10 feet from 1906 – 2000. District Representatives spent

[57] Kasmarek, M.C., 2012, Hydrogeology and simulation of groundwater flow and land-surface subsidence in the northern part of the Gulf Coast Aquifer System, Texas, 1891–2009 (ver. 1.1, December 2013): U.S. Geological Survey Scientific Investigations Report 2012–5154, 55 p., http://dx.doi.org/sir20125154.

considerable time reviewing scientific studies on subsidence in GMA 14, including results from the recently completed update to the Northern Gulf Coast GAM with a focus on the subsidence package developed as part of this model update (see Kasmarek, 2012[58], and Freese & Nichols and others, 2012[59]). Additional technical resources utilized by GMA 14 District Representatives during their consideration of potential impacts of proposed DFCs included Kasmarek and Robinson, (2004)[60], Coplin and Galloway, (1999)[61], Holzschuh, (1991)[62], Jones and Larson (1975)[63], Harris-Galveston Subsidence District (2014)[64], and Campbell and others (2014)[65]. The presentation on impacts of proposed DFCs on subsidence is included in its' entirety in *Appendix N*. This presentation on subsidence in GMA 14 generally focused on predictions of subsidence utilizing PRESS model results for Harris, Galveston, and Fort Bend counties, and utilizing the Northern Gulf Coast GAM Run 2 (SUB package) for the remainder of GMA 14.

Prediction of Effective Stress and Subsidence ("PRESS") model predictions of subsidence (Freese & Nichols and others, 2012), as illustrated in *Figure 5-23*, for the period of 2010 – 2070, indicate that more than 3.25 feet of future subsidence will occur in the Arcola area of Fort Bend County, followed by more than 2.25 feet and 1.75 feet of future subsidence in the Katy area and Laughlin Creek area in Harris County, respectively. It is noted that the PRESS model results were limited to areas where PRESS model sites exist, mostly within the Subsidence Districts. At this point in time, no areas other than the Subsidence Districts have PRESS models.

[58] Kasmarek, M.C., 2012, Hydrogeology and Simulation of Groundwater Flow and Land-Surface Subsidence in the Northern Part of the Gulf Coast Aquifer System, Texas, 1891–2009: Scientific Investigations Report 2012–5154, Version 1.1, 55 p.

[59] Freese & Nichols, and others, 2012, Regional Groundwater Update Project: Final Report prepared for the Harris-Galveston Subsidence District, Fort Bend Subsidence District, and Lone Star Groundwater Conservation District, 24 p.

[60] Kasmarek, M. C., and Robinson, J. L., 2004, Hydrogeology and Simulation of Ground-Water Flow and Land-Surface Subsidence in the Northern Part of the Gulf Coast Aquifer System, Texas: U. S. Geological Survey Scientific Investigations Report 2004–5102, 111 p.

[61] Coplin, L.S., and Galloway, D.L., 1999, Houston-Galveston, Texas—Managing coastal subsidence: in Land Subsidence in the United States, Galloway, D.L., Jones, D.R., and Ingebritsen, S.E., eds., U.S. Geological Survey Circular 1182, p. 35-48, http://pubs.usgs.gov/circ/circ1182/, accessed Feb. 13, 2009.

[62] Holzschuh, J.C., 1991, Land Subsidence in Houston, Texas U.S.A.: Field-Trip Guidebook for the 4th International Symposium on Land Subsidence, May 12–17, 1991, Houston, Tex., 22 p.

[63] Jones, L. L., and Larson, J., 1975, Economic effects of land subsidence due to excessive groundwater withdrawal in the Texas Gulf Coast area: Texas Water Resources Institute, Texas A & M University, Technical Report No. 67, 33 p.

[64] Harris-Galveston Subsidence District 2015 Annual Groundwater Report, 146 p. See http://hgsubsidence.org/wp-content/uploads/2015/08/HG_GW_Report_2015-Approved.pdf

[65] Campbell, M. D., Wise, H. M., and Bost, R. C., 2014, Growth faulting and subsidence in the Houston, Texas Area: Guide to the origins, relationships, hazards, potential impacts and methods of investigation: Published for the Graduates and Members of The Institute of Environmental Technology, Houston, Texas, The Houston Geological Society, and, The American Institute of Professional Geologists, 102 p.

The SUB package in the Northern Gulf Coast GAM was utilized for the rest of the GMA 14. Based on results from the Northern Gulf Coast GAM Run 2 utilizing the SUB package, average predictions of subsidence on a county basis range from 0.0 feet for Grimes, Polk, Walker, and Washington counties to 0.5 feet for Austin, Liberty, and Montgomery counties and 0.7 feet in Brazoria County (*Figure 5-24* and *Figure 5-25*).

The economic impacts of subsidence are a priority public policy issue in the areas included in GMA 14, in large part due to the catastrophic economic impacts that result from significant land surface subsidence. During considerations of the impacts of proposed DFCs on subsidence, District Representatives and inter-local agreement partners discussed a number of factors impacting subsidence. Groundwater use resulting in groundwater-level declines in the Gulf Coast Aquifer System results in land surface subsidence and increased movement along growth faults in the Texas Gulf Coast. Groundwater-level decline, subsidence, and faulting are inter-related in the Gulf Coast Aquifer System, all having the potential for an adverse economic impact (Campbell and others, 2013[66]). Jones and Larson (1975[67]) estimated the cost associated with land subsidence in about a 900 mi^2 area including a small portion of Harris County and some shoreline in Galveston County to be about $32 million (about $150 million in 2015) annually. When looking at the financial impacts for repairing 165 homes along 3 fault zones, costs exceed $2.7 million dollars, not including damage to public infrastructure, which would have been far greater (Campbell and others, 2013). Coplin and Galloway (1999[68]) and Holzschuh (1991[69]) suggested that subsidence-damage estimates just along the Houston Ship Channel refineries were in the range of $340 million (1998 dollars) while damage requiring repairs and re-construction to industry-wide infrastructure likely amounted to billions of dollars (as of 1998) (Campbell and others, 2013). Considering the magnitude of population growth over the last decade and the associated increased water demand, public infrastructure, and new development, the economic impact of subsidence in the GMA 14 region is most certainly in the billions of dollars.

[66] Campbell, M. D., Wise, H. M., and Bost, R. C., 2014, Growth faulting and subsidence in the Houston, Texas Area: Guide to the origins, relationships, hazards, potential impacts and methods of investigation: Published for the Graduates and Members of The Institute of Environmental Technology, Houston, Texas, The Houston Geological Society, and, The American Institute of Professional Geologists, 102 p.

[67] Jones, L. L., and Larson, J., 1975, Economic effects of land subsidence due to excessive groundwater withdrawal in the Texas Gulf Coast area: Texas Water Resources Institute, Texas A & M University, Technical Report No. 67, 33 p.

[68] Coplin, L.S., and Galloway, D.L., 1999, Houston-Galveston, Texas—Managing coastal subsidence: in Land Subsidence in the United States, Galloway, D.L., Jones, D.R., and Ingebritsen, S.E., eds., U.S. Geological Survey Circular 1182, p. 35-48, http://pubs.usgs.gov/circ/circ1182/, accessed Feb. 13, 2009.

[69] Holzschuh, J.C., 1991, Land Subsidence in Houston, Texas U.S.A.: Field-Trip Guidebook for the 4th International Symposium on Land Subsidence, May 12–17, 1991, Houston, Tex., 22 p.

Based on these considerations, subsidence is clearly one of the most important factors to take into account when establishing DFCs. Unique to GMA 14, DFCs specific to land subsidence were adopted for 7 of the 20 counties making up the GMA. While DFCs specific to every county in GMA 14 were not adopted, clearly, the impact of projected groundwater use was considered in the adopted DFCs for the Gulf Coast Aquifer System in GMA 14.

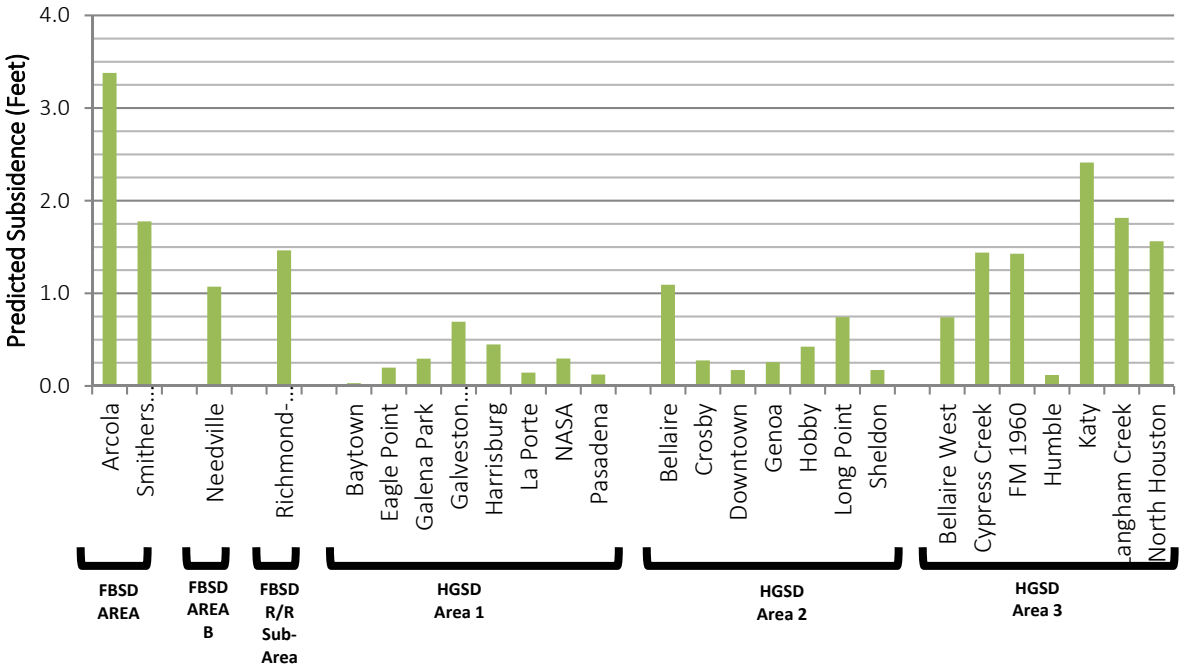

Figure 5-23 – Predictions of subsidence in locations throughout Fort Bend, Galveston, and Harris Counties utilizing the PRESS model[70]

[70]See http://hgsubsidence.org/wp-content/uploads/2013/07/Regional_Groundwater_Update_Project-Report-6-2013.pdf.

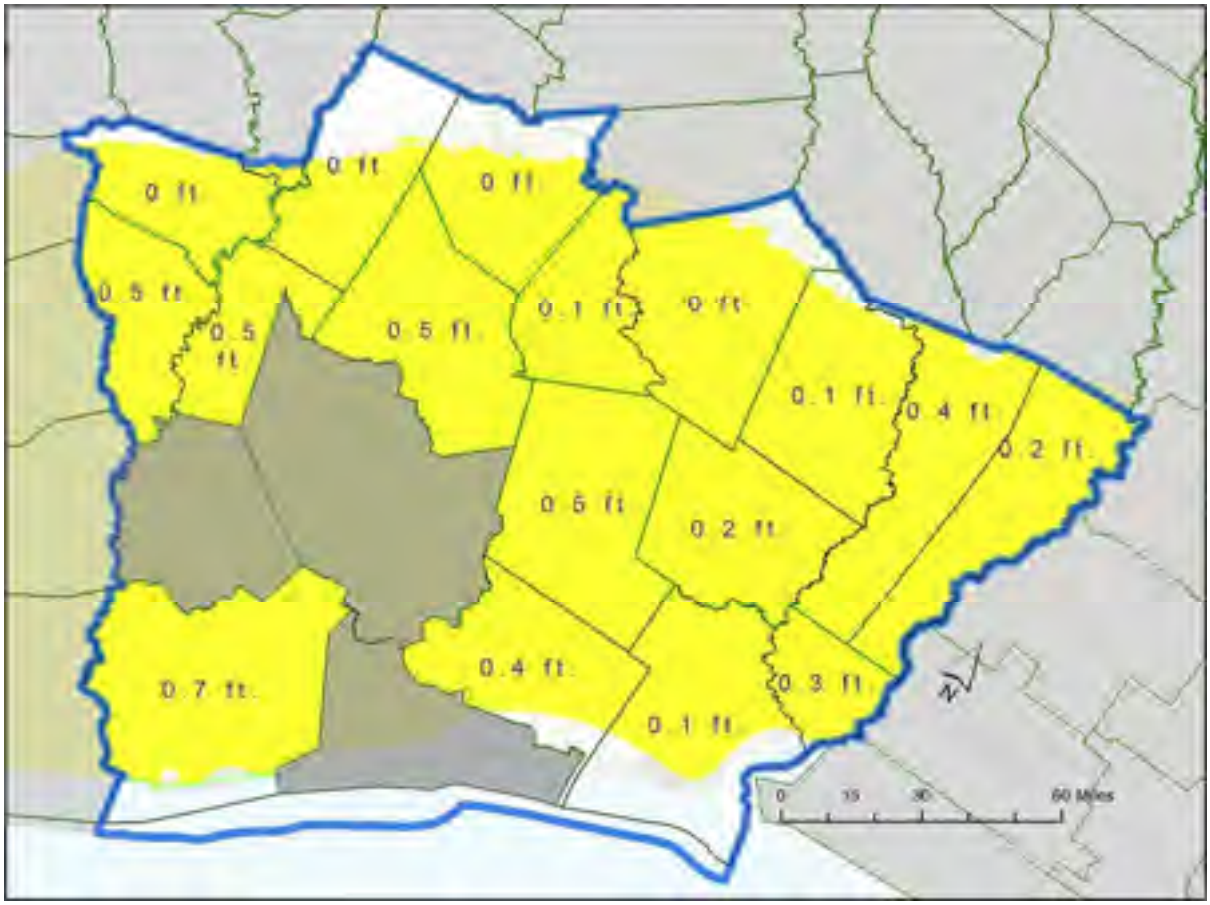

Figure 5-24 – County average subsidence results from Northern Gulf Coast GAM Run 2 using SUB package for predictive period of 2010-2070[71]

[71] Results from Northern Gulf Coast Aquifer GAM Run 2

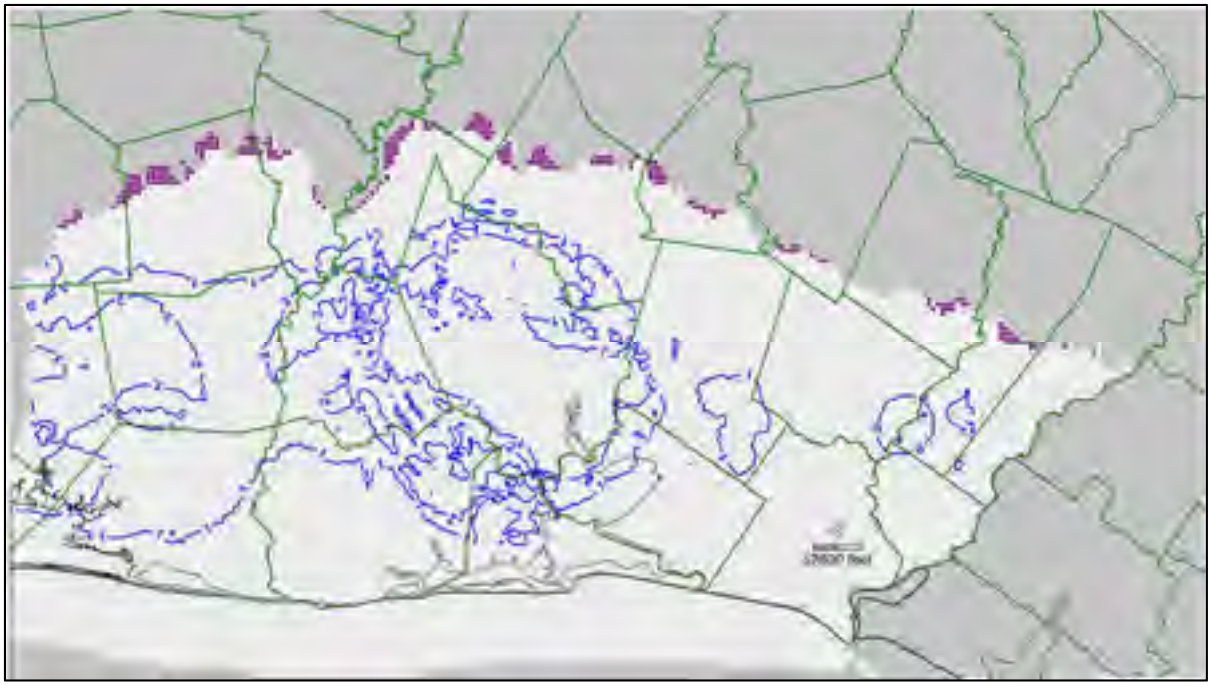

Figure 5-25 – Contours of subsidence from Northern Gulf Coast GAM Run 2 using SUB package for predictive period of 2010-2070.

5.6 SOCIOECONOMICS

Texas Water Code Section 36.108 (d)(6) requires District Representatives in a GMA to consider socioeconomic impacts reasonably expected to occur as a result of the proposed desired future conditions for relevant aquifers. Consideration of socioeconomic impacts as part of water planning in Texas, both at the regional and state level, has been a fundamental element of the planning process dating back to the 1990s. Texas Water Code Section 16.051 (a) states that the TWDB "shall prepare, develop, formulate, and adopt a comprehensive state water plan that . . . shall provide for . . . further economic development." A companion provision in Texas Water Code Section 16.053 (a) and (b) creates a similar requirement for regional water planning groups that regional water plans "further economic development." Title 31 of Texas Administrative Code, Section 357.7 (4)(A) states, "The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs." This technical assistance and analysis provided by the executive administrator is the only consistent analysis of socioeconomic impacts available for joint-planning in regards to socioeconomic impacts, both at the local, regional, and state level. Title 31 of Texas Administrative Code, Section 357.40(a) states that regional water plans "shall include a quantitative description of the socioeconomic impacts of not meeting the identified water needs pursuant to §357.33(c) of this title (relating to Needs Analysis: Comparison of

Water Supplies and Demands)." This analysis, executed by the executive administrator at the TWDB, is performed at the request of the individual regional water planning groups and is based on water supply needs from the regional water plans. This analysis consists of a series of point estimates of 1-year droughts at 10-year intervals. The socioeconomic impact analysis attempts to measure the impacts in the event that water user groups do not meet their identified water supply needs associated with a drought of record for one year. For this socioeconomic impact analysis, multiple impacts are examined, including (1) sales, income, and tax revenue, (2) jobs, (3) population, and (4) school enrollment. Results from this analysis are then incorporated into the final regional water plan, and then comprehensively presented in the subsequent state water plan.

Information regarding socioeconomic impacts reasonably expected to occur as a result of the proposed DFCs presented to GMA 14 District Representatives is included in its entirety in *Appendix O*. As part of the GMA 14 District Representatives' considerations of socioeconomic impacts reasonably expected to occur as a result of the proposed DFCs for relevant aquifers in GMA 14, the socioeconomic impact analysis provided by the Texas Water Development Board to Brazos G[72], Region H[73], and East Texas[74] regional water planning groups for the 2011 regional water plans were considered. These technical memoranda are included in their entirety as *Appendix P*, *Appendix Q*, and *Appendix R*, respectively. To illustrate the regional impacts of not meeting water supply needs, examples for specific water user groups for each of the three regional water planning areas (G, H, and I) along with regional summaries for Region H were presented. *Figure 5-26* and *Figure 5-27* illustrate the socioeconomic impacts of not meeting water supply needs in Region H based on the 2011 Region H Regional Water Plan. An example of the significance of not meeting future water supply needs is illustrated in *Figure 5-26* in which lost income in 2060 will be almost $19 billion annually for Region H if water supply needs identified in the 2011 Region H Regional Water Plan are not met. Similarly, *Figure 5-27* illustrates that there will be a loss of more than 170,000 people in Region H if projected water supply needs are not met.

[72] Norvell, S. D., and Shaw, S. D. 2010, Socioeconomic Impacts of Projected Water Shortages for the Brazos G Regional Water Planning Area (Region G) Prepared in Support of the 2011 Brazos G Regional Water Plan: Texas Water Development Board, 60 p.

[73] Norvell, S. D., and Shaw, S. D. 2010, Socioeconomic Impacts of Projected Water Shortages for the Region H Regional Water Planning Area: Prepared in Support of the 2011 Region H Regional Water Plan: Texas Water Development Board, 73 p.

[74] Norvell, S. D., and Shaw, S. D., 2010, Socioeconomic Impacts of Projected Water Shortages for the East Texas Regional Water Planning Area (Region I), Prepared in Support of the 2011 East Texas Regional Water Plan: Texas Water Development Board, 45 P.

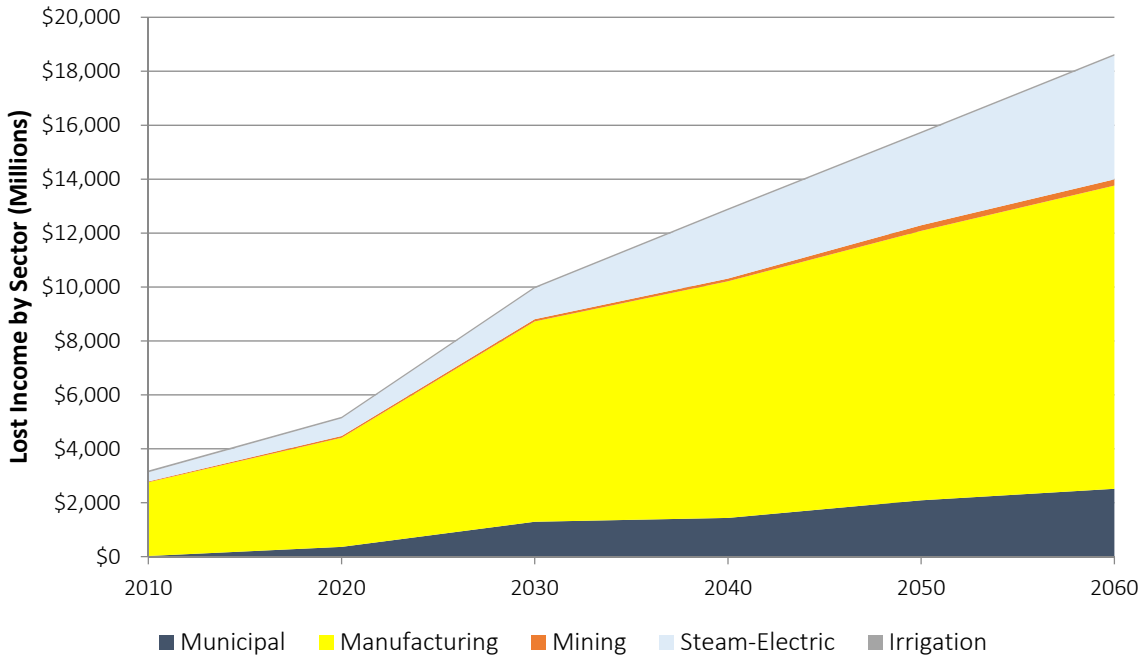

Figure 5-26 – Estimates of lost income due to not meeting water supply needs by water use sector over the 50-year planning horizon (2010-2060) for Region H based on analysis provided by TWDB

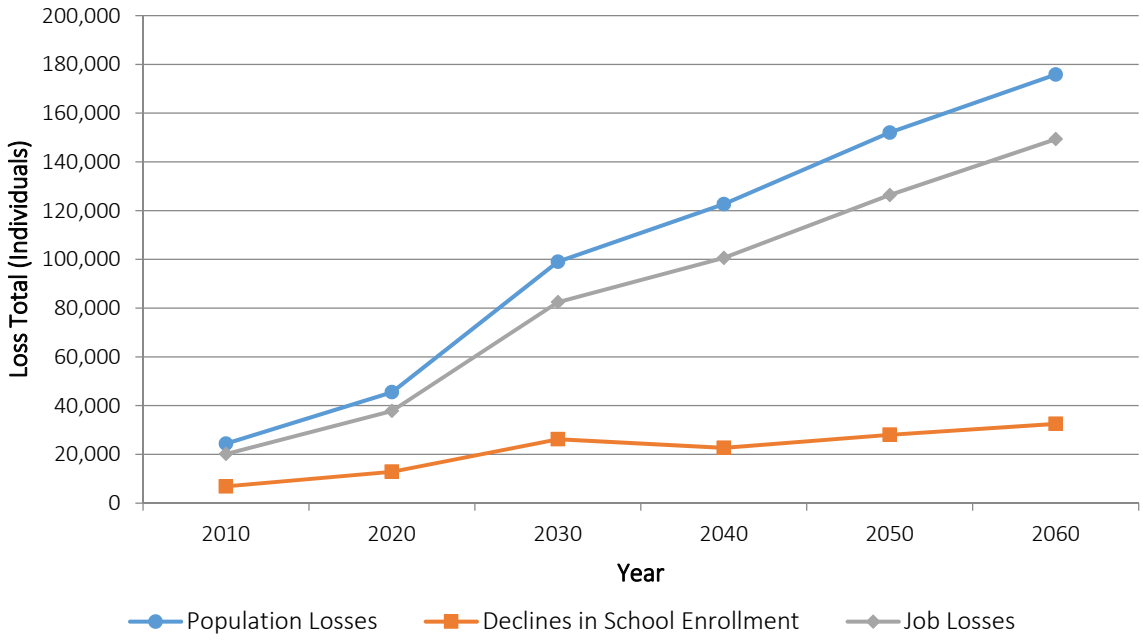

Figure 5-27 – Estimates of population losses, declines in school enrollment, and job losses over the 50-year planning horizon (2010-2060) due to not meeting water supply needs by water use sector for Region H based on analysis provided by TWDB

The primary source of quantitative information considered by GMA 14 as part of the joint-planning process was information on the socioeconomic impacts of not meeting water supply needs as quantified in the applicable 2011 Regional Water Plans and the 2012 Texas State Water Plan. GMA 14 District Representatives also considered the socioeconomic impacts of proposed DFCs. These considerations were somewhat different from the socioeconomic impacts resulting from not meeting water supply needs for two primary reasons. First, a standardized local or regional socioeconomics analytical tool has not been developed for the joint-planning process as is the case for the regional water supply planning process in Texas. Clearly, the development of a similar tool for the joint-planning process is well beyond the intent of the joint-planning process amended by Senate Bill 660 in 2011. Second, the nature of socioeconomic impacts from proposed DFCs is unique from one GCD to another within a common groundwater management area in that two or more GCDs may share a common DFC, but the communities within the GCDs differ widely—inevitably resulting in differences in socioeconomic impacts. The GCDs in GMA 14 vary from almost entirely urban to almost entirely rural farming areas. As such, a quantitative analysis of socioeconomic impacts for proposed DFCs in the joint-planning process is not practical.

Instead, GMA 14 District Representatives had discussions of qualitative socioeconomic impacts that may result from proposed DFCs. These impacts were both positive and negative, depending on the timing of the consideration. The following is a summary list of socioeconomic impacts considered by GMA 14 District Representatives.

- Proposed DFCs may require conversion to alternative water supply, which may have increased costs associated to infrastructure, operation, and maintenance.
- Proposed DFCs may reduce/eliminate the costs of lowering pumps and either drilling or deepening of wells.
- Proposed DFCs may reduce/eliminate the costs associated with subsidence (including legal costs assigned to parties determined to be liable).
- Proposed DFCs may serve to sustain/enhance economic growth due to assurances provided by diversified water portfolio.
- Alternatives to proposed DFCs may result in short-term reduction in utility rates due to reduction in cost of water management strategy implementation.
- Alternatives to proposed DFCs may result in significant but unquantified production costs due to transition from confined to unconfined conditions in local aquifers.
- Alternatives to proposed DFCs may result in either an increase or reduction of production costs due to positive or negative changes in water quality.

As part of the 90-day public comment period and public hearings held by the five GMA 14 GCDs, a comment was received highlighting one additional study of socioeconomic impacts related to changing water levels in Lake Conroe in Montgomery County. In this study (Rogers

and others, 2012[75]) the local socioeconomic impacts projected to result from fluctuating water levels in Lake Conroe are presented. This study was considered by the Lone Star GCD during their proposed DFC hearing on September 18, 2015 and by GMA 14 District Representatives at the October 28, 2015 joint-planning meeting.

Another technical issue discussed by GMA 14 District Representatives was the lack of available socioeconomic impacts information directly appropriate for the joint-planning process (see *Section 5.6* below for results of GMA 14's consideration of socioeconomic impacts). It was noted that the only consistently available quantitative socioeconomic impact analysis for water planning in Texas is the analysis of socioeconomic impacts on cities and other major water use sectors resulting from not meeting current and future water supply needs.

The analysis executed and provided by the TWDB to the regional water planning groups is designed to answer a somewhat different question than the factor to be considered in the joint-planning process by Texas Water Code Section 36.108 (d)(6), which requires District Representatives in a GMA to consider the socioeconomic impacts reasonably expected to occur for proposed DFCs. No uniform quantitative analysis has been performed by the TWDB or any other entity to answer this specific question. There are multiple reasons for this absence of quantitative socioeconomic impact analysis. The most important reason is that, as GMA 14 District Representatives determined during the joint-planning process, any potential socioeconomic impacts that may occur, either positive or negative impacts, will be the result of the specifics of an individual GCD's regulated community and the regulatory approach taken by that GCD to achieve the DFC, not the DFC itself. Therefore, the requirements of this element of the joint-planning process should be revisited to better clarify what is practicable with respect to the socioeconomic impacts of proposed and adopted DFCs.

5.7 PRIVATE PROPERTY RIGHTS

Texas Water Code Section 36.108(d)(7) requires that District Representatives in a GMA consider the impact of proposed DFCs on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater, as recognized under Texas Water Code Section 36.002. GMA 14 District Representatives formally considered this factor during joint-planning meetings on September 23, 2014, June 24, 2015, and October 28, 2015. The presentation materials utilized by GMA 14 District Representatives are included in their entirety in *Appendix S*. While GMA 14 District Representatives invested significant time during these three meetings on the impacts of

[75] Rogers, G. O., Moore, G. W., Saginor, J., Brody, S. D., Burns, G. R., Jithitikulch, T., and Young, T., 2012, Impact of Lake-Level Reductions on Lake Conroe Area, Lake Area Property Values, Property Tax Revenues and Sales Tax Revenues: Contract report prepared for Montgomery County by Texas A & M University, 54 p.

proposed DFCs on private property rights, it is understood that the impacts of proposed DFCs on private property rights has truly been an overarching consideration throughout the joint-planning process. Each District Representative provided input to GMA 14 on not only the impacts of proposed DFCs, but also how individual GCD management plans and rules have been developed to achieve current DFCs (adopted in August 2010) while protecting private property rights. GCDs must consider all private property rights when considering management plans, rules, and permit decisions. GCDs must balance the interests of historic groundwater users, landowners who desire to preserve the aquifer levels beneath their property, and property owners who may be damaged by either groundwater-level declines or subsidence. The DFCs attempt to strike a balance between all of these property interests.

For a more complete record of these discussions, see the approved GMA 14 meeting minutes for the April 29, 2016, GMA 14 meeting (included in *Appendix B*).While the approach to protecting private property rights varies somewhat from GCD to GCD in GMA 14, depending upon local conditions, it is recognized that in addition to the proposed DFCs, all GCDs in GMA 14 have developed management plans and rules that fundamentally work to protect private property rights.

For reference, Texas Water Code Section 36.002 reads as follows:

a) *The legislature recognizes that a landowner owns the groundwater below the surface of the landowner's land as real property.*
b) *The groundwater ownership and rights described by this section:*
    1) *entitle the landowner, including a landowner's lessees, heirs, or assigns, to drill for and produce the groundwater below the surface of real property, subject to Subsection (d), without causing waste or malicious drainage of other property or negligently causing subsidence, but does not entitle a landowner, including a landowner's lessees, heirs, or assigns, to the right to capture a specific amount of groundwater below the surface of that landowner's land; and*
    2) *do not affect the existence of common law defenses or other defenses to liability under the rule of capture.*
c) *Nothing in this code shall be construed as granting the authority to deprive or divest a landowner, including a landowner's lessees, heirs, or assigns, of the groundwater ownership and rights described by this section.*
d) *This section does not:*
    1) *prohibit a district from limiting or prohibiting the drilling of a well by a landowner for failure or inability to comply with minimum well spacing or tract size requirements adopted by the district;*

2) *affect the ability of a district to regulate groundwater production as authorized under Section 36.113, 36.116, or 36.122 or otherwise under this chapter or a special law governing a district; or*
3) *require that a rule adopted by a district allocate to each landowner a proportionate share of available groundwater for production from the aquifer based on the number of acres owned by the landowner.*

e) *This section does not affect the ability to regulate groundwater in any manner authorized under:*
1) *Chapter 626, Acts of the 73rd Legislature, Regular Session, 1993, for the Edwards Aquifer Authority;*
2) *Chapter 8801, Special District Local Laws Code, for the Harris-Galveston Subsidence District; and*
3) *Chapter 8834, Special District Local Laws Code, for the Fort Bend Subsidence District.*

While this provision of the Texas Water Code Section 36.002 was substantively amended to its current scope with the passage of Senate Bill 660 by the Texas Legislature in 2011[76], the spirit of this section has been at the core of groundwater laws since passage of House Bill 162 by the Texas Legislature in 1949[77]. GMA 14 District Representatives ultimately based the adopted DFCs on a balancing of private property rights, for both current and future users, as exemplified in each GCDs management plan and rules.

5.8 FEASIBILITY OF ACHIEVING THE PROPOSED DESIRED FUTURE CONDITIONS

Texas Water Code Section 36.108 (d)(8) requires District Representatives in a GMA to consider the feasibility of achieving the proposed desired future condition(s). This requirement was added to the joint-planning process with the passage in 2011 of Senate Bill 660 by the 82nd Texas Legislature[78]. However, this review concept actually dates back to the rules adopted by the Texas Water Development Board (TWDB) in 2007 to provide guidance as to what would be considered by the TWDB during a petition process regarding the reasonableness of an adopted DFC. In these rules, the TWDB required that an adopted DFC must be physically possible from a hydrological perspective. During the first round of joint planning, the TWDB definition for DFCs included in Title 31, Texas Administrative Code, Section 356.2 (8) was "The desired, quantified condition of groundwater resources (such as water levels, water quality, spring flows, or volumes) for a specified aquifer within a management area at a specified time

[76] Act of May 29, 2011, 82nd Leg., R.S., ch. 1233, 2011 Tex. Gen. Laws 3287.
[77] Act of May 23, 1949, 51st Leg., R.S., ch. 306, 1949 Tex. Gen. Laws 559.
[78] Act of May 29, 2011, 82nd Leg., R.S., ch. 1233, 2011 Tex. Gen. Laws 3287.

or times in the future, through at least the period that includes the current planning period for the development of regional water plans pursuant to §16.053, Texas Water Code, or in perpetuity, as defined by participating groundwater conservation districts within a groundwater management area as part of the joint-planning process. Desired future conditions have to be physically possible, individually and collectively, if different desired future conditions are stated for different geographic areas overlying an aquifer or subdivision of an aquifer."

In addition, in these original rules, Title 31, Texas Administrative Code Section 356.34 (1) stated the following: "Submission Package - Districts must include the following when submitting an adopted desired future condition to the board:(1) the desired future condition of the aquifer in the groundwater management area (multiple desired future conditions for the same aquifer in a groundwater management area need to be physically compatible)."

Upon passage of Senate Bill 660 in 2011, the TWDB made significant revisions to the rules contained in Title 31, Texas Administrative Code, Chapter 356 to be consistent with requirements and terminology added and revised by the new statutes. During this process, the reference to the need for a DFC to be physically possible or physically compatible was removed, under the rationale that the reference to consideration of feasibility of achieving a DFC included in Texas Water Code Section 36.108 (d) (8) equated to a DFC being physically possible or physically compatible.

During the TWDB's review of multiple petitions regarding the reasonableness of adopted DFCs in groundwater management areas from 2010 - 2011, the evaluation of whether or not an adopted DFC was physically possible was based on whether or not the DFC(s) could reasonably be simulated using the TWDBs adopted groundwater availability model for the aquifer(s) in question. This was a valid approach because if an adopted DFC was not physically possible, then under the physical laws of hydrology, as incorporated in the mathematical calculations executed during model simulations, the model would not execute the prescribed simulation successfully.

There have been and continue to be many potential DFC scenarios considered in GMAs across Texas that are not physically possible. One example is GMA 9, where petitions filed in 2009 challenged DFCs approved for the Edwards Group of the Edwards Trinity (Plateau) Aquifer. Following a hearing, the TWDB determined the DFC for Kerr County to be unreasonable because more than 100% of the available MAG would be produced through exempt-use wells making it unfeasible to achieve the adopted DFC.[79]

[79] http://www.twdb.texas.gov/groundwater/petitions/doc/GMA9/2009_Petitions/TWDB_Staff_Report_GMA9_Petitions_01-10.pdf

The DFCs and resulting estimates of modeled available groundwater initially presented during the June 24, 2014 GMA 14 meeting, referred to as the Northern Gulf Coast GAM Run 2, and utilized throughout the remainder of the joint-planning process in GMA 14, were successfully simulated and corresponding estimates of modeled available groundwater were produced. Therefore, utilizing the approach taken by the TWDB during the first round of joint planning that concluded on September 1, 2010, the proposed DFCs for the Northern Gulf Coast Aquifer System in GMA 14 are physically possible, and thus are feasible.

A common definition of feasibility is "capable of being accomplished or brought about; possible." Using this definition, it becomes important to consider the estimates of modeled available groundwater resulting from proposed DFCs with respect to both historic use, current and projected supplies, projected water demands, and available regulatory framework necessary to achieve proposed DFCs. All of these elements were considered by GMA 14 District Representatives to confirm this finding of feasibility.

5.9 OTHER SPECIFIC INFORMATION

Finally, Texas Water Code Section 36.108 (d)(8) requires District Representatives in a GMA to consider any other information relevant to the specific desired future condition. As GMA 14 District Representatives worked through the considerations process required in Texas Water Code Section 36.108(d)(1)–(8), no additional information was identified for inclusion in this explanatory report.

5.10 BALANCE BETWEEN THE HIGHEST PRACTICABLE LEVEL OF GROUNDWATER PRODUCTION AND THE CONSERVATION, PRESERVATION, PROTECTION, RECHARGING, AND PREVENTION OF WASTE OF GROUNDWATER

GMA 14 DFCs achieve balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area.

Texas Water Code Section 36.108(d-2) states, in part, that GCDs, while establishing DFCs during the joint-planning process in a GMA, "...must provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area."[80] This requirement does not prohibit the establishment of desired future

[80] Texas Water Code Section 36.108(d-2)

conditions that provide for the reasonable long-term management of groundwater resources consistent with the management goals under Section 36.1071(a).[81]

This requirement for a balance is a new requirement in the joint-planning process resulting from the passage of Senate Bill 660 by the Texas Legislature in 2011.[82] This requirement recognizes that the proposed DFCs may vary significantly from one area of the state to another. Texas Water Code Section 36.108(d-1) authorizes GCDs within a specific GMA to establish different DFCs for each aquifer, subdivision thereof, or geologic strata, as well as different DFCs for different geographic areas overlying those aquifers or subdivisions thereof. Such DFCs are only to be established after consideration by the GMA of the nine statutory criteria set forth in Texas Water Code Section 36.108(d), which includes consideration of "aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another." The proposed DFCs for GMA 14, both on the regional scale and by county, clearly document unique conditions in GMA 14 that exist in no other area of Texas that work collectively to influence the balance achieved by the proposed DFCs.

The primary groundwater resource in GMA 14 is the Gulf Coast Aquifer System. As a result, the primary emphasis during this, the second cycle of joint planning (2010 – 2016), has been on the Gulf Coast Aquifer System. All other minor or local aquifers in GMA 14 have been classified as non-relevant (see Section 7.0) for the current round of joint planning, as allowed by Title 31, Texas Administrative Code Section 356.31 (b). Overarching and disparate conditions in the Gulf Coast Aquifer System existing in GMA 14 are best illustrated by demographic dynamics, water demand projections documented in the 2012 State Water Plan[83], and the presence of and associated socioeconomic costs resulting from land subsidence. Current and future population projections for GMA 14 indicate that slightly more than 25 percent of Texas' population resides in GMA 14. Population projections for GMA 14 are projected to increase from 2010's 6,529,891 residents to 11,958,683 in 2060. That would equate to an 83 percent increase in population over the 50-year planning horizon. However, these significant increases in population are not uniformly distributed throughout GMA 14. For example, according to the 2012 Texas State Water Plan, increases in county population projections are expected to range from 9 percent, 11 percent, and 13 percent in Orange, Jasper, and Galveston counties, respectively, whereas in Montgomery, Fort Bend, and Waller counties, projected increases in population range from 219 percent, 199 percent, and 159 percent, respectively.

[81] Texas Water Code Section 36.1071(a)

[82] Act of May 29, 2011, 82nd Leg., R.S., ch. 1233, 2011 Tex. Gen. Laws 3287.

[83] Texas Water Development Board, 2012, Water For Texas – The Texas State Water Plan, 299 p. see http://www.twdb.texas.gov/waterplanning/swp/2012/index.asp.

This variability in demographic dynamics in GMA 14 translates strongly to the projections for GMA 14 water demands. As part of the regional water-planning process in Texas (Texas Water Code Section 16.053), water demand projections are developed for municipalities and utilities, manufacturing, mining, steam-electric power generation, irrigated agriculture, livestock, and rural areas within each county. For the regional and state water-planning process in Texas, water demand projections are based on an analysis of the volume of water necessary to meet projected needs during drought conditions (often referred to as drought-of-record conditions). Based on an analysis of all of these primary water use sectors in GMA 14, water demand projections range from 2,917,795 acre-feet per year in 2010 to 4,723,228 acre-feet per year in 2060, representing a 61.9 percent increase in water demands. An acre foot of water is equal to 325,851 gallons. It is noteworthy that the increase in water demands, on a percentile basis, is approximately 21.2 percent less than the increase in population, primarily a result of increased water conservation efforts throughout the region and the disconnect between population and certain demands such as irrigated agriculture.

An important element of the balance required in the joint-planning process is the consideration of how proposed DFCs may affect water supply needs and water management strategies in the current 2012 Texas State Water Plan. After consideration of water supply needs and water management strategies recommended in the 2012 Texas Water Plan and the 2011 Regions G, H, and I regional water plans[84],[85],[86], District Representatives in GMA 14 have determined that adoption and implementation of the proposed DFCs for GMA 14 will not negatively impact the implementation of any recommended water management strategies included in the 2012 Texas Water Plan. Furthermore, it is anticipated that these proposed DFCs will not negatively impact recommended water management strategies included in the Initially Prepared Plans for the 2016 round of regional water planning in the 2016 Region G, H, and I regional water plans.

Texas Water Code Section 36.108(d)(3) requires District Representatives in a GMA to consider hydrological conditions, including, for each aquifer in the GMA, the total estimated recoverable storage (TERS) as provided by the executive administrator of the Texas Water Development Board.

[84] Brazos G Regional Water Planning Group, 2011, Brazos G Regional Water Plan, see http://www.twdb.texas.gov/waterplanning/rwp/plans/2011/index.asp#region-g.

[85] Region H Water Planning Group, 2011,Region H Water Plan, see http://www.twdb.texas.gov/waterplanning/rwp/plans/2011/index.asp#region-h

[86] East Texas Regional Water Planning Group, 2011, East Texas Regional Water Plan, see http://www.twdb.texas.gov/waterplanning/rwp/plans/2011/index.asp#region-i

The TERS estimates for GMA 14 were made available to GMA 14 in June of 2014[87] and, since that time, have been the subject of numerous formal discussions, both by District Representatives in GMA 14 as part of the joint-planning process, by individual GCDs in GMA 14, and during the 90-day public comment period on the proposed DFCs. These considerations of the TERS report have included a special workshop by Lone Star GCD to better understand the implications of the TERS report on future groundwater management. Specific considerations of the TERS report by GMA 14 occurred on June 24, 2014, June 24, 2015, and October 28, 2015. The TERS report for GMA 14 provides an estimate for the Gulf Coast Aquifer System that ranges from 694,000,000 to 2,082,000,000 acre-feet of water. Estimates of TERS for the other relevant aquifers in GMA 14 are also provided in this report.

While some observers of the joint-planning process have suggested that volumes of groundwater quantified in the TERS report should equate to the "highest practicable level of groundwater production" referenced in Texas Water Code Section 36.108 (d-2), District Representatives have determined that the TERS volumes for GMA 14, due to the potential impacts of excessive production on land-surface subsidence, the lowering of artesian water levels, and the resulting decreasing yields in water wells that would result from the production of even a very small fraction of the TERS volume reported by the TWDB is not even remotely practicable. Further, it was determined that adequate applied scientific research regarding the impacts for producing groundwater from storage in an artesian aquifer such as the Gulf Coast Aquifer System does not exist, and thus a conservative approach with respect to consideration of the TERS volumes is warranted.

GMA 14 is unique in that Texas Water Code Section 36.108(d)(5), requiring District Representatives to consider the impacts of proposed DFCs on subsidence, at least currently, only applies to GMA 14. In GMA 14, District Representatives clearly recognize that the socioeconomic impacts and public health and safety issues resulting from subsidence require that appropriate groundwater management policies take precedent over any other consideration. As previously described in section *5-5* on Subsidence, inaction would likely beget substantial financial consequences. Information considered by GMA 14 District Representatives included analysis that groundwater use resulting in groundwater-level declines in the Gulf Coast Aquifer System results in land surface subsidence and increased movement along growth faults in the Texas Gulf Coast.

Texas Water Code Section 36.108(d)(6) requires District Representatives in a GMA to consider the socioeconomic impacts reasonably expected to occur from the adoption of proposed DFCs. This consideration is a central element that any GMA must carefully evaluate in achieving a

[87] Wade, S., Thorkildsen, D., and Anaya, R., 2014, GAM Task 13-037: Total estimated recoverable storage for aquifers in Groundwater Management Area 14, 35 p.

balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area. It is noteworthy that, in a similar planning process in Texas, the regional water-planning process, it is required that the socioeconomic impacts of not meeting water supply needs identified in the regional water-planning process is required according to guidelines adopted by the TWDB. All quantitative analysis performed to support this socioeconomic impact analysis in the regional water-planning process is performed by staff at the TWDB. This analysis is based on a straightforward valuation of water to the various water use sectors and subsectors present in any particular region. As part of the joint-planning process, all quantitative analysis performed regarding the socioeconomic impacts of not meeting future water supply needs identified in the 2011 regional water plans for Regions G, H, and I were considered by GMA 14 to, in part, meet this requirement to consider the socioeconomic impacts reasonably expected to occur from the implementation of the proposed DFCs. GMA 14 District Representatives, based both on this review and on the determination stated above that implementation of recommended water management strategies to meet water supply needs included in the 2011 regional water plans and the 2012 State Water Plan, and also in the draft 2016 regional water plans, will not be negatively impacted, have also determined that, on balance, since the proposed DFCs will not prevent implementation of recommended water management strategies, there will be no negative socioeconomic impacts utilizing the quantitative socioeconomic impact methodology utilized in the Texas regional water-planning process.

After significant consideration by GMA 14 District Representatives, however, there were a number of socioeconomic impacts identified that could be reasonably expected to occur from a qualitative perspective. As the reader will note, most, but not all, of the socioeconomic impacts identified fall on the positive side of the balancing consideration. An overview of these socioeconomic impacts includes:

- Proposed DFCs may require water users to convert to an alternative water supply, which may have increased costs associated with infrastructure, operation, and maintenance;
- Proposed DFCs may reduce/eliminate the costs of lowering pumps and either drilling or deepening of water wells;
- Proposed DFCs may reduce/eliminate the costs associated with subsidence (including legal costs assigned to parties determined to be liable);
- Proposed DFCs may serve to sustain/enhance economic growth due to assurances provided by a diversified water portfolio to new industry and development;

- Alternatives to the DFCs proposed by GMA 14 may result in short-term reduction in utility rates due to reduction in cost of water management strategy implementation; and
- Alternatives to the DFCs proposed by GMA 14 may result in significant but unquantified production costs due to transition from confined to unconfined conditions in local aquifers.

Texas Water Code Section 36.108(d)(7) requires District Representatives in a GMA to consider the impact of proposed DFCs on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater, as recognized under Texas Water Code Section 36.002. GMA 14 District Representatives formally considered this factor during meetings on September 23, 2014, June 24, 2015, and October 28, 2015. However, the impacts of proposed DFCs on private property rights has truly been an overarching consideration throughout the joint-planning process. Each District Representative provided input to GMA 14 on, not only the impacts of proposed DFCs, but also how individual District management plans and rules have been developed to achieve current DFCs (adopted in August 2010) while protecting private property rights. While the approach to protecting private property rights varies somewhat from District to District in GMA 14, depending upon local conditions, it is recognized that in addition to the proposed DFCs, all Districts in GMA 14 have developed management plans and rules that fundamentally work to protect private property rights.

After having considered each of the nine statutory criteria set forth in Texas Water Code Section 36.108(d) for the DFCs for the proposed DFCs for GMA 14, the GMA 14 District Representatives have concluded that the DFCs provide a reasonable balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence. Each of the eight required statutory criteria contributed in some way to this conclusion, including, without limitation, the following: (1) land subsidence is a serious problem in some geographic areas of GMA 14 and can have enormous economic consequences; (2) vast differences in aquifer uses and conditions in different parts of the GMA, including huge discrepancies in demands that will be placed on groundwater resources because of expected population growth patterns over the 50-year joint-planning horizon and corresponding increases in water demand projections; (3) the impacts, or lack thereof, on recommended water management strategies in the state and regional water plans; (4) other socioeconomic impacts unrelated to land subsidence or impacts on recommended water management strategies, such as the economic costs to current and future well owners to continue to chase falling artesian water levels in the aquifer and corresponding declining well yields, including

numerous existing wells completed at shallower depths that may go dry, as well as the socioeconomic risk to GMA 14's regional and local economies associated with reliance upon a single source of water supply versus the security of a diversified water supply portfolio; (5) hydrological conditions, such as total estimated recoverable storage, effective annual recharge, inflows, and discharge of the aquifer, and the relationship of those values to the current and projected groundwater pumping estimates over the joint-planning horizon, to existing well yields and groundwater-related investments, and to the long-term viability of the aquifer to serve the landowners and communities as an economically viable source of water supply; (6) the achievability of the DFCs; and (7) the impacts on the interests and rights in private property, including the ownership rights of GMA 14 landowners, which include the protection of investments by those landowners in existing wells and related infrastructure, as well as the ability of landowners to drill and produce groundwater at an economically feasible cost from new wells in the future.

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6.0 AQUIFERS DECLARED NON-RELEVANT FOR JOINT PLANNING

TWDB rules[88] allow for portions of major or minor aquifers to be classified as non-relevant if their aquifer characteristics, groundwater demands, and current groundwater uses do not warrant adoption of a desired future condition. In these cases, a desired future condition is not required. Instead, GCDs must submit documentation describing why the aquifer was considered non-relevant. This documentation includes:

1) A description, location, and/or map of the aquifer or portion of the aquifer;

2) A summary of aquifer characteristics, groundwater demands, and current groundwater uses, including the total estimated recoverable storage as provided by the executive administrator, that support the conclusion that desired future conditions in adjacent or hydraulically connected relevant aquifer(s) will not be affected; and

3) An explanation of why the aquifer or portion of the aquifer is non-relevant for joint-planning purposes.

This section is included in the Explanatory Report to serve as the documentation required to classify several aquifers in GMA 14 as non-relevant for joint planning and for development of a DFC. These aquifers include the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson and several river alluviums (Brazos, San Bernard, Navasota, Trinity and San Jacinto river alluviums).

6.1 CARRIZO-WILCOX AQUIFER

Figure 6-1 shows the locations of major aquifers in GMA 14. As shown in *Figure 6-1*, the Gulf Coast Aquifer System is present throughout most of the management area. The Carrizo-Wilcox Aquifer is only present in subcrop in the far northern and western portions of Grimes and Walker counties. Outside of these areas, the Carrizo-Wilcox Aquifer is not recognized as an aquifer by the TWDB. It is wholly located within the Bluebonnet GCD.

All reported information on groundwater pumpage/use and current groundwater demands is included in *Table 5-2* and *Table 5-3*. Using data from the TWDB Water Use Survey program, groundwater use in Grimes and Walker counties averages 3,700 and 5,300 acre-feet per year, respectively. No groundwater production is reported from Grimes County for the Carrizo-

[88] Title 31, Texas Administrative Code Section 356.31 (b) see http://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=31&pt=10&ch=356&rl=31

Wilcox Aquifer and a maximum of 2 acre-feet per year has been reported in Walker County for the 10 years of data examined. Uses categorized as coming from "other" or "unknown" aquifers account for 165 and 1,600 acre-feet per year from Grimes and Walker counties, respectively.

Appendix K shows the TERS for the Carrizo-Wilcox Aquifer as defined and estimated by the TWDB.

Table 6-1 shows the water-budget values for the Carrizo-Wilcox Aquifer in Bluebonnet GCD from the District's 2013 management plan. As shown in *Table 6-1*, the aquifer receives no direct recharge from precipitation in the GCD. The primary inflow is lateral flow of approximately 2,700 acre-feet per year from the up-dip portions of the aquifer outside GMA 14. The vast majority of this discharges to deeper portions of the Carrizo and Wilcox formations. The Carrizo-Wilcox GAM indicates that, on average, only 17 acre-feet of water discharges vertically upward into the overlying Reklaw confining unit. GMA 14, therefore, expects very little impact on the Gulf Coast Aquifer System DFCs as a result of classifying the Carrizo-Wilcox Aquifer non-relevant.

Due to its limited spatial extent, current uses and connection to other aquifers, GMA 14 finds that a DFC for the Carrizo-Wilcox Aquifer in GMA 14 is not warranted and declare it non-relevant for joint-planning purposes.

Table 6-1 – Inflows and outflows to/from the Carrizo-Wilcox Aquifer in the Bluebonnet GCD management plan (GAM Run 13-028: Kohlrenken, 2013)

Management Plan Requirement	Aquifer or Confining Unit	Results
Estimated annual amount of recharge from precipitation to the district	Carrizo-Wilcox Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Carrizo-Wilcox Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Carrizo-Wilcox Aquifer	2,699
Estimated annual volume of flow out of the district within each aquifer in the district	Carrizo-Wilcox Aquifer	379
Estimated net annual volume of flow between each aquifer in the district	From the Carrizo-Wilcox Aquifer into the Reklaw Confining Unit	17
	From the Carrizo-Wilcox Aquifer to the downdip portions of the Carrizo and Wilcox formations	2,322

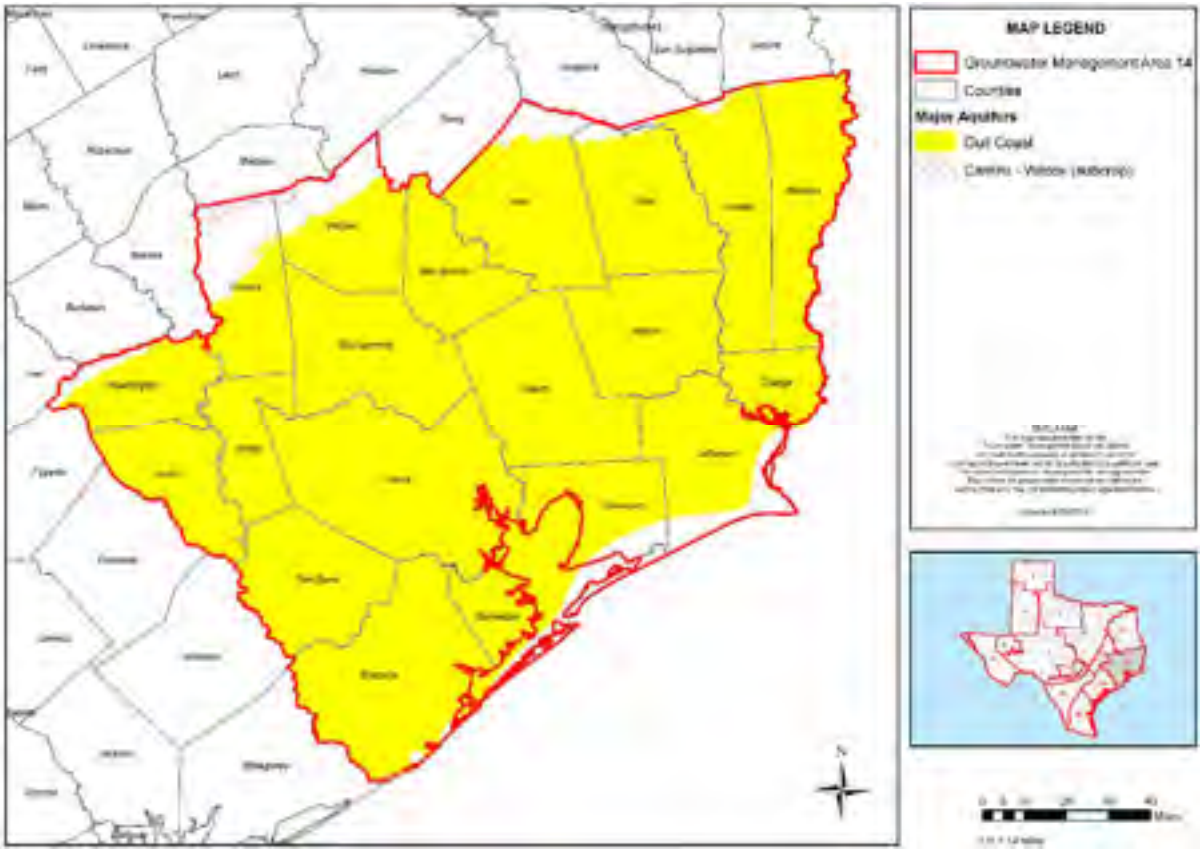

Figure 6-1 – Major Aquifers in GMA 14

6.2 QUEEN CITY AQUIFER

Figure 6-2 shows the locations of minor aquifers in GMA 14. The Queen City Aquifer is only present in subcrop in the far northern and western portions of Grimes, Walker and Washington counties. Outside of these areas, the Queen City is not recognized as an aquifer by the TWDB in GMA 14. Bluebonnet GCD encompasses Grimes and Walker counties while Washington County is not in a GCD.

All reported information on groundwater pumpage/use and current groundwater demands is included in *Table 5-2* and *Table 5-3*. Using data from the TWDB Water Use Survey program, groundwater use in Grimes, Walker, and Washington counties averages, respectively, 3,700 acre-feet per year, 5,300 acre-feet per year, and 2,200 acre-feet per year. Less than 30 acre-feet per year of this is specifically estimated to be from the Queen City Aquifer. Uses categorized as coming from "other" or "unknown" aquifers account for 165 acre-feet per year, 1,600 acre-feet per year, and 7 acre-feet per year from Grimes, Walker and Washington counties, respectively.

Appendix K shows the TERS for the Queen City Aquifer as defined and estimated by the TWDB.

Table 6-2 shows the water-budget values for the Queen City Aquifer in Bluebonnet GCD from the District's 2013 management plan. As shown in *Table 6-2*, the aquifer receives no direct recharge from precipitation in the Bluebonnet GCD. Flows in the aquifer consist of small lateral inflows from the up-dip portions of the aquifer outside GMA 14 and small vertical inflows from the underlying Reklaw confining unit. The GAM indicates that, on average, only 55 acre-feet of water discharges vertically upward into the overlying Weches confining unit. GMA 14, therefore, expects very little impact on the Gulf Coast Aquifer System DFCs as a result of declaring the Queen City Aquifer non-relevant.

Due to its limited spatial extent, current uses and connection to other aquifers, GMA 14 finds that a DFC for the Queen City Aquifer in GMA 14 is not warranted and classifies it non-relevant for joint-planning purposes.

Table 6-2 – Inflows and outflows to/from the Queen City Aquifer in the Bluebonnet GCD management plan (GAM Run 13-028: Kohlrenken, 2013)

Management Plan Requirement	Aquifer or Confining Unit	Results
Estimated annual amount of recharge from precipitation to the district	Queen City Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Queen City Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Queen City Aquifer	134
Estimated annual volume of flow out of the district within each aquifer in the district	Queen City Aquifer	98
Estimated net annual volume of flow between each aquifer in the district	From the Queen City Aquifer into the Weches Confining Unit	190
	From the Reklaw Confining Unit into the Queen City Aquifer	55
	From the downdip portion of the Queen City formation to the Queen City Aquifer	49

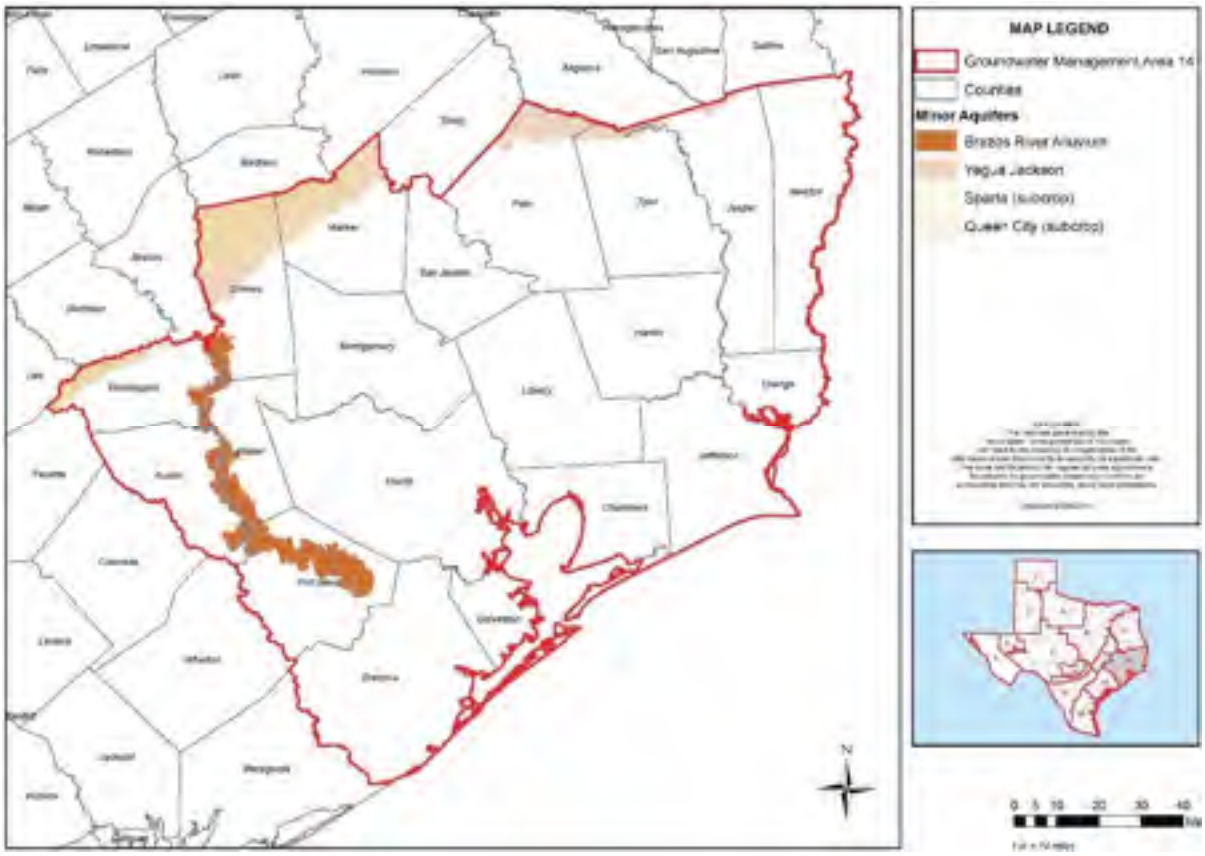

Figure 6-2 – Minor aquifers in GMA 14

6.3 SPARTA AQUIFER

Figure 6-2 shows the locations of minor aquifers in GMA 14. The Sparta Aquifer is only present in subcrop in the northern and western portions of Grimes, Walker, and Washington counties. Outside of these areas, the Sparta Aquifer is not recognized as an aquifer by the TWDB. Bluebonnet GCD encompasses Grimes and Walker counties while Washington County is not in a GCD.

All reported information on groundwater pumpage/use and current groundwater demands is included in *Table 5-2* and *Table 5-3*. Using data from the TWDB Water Use Survey program, groundwater use in Grimes, Walker, and Washington counties averages, respectively, 3,700 acre-feet per year, 5,300 acre-feet per year, and 2,200 acre-feet per year. Less than 5 acre-feet per year of this is specifically estimated to be from the Sparta Aquifer. Uses categorized as coming from "other" or "unknown" aquifers account for 165 acre-feet per year, 1,600 acre-feet per year, and 7 acre-feet per year from Grimes, Walker, and Washington counties, respectively.

Appendix K shows the TERS for the Sparta Aquifer as defined and estimated by the TWDB.

Table 6-3 shows the water-budget values for the Sparta Aquifer in Bluebonnet GCD from the District's 2013 management plan. As shown in *Table 6-3*, the aquifer receives no direct recharge from precipitation in the district. Flows in the aquifer consist of small lateral inflows from the up-dip portions of the aquifer outside GMA 14 and small vertical inflows from the Weches confining unit. The GAM indicates that, on average, only 31 acre-feet of water discharges vertically upward into the overlying units. GMA 14, therefore, expects very little impact on the Gulf Coast Aquifer DFCs as a result of classifying the Sparta Aquifer non-relevant.

Due to its limited spatial extent, current uses and connection to other aquifers, GMA 14 finds that a DFC for the Sparta Aquifer in GMA 14 is not warranted and classifies it non-relevant for joint-planning purposes.

Table 6-3 – Inflows and outflows to/from the Sparta Aquifer in the Bluebonnet GCD management plan (GAM Run 13-028: Kohlrenken, 2013)

Management Plan Requirement	Aquifer or Confining Unit	Results
Estimated annual amount of recharge from precipitation to the district	Sparta Aquifer	0
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Sparta Aquifer	0
Estimated annual volume of flow into the district within each aquifer in the district	Sparta Aquifer	338
Estimated annual volume of flow out of the district within each aquifer in the district	Sparta Aquifer	482
Estimated net annual volume of flow between each aquifer in the district	From the Sparta Aquifer to overlying units	31
	From the Weches Confining Unit into the Sparta Aquifer	208
	From the Sparta Aquifer to the downdip portion of the Sparta Formation	49

6.4 YEGUA-JACKSON AQUIFER

Figure 6-2 shows the locations of minor aquifers in GMA 14. The Yegua-Jackson Aquifer is only present in the far northern and western portions of GMA 14 (Grimes, Walker, Washington, Polk, Tyler, Jasper, and Newton counties). Outside of these areas, the Yegua-Jackson is not recognized as an aquifer by the Texas Water Development Board in GMA 14. The Yegua-Jackson Aquifer is present in Bluebonnet GCD, Lower Trinity GCD, and Southeast Texas GCD.

All reported information on groundwater pumpage/use and current groundwater demands is included in *Table 5-2* and *Table 5-3*. Using data from the TWDB Water Use Survey program, the average groundwater pumping from the Yegua-Jackson Aquifer between 2000 and 2011

was approximately 1,900 acre-feet per year with a maximum annual use of 3,700 acre-feet per year. On average the Yegua-Jackson Aquifer accounts for approximately 3 percent of the groundwater use in the counties where it exists (*Figure 6-2*), with the maximum of 16 percent in Grimes County.

Appendix K shows the TERS for the Yegua-Jackson Aquifer as defined and estimated by the TWDB.

Table 6-4,

Table 6-5, and *Table 6-6* show the water-budget values for the Yegua-Jackson Aquifer in Bluebonnet, Lower Trinity, and Southeast Texas GCDs, respectively. In Bluebonnet GCD the Yegua-Jackson receives considerable recharge. However, more than 80 percent of this quickly discharges to lakes, streams, and rivers. Most of the water that does not discharge to surface water flows laterally out of the districts. The GAM indicates that, on average, 691 acre-feet of water flows vertically into the Yegua-Jackson Aquifer from the overlying Catahoula Formation (limited to Bluebonnet GCD). GMA 14 expects very little impact on the Gulf Coast Aquifer DFCs as a result of declaring the Yegua-Jackson Aquifer non-relevant.

Due to its limited spatial extent, current uses and connection to other aquifers, GMA 14 finds that a DFC for the Yegua-Jackson Aquifer in GMA 14 is not warranted and classify it non-relevant for joint-planning purposes.

Table 6-4 – Inflows and outflows to/from the Yegua-Jackson Aquifer in the Bluebonnet GCD management plan (GAM Run 13-028: Kohlrenken, 2013)

Management Plan Requirement	Aquifer or Confining Unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	47.258
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	38,660
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	6,829
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	14,759
Estimated net annual volume of flow between each aquifer in the district	From the confined portion of the Yegua-Jackson units into the official Yegua-Jackson Aquifer	691
	From the Catahoula and overlying units into the Yegua-Jackson Aquifer	598

Table 6-5 – Inflows and outflows to/from the Yegua-Jackson Aquifer developed for the Lower Trinity GCD management plan (GAM Run 14-006: Kohlrenken, 2014)

Management Plan Requirement	Aquifer or Confining Unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	4,114
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	3,879
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	1,950
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	2,826
Estimated net annual volume of flow between each aquifer in the district	To the Yegua-Jackson Aquifer from the confined portion of the Yegua and Jackson groups	434

Table 6-6 – Inflows and outflows to/from the Yegua-Jackson Aquifer developed for the Southeast Texas GCD management plan (GAM Run 11-019: Jones, 2012)

Management Plan Requirement	Aquifer or Confining Unit	Results
Estimated annual amount of recharge from precipitation to the district	Yegua-Jackson Aquifer	5
Estimated annual volume of water that discharges from the aquifer to springs and any surface water body including lakes, streams, and rivers	Yegua-Jackson Aquifer	152
Estimated annual volume of flow into the district within each aquifer in the district	Yegua-Jackson Aquifer	751
Estimated annual volume of flow out of the district within each aquifer in the district	Yegua-Jackson Aquifer	798
Estimated net annual volume of flow between each aquifer in the district	From Yegua-Jackson Aquifer into overlying units	33

6.5 RIVER ALLUVIUM AQUIFERS

Figure 6-2 shows the location of minor aquifers in GMA 14. The Brazos River Alluvium Aquifer is present in portions of Grimes, Washington, Waller, Austin, and Fort Bend counties. Though not recognized as minor aquifers by the TWDB, several other alluvial aquifers are also present in GMA 14. These include the Navasota River Alluvium Aquifer (*Figure 6-3*), the San Bernard River Alluvium Aquifer (*Figure 6-4*), the San Jacinto River Alluvium Aquifer (*Figure 6-5*), and the Trinity River Alluvium Aquifer (*Figure 6-6*). All of the river alluvium aquifers are present in

Bluebonnet GCD. Washington County does not have a GCD. In Fort Bend County, groundwater is regulated by the Fort Bend Subsidence District.

All reported information on groundwater pumpage/use and current groundwater demands is included in *Table 5-2* and *Table 5-3*. Using data from the TWDB Water Use Survey program, groundwater production from the Brazos River Alluvium Aquifer between 2000 and 2011 averaged approximately 1,300 acre-feet per year with a maximum of 1,700 acre-feet per year. While estimates are not available for the other river alluvium aquifers, Bluebonnet GCD has indicated that the small amount of pumping that does occur from these aquifers is exempt from GCD permitting.

Appendix K shows the TERS for each of the river alluvium aquifers as defined and estimated by the TWDB.

At this time, a GAM is being developed for the Brazos River Alluvium Aquifer, but is not yet completed. TWDB does not have GAMs completed or in development for the remaining river alluvium aquifers. For this reason, water-budget inflows and outflows are not available for the river alluvium aquifers. GMA 14, however, expects very little impact on the Gulf Coast Aquifer DFCs as a result of classifying the river alluvium aquifers non-relevant. This is because 1) the alluvial aquifers are very shallow relative to pumping horizons of the Gulf Coast Aquifer, and 2) the magnitude of pumping in the alluvial aquifers is very small compared to that of the Gulf Coast Aquifer.

Due to their limited spatial extent, current uses and connection to other aquifers, GMA 14 finds that DFCs for the river alluvium aquifers in GMA 14 are not warranted and classifies them non-relevant for joint-planning purposes.

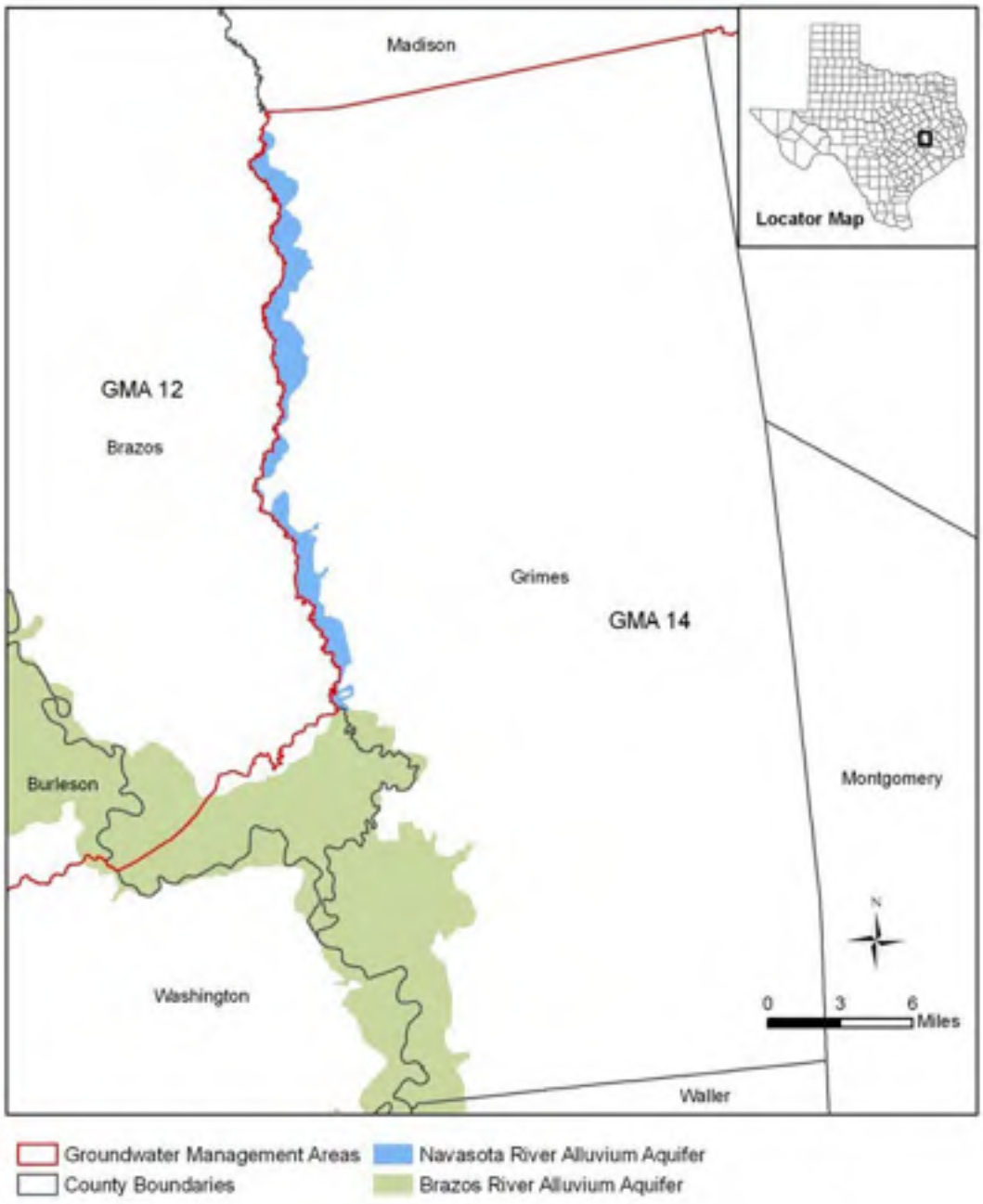

Figure 6-3 – Area of the Navasota and Brazos River Alluvium Aquifers in GMA 14

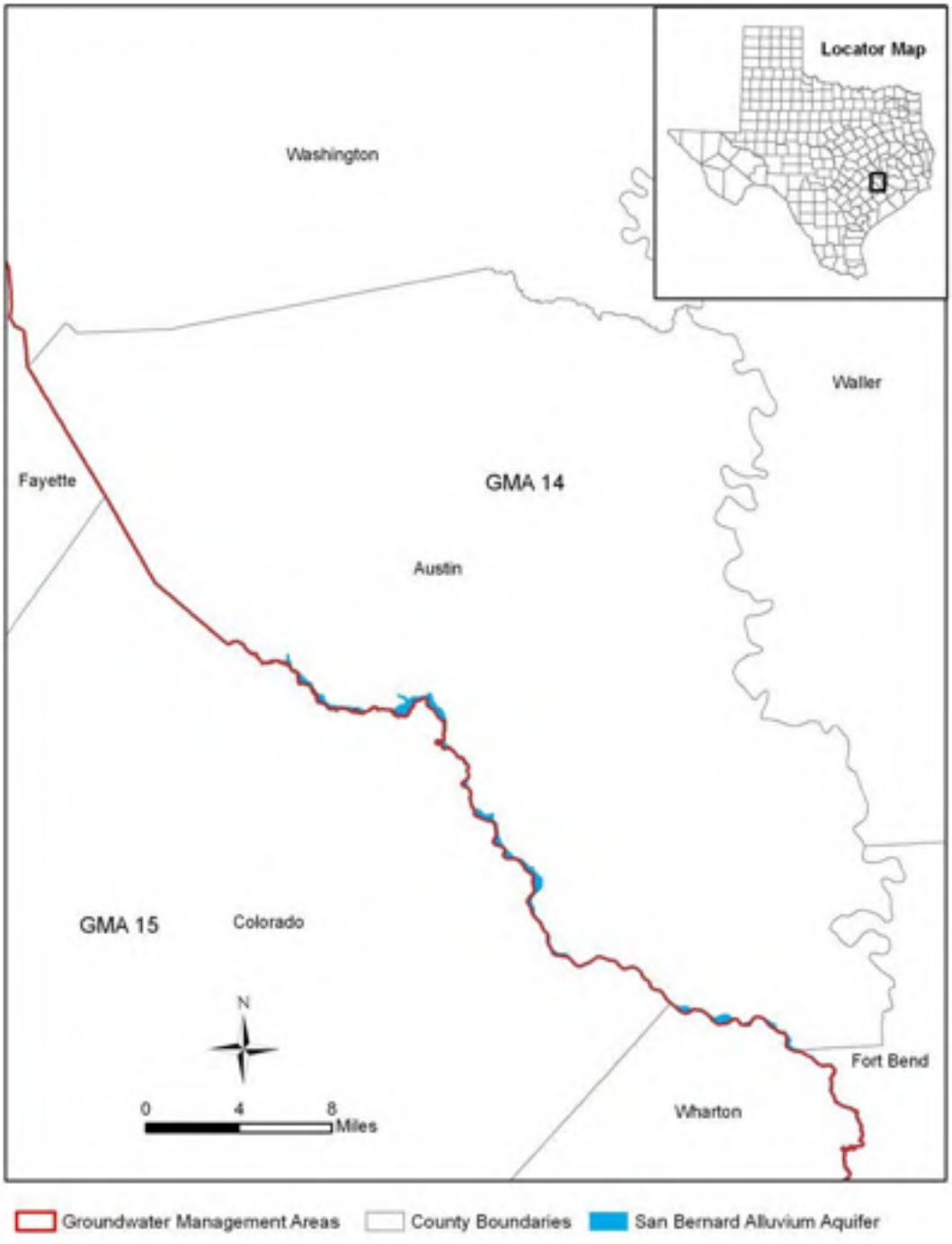

Figure 6-4 – Area of the San Bernard River Alluvium Aquifers in GMA 14

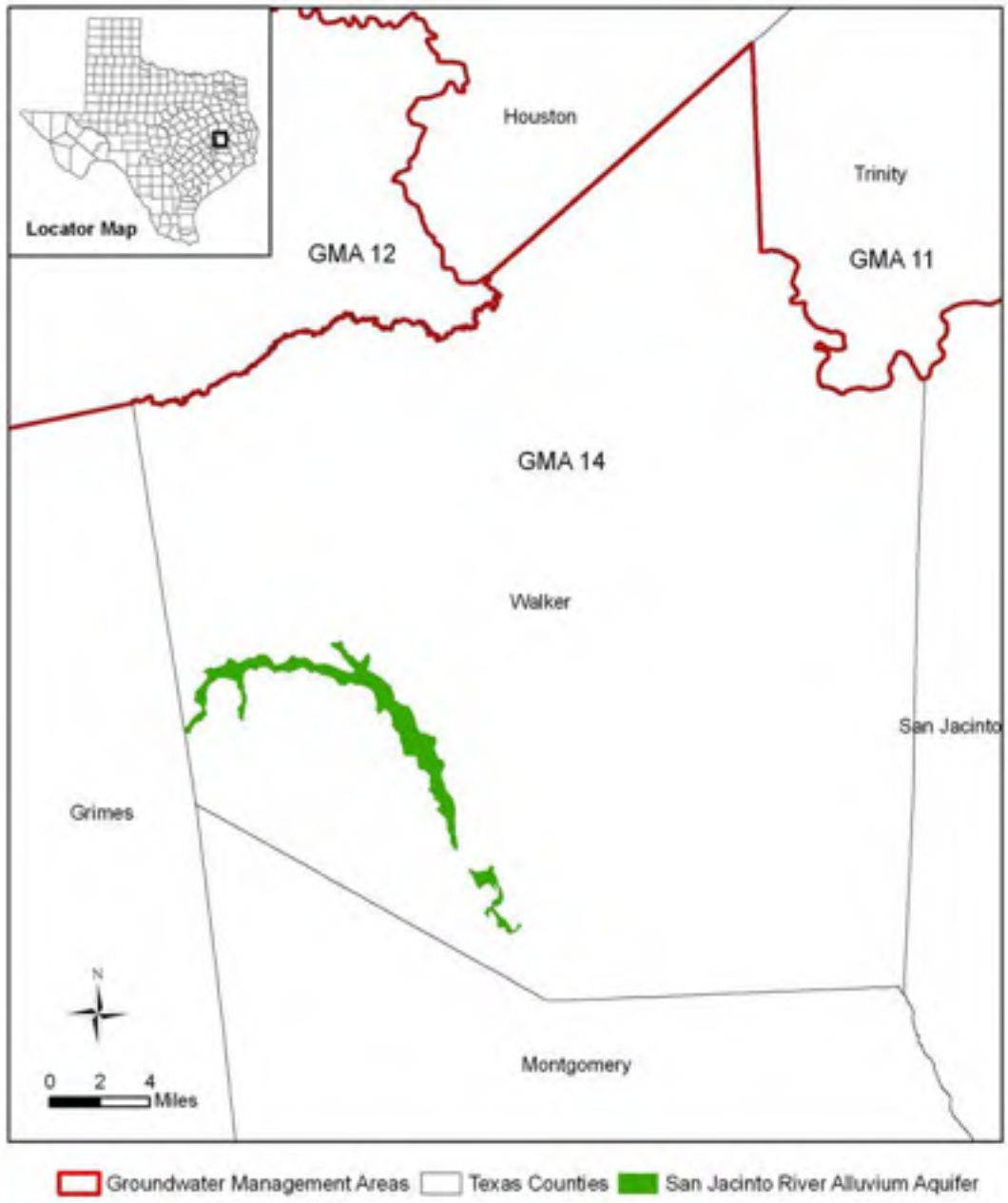

Figure 6-5 – Area of the San Jacinto River Alluvium Aquifers in GMA 14

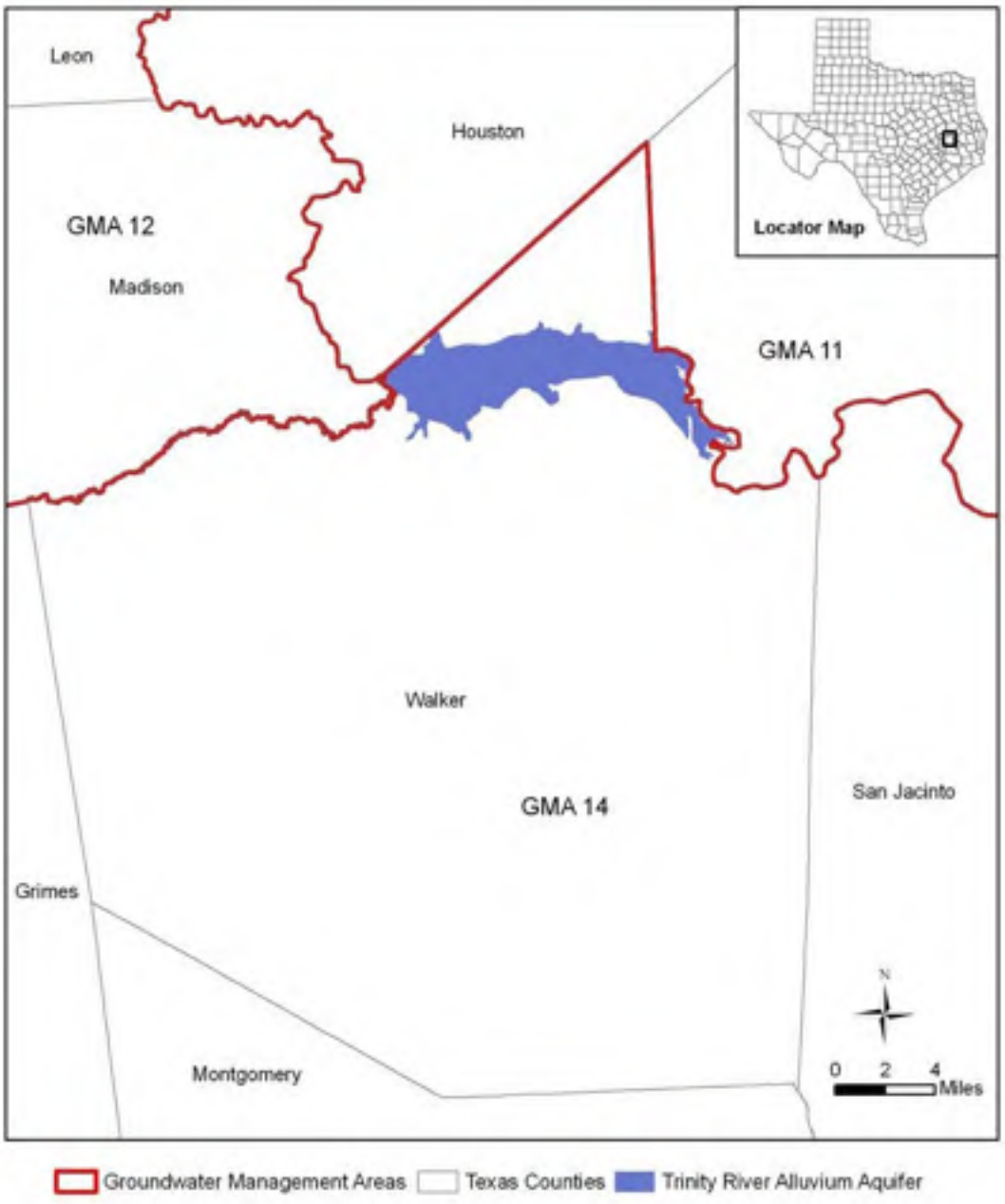

Figure 6-6 – Area of the Trinity River Alluvium Aquifers in GMA 14

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7.0 OTHER DFC OPTIONS CONSIDERED

During this round of joint planning in GMA 14, the new requirement for GMAs to address other DFC options that were considered but not adopted (Texas Water Code Section 36.108 (d – 3)(4)) led the District Representatives to develop and adopt, by resolution, administrative procedures that clearly prescribed the process for recognizing any suggested proposals for DFCs as official "options" that would then need to be addressed in the explanatory report. The administrative produces (see Appendix T) clearly articulate the procedures for any suggested proposals for DFCs to be designated as official options. Once designated as an official DFC option, then the District Representatives considered the nine factors included in Texas Water Code Section 36.108 (d) (1 – 9) with respect to the DFC option.

Following the process prescribed in the adopted administrative procedures, GMA 14 District Representatives only designated one DFC option for the four aquifers in the Gulf Coast Aquifer System. After consideration of the nine factors on the approved DFC option, this option was ultimately adopted as the Final DFC for the four aquifers in the Gulf Coast Aquifer System (see Appendix E). There were no other DFC options considered during this round of joint planning by GMA 14 District Representatives.

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8.0 RECOMMENDATIONS BY ADVISORY COMMITTEES AND RELEVANT PUBLIC COMMENTS

In accordance with Texas Water Code Section 36.108(d-3) and (d-4), this section of the Explanatory Report discusses reasons why recommendations made by advisory committees and relevant public comments received by the GCDs during the joint-planning process were or were not incorporated into the DFCs ultimately adopted on April 29, 2016.

The consideration, proposal, and adoption of DFCs in the joint-planning process, as described in Section 2.0 of this Explanatory Report, is necessarily a public, transparent process authorized only through open, publicly noticed meetings as required by the provisions of Chapter 36, Texas Water Code, and the Open Meetings Act, Texas Government Code. Over the course of several years, beginning in 2010, GMA 14 has held multiple joint-planning meetings to consider information in order to develop DFCs, including research applicable to the nine statutory factors and other relevant scientific and hydrogeological data. The Fort Bend Subsidence District and Harris-Galveston Subsidence District, special districts statutorily obligated to regulate groundwater withdrawals within their respective jurisdictions in GMA 14 for the purpose of preventing land subsidence, and other public stakeholders from Chambers and Washington counties sought participation early on in the joint-planning process to develop DFCs. As a result, these stakeholders were appointed to a nonvoting advisory committee to assist in the development of the DFCs pursuant to Texas Water Code Section 36.1081. With the exception of this advisory committee, GMA 14 received little to no public participation or comments throughout the majority of the joint-planning process. Only in the final months of the DFC process did GMA 14 receive comments from the public.

On October 28, 2015, the District Representatives in GMA 14 approved proposed DFCs for the purpose of drafting this Explanatory Report. The proposed DFCs provided acceptable drawdown levels for each subdivision of the Gulf Coast Aquifer System, including the Chicot, Evangeline, Burkeville, and Jasper (formations/aquifers), for each county located within GMA 14, as well as acceptable land subsidence levels, as applicable. The acceptable levels of drawdown for each subdivision of the Gulf Coast Aquifer System were measured in terms of water level drawdowns over the current planning cycle measured in feet from 2009 estimated water levels. These proposed DFCs were also supported by the advisory committee stakeholders.

The GCDs in GMA 14 each prepared a Summary Report inclusive of all relevant comments received during the 90-day public comment period regarding the proposed DFCs, any suggested revisions to the proposed DFCS, and the basis for the revisions. The GCDs'

Summary Reports were submitted to GMA 14 for further review by the District Representatives at a joint-planning meeting held October 28, 2015. In evaluating the comments received, GMA 14 District Representatives deemed certain comments relevant to the proposed DCFs. The remainder of this section identifies the relevant comments received and discusses why these comments were or were not incorporated into the DFCs.

As set forth in the public comments received, one commenter contended that the adoption of different DFCs for different geographic areas over the same aquifer—along the boundaries of political subdivisions—was not authorized by law, and as such the proposed DFCs were legally and hydrogeologically wrong. The commenter further stated that such proposed DFCs would cause GCDs to adopt different regulatory schemes, including different production limits, which would allow landowners producing groundwater in GCDs with less restrictive regulations to unfairly drain groundwater from landowners in adjacent GCDs with more restrictive regulations. The commenter claimed that this sort of activity constituted a regulatory taking of property by the GCDs as a result of the proposed DFCs.

The District Representatives to GMA 14 did not recommend any substantive changes to the proposed DFCs, but did recommend changes in the presentation and explanation of those DFCs. As originally proposed, it appeared the District Representatives proposed separate DFCs for each GCD and county in GMA 14; in actuality, the proposed DFCs applied throughout GMA 14, with a separate DFC for each of the four primary formations within the Gulf Coast Aquifer System. The presentation changes made it clear that GMA 14 was adopting four DFCs, but then also provided how the Northern Gulf Coast Aquifer GAM calculated the impact on each individual county within GMA 14.

To the extent the comments are directed at different DFCs for each aquifer formation they relate to policy issues GCDs face in considering, proposing, and adopting DFCs. As previously noted, the adoption of DFCs by GCDs, pursuant to the requirements and procedures set forth in Texas Water Code Chapter 36, is an important policy-making function. DFCs are planning goals that state a desired condition of the groundwater resources in a GMA in the future in order to promote better management of those resources on a long-term basis. GCDs are authorized to utilize different approaches in developing and adopting DFCs based on local conditions and the consideration of other statutory criteria as set forth in Texas Water Code Section 36.108. Contrary to the commenter's statements, the law authorizes GCDs in a GMA to adopt different DFCs for different geographic areas over the same aquifer based on political boundaries. However, whether this approach to setting DFCs should be utilized by the GCDs in GMA 14 is a policy decision the GCDs must make after careful consideration of local conditions and all other mandatory, statutory criteria as part of the joint-planning process.

Texas Water Code Section 36.108(d)(1) contemplates and authorizes the adoption of different DFCs for different geographic areas over the same aquifer based on the boundaries

of political subdivisions. First, the statute expressly and specifically *directs* GCDs "to consider uses or conditions of an *aquifer* within the management area, including conditions that differ substantially from one geographic area to another" when developing and adopting DFCs.[89] The use of the singular "aquifer" in this context clearly demonstrates that the Legislature intended that the uses and conditions in different geographic areas *over the same aquifer* were to be considered when adopting DFCs. Second, Texas Water Code Section 36.108(d-1) provides that districts may establish different DFCs for:

1) each aquifer, subdivision of an aquifer, or geologic strata located in whole or in part within the boundaries of the management area; *or*
2) *each geographic area overlying an aquifer in whole or in part* or subdivision of an aquifer within the boundaries of the management area.[90]

The Legislature's addition of the phrase "in whole or in part" makes it clear that GCDs may establish a "different" DFC for a geographic area that does not overlie a whole aquifer but only part of that aquifer. Moreover, the plain meaning of the term "geographic area" in this context clearly includes an area defined by political boundaries such as those of a GCD or a county.[91] Any other reading of "geographic area" in Texas Water Code Section 36.108(d-1) would be highly strained and contrary to the obvious intent of the larger statute.[92]

Such statutory authorization has also been recognized by the TWDB. In 2009, after GMA 1 adopted different DFCs for different geographic areas over the same aquifer (the Ogallala Aquifer) along the boundaries of political subdivisions, Mesa Water, LP and G&J Ranch (collectively the "Petitioners") filed a petition with the TWDB to appeal the reasonableness of the adopted DFCs.[93] The same complaints made in opposition of the DFCs adopted by GMA 1 are the same complaints made by the commenter to the GCDs in GMA 14 in opposition of the proposed DFCs. In their appeal of the DFCs adopted by GMA 1, Petitioners argued that, overall, the DFCs had no scientific basis and that the DFCs should be uniform on an aquifer-wide basis to ensure all areas and landowners receive "equal treatment." However, on February 17, 2010, the TWDB considered and approved its staff's recommendation that the DFCs adopted by GMA

[89] TEX. WATER CODE § 36.108(d)(1) (emphasis added).
[90] *Id.* § 36.108(d-1) (emphasis added).
[91] See *Morales v. Liberty Mutual Insurance Co.*, 241 S.W.3d 514, 517-18 (Tex. 2007) (stating that a particular term is to be considered and interpreted in the context of the entire statutory provision).
[92] See *McIntyre v. Ramirez*, 109 S.W.3d 741, 745 (Tex. 2003) (stating that it is improper to give an undefined statutory term a meaning that is out of harmony or inconsistent with other provisions in the statute).
[93] See TEX. WATER CODE ANN. § 36.108(l) (West 2009).

1 were reasonable.[94] The TWDB staff's analysis concluded that political boundaries, such as county lines, can be used to define geographic areas for different DFCs provided that aquifer uses and conditions support the designation of the areas. In reaching this conclusion, TWDB staff addressed private property rights, stating that "[t]o one degree or another, all DFCs adopted by groundwater conservation districts potentially impact the exercise of private property rights."[95] The TWDB staff explained that "beyond outright prohibition, the impact on private property rights involves the balancing of competing interest."[96]

During the joint-planning process for GMA 14, District Representatives considered uses and conditions of the Gulf Coast Aquifer System, as required by Texas Water Code Section 36.108(d)(1). District Representatives studied uses and conditions for each subdivision of the Gulf Coast Aquifer System, including the Chicot, Evangeline, Burkeville, and Jasper, for each county located within GMA 14. Evidence was provided and considered that demonstrated different types of uses of groundwater, differences in historic pumping, and different environmental conditions that were distinguishable in the various geographic areas of GMA 14 and described conveniently by reference to the counties (a more detailed discussion of these considerations is included below in the discussion of aquifer uses and conditions in *Section 5.1*).

For these reasons, in developing proposed DFCs, District Representatives in GMA 14 found it reasonable to divide the geographic area over each subdivision of the Gulf Coast Aquifer System for the different DFCs using the political boundaries of the counties. This finding was further supported by other relevant factors considered by District Representatives in GMA 14, including: (1) the heavy utilization by the TWDB and the regional water planning groups in the state and regional water-planning processes of information and data related to water supply and demand and other demographic information on a county-by-county basis, (2) the ability of the public to identify the boundaries of the geographic areas delineated, and (3) the ability of the GCDs—the responsible planning and regulatory entities created along county boundaries by the Texas Legislature—to achieve the DFCs, as mandated by law.

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[94] *See* Texas Water Development Board, Report on Appeal of the Reasonableness of the Desired Future Conditions Adopted by Groundwater Management Area 1 for the Ogallala and Rita Blanca Aquifers (February 10, 2010) *available at* http://www.twdb.texas.gov/groundwater/petitions/doc/GMA1/2009_Petitions/Mesa_G&J_Ranch/TWDB_Staff_Report_GMA1_Petitions_02-10.pdf.

[95] *Id.* at 4 (citing TEX. WATER CODE ANN. § 36.002 (West 2009) ("Ownership and rights of the owners of the land . . . in groundwater are hereby recognized, and nothing in this code shall be constituted as depriving or divesting the owners . . . of the ownership or rights, *except as those rights may be limited or altered by rules promulgated by a district*.") (Emphasis added).

[96] *Id.*

Also, as part of the joint-planning process, District Representatives in GMA 14 considered impacts to private property rights and interests in groundwater, as required by Texas Water Code Section 36.108(d)(7). The Gulf Coast Aquifer System is a finite resource that replenishes at a lower rate than is required to meet all current and projected water demands. Accordingly, the consideration of impacts to private property rights necessitated the careful balancing of competing interests. For instance, it is essential to protect the property rights of existing well owners and their abilities to realize their reasonable investment-backed expectations from their wells. It is also essential to protect the property rights of landowners who have yet to drill water wells on their properties. Protecting the property rights of landowners who may be impacted by subsidence is also critical. The concerns raised by commenters regarding future harm to landowners along adjacent county lines were weighed against the real and present economic harm to existing groundwater users in certain areas of GMA 14 where groundwater levels continue to decline as demands exceed available, sustainable supplies—such as is the case in Montgomery County. In balancing all sectors, District Representatives found that it was reasonable to divide the geographic area over each subdivision of the Gulf Coast Aquifer System for the different DFCs using the political boundaries of the counties in order to protect existing users in the more stressed areas of GMA 14, which were best delineated on a county-by-county basis.

As previously noted, the GCDs also received comments suggesting that the proposed DFCs will result in a taking of property. However, these assumptions are not only speculative, but also counterintuitive to the fundamental principles in support of local groundwater management and regulation by GCDs. In Texas, the legislature has declared GCDs as the preferred method of groundwater management.[97] Unlike the statewide regulation of oil and gas, local GCDs are required to manage and protect the groundwater resources within their jurisdiction pursuant to their statutory powers and duties as set forth in Texas Water Code Chapter 36 and their respective enabling legislation. While the GCDs in a GMA may adopt aquifer-wide DFCs, the adoption of such DFCs does not prevent the GCDs from adopting different regulatory plans based on local conditions and uses occurring in each GCD.

Nonetheless, after consideration of these comments, the District Representatives of GMA 14 approved non-substantive changes to the proposed DFCs. The DFCs that were considered and proposed for final adoption, inclusive of all non-substantive changes, provided acceptable drawdown levels for each hydrogeologic subdivision of the Gulf Coast Aquifer System, including the Chicot, Evangeline, Burkeville, and Jasper, on two different scales—on an aquifer-wide basis for the entire geographic extent of the aquifer subdivisions in GMA 14 and on a county-by-county geographic basis, in light of the various considerations set forth

[97] *See* TEX. WATER CODE § 36.0015 (b)

above—and acceptable land subsidence levels, as applicable, for certain counties located within GMA 14. These proposed DFCs, inclusive of acceptable drawdown levels on an aquifer-wide scale and a county-by-county basis, were finally adopted by the District Representatives in GMA 14 on April 29, 2016, at a properly noticed joint-planning meeting. These non-substantive changes were also supported by the advisory committee stakeholders. As a result, the policy issues raised by commenters as discussed above are now moot.

The GCDs also received various comments regarding the failure to factor economic and hydrologic constraints into the calculation of total estimated recoverable storage ("TERS"). In June of 2014, as required by amendments to Texas Water Code Chapter 36, resulting from the passage of Senate Bill 660 in 2011, the executive administrator of the TWDB submitted the initial report on total estimated recoverable storage to GMA 14 District Representatives. While GMA 14 District Representatives were cognizant of the enormity of this new responsibility assigned to the TWDB, significant concerns were raised both by GMA 14 District Representatives and also during public comments regarding the lack of usefulness of this information for two primary reasons. First, in the TWDB analysis, it was confirmed that there were no constraints placed on the recoverability analysis due to the obvious and inevitable negative economic impacts that will result with the reduction and elimination of artesian pressures in systems like the Gulf Coast Aquifer System. Second, sufficient information was provided to prove the far-reaching negative consequences of adopting DFCs based on a percentage of storage calculated from TERS, as proposed by commenters.

Based on input from GMA 14 District Representatives and technical presentations received during the 90-day public comment period, in particular two presentations by representatives from INTERA, Inc. on behalf of various stakeholders, including those stakeholders participating in the advisory committee, the negative economic impacts resulting from the elimination of artesian pressures from the Gulf Coast Aquifer System, a dynamic projected to occur with less than one percent of the TERS volume being produced, clearly resulted in the elimination of the Gulf Coast Aquifer System as a viable water resource for almost all water use sectors. These economic impacts are, in part, driven by the negative impacts on well yields that will result with the inevitable conversion from confined to unconfined conditions as water levels are lowered due to pumping. The analysis provided in the TERS report to GMA 14 by the TWDB does not factor in either economics or hydrology into the calculations. GMA 14 District Representatives strongly encourage the TWDB to conduct necessary science to better constrain future estimates of TERS, taking into consideration the negative impacts of economics and hydrology, on the volumes of water that can reasonably be expected to be recovered from storage.

GMA 14 District Representatives carefully weighed all comments received on this issue of TERS and ultimately decided, for the reasons provided above (as also discussed in Section

5.10 of this Explanatory Report) that, due to other considerations, in particular the negative socioeconomic impacts of subsidence, TERS has no practical application in the GMA 14 joint-planning process or in groundwater management of the Gulf Coast Aquifer System. Therefore, the public comments received on this issue did not result in any changes to the DFCs.

Finally, public comments were also received from both sides of the issue of the balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence. Some comments received suggested that there should be sustainable management of groundwater resources in GMA 14 through proactive conservation and management. These comments were predicated on the critical need for the long-term viability of the economy and environment in the region, both today and for future generations. Others have suggested that as much as 5 percent of the groundwater in storage in the Jasper Aquifer should be allocated for pumping over the next 50 years in order to sustain anticipated economic development. The balance achieved by GMA 14 with respect to the volume of groundwater quantified in the TERS report may be compartmentalized into two areas.

In the more rural areas of GMA 14, water demands will easily be met by proposed DFCs resulting from selected pumping projections. As such, the TERS estimates in these rural areas are functionally irrelevant in proposing DFCs. In the urban, fast-growing areas of GMA 14, District Representatives have balanced the TERS volumes with the need to mitigate the impacts of subsidence, the impacts of declining artesian water levels on existing and future well owners (in particular, the economic impacts on smaller utilities with limited customer base and individual landowners with limited economic means to drill for and produce groundwater), and the negative consequences of decreasing well yields that result when artesian water levels are lowered/eliminated and groundwater is produced form storage. Ultimately, for the reasons provided in Section 5.10, GMA 14 did not revise the DFCs in response to these comments.

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Appendix A

TWDB Explanatory Report Checklist

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Texas Water Development Board			
Desired Future Condition Submission Packet Checklist - Administrative Completeness (part 1)			
Groundwater Management Area:			
Reviewing Staff:		**Date Packet Received:**	
		Date E-mail Acknowledgement Sent:	
		Date Review Completed:	
	Citation of Rule	Present in packet and administratively complete	Notes
1. Is a copy of the explanatory report addressing the information required by Texas Water Code §36.108(d-3) and the criteria in Texas Water Code §36.108(d) included? *(refer to Explanatory Report checklist before responding)*	31 TAC §356.32(1)	See attached	
2. Is a copy of the resolution of the groundwater management area adopting the desired future conditions as required by Texas Water Code §36.108(d-3) included?	31 TAC §356.32(2)	See Appendix E	
3. Is a copy of the notice that was posted for the joint planning meeting at which the districts collectively adopted the desired future condition(s) as required by Texas Water Code §36.108(e) and §36.108(e-2) included?	31 TAC §356.32(3)	See Appendix B	
4. Is the name of a designated representative of the groundwater management area for TWDB staff to contact as necessary included?	31 TAC §356.32(4)	Kathy Turnery Jones Lone Star GCD See Transmittal Letter	
5. Are any groundwater availability model files or aquifer assessments acceptable to the executive administrator used in developing the adopted desired future condition with documentation sufficient to replicate the work included? *(refer to the Groundwater Availability Model Administrative Elements checklist before responding)*	31 TAC §356.32(5)	See Appendix F	

6. Is any other information the executive administrator may require to be able to estimate the modeled available groundwater included?	31 TAC §356.32(6)	NA	
Mark elements that are present in the packet with YES Mark elements that are not applicable with NA Mark elements that are missing from the packet with NO			

Texas Water Development Board			
Desired Future Condition Submission Packet Checklist - Groundwater Availability Model Administrative Elements (part 2)			
Groundwater Management Area:			
Reviewing Staff:		**Date Packet Received:**	
		Date Review Completed:	
	Citation of Rule	Present in packet and administratively complete	Notes
1. Is a descriptive narrative of the methods and references used to determine the desired future conditions included with the desired future condition statements?		See Section 3.0 and Appendix E	
2. Is any other information the executive administrator may require to be able to estimate the modeled available groundwater included?	31 TAC §356.32(6)	See Appendix E and groundwater availability model files transmitted separately.	
3. If item 2 is no, please list additional information required. (For example, model or GIS files necessary for review)		See response to Number 2 above.	
Mark elements that are present in the packet with YES			
Mark elements that are not applicable with NA			
Mark elements that are missing from the Packet with NO			

Texas Water Development Board			
Desired Future Condition Submission Packet Checklist - Factors and Technical Elements (part 3)			
Groundwater Management Area:			
Reviewing Staff:		**Date Packet Received:**	
	Citation of Rule	Present in packet and administratively complete	Notes
1. Does the explanatory report identify each desired future condition?	TWC §36.108(d-3)	See Section 3.0 and Appendix E.	
2. Does the explanatory report provide the policy and technical justifications for each desired future condition?	TWC §36.108(d-3)	See Section 4.0 – 4.3 (Pages 26 – 37), Section 5.10 (Pages 94 – 100),	
3. Does the explanatory report include documentation that the factors under Subsection (d) were considered by the districts and a discussion of how the adopted desired future conditions impact each factor?	TWC §36.108(d-3)	See Executive Summary (Pages 7 – 12) and Section 5.0 – 5.10 (Pages 38 – 100), Appendix D,	
3a. Did the districts consider aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another?	TWC §36.108(d1)	See Section 5.1 (Pages 38 – 68), Appendix G, Appendix H,	
3b. Did the districts consider the water supply needs and water management strategies included in the state water plan?	TWC §36.108(d2)	See Section 5.2 (Pages 68 – 73), Appendix I	
3c. Did the districts consider hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge?	TWC §36.108(d3)	See Section 5.3 (Pages 73 – 80), , Appendix J, Appendix K, and Appendix L	
3d. Did the districts consider other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water?	TWC §36.108(d4)	See Section 5.4 (Page 80), Appendix M	

3e. Did the districts consider the impact on subsidence?	TWC §36.108(d5)	See Section 5.5 (Pages 80 – 86), Appendix N,
3f. Did the districts consider socioeconomic impacts reasonably expected to occur?	TWC §36.108(d6)	See Section 5.6 (Pages 86 – 90), Appendix O, Appendix P, Appendix Q, Appendix R
3g. Did the districts consider the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002?	TWC §36.108(d7)	See Section 5.7 (Pages 90 – 92), Appendix S
3h. Did the districts consider the feasibility of achieving the desired future condition?	TWC §36.108(d8)	See Section 5.8 (Pages 92 – 94)
3i. Did the districts consider any other information relevant to the specific desired future conditions?	TWC §36.108(d9)	NA
4. Does the explanatory report list other desired future condition options considered, if any, and the reasons why those options were not adopted?	TWC §36.108(d-3)(4)	See Section 7.0 (Page 115). Aquifers declared not relevant for joint planning included in Section 6.0 (Pages 102 – 114)
5. Does the explanatory report discuss reasons why recommendations made by advisory committees and relevant public comments received by the districts were or were not incorporated into the desired future conditions?	TWC §36.108(d-3)(5)	See Section 8.0 (Pages 115 – 122)
Mark elements that are present in the packet with YES Mark elements that are missing from the packet with NO		

Texas Water Development Board				
Desired Future Condition Submission Packet Checklist - Groundwater Availability Modeling Technical Elements (part 4)				
Groundwater Management Area:				
Groundwater Management Area Coordinator and contact information				
Reviewing Staff:		**Date Packet Received:**		
		Date Review Completed:		
	Present in packet and administratively complete	Notes	Contacted GMA Coordinator (date and by whom)	Additional data received and loaded onto network (date/TWDB staff name)
1. Summary report that includes the following:				
a. Modeling contact information if clarification is needed	See Appendix F			
b. Date and year of submittal	Submitted with DFC package			
c. Seal by Texas Professional Geoscientist or Engineer	See Appendix F			
d. Groundwater Management Area and requested by whom	See Appendix F			
e. Description of Desired Future Condition (DFC)	See Appendices A and F			
f. Approach: Modeling Methods Document to include parameters and assumptions such as:				
i. Groundwater availability model (GAM) version or acceptable alternative model, and version of acceptable pre-/post-processor used, if applicable	See Appendix F			
ii. table or description of stress periods and corresponding years/months	See Appendix F			
iii. if the end of the calibration period is different from the start of the predictive simulations describe assumptions for projecting model from end of calibration to beginning conditions for predictive simulation including pumping, recharge, and related surface water heads. Include targets and hydrographs, as applicable, in appendix as well as electronic copies.	NA			
iv. Assumption for recharge i.e. what years averaged and/or drought and related stress periods, etc.	NA	Unmodified from NGC GAM.		
v. Assumption for pumping in prediction such as:				
1. same distribution as end of calibration and increase or decrease per county and layer?	See Appendix F			
2. New wellfields (include maps),	NA	Unmodified from NGC GAM.		
3. Some other method—please provide as much detail as needed.	NA			

g. Version of TWDB “model grid” file that associates model grids with counties, groundwater conservation districts, river basins, groundwater management areas, and regional water planning areas within the model study area using a centroid based approach. These files are available to download on each of the respective model web pages noted above.	See Appendix F			
h. Description of method used to extract data from model; for example, method and assumptions used to average drawdown etc. Include a description of how dry cells were treated in averaging drawdown.	See Appendix F			
i. Results Section to include appropriate tables of pumping versus drawdown, volume, surface water discharge, etc by aquifer, layer, etc. as applicable to the DFC statement.	See Appendix F			
j. References	NA			
2. Related model files (MODFLOW), PEST or other automated calibration files (if used), target files (for establishing starting conditions) with appropriate read me files.	See Appendix F			
Mark elements that are present in the packet with YES				
Mark elements that are not applicable with NA				
Mark elements that are missing from the Packet with NO				

Texas Water Development Board				
Desired Future Condition Submission Packet Checklist - Aquifer Assessments Elements (part 5)				
Groundwater Management Area:				
Groundwater Management Area Coordinator and contact information				
Reviewing Staff:		**Date Packet Received:**		
		Date Review Completed:		
	Present in packet and administratively complete	Absent from packet and not complete	Contacted GMA Coordinator (date and by whom)	Additional data received and loaded onto network (date/TWDB staff name)
1. Summary report that includes the following:				
a. Technical contact information if clarification is needed	NA			
b. Date and year of submittal	NA			
c. Seal by Texas Professional Geoscientist or Engineer	NA			
d. Groundwater Management Area and requested by whom	NA			
e. Description of Desired Future Condition (DFC)	NA			
f. Approach: Details of the water budget or analytical methods used, as applicable to selected method:				
i. Description and documentation of water budget, analytic formula/model, or other method used,	NA			
ii. Recharge assumptions and data	NA			
iii. Water level data used, including hydrographs and maps	NA			
iv. Inflow and outflow data	NA			
v. Hydrologic parameters required for method	NA			
vi. Structural data used in method	NA			
vii. Formulas and calculations used in assessment	NA			
viii. Geographic information system files or references used for assessment	NA			
ix. Any other applicable information to assess the aquifer	NA			
g. Description of method used to extract data from background data or geographic information files, for example, methods and assumptions used to average drawdown, recharge, or any other relevant method.	NA			
h. Results section with appropriate summary tables, as applicable to the DFC statement.	NA			
i. References	NA			
Mark elements that are present in the packet with YES				

Mark elements that are not applicable with NA
Mark elements that are missing from the Packet with NO

Appendix B

Meeting materials for GMA 14 meetings held during the 2011 – 2016 round of joint planning

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GMA 14

AGENDAS

Postings

BLUEBONNET

GCD

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee,** comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment

(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)

4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to reach statutory mandates
   a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 26.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1262 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3426.

ORIGINAL FILED
COPIES NOT COMPARED

MAY 09 2013

Carrie Gregor
County Clerk, Austin County, TX

#4

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held **on Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to reach statutory mandates
   a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 26.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1262 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

FILED FOR RECORD
at 2:15 o'clock P M

MAY 09 2013

COUNTY CLERK
Montgomery County, Texas

2013-062

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

2013 MAY -9 PM 3:18

As required by Section 36.108(e) Texas Water Code, a meeting of the **Groundwater Management Area 14** Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve Minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to meet statutory mandates
   a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 36.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update SB 1252 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303 prelson@lonestargcd.org, or (936) 494-3436.

Came to hand and posted on a Bulletin Board in the Courthouse of ____ County, Texas, on this, the ___ day of May, 2013 at ___ .m.

/s/ Kelby Turner Jones
Kelby Turner Jones, Chairman
GMA 14 Planning Group

____, Deputy Clerk

____ County, Texas

NOT COMPARED
AN ORIGINAL WAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

POSTED MAY 9 10 30 11:55 AM
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY _____ Deputy

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers).
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to reach statutory mandates
    a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
    b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 26.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1292 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3436.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d)

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes effecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

ORIGINAL FILED
COPIES NOT COMPARED

JUN 14 2013
1:37 PM
Connie Gregor
County Clerk, Austin County, TX

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Eason of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303. peason@lonestargcd.org, or (936) 494-3436.

* 64

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.109(e). Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filing of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be converted as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes effecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

FILED FOR RECORD
at 2:54 o'clock P.M.
JUN 14 2013
DAVID WALKER
County Clerk, Montgomery County, TX

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes effecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

FILED FOR POSTING
At 4:30 O'clock P M
JUN 14 2013
K.A. French, County Clerk
WALKER COUNTY
By

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Jim R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; jnelson@lonestargcd.org, or (936) 494-3436.

NOT COMPARED
AN ORIGINAL WAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

POSTED 5/16/13 @ 2:00 PM
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY _____ Deputy

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes effecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Jeison of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pjeison@lonestargcd.org, or (936) 494-3436.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD and Southeast Texas GCD will be held on **Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes/rules affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

ORIGINAL FILED
COPIES NOT COMPARED

SEP - 5 2013
1:05 PM
09/18/2013
County Clerk, Austin County, TX

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

#142

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District**, located **at 655 Conroe Park North, Conroe, Texas** 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s)
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Ground Water Management Area 14 [as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes/rules affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

FILED FOR RECORD
at 11:01 o'clock A.M.
SEP 06 2013
DAVID PASKET
County Clerk, Grimes County, TX
by [illegible] Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-029 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Ground Water Management Area 14 (as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes/rules affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

FILED FOR POSTING
At 2:00 O'clock P M
SEP 06 2013
K.A. French, County Clerk
WALKER COUNTY
By Deputy
GMA 14 9/18/13 Agenda

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436

NOT COMPARED
AN ORIGINAL WAS

POSTED 9-5-13 @ 12:30 p.m.
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY: Tiffany McDonald

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment.
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 13-023 and for the updated Northern Gulf Coast GAM
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Ground Water Management Area 14 (as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes/rules affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108(d)(3).
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108(d)(4).
11. Briefing and discussion of the impacts of proposed desired future condition on subsidence, as required by Texas Water Code Chapter 36.108(d)(5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.

13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned.

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.
16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, Texas 77304; pnelson@lonestargcd.org, or (936) 494-3466.

ORIGINAL FILED
COPIES NOT COMPARED

JUN 11 2014
9:34 AM
Carrie Breazeale
County Clerk, Austin County, TX

#17

FILED FOR RECORD
AT 3:02 O'CLOCK P.M.
JUN 10 2014
DAVID RAGSDET
COUNTY CLERK, MONTGOMERY, TX
BY [illegible] DEPUTY

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108(d)(3).
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108(d)(4).
11. Briefing and discussion of the impacts of proposed desired future condition on subsidence, as required by Texas Water Code Chapter 36.108(d)(5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.

13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

    GMA 14 Interlocal Agreement Participants meeting will be adjourned.

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.
16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, Texas 77303; pne.sun@lonestargcd.org, or (936) 494-3436.

Filed for Record in:
Grimes County
On: Jun 10,2014 at 02:00P
As a [illegible]

Amount 8.00
Receipt Number - 71251
By Breddie Henson

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was
filed on the date and time stamped hereon by me
and was duly recorded in the volume and page
of the named records of
Grimes County
as stamped hereon by me.
Jun 10,2014

David Paskett, Grimes County Clerk
Grimes County

Filed for Record in:
Grimes County
On: Jun 10,2014 at 03:00P
As a MOTION

Amount 8.00
Receipt Number - 71251
By Breddie Henson

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was
filed on the date and time stamped hereon by me
and was duly recorded in the volume and page
of the named records of
Grimes County
as stamped hereon by me
Jun 10,2014

David Paskett, Grimes County Clerk
Grimes County

POSTED JUNE 11, 2014 4:00 PM
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY _____ Deputy

NOT COMPARED
AN ORIGINAL WAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108(d)(3).
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108(d)(4).
11. Briefing and discussion of the impacts of proposed desired future condition on subsidence, as required by Texas Water Code Chapter 36.108(d)(5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.

13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

    GMA 14 Interlocal Agreement Participants meeting will be adjourned.

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.
16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, Texas 77303; prelson@lonestargcd.org, or (936) 494-3436.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee,** comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, **June 24, 2014,** at **1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108(d)(3).
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108(d)(4).
11. Briefing and discussion of the impacts of proposed desired future condition on subsidence, as required by Texas Water Code Chapter 36.108(d)(5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Blackhorse GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.
At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Agenda: Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108(d)(3).
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108(d)(4).
11. Briefing and discussion of the impacts of proposed desired future condition on subsidence, as required by Texas Water Code Chapter 36.108(d)(5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

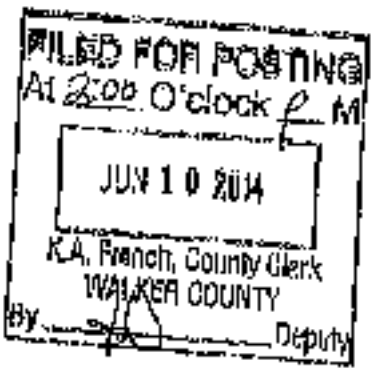
GMA 14 Interlocal Agreement Participants meeting will be adjourned.

13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

    GMA 14 Interlocal Agreement Participants meeting will be adjourned.

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.
16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul H. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, Texas 77303; pnelson@lonestargcd.org, or (936) 494-3436.



GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee,** comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3436.

ORIGINAL FILED
COPIES NOT COMPARED

SEP 11 2014
4:19 pm
Anna Bryan
County Clerk, Austin County, TX

27

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee,** comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and rentalning requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3402.

FILED FOR RECORD
AT 2:15 O'CLOCK P M
SEP 10 2014
DAVID PASKETT
COUNTY CLERK, MONTGOMERY COUNTY, TEXAS
By [signature] Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, September 23, 2014, at 1:30 pm** at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
6. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (5).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul D. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com, or (936) 494-3456.

FILED FOR POSTING
At 1:29 o'clock P M
SEP 10 2014
Kori French, Waller County Texas
By _____ Deputy

NOT CONFIRMED
AS POSTED 9/10
POSTED 9:10:14 @ 4:30pm
BRENDA HOLLAN, COUNTY CLERK
WALKER COUNTY, TEXAS
BY: _____ Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3429.

ORIGINAL FILED
COPIES NOT COMPARED
NOV 06 2014
11:19AM
County Clerk, Austin County, TX

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment:
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (5).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned.

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14.
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn.

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prnelson@lonestargcd.org, or (936) 494-3402.

#286

FILED FOR RECORD
AT 9:35 O'CLOCK A.M
NOV 06 2014
DAVID PARKET
COUNTY CLERK, BRAZOS COUNTY, TX
By _____ Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discuss on and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discuss on and possible action regarding approval of resolution adopting administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (c) (8).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Hesson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe TX 77303; phesson@lonestargcd.org or (936) 494-3436

FILED FOR POSTING
At 11:54 O'clock A M
NOV 06 2014
Kari French, Walker County Texas
By [signature] Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14

Meeting will be converted to a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (6)
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option (s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and reporting requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul D. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnel@gmdg.lonestargcd.com or (936) 494-3435

POSTED 11-10-14 @ 9:50 am
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY _____ Deputy

NOT COMPARED
AN ORIGINAL WAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, process, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be converted to a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (6).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned.

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14.
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul N. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

ORIGINAL FILED
COPIES NOT COMPARED

MAY 08 2015 3:17 pm

Carrie Gregor
County Clerk, Austin County, TX

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 3.04.*
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

#91

FILED FOR RECORD
AT 1:55 O'CLOCK P.M.
MAY 26 2015
DAVID RAMSEY
COUNTY CLERK, MONTGOMERY, TX
By _____ Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 3.04.*
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prnelson@lonestargcd.org, or (936) 494-3456.

Filed for Record in:
Grimes County
On: Mon 08,2015 at 01:55P
As a POSTING

Amount 3.00
Receipt Number - 78671
By: Candice Dawson

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was
filed on the date and time stamped hereon by me
and was duly recorded in the volume and page
of the named records of:
Grimes County
as stamped hereon by me.
Mon 08,2015

David Pasket, Grimes County Clerk
Grimes County

Filed for Record in:
Grimes County
On: Mon 08,2015 at 01:55P
As a HOTICE

Amount 8.00
Receipt Number - 78671
By: Candice Dawson

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was
filed on the date and time stamped hereon by me
and was duly recorded in the volume and page
of the named records of:
Grimes County
as stamped hereon by me.
Mon 08,2015

David Pasket, Grimes County Clerk
Grimes County

FILED FOR POSTING
At 2:25 O'clock P M
MAY 08 2015
Kari French, Waller County Texas
By _____ Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(b), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 3.04.*
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn.

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson, of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3436.

FILED FOR POSTING
At 2:28 O'clock P M
MAY 08 2015
Karl French, Walker County, Texas
by dp2 Deputy

POSTED 5.8.15 @ 2:45 pm
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY _____
Deputy

NOT COMPARED
AN ORIGINAL WAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 3.04.*
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3294.

ORIGINAL FILED
COPIES NOT COMPARED

JUN 10 2015

Carrie Gregor
County Clerk, Austin County TX

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303 pnelson@lonestargcd.org, or (936) 494-3496.

#131

FILED FOR RECORD
AT 9:33 O'CLOCK AM
JUL 10 2015
DAVID PASKET
COUNTY CLERK, MONTGOMERY COUNTY, TX
By _____ Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action.

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(3) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3436.

Filed for Record in
Grimes County
Jan 06,2015 at 09:53A
By [illegible] DEPUTY

Amount 5.00
Receipt Number - 79278
By Barbara Kinch

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the volume and page of the named records of
Grimes County
as stamped hereon by me.
Jan 06,2015

David Pechek, Grimes County Clerk
Grimes County

Filed for Record in
Grimes County
Jan 06,2015 at 09:53A
By [illegible] DEPUTY

Amount 5.00
Receipt Number - 79278
By Barbara Kinch

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the volume and page of the named records of
Grimes County
as stamped hereon by me.
Jan 06,2015

David Pechek, Grimes County Clerk
Grimes County

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(8) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Filed for Record in:
Grimes County
On: Jun 10,2015 at 08:27A
As a RECORDING
Document Number: 79271
Receipt Number - 79271
By, Barbara Hinch

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the volume and page of the named records of:
Grimes County
as stamped hereon by me.
Jun 10,2015

David Pechacek, Grimes County Clerk
Grimes County

Filed for Record in:
Grimes County
On: Jun 10,2015 at 08:27A
As a RECORDING
Document Number: 79271
Receipt Number - 79271
By, Barbara Hinch

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the volume and page of the named records of:
Grimes County
as stamped hereon by me.
Jun 10,2015

David Pechacek, Grimes County Clerk
Grimes County

POSTED 6/10/15 @ 9:00am
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY _____ Deputy

NOT POSTED AT COURTHOUSE DOOR

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bushonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 24, 2015**, at **9:00 am at the offices of the Lone Star Groundwater Conservation District**, located at **655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussions of items of Interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

FILED FOR POSTING
At 2:17 O'clock PM
JUN 16 2015
Karl French, Walker County, Texas
by _____ Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with: GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(5) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

FILED FOR POSTING
At 2:18 O'clock P M
JUN 16 2015
Ken French, Walker County Texas
By _____ Deputy

ORIGINAL FILED
COPIES NOT COMPARED

OCT 15 2015
8:07 am
Carrie Gregor
County Clerk, Austin County, TX

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as

required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.

9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; [redacted], or (936) 494-3436.

#198

FILED FOR RECORD
AT 2:58 O'CLOCK P.M
OCT 15 2015
DAVID PASKET
COUNTY CLERK, GRIMES COUNTY, TX
By B Burgess Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as

required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.

8. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; [redacted], or (936) 494-3436.

Filed For Record in:
Grimes County
On: Oct 15,2015 at 12:58A
By: MEIPCE

Receipt 2.00
Receipt Number - 81540
By: Barbara Sinclair

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the volume and page of the named records of:
Grimes County
as stamped hereon by me.
Oct 15,2015

David Pockett, Grimes County Clerk
Grimes County

Filed for Record in:
Grimes County
On: Oct 15,2015 at 12:58A
By: MEIPCE

Receipt Number - 81540
Amount 2.00
Receipt Number - 81540
By: Barbara Sinclair

STATE OF TEXAS
I hereby certify that this instrument was filed on the date and time stamped hereon by me and was duly recorded in the volume and page of the named records of:
Grimes County
as stamped hereon by me.
Oct 15,2015

David Pockett, Grimes County Clerk
Grimes County

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

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1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as

required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.

9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com, or (936) 494-3436

FILED FOR POSTING
9:52 o'clock A.M.
OCT 15 2015
Karl French, Walker County Texas
by _____ Deputy

POSTED 10/15/15 @ 8:30 am
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY Deputy

NOT COMPARED
AN ORIGINAL WAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as

required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.

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14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; [redacted], or (936) 494-3436.

FILED FOR POSTING
At 11:50 O'clock A. M.
APR 15 2016
K.A. French, County Clerk
WALKER COUNTY
By _____ Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

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1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

TIM LAPHAM
County Judge

Austin County Courthouse
One East Main
Bellville, Texas 77418-1521

Telephone (979) 865-5911 extension 2223
Fax (979) 865-8786
E-Mail tlapham@austincounty.com

April 19, 2016

To whom it may concern:

This letter serves as notice of the posting of an open meeting of the Groundwater Management Area 14 Joint Planning Committee Meeting scheduled for Friday, April 29, 2016, at 9:00am

Notice was hand delivered by Paul Nelson on 04/19/2016 at 3:00 pm.

Sincerely,

The Honorable Tim Lapham
County Judge

TRANSACTION REPORT

APR/19/2016/TUE 12:05 PM

FAX(TX)

#	DATE	START T.	RECEIVER	CON. TIME	PAGE TYPE/NOTE	FILE
001	APR/19	12:04	9798650336	0:02:33	3 MEMORY OK	ECM 2488

LONE STAR
GROUNDWATER CONSERVATION DISTRICT

FACSIMILE TRANSMITTAL SHEET

TO: AUSTIN COUNTY CLERK	FROM: Paul R. Nelson, LSGCD
COMPANY: Lone Star GCD	DATE: April 19, 2016
FAX NUMBER: 979 865 0336	TOTAL NO. OF PAGES (INCLUDING COVER): 3
PHONE NUMBER:	LSGCD TELEPHONE NUMBER: 936-494-3436
RE:	LSGCD FAX NUMBER: 936-494-3436

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:
Please post the attached agenda for Groundwater Management Area 14 Meeting as soon as possible. Thank you,

Paul R. Nelson
Assistant General Manager
Lone Star Groundwater Conservation District
936-494-3436(phone) 936 494 3438(fax)
pnelson@lonestargcd.org

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

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1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

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1. Call to order
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   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2016, at _____.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

FILED FOR RECORD
at 10:32 O'CLOCK A M
APR 19 2016
DAVID PASKET
COUNTY CLERK, GRIMES COUNTY, TX
By Blanchard Deputy

#57

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

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1. Call to order
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Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
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Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Filed for Record in
Grimes County
On: Apr 19,2016 at 10:30A
As a RECITAL

Amount 5.00
Receipt Number - 84791
By: Barbara Klatch

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was
filed on the date and time stamped hereon by me
and was duly recorded in the volume and page
of the named records of
Grimes County
as stamped hereon by me.
Apr 19,2016

David Pankaby Grimes County Clerk
Grimes County

Filed for Record in
Grimes County
On: Apr 19,2016 at 10:43A
As a RELEASE

Amount 3.00
Receipt Number - 84795
By: Barbara Klatch

STATE OF TEXAS COUNTY OF GRIMES
I hereby certify that this instrument was
filed on the date and time stamped hereon by me
and was duly recorded in the volume and page
of the named records of
Grimes County
as stamped hereon by me.
Apr 19,2016

David Pankaby Grimes County Clerk
Grimes County

NOT COMPARED WITH ORIGINAL

POSTED 4-19-16 @ 10:03a.m.
DEBBIE HOLLAN, COUNTY CLERK
WALKER COUNTY, TEXAS
BY _____
Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

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GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

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NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

NOT COMPARED WITH ORIGINAL

POSTED 4-19-16 @ 10:03am
DEBBIE HOLLAN, COUNTY CLERK
WALLER COUNTY, TEXAS
BY Daisy Mestes
Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14---Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a seperate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3436.

Posted 4/19/16 at 8:30 AM

By Paul R. Nelson

(title) General Manager

Zach Holland Log Off

Open Meeting Submission

TRD:	2016002620
Date Posted:	04/19/2016
Status:	Accepted
Agency Id:	1114
Date of Submission:	04/19/2016
Agency Name:	Bluebonnet Groundwater Conservation District
Board:	Groundwater Management Area 14
Date of Meeting:	04/29/2016
Time of Meeting:	09:00 AM (##:## AM Local Time)
Street Location:	655 Conroe Park North
City:	Conroe
State:	TX
Liaison Name:	Zach Holland
Liaison Id:	4
Additional Information Obtained From:	Paul R. Nelson of Lone Star Groundwater Conservation District 655 Conroe Park North Drive Conroe, Texas 77303 pnelson@lonestargcd.org 936-494-3436

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 9:00

A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

Agenda:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.
GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.
Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.
7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.
(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

New Submission

HOME | TEXAS REGISTER | TEXAS ADMINISTRATIVE CODE | OPEN MEETINGS

BRAZORIA GCD

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 24, 2013, at 9:30 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Public Comment
3. Receipt of Posted Notices
4. Approval of April 25, 2012 minutes
5. Update and report from the Texas Water Development Board
6. GMA 14 Inter-local Agreements Financial Report
7. Discussion and overview relating to non-exempt Well Development, Operating, Aggregation and Transportation Applications of Electro Purification LLC currently filed with the Bluebonnet GCD – Zach Holland
8. Overview of results of Regional Groundwater Update Project; discussion of possible effects on GMA 14 and path forward – Freese and Nichols
9. Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD from GMA 14 to GMA 12, pursuant to 31 Tex. Admin. Code 356.22 – Alan Day
10. Discussion of next meeting date, location, and agenda items.
11. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2013 at _____.m.

Filed 04/12/2013 10:30:0[illegible] AM
[signature]
Joyce Hudman
County Clerk
Brazoria County, Texas

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Hays-Trinity GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, May 22, 2019, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following actions may be considered and recommended for Joint Planning Committee consideration:

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comments limited to a maximum of 5 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2019 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group

Meeting will be converted to a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreement Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to retain statutory consultants
   a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning period in GMA 14 as required by Texas Water Code 36.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1392 (DFC extension bill) voted out of House 5/2/19
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Filed: 6/24/2013 9:48:20 AM
Joyce Hudman
County Clerk
Brazos County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Blue Bonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analyses to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

Filed: 09/03/2013
10:01:54 AM

Joyce Hudman
County Clerk
Brazoria County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussion of items of interest to the GMA.
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Groundwater Management Area 14 (as required by Texas Water Code § 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned.

12. Discussion of new legislation/statutes/rules affecting districts.
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD **will** be held on **Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions.
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 16, 2013 GMA 14 Joint Planning Meeting.

Meeting will be converted to a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model.
8. Briefing and discussion of approach and results from the predictive simulator utilizing GMA 14 approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model
10. Briefing and consideration of draft statement of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM (also referred to as the NAGM).
11. Briefing and discussion of process for GMA 14 agreement for proposed Desired Future Conditions during joint planning process.
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Filed: 04/04/2014 09:55:55 AM
Juliet Stallman
County Clerk
Brazoria County, Texas

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.

Filed: 6/4/2014 8:32:18 AM
Joyce Hudman
County Clerk
Montgomery County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108 (d) (3)
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4)
11. Briefing and discussion of the impacts of proposed desired future conditions on subsidence, as required by Texas Water Code Chapter 36.108 (d) (5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Filed: 09/11/2014
08:43:40 AM
Joyce Hudman
Joyce Hudman
County Clerk
Brazoria County,
Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (6).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Filed 11/03/2014 09:04:41 AM

Joyce Hudman
County Clerk
Brazoria County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

Filed: 05/12/2015 11:00:11 AM

Joyce Hudman
County Clerk
Montgomery County, Texas

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14*, Section 3.04.
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

Filed: 6/10/2015 08:26:31 AM
Joyce Hudman
County Clerk
Brazoria County, Texas

NOTICE OF OPEN MEETING

As required by Section 36.105(c), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss hearing levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(3) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d)(1)-(3) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.

Joyce Hudman
County Clerk
Brazoria County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.
9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.

Filed: 10/19/2015 0:53:30 PM

Joyce Hudman
County Clerk
Montgomery County, Texas

15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303 pnelson@lonestargcd.org or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of October, 2015 at _____ .m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Blueberner GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting the following business may be considered and recommended for Joint Planning Committee possible action

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 2 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:30 A.M. meeting, whichever is later)

Filed 04/15/2016 02:01:49 PM
Joyce Lindman
County Clerk
Brazoria County, Texas

Filed: 3/31/2016 9:01:19 AM

Joyce Hudman
County Clerk
Travis County, Texas

NOTICE OF OPEN MEETING

As required by Section 36.105(e), Texas Water Code a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul K. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____, _____ County, Texas, on this, the _____ day of April, 2016, at _____.m.

_____
/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

LONESTAR GCD

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

DOC# 13-05543
POSTED
04/12/2013 10:38AM
Ashley Tuttle
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 24, 2013, at 9:30 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Public Comment
3. Receipt of Posted Notices
4. Approval of April 25, 2012 minutes
5. Update and report from the Texas Water Development Board
6. GMA 14 Inter-local Agreements Financial Report
7. Discussion and overview relating to non-exempt Well Development, Operating, Aggregation and Transportation Applications of Electro Purification LLC currently filed with the Bluebonnet GCD – Zach Holland
8. Overview of results of Regional Groundwater Update Project, discussion of possible effects on GMA 14 and path forward – Preese and Nichols
9. Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD from GMA 14 to GMA 12, pursuant to 31 Tex. Admin. Code 356.22 – Alan Day
10. Discussion of next meeting date, location, and agenda items
11. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2013 at _____ m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

Doc# 13-0484
Filed
05/08/2013 3:15PM
Rhonda Kohen
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

- GMA 14 Interlocal Agreements Financial Report
- Discussion and possible action to approve action plan for GMA 14 to reach statutory mandates
  - Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
  - Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 36.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1262 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 **Joint Planning Committee,** comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

Doc# 13-068697

POSTED
06/13/2013 2:29PM
Tallen Caldwell
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

1. Call to order
2. Welcome and introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

Doc # 13-13341-22
FILED
09/03/2013 1:24PM
Filed for Record
LORI RUSSELL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 25, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Ground Water Management Area 14 (as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes effecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

Docs 14-0638

POSTED
04/08/2014 2:00PM
Glenda Bacalak
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 18, 2013 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model.
8. Briefing and discussion of approach and results from the predictive simulation utilizing GMA 14 approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model
10. Briefing and consideration of draft statement of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM (also referred to as the HAGM).
11. Briefing and discussion of process for GMA 14 agreement for proposed Desired Future Conditions during joint-planning process.
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.

Doc# 14-079383
FILED
06/06/2014 9:45AM
ANNIE PARKER, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108 (d) (3).
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4).
11. Briefing and discussion of the impacts of proposed desired future conditions on subsidence, as required by Texas Water Code Chapter 36.108 (d) (5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

Doc # 14-165726

POSTED
09/09/2014 3:34PM
Amber Tuttle
BARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul D. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 **Joint Planning Committee,** comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or [illegible])
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 28, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Doc# 14-1660
POSTED
11/05/2014 03:58PM
Shelley Sadler
MONTGOMERY COUNTY, TEXAS

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (3).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned.

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Doc# 15-0426

POSTED
05/08/2015 11:39AM
Rhonda Robey
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 13, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14*, Section 3.04.
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

POSTED
06/10/2015 10:14AM
Rhonda Robes
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

1. Call to order
2. Welcome and introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d)(1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.

Doc#: 15-36529
FILED
10/14/2015 12:42PM
Filed & Recorded
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.
9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, **April 29, 2016, at 9:00 A.M.** at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

Dec# 14-0529

POSTED
04/15/2016 1:29PM
Rebecca Robey
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion, consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation, regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2016, at _____ m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

LOWER TRINITY
GCD

2013-049

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Brazoscnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 24, 2013, at 9:30 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

FILED FOR RECORD
2013 APR 12 AM 9:56

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Public Comment
3. Receipt of Posted Notices
4. Approval of April 25, 2012 minutes
5. Update and report from the Texas Water Development Board
6. GMA 14 Interlocal Agreements Financial Report
7. Discussion and overview relating to non-exempt Well Development, Operating, Aggregation and Transportation Applications of Electro Purification LLC currently filed with the Blueberry GCD – Zach Holland
8. Overview of results of Regional Groundwater Update Project; discussion of possible effects on GMA 14 and path forward – Freese and Nichols
9. Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD from GMA 14 to GMA 12, pursuant to 31 Tex. Admin. Code 356.22 – Alan Day
10. Discussion of next meeting date, location, and agenda items.
11. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303, paul.nelson@lsgcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2013 at _____ m.

_____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

April 2013

Notice Copies

GMA 14

#1 of 4

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Blackwater GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 24, 2013, at 9:30 am at the offices of the Lone Star Groundwater Conservation District located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following matters may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Public Comment
3. Receipt of Board Notices
4. Approval of April 25, 2012 minutes
5. Update and report from the Texas Water Development Board
6. GMA 14 Interlocal Agreements Financial Report
7. Discussion and overview relating to non-exempt Well Development Transportation Applications of Electro Purification LLC currently [illegible] GCD - Zach Holland
8. Overview of results of Regional Groundwater Update Project; discussion of possible next steps on GMA 14 and path forward – Freese and Nichols
9. Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD from GMA 14 to GMA 12, pursuant to 31 Tex. Admin. Code 356.22 – Allen Day
10. Discussion of next meeting date, location, and agenda items.
11. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; [illegible] or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2013 at _____ m.

_____
/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

FILED FOR RECORD

_____, Deputy Clerk

2013 APR 12 AM 10 43

_____ County, Texas

COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

2013-062

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

2013 MAY -9 PM 3:13

As required by Section 36.108(c), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA
6. Presentation of information from the Texas Water Development Board on the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve routine plan for GMA 14 to reach statutory mandates
   a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 36.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative Update - SB 1262 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

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GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMI

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker or
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA
6. Presentation of information from the Texas Water Development Board at the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to meet statutory mandates
   a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 36.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1270 (DFC extension 6/6 voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items
12. Adjourn

2013-078

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

FILED FOR RECORD
2013 JUN 18 AM 10:06

As required by Section 36.108(g), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

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GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action.

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes effecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

2013-110

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of proposed GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/rules/rule changes affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

FILED FOR RECORD
2013 SEP -9 PM 12:44
[illegible]

3 4 8

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, **September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Public Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be converted to a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-022 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/state rules affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

FILED FOR RECORD
2013 SEP 5 PM 12:59
GMA JOINT PLANNING
COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

2014-054

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

2014 APR -7 AM 11:12

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker unless
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 18, 2013 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model
8. Briefing and discussion of approach and results from the predictive simulation utilizing GMA 14 approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model
10. Briefing and consideration of draft statement of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM (also referred to as the NGGM).
11. Briefing and discussion of process for GMA 14 agreement for proposed Desired Future Conditions during joint planning process.
12. Discuss funding needs, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14, Fayetteville GCD, Brazos County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for possible action.

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 16, 2013 [illegible] meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model.
8. Briefing and discussion of approach and results from the predictive simulation utilizing GMA 14 approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model
10. Briefing and consideration of draft statement of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM (also referred to as the NGGM)
11. Briefing and discussion of process for GMA 14 consideration of proposed Desired Future Conditions during joint-planning process.
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Reviews of progress to date for Groundwater Management Area 14 Joint Planning [illegible]
15. Discussion of next meeting date, location, and agenda items.

FILED FOR RECORD

GMA 14 Planning Group — Page 1 1

APR 25 2014 [illegible] Agenda

[illegible]
[illegible]
[illegible]

2014-079

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Brazos-Texas GCD will be held on Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108 (d) (2)
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4).
11. Briefing and discussion of the impacts of proposed desired future conditions on subsidence, as required by Texas Water Code Chapter 36.108 (d) (5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

COPY

3+7

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 3 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108 (d) (3)
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4).
11. Briefing and discussion of the impacts of proposed desired future conditions on subsidence, as required by Texas Water Code Chapter 36.108 (d) (5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

COPY

2014-121

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

COPY

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

FILED FOR RECORD
2014 SEP 10 AM 11:12

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul S. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive Conroe, TX 77303; pnelson@lonestargcd.org or (936) 494-3436.

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

COPY

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3436.

2014-144

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment:
   (Public comment is limited to a maximum of 5 minutes per speaker and for 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (8).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

FILED AND RECORDED
2014 NOV -5 PM 1:53

0000565

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and a 30 minute limit for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (3).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Camino Park North Drive, Conroe, TX 77303; [illegible] (936) 494-3135.

Came in hand and posted on a Bulletin Board in the Courthouse, [illegible] County, Texas, on this, the [illegible] day of November, 2014 at [illegible] m

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

[illegible], Deputy Clerk
[illegible] County, Texas

FILED FOR RECORD
2014 NOV -5 PM 2:16
[illegible]

00000279

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts created wholly or partially within Groundwater Management Area 14: Evolution GCD, Brazos County GCD, Lone Star GCD, Lower Trinity GCD, and Southwest Texas GCD will be held on Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following topics may be discussed and thereafter posted for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment will be limited to three minutes per speaker on GMA 14 Joint Planning matters)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 20, 2015 GMA 14 Joint Planning Meeting
6. Presentation of Comments from the Texas Water Development Board and discussion of Report Issued by the GMA

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants:

1. Executive Briefing Session (no action may be taken) regarding the Interlocal Agreement and the possible ending.
2. Hearing by participating groundwater conservation districts regarding any DFC options requested to be considered by the District. Requests for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Section 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(4)(E) and 31 TAC Section 356.31(d) and the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and the provision of DFC options submitted to GMA 14 by a District for consideration by the GMA 14 Joint Planning meeting in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to accept any DFC options currently under formal consideration, to be further reviewed or take desired action relative to any DFC options in accordance with Texas Water Code Section 36.108 (d)(4)(E) and in accordance with GMA 14 Joint Planning Procedures, Section 3.05.
6. Discussion and possible action to adopt explanatory statements for any proposed DFC options under Texas Water Code Sections 36.108(d)(4)(E) and 31 TAC Section 356.31(d) in accordance with GMA 14 Administrative Procedures, Section 3.05
7. Briefing and discussion of progress by Groundwater Management Area 14 Joint Planning and requesting responses and schedule.

8. Presentation and Discussion by District of issues and Rules of Interest to Industry for GMA 14 Planning group
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Fred R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; fnelson@lonestargcd.com, or (936) 494-3136.

Copies posted and notice on the Bulletin Board in the Courthouse, _____ County, Texas, on this the _____ day of June, 2015 at _____ m.

_____
Kelly Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

Accepted for Filing this
San Jacinto County
on Jun 22, 2015 at 1:47 PM
By Tonya Jones

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

FILED FOR RECORD
2015 JUN 10 PM 1:03

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d)(1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.

8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, Polk County, Texas, on this, the 10 day of June, 2015 at ____m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

2015-135

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

2015 OCT 15 PM 2:09

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, consisted of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At the meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment: (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Proxies if any
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.
   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.
9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for Inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desired Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and rulemaking requirements and schedule
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com, or (936) 494-3436

Come to hand and posted on a Bulletin Board in the Courthouse, P/K County, Texas, on this, the 15th day of October, 2015 at 2:30 p.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment. *(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)*
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.
   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts suggested revisions to the proposed Desired Future Conditions, as required by Texas Water Code Section 36.108(d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.
9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; phone: 936) 494-3436; email: pnelson@lsgcd.org.

Came to hand and posted on a Bulletin Board in the Courthouse of San Jacinto County, Texas, on this the 15th day of October, 2015 at 10:27 a.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

Deputy Clerk

Accepted for Filing in the San Jacinto County
On the 15th day of October, 2015 at 10:27 a.m.
& Recorded in Page
County, Texas

2016-048

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

FILED FOR RECORD
2016 APR 18 PM 3:35
SHERRY C. HOOK
COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Brazos Valley GCD, Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting
   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
6. Discussion, consideration and possible action regarding amending WG 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or appropriate

   GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.
   Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14
8. Discussion and possible action authorizing GMA 14 Chair and the designated committee, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, which ever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Brazos Valley GCD, Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 11:00 A.M., or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker or for 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

For further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org; or (936) 494-3333.

Came to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the ___ day of April, 2016, at _____ m.

_____
/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman GMA 14 Planning Group

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

Accepted for Filing in:
San Jacinto County
On Apr 19, 2016 at 11:43A
By Christina Hayes

At this meeting the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 3 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 29, 2015 GMA 14 Joint Planning Meeting
   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
6. Discussion, consideration and possible action regarding amending WD 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required

   GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.
   Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.
7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the administrator, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M meeting, whichever is later.)

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

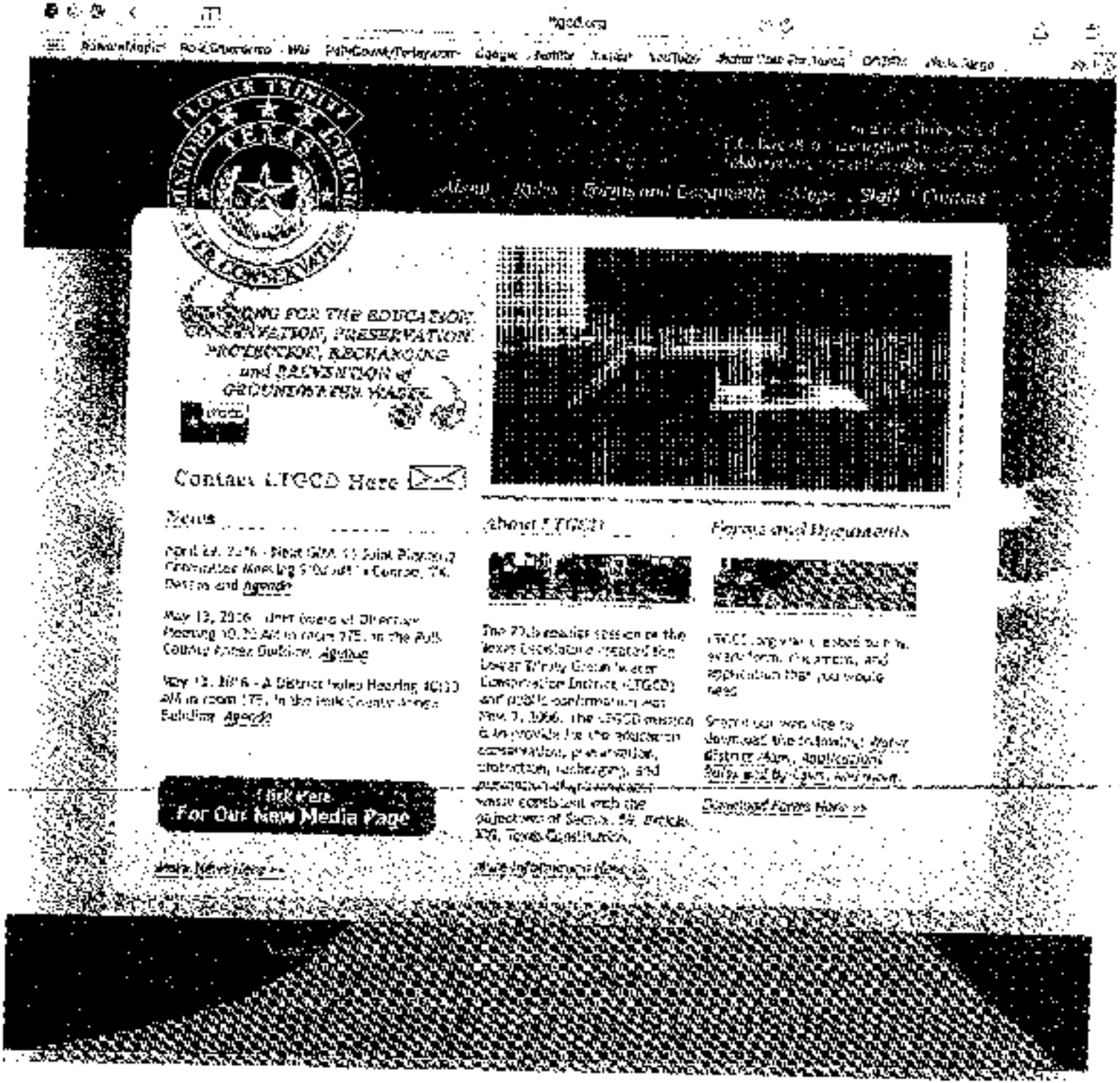
At this meeting the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 3 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul A. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe TX 77303; pnelson@lonestargcd.org, or (936) 494-3096

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this the ____ day of April, 2016, at ____ m.

____ /s/ Kelly Turner Jones _____
Kelly Turner Jones, Chairman GMA 14 Planning Group


LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT
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Click Here For Our New Media Page

A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

Agenda: At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

New Submission

2016-048

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

FILED FOR RECORD
2016 APR 18 PM 3:35
SHERRY C. HOOK
COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Brazos Valley GCD, Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting
   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
6. Discussion, consideration and possible action regarding amending WG 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or appropriate

   GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.
   Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14
8. Discussion and possible action authorizing GMA 14 Chair and the designated committee, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, which ever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Brazos Valley GCD, Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 11:00 A.M., or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker or for 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

For further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org; or (936) 494-3333.

Came to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the ___ day of April, 2016, at _____ m.

_____
/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman GMA 14 Planning Group

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

Accepted for Filing in:
San Jacinto County
On Apr 19, 2016 at 11:43A
By Christina Hayes

At this meeting the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 3 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 29, 2015 GMA 14 Joint Planning Meeting
   Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
6. Discussion, consideration and possible action regarding amending WD 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required

   GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.
   Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.
7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the administrator, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M meeting, whichever is later.)

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

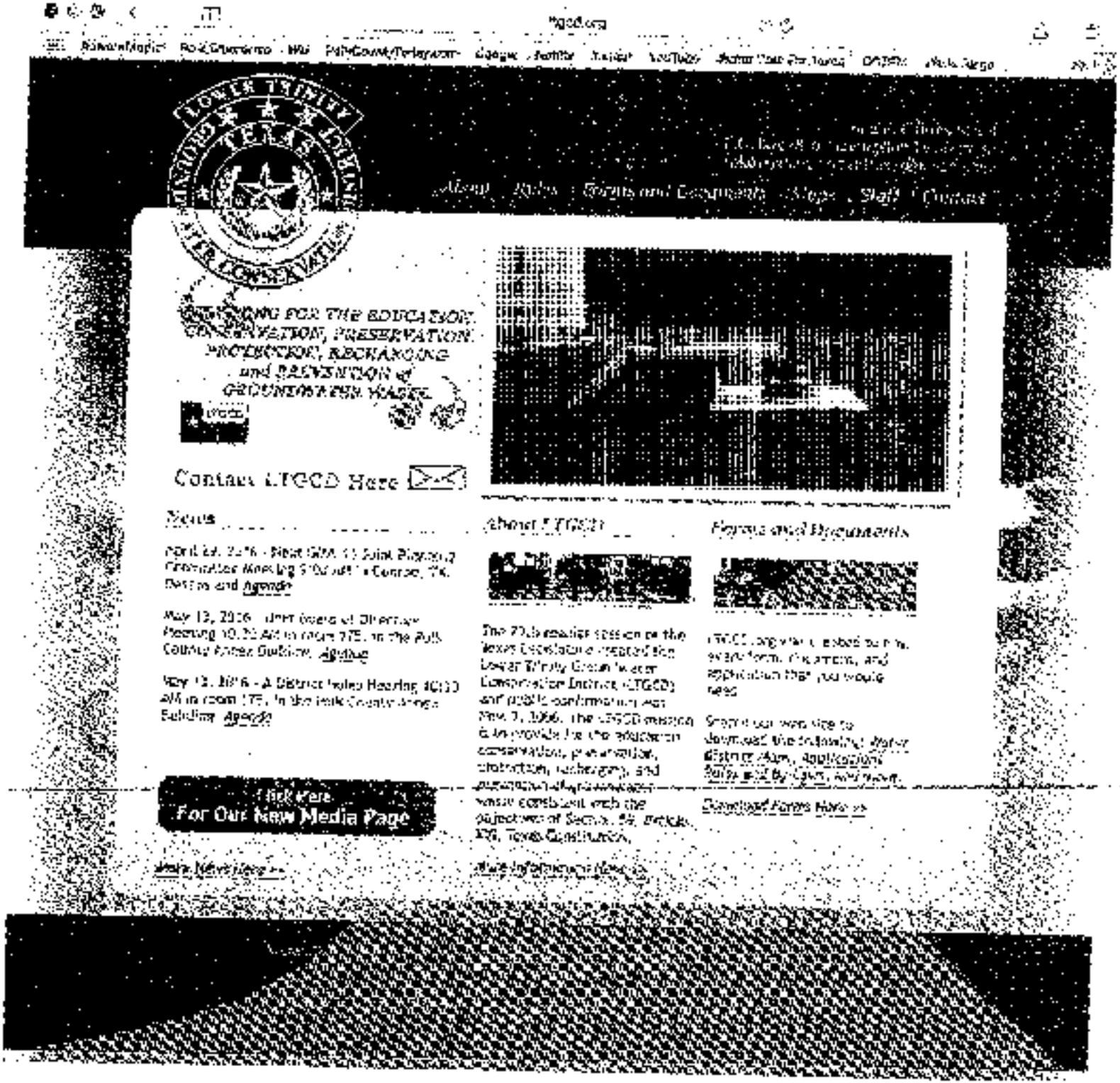
At this meeting the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 3 minutes per speaker and/or 20 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul A. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe TX 77303; pnelson@lonestargcd.org, or (936) 494-3096

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this the ____ day of April, 2016, at ____ m.

____ /s/ Kelly Turner Jones _____
Kelly Turner Jones, Chairman GMA 14 Planning Group


LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT
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Contact LTGCD Here
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Upcoming Events
Forms and Documents
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A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

Agenda: At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

New Submission

SOUTHEAST TEXAS GCD

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 24, 2013, at 9:30 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

FILED FOR RECORD
2013 APR 12 AM 11:45
MONTGOMERY COUNTY, TEXAS

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Public Comment
3. Receipt of Posted Notices
4. Approval of April 25, 2012 minutes
5. Update and report from the Texas Water Development Board
6. GMA 14 Inter-local Agreement's Financial Report
7. Discussion and overview relating to non-exempt Well Development, Operating, Aggregation and Transportation Applications of Electro Purification LLC currently filed with the Bluebonnet GCD – Zach Holland
8. Overview of results of Regional Groundwater Update Project; discussion of possible effects on GMA 14 and path forward - Freeze and Nichols
9. Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD from GMA 14 to GMA 12, pursuant to 31 Tex. Admin. Code 356.22 – Alan Day
10. Discussion of next meeting date, location, and agenda items.
11. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2013 at ____m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk.

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 24, 2013, at 9:30 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Public Comment
3. Receipt of Posted Notices
4. Approval of April 25, 2012 minutes
5. Update and report from the Texas Water Development Board
6. GMA 14 Inter-local Agreements Financial Report
7. Discussion and overview relating to non-exempt Well Development, Operating, Aggregation and Transportation Applications of Electro Purification LLC currently filed with the Bluebonnet GCD – Zach Holland
8. Overview of results of Regional Groundwater Update Project; discussion of possible effects on GMA 14 and path forward – Freeze and Nichols
9. Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD from GMA 14 to GMA 12, pursuant to 31 Tex. Admin. Code 356.22 – Alan Day
10. Discussion of next meeting date, location, and agenda items.
11. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, Jasper County, Texas, on this, the 11 day of April, 2013 at 2:25 p.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

Deputy Clerk
Jasper County, Texas

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS
FILED APR 11 2013
BY DEPUTY

4912

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Blushorner GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 24, 2013, at 9:30 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Public Comment
3. Receipt of Posted Notices
4. Approval of April 25, 2012 minutes
5. Update and report from the Texas Water Development Board
6. GMA 14 Inter-local Agreement Financial Report
7. Discussion and overview relating to non-exempt Well Development, Operating, Aggregation and Transportation Applications of Electro Purification LLC currently filed with the Blushorner GCD – Zach Holland
8. Overview of results of Regional Groundwater Update Project; discussion of possible effects on GMA 14 and path forward – Freese and Nichols
9. Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD from GMA 14 to GMA 12, pursuant to 31 Tex. Admin. Code 356.22 – Alan Day
10. Discussion of next meeting date, location, and agenda items.
11. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Copy to Land and posted on a Bulletin Board in the Courthouse, _____ _____ County, Texas, on this, the _____ day of April, 2013 at ___ ___m.

POSTED
APR 11 2013
TIME 2:32 PM
BY: _____
DEPUTY/ASSISTANT COUNTY CLERK

_____
/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, April 24, 2013, at 9:30 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Public Comment
3. Receipt of Posted Notices
4. Approval of April 25, 2012 minutes
5. Update and report from the Texas Water Development Board
6. GMA 14 Inter-local Agreements Financial Report
7. Discussion and overview relating to non-exempt Well Development, Operating, Aggregation and Transportation Applications of Electro Purification LLC currently filed with the Bluebonnet GCD - Zach Holland
8. Overview of results of Regional Groundwater Update Project; discussion of possible effects on GMA 14 and path forward – Freeze and Nichols
9. Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD from GMA 14 to GMA 12, pursuant to 31 Tex. Admin. Code 356.22 – Alan Day
10. Discussion of next meeting date, location, and agenda items.
11. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2013 at _____ .m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to meet statutory mandates
   10. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   11. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 36.108 and presentation of proposed scope of services.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1292 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

FILED FOR RECORD
2013 MAY 13 PM 1:57
[illegible] COUNTY CLERK

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interst to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to reach statutory mandates
   a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 26.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1282 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

4983

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Blueblannel GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 29, 2013, at 10:30 am** at the offices of the **Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. GMA 14 Interlocal Agreements Financial Report
9. Discussion and possible action to approve action plan for GMA 14 to reach statutory mandates
   a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
   b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 36.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative Update – SB 1262 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, May 22, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

- GMA 14 Interlocal Agreements Financial Report
- Discussion and possible action to approve action plan for GMA 14 to reach statutory mandates
  - Discuss and take possible action to approve Interlocal Agreement related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
  - Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 36.108 and presentation of proposed scope of services

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Legislative update - SB 1292 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

FILED TIME 1:00 pm

MAY 10 2013

DONECE GREGORY, COUNTY CLERK
TYLER COUNTY, TEXAS
By

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

FILED FOR RECORD
2013 JUN 14 PM 2:05
MONTGOMERY COUNTY, TEXAS

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes effecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

4098

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 26, 2013, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comments limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 22, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
8. Discuss and take possible action on the filling of the currently vacant position of Secretary of the Joint Planning Committee.

Meeting will be converted to a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

9. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
10. Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070.
11. Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/statutes affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

DONECE GREGORY
County Clerk, Tyler County
Woodville, Texas 75979

THE STATE OF TEXAS }
COUNTY OF TYLER }

This is to certify that on the time and date stamped hereon, the notice of a meeting, a copy of which is attached hereto, has been filed in my office and was posted on the official bulletin board in the courthouse, as is required by Section 551.041, Government Code.

Executed on June 14, 2013.

Donece Gregory
Tyler County Clerk

By: _____
Deputy

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3486.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of June, 2013 at _____.m

_____
/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

FILED AT _____ TIME: 1:30pm

JUN 14 2013

DONNIE GUNN, COUNTY CLERK
TYLER COUNTY, TEXAS
By: _____

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazos County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southwest Texas GCD will be held on Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve Minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss Briefing levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one groundwater use to another in Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/rules/issues affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Wojtek of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303 (pwojtek@lonestargcd.org), or (936) 494-3129.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of September, 2013 at _____ m.

FILED FOR RECORD
2013 SEP -5 AM 10:11
GLENDA ALLISON
COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

/s/ Kathy Turner Jones

Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk.

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Blackhorse GCD, Jasper County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment (Public comment is limited to a maximum of 5 minutes per speaker and 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of Information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(4).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/rules/notice of funding deadline
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com, or (936) 494-3436.

Came to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this the _____ day of September, 2013 at _____ m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

DEBBIE HERMANN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED SEP 06 2013

BY _____ DEPUTY

_____, Deputy Clerk

_____ County, Texas

5033

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(s), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 27, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Ground Water Management Area 14 (as required by Texas Water Code 36.108 (d)(3)).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation that besomes affecting districts
13. Discussion of next meeting date, location, and agenda items
14. Adjourn

POSTED
AUG 29 2013
TIME 1:05 P.M.
BY Michelle Fordyce
DEPUTY DISTRICT CLERK

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Fayette County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 25, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest in or affecting the GMA 14 planning group.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

8. Discuss funding, bylaws, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of Updated GAM Run using pumping conditions developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one groundwater area to another in Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(1).
11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).

GMA 14 Interlocal Agreement Participants meeting will be adjourned

12. Discussion of new legislation/related issues affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this the _____ day of September, 2013 at _____ m.

_____ /s/ Kelly Turner Jones
Kelly Turner Jones, Chairman
GMA 14 Planning Group

By: _____, Deputy Clerk

SEP 06 2013

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 18, 2013 GMA 14 Joint Planning Meeting.

Meeting will be converted as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model.
8. Briefing and discussion of approach and results from the predictive simulation utilizing GMA 14 approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model
10. Briefing and consideration of draft statement of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM (also referred to as the NAGM).
11. Briefing and discussion of process for GMA 14 agreement for proposed Desired Future Conditions during joint planning process.
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.
16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org or (936) 494-3436.

Came to hand and posted on a bulletin board in the Courthouse, _____ County, Texas, on this, the ____ day of April, 2014 at _____ m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

FILED FOR RECORD
2014 APR 11 PM 2:45
BRENDA STEVENSON
MONTGOMERY COUNTY, TEXAS
BY:

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment

   (Public comment is limited to a maximum of 3 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 18, 2013 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model.
8. Briefing and discussion of approach and results from the predictive simulation utilizing GMA 14-approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model
10. Briefing and consideration of declaration of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM (also referred to as the NGGM).
11. Briefing and discussion of process for GMA 14 agreement for proposed Desired Future Conditions during joint-planning process.
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.
16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Wilson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pwilson@lonestargcd.org, or (936) 494-3496.

Come to hand and posted on a bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2014 at _____ m.

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED APR 11 2014

_____ Deputy

GMA 14 Planning Group

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____ Deputy Clerk

_____ County, Texas

5175

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 10, 2013 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model.
8. Briefing and discussion of approach and results from the predictive simulation utilizing GMA 14 approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model
10. Briefing and consideration of draft statement of Desired Future Conditions based on adoption of the updated Northern Gulf Coast Aquifer GAM (also referred to as the FASTA).
11. Briefing and discussion of process for GMA 14 agreement for proposed Desired Future Conditions during joint planning process.
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.
16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson at Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; paulson@lonestargcd.org, or (936) 494-3438.

Came to hand and posted on a Bulletin Board in the Courthouse, Montgomery County, Texas, on this, the 14th day of April, 2014 at 9:00 Am.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

[illegible], Deputy Clerk

Montgomery County, Texas

DONECE GREGORY
County Clerk, Tyler County
Woodville, Texas 75979

THE STATE OF TEXAS }{
COUNTY OF TYLER }{

This is to certify that on the time and date stamped hereon, the notice of a meeting, a copy of which is attached hereto, has been filed in my office and was posted on the official bulletin board in the courthouse, as is required by Section 551.041, Government Code.

Executed on April 11, 2014.

Donece Gregory
Tyler County Clerk

By: _____
Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action.

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 18, 2013 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model.
8. Briefing and discussion of approach and results from the predictive simulation utilizing GMA 14 approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model.
10. Briefing and consideration of draft statement of Desired Future Conditions based on execution of the updated North and Gulf Coast Aquifer GAM (also referred to as the HAGM).
11. Briefing and discussion of process for GMA 14 agreement for proposed Desired Future Conditions during joint planning process.
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned.

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.
16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3494.

Come to hand and posted on a Bulletin Board in the Courthouse, ___ ____ __, County, Texas, on this, the _____ day of April, 2014 at___ _:_m.

_____ /s/ Kathy Turner Jones _____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

APR 11 2014

COUNTY CLERK
TRUE COPY I CERTIFY

FILED FOR RECORD

2014 JUN -6 AM 11:41

COUNTY CLERK
HARRIS COUNTY, TEXAS
BY

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108 (d) (3)
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4).
11. Briefing and discussion of the impacts of proposed desired future conditions on subsidence, as required by Texas Water Code Chapter 36.108 (d) (6).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.

16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436

Come to hand and posted on a Bulletin Board in the Courthouse, ... _____ County, Texas, on this, the _____ day of June, 2014 at ... ...m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

... ... Deputy Clerk

... County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers.)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108 (d) (5)
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4).
11. Briefing and discussion of the impacts of proposed desired future conditions on subsidence, as required by Texas Water Code Chapter 36.108 (d) (5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.

16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3408.

Come to hand and posted on a bulletin Board in the Courthouse Jasper County, Texas, on this, the 10 day of June, 2014 at 10:00 AM

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

Deputy Clerk

Jasper County, Texas

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED JUN 16 2014

BY DEPUTY

#5196

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, June 24, 2014, at 7:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comment is limited to a maximum of 6 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation, utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge as required by Texas Water Code Chapter 36.108 (d) (3)
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4).
11. Briefing and discussion of the impacts of proposed desired future conditions on subdivision, as required by Texas Water Code Chapter 36.108 (d) (5)
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.

16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 County Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com, or (936) 494-3436.

Came to hand and posted on a Bulletin Board in the Courthouse, Newton County, Texas, on this the 6th day of June, 2014 at 10:02am.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

Angie Lacoste, Deputy Clerk
Newton County, Texas

POSTED
JUN 06 2014
TIME 10:02 AM
BY: Angie Lacoste, Deputy Clerk

DONECE GREGORY
County Clerk, Tyler County
Woodville, Texas 75979

THE STATE OF TEXAS }(
COUNTY OF TYLER }(

This is to certify that on the time and date stamped hereon, the notice of a meeting, a copy of which is attached hereto, has been filed in my office and was posted on the official bulletin board in the courthouse, as is required by Section 551.041, Government Code.

Executed on June 6, 2014

Donece Gregory
Tyler County Clerk

By: Janet Brown
Deputy

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment:
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108 (d) (3)
10. Briefing and discussion of environmental impacts including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4).
11. Briefing and discussion of the impacts of proposed desired future conditions on subsidence, as required by Texas Water Code Chapter 36.108 (d) (5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.

16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of June, 2014 at _____ m.

_____ /s/ Kathy Turner Jones _____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

NO. _____ TIME 10:45 AM

_____ COUNTY, TEXAS
J. Smith Brown

Groundwater Management Area 14 Joint Planning Committee Meeting

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, **September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned.

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn.

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3426.

Come to hand and posted on a Bulletin Board in the Courthouse, _____, County, Texas, on this, the _____ day of September, 2014 at _____ .m.

FILED FOR RECORD
2014 SEP 10 PM 3:31
[illegible]
COUNTY CLERK
MONTGOMERY COUNTY, TEXAS
BY _____ DEPUTY

_____ */s/ Kelly Turner Jones* _____
Kelly Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

Groundwater Management Area 14 Joint Planning Committee Meeting

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the Groundwater Management Area 14 **Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, **September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At the meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3426.

Come to hand and posted on a Bulletin Board in the Courthouse, Jasper County, Texas, on this, the ____ day of September, 2014 at ____ .m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

DEBBIE NEWMAN, COUNTY COURT
JASPER COUNTY, TEXAS

FILED SEP 05 2014

BY _____ DEPUTY

_____, Deputy Clerk

_____ County, Texas

5253

Groundwater Management Area 14 Joint Planning Committee Meeting

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Blueberry Hill GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Briefing and discussion of the modeled-available impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (5).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (6).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and rulemaking requirements.
11. Discussion of next meeting date, location, and agenda items
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; paulnelson@lonestargcd.com, or (936) 494-3438.

Came to hand and posted on a Bulletin Board in the Courthouse, Newton County, Texas, on this the 10th day of September, 2014 at 9 a.m.

POSTED
SEP 10 2014
TIME 9:45 AM
BY Michelle Parks
DEPUTY DISTRICT/COUNTY CLERK

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

Michelle Parks, Deputy Clerk
Newton County, Texas

SEP/10/2014/WED 09:05 AM FAX No. 409 379 3049 P. 002

Groundwater Management Area 14 Joint Planning Committee Meeting

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interbasin Agreement Participants.

6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 53.109 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 53.109 (c) (7).
8. Discuss funding levels, participation, and any other aspects of the Interbasin Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interbasin Agreement Participants meeting will be adjourned

10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org or (936) 494-3496.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ ..County, Texas, on this, the _____ cey of September, 2014 at _____m.

NO. _____ TIME 2:30p

SEP 10 2014

DENECE GREGURY, COUNTY CLERK
TYLER COUNTY, TEXAS

/s/ Kelly Turner Jones
Kelly Turner Jones, Chairman
GMA 14 Planning Group

..Deputy Clerk

... County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (8).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____County, Texas, on this, the _____day of November, 2014 at _____.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____County, Texas

FILED FOR RECORD
2014 NOV -5 PM 3:10
BRENDA ALSTON
COUNTY CLERK
HARRIS COUNTY, TEXAS

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (8).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____County, Texas, on this, the _____day of November, 2014 at _____.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____County, Texas

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED NOV 05 2014

BY Holly Moore
DEPUTY

GMA 14 Planning Group

5079

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment;
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (3).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul E. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org or (936) 494-3436.

Came to hand and posted on a Bulletin Board in the Courthouse, Newton County, Texas, on this, the 5th day of November, 2014 at 8:00 a.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

Deputy Clerk

Newton County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (8).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, Tyler County, Texas, on this, the 5 day of November, 2014 at 2:30 p.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

Deputy Clerk

Tyler County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazos County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Postal Notices
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who wish to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 3.0A.*
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org or (936) 494-3436.

Copies hereof are posted on Bulletin Board in the Courthouse, _____ County, Texas, on this the _____ day of May, 2015 at _____ m.

FILED FOR RECORD
2015 MAY 12 AM 9:

/s/ Kelly Turner Jones
Kelly Turner Jones, Chairman
GMA 14 Planning Group

_____ Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazos County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notice
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally noticed as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14*, Section 3.04.
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by District of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of May, 2015 at _____ .m.

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED MAY 12 2015

By _____
DEPUTY

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

5310

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 19, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be converted as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options for those currently being discussed in the joint-planning process. Time permitting, all entities/individuals submitting before GMA 14 for this agenda item will be afforded up to 7 minutes to make technical presentations on alternative desired future conditions options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and appropriate action regarding eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 5.(b).
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and reporting requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of the meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com, or (936) 494-3488.

Copy to hand and posted as a Bulletin Board in the Courthouse, Montgomery County, Texas, on this, the 13th day of May, 2015

POSTED
MAY 12 2015
TIME 8:45 AM
BY [signature]
MONTGOMERY COUNTY, TEXAS

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

[signature], Deputy Clerk
Montgomery County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(k), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Brazoria County GCD, Brazos County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of these considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 3.04*
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3135.

Come to hand and posted on a Bulletin Board in the Courthouse, ___ ____ ___ County, Texas, on this, the ___ day of May, 2015 at _____ m

NO._____ TIME_____

MAY 19 2015
MICHAEL GREGORY, COUNTY CLERK
BRAZOS COUNTY, TEXAS

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____ Deputy Clerk

_____ County, Texas

GMA 14 Planning Group

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment: *(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)*
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 25, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options recessed in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(3) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(3) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this the _____ day of June, 2015 at _____ m.

2015 JUN 10 PM 2:55

/s/ Kathy Turner Jones

Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts applied wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Hayrolds County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 24, 2015, at 9:00 am** at the offices of the **Lone Star Groundwater Conservation District**, located at **655 Conroe Park North**, Conroe, Texas.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment *(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)*
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 26, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303, prelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, __ County Texas, on this, the __ day of June, 2015 at __ pm.

/s/ Kelly Turner Jones

Kelly Turner Jones Chairman
GMA 14 Planning Group

PEGGIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED JUN 19 2015

By _____ Deputy Clerk

_____ County, Texas

538

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Brazoswood GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and introductions
3. Public Comment *(Public comment is limited to a maximum of 3 minutes per speaker and/or 30 minutes total for all speakers)*
4. Receipt of Posted Notice
5. Discussion and possible action to approve minutes of May 29, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be converted to a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects of the Interlocal Agreement and take possible action.
2. Briefing by contracted consultant(s) regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul H. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.com, or (936) 494-3409.

Came to hand and posted on a bulletin board in the Courthouse, ____ County, Texas, on this, the 10th day of June, 2015 at 9:45 am pm

POSTED
JUN 10 2015
TIME
BY DEPUTY/COUNTY CLERK

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

Deputy Clerk
Navarro County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on **Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment *(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)*
4. Receipt of Posted Notices
5. Discuss and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, ___County, Texas, on this, the ___ day of June, 2015 at ___ m.

NO. _____ TIME _____

/s/ Kathy Turner Vance
Kathy Turner Vance, Chairman
GMA 14 Planning Group

JUN 10 2015

DOROTHY GREGORY, COUNTY CLERK
TYLER COUNTY, TEXAS
By _____

_____, County Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING
NOTICE OF OPEN MEETING

As required by Section 36.108(a), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding issues, participation and any other aspects for the Interlocal Agreement; and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.
9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of the adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3403.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of October, 2015, at _____ m.

FILED FOR RECORD
2015 OCT 16 PM 3:11
COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING
NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.
9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of October, 2015 at _____.m.

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED OCT 14 2015

By Holly Thomas
DEPUTY

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

POSTED

OCT 14 2015

TIME 12:45 P

BY: Angel Clark

5457

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(d), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Mesquite GCD, Brazos County GCD, Lone Star GCD, Lower Trinity GCD, and Post Oak Save GCD, will be held on Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and/or recommended for Joint Planning Committee action.

1. Call to order
2. Welcome and introductions
3. Public Comment
   (Public comment will be limited to a maximum of 3 minutes per person and/or 30 minutes total for oral speaking)
4. Receipt of Public Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting of the convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of findings from the Texas Water Development Board and discussions of areas of interest in Groundwater Management Area 14 (GMA 14).
7. Consider 2016 budget, participation and any other aspects of the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports as limited by each Groundwater Conservation District (District) within GMA 14 and any District suggested revisions to the proposed District Rules or Conditions, as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to the recommended/suggested revisions suggested.
9. Discussion and consideration of any additional or supplemental information or data relative to the Proposed District Rules or Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be reformed

10. Discussion, consideration and possible action of suggested revisions to proposed District Rules or Conditions or alternate District Rules or Conditions submitted in the submitted Summary Reports.
11. Discussion, consideration and possible action of the compilation of District Rules or Conditions and finalizing and development of the Explanatory Report.
12. Setting and discussion of long term goals for GMA 14 Joint Planning and requesting topic requests and schedule.
13. Presentation and discussion by District's of recent activities of interest or importance to GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information on questions or comments concerning any topic of this meeting should be directed to Mr. Henry E. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; hnelson@lonestargcd.com, or (936) 494-3408.

Comes to hand and posted on a Bulletin Board in the Courthouse of Newton County, Texas, on this the 14 day of October, 2015 at 12:45 PM

/s/ Kelly Turner Jones

Kelly Turner Jones, Chairman
GMA 14 Planning Group

Angel Clark, Deputy Clerk
Newton County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING
NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on **Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants

6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.
9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned

10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of October, 2015 at _____.m.

NO. _____ TIME 2:45P

OCT 14 2015

DONECE GREGORY, COUNTY CLERK
TYLER COUNTY, TEXAS
BY _____

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

Home Rules Forms Maps Links History Board & Staff Contact Us

Meetings/Hearings

Southeast Texas Groundwater Conservation District Meetings

Notice / Agenda – April 14, 2016 Board Meeting

East Texas Regional Water Planning Group (Region I)

Regional Water Plan IPP Hearing Notice

Groundwater Management Area 14

GMA 14 Notice / Agenda for April 29, 2016 Meeting

Regular Monthly Board Meetings

3rd Thursday of each month beginning at 10:00 AM (check the notice for location)

No Board meetings scheduled for August

Public Information Act

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or December unless otherwise noticed.

Meetings are held at the
Jaque-Newton Electric Co-op
512 S. Margaret Avenue, Kirbyville, TX.

Public Information Act

Download

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(c), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonne. GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2016, at _____.m.

_____ */s/ Kathy Turner Jones* _____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

Posted On: 4/18/2016 at: 9:15 am
At Office: GC Website
By: _____
Title: General Manager

SOUTHEAST TEXAS GROUNDWATER CONSERVATION DISTRICT

Fax

To:	Newton County Clerk	**From:**	John Martin Southeast Texas GCD
Fax:	(409) 379-8049	**Pages:**	3 (including cover)
Phone:		**Date:**	04/18/2016
Re:	Notice of Open Meeting		

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

• **Comments:**

Hello Newton County Clerks,

If you would, please post this notice for me. If you could, please fill out the bottom or otherwise mark as posted and fax a copy back to our office. It would be very appreciated. THANK YOU!!!!

Sincerely,

John Martin
Southeast Texas Groundwater Conservation District
P.O. Box 1407
Jasper, TX 75951
Telephone (409) 383-1577
Fax (409) 383-0799

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

FILED FOR RECORD
2016 APR 18 PM 12:53
GLENDA ALSTON
COUNTY CLERK
MONTGOMERY COUNTY, TEXAS
BY

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M. Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2016, at _____.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

___ County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

NO. _____ TIME 9:02 A.M.

APR 18 2016

DONECE GREGORY, COUNTY CLERK
TYLER COUNTY, TEXAS

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers).
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M.** or **fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2016, at _____.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk

_____ County, Texas

NO. _____ TIME 12:00p

APR 18 2016

CONROE GRESHAM, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

5510

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending MOU 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or** fifteen minutes after adjournment of the 8:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 8:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Sigalen of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; psigalen@lonestargcd.org, or (936) 494-3423.

Come to hand and posted on a Bulletin Board in the Courthouse, Montgomery County, Texas, on this, the 18th day of April, 2016, at 9:04 a.m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

POSTED
APR 18 2016
TIME 9:04 AM
BY [illegible] Deputy Clerk
[illegible] County, Texas

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETINGS

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 9:00 A.M. at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of October 28, 2015 GMA 14 Joint Planning Meeting

Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

6. Discussion consideration and possible action regarding amending WO 3 for joint planning activities during the current round of joint planning, and any appropriate budget amendments for GMA 14 Interlocal Agreement participants that may be necessary or required.

GMA 14 Joint Planning Interlocal Agreement Participants meeting will be adjourned.

Meeting will be reconvened as a meeting of the GMA 14 District Representatives only.

7. Discussion and possible action approving resolution adopting Desired Future Conditions for the relevant aquifers in GMA 14.
8. Discussion and possible action authorizing GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission.
9. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

(The GMA 14 District Representatives will convene in a separate meeting, as posted on the following page, at 11:00 A.M or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later).

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the **Groundwater Management Area 14 Joint Planning Committee**, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14—Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD—will be held on **Friday, April 29, 2016, at 11:00 A.M. or fifteen minutes after adjournment of the 9:00 A.M. meeting, whichever is later, at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.**

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment

   (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Consider approval of the meeting minutes of the 9:00 A.M., Friday, April 29, 2016, meeting of the GMA 14 Joint Planning Committee.
6. Adjournment of Joint Planning Meeting of GMA 14 District Representatives.

Further information, questions, or comments concerning any aspect of the above meeting(s) should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; prelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2016, at _____m.

_____*/s/ Kathy Turner Jones*_____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

_____, Deputy Clerk

_____ County, Texas

FILED APR 18 2016

By: _____
DEPUTY

GMA 14

APPROVED
MINUTES

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group
Meeting

Wednesday, April 24, 2013
9:30 AM

MEETING MINUTES

A regular meeting of the Upper Gulf Coast Aquifer Planning Area (GMA 14) was held Wednesday, April 24, 2013, at 9:30 a.m., in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 9:30 a.m. District representatives introduced themselves. Districts represented included: Lone Star GCD, Bluebonnet GCD, Lower Trinity GCD, Brazoria County GCD, Southeast Texas GCD, and Brazos Valley GCD. Also, in attendance at said meeting were: Temple McKinnon and Sarah Beckhouse with the TWDB, Ron Neighbors with the Harris Galveston Subsidence District, Robert Thompson with the Ft. Bend Subsidence District, Washington County Judge John Brioden, Washington County Commissioner Kirk Hannah, Bill Mullican with Bill Mullican, Associates and Jason Afinowicz-Freese and Nichols, Inc. *(see Attachment "A" for a list of attendees).*

Members discussed approval of the meeting minutes of the April 25, 2012, Joint Planning Group Meeting. Without further discussion, upon a motion by Kent Burkett (Brazoria County GCD), seconded by John Martin (Southeast Texas GCD) and unanimously carried, the meeting minutes for April 25, 2012, were approved.

Sarah Beckhouse with the Texas Water Development Board gave a brief update of current items of interest to the GMA. The TWDB has compiled a groundwater management plan summary spreadsheet which is available on the TWDB website. The TWBD is still in the process of preparing a guidance document for defining the term "relevant", and by association, the term "non-relevant" and providing information on how the TWBD will calculate recoverable storage. Ms. Backhouse passed out a guidance document on how to submit DFC runs, including format and materials which must be included and concluded her report by informing the Group that the Board is also working on a guidance document for the explanatory report.

A copy of the current financial report was provided to the participants.

Mr. Zach Holland (Bluebonnet GCD) then updated the GMA on the ten (10) applications before the Bluebonnet GCD, totaling 20 MGD, 10 MGD of which is proposed to be transported to Ft. Bend County for use by the cities of Richmond and Rosenberg. Mr. Holland further reported that the GCD would be objecting to the transport of water outside the boundaries of the GCD and to date has received some 250 letters of concern. Bluebonnet intends to address the effect of these proposed permits on 1) subsidence, 2) existing wells and 3) DFC's.

Jason Afinowicz of Freese Nichols then gave a PowerPoint presentation on the Regional Groundwater Modeling update efforts recently completed by the Harris Galveston and Ft Bend Subsidence Districts in conjunction with the LSGCD. The focus of Mr. Afinowicz's presentation was the effects of the findings of this study on the GMA 14 (DFC's and water demands) and the path forward with the GMA and TWDB to rectify any discrepancies created with the new data. Mr. Afinowicz told the GMA that the population study results and the new Gulf Coast Model had been delivered to the TWDB for their consideration and approval/adoption.

Following Mr. Afinowicz' presentation, Mr. Bill Mullican, of Bill Mullican Associates, provided an overview of the GMA 14's requirements under Senate Bill 660. Mr. Mullican stated that the process of adopting DFC's would be more complex and will now include an "explanatory report"; this report being necessary to justify adopted DFC's if the process is later questioned. Mr. Mullican added the following considerations that will have to be addressed:

Total estimated recoverable groundwater left in the aquifer
Spring flows
Impacts on subsidence
Regional Water Plan and socio-economic impacts
Effect of DFC's on private property rights
reality of achieving DFC's once adopted

Mr. Mike Turco of USGS was called upon to discuss the new Gulf Coast model and explained that the major difference between the old model and the new was the increase in the amount of data, especially from the Jasper, that was available for input in this most recent effort.

Kent Burkett (Brazoria County GCD), then raised the issue of procuring a consultant for the next round of DFC's and the coordination between Region H Planning Group and GMA 14. John Martin (Southeast Texas GCD) raised the possibility of seeking bids for these professional services in an effort to make certain that the GMA received a competitive cost estimate for the proposed work. It was explained to the group that while multiple statements of qualification could be solicited, the law did not permit the selection of professional services (engineering) by competitive bid.

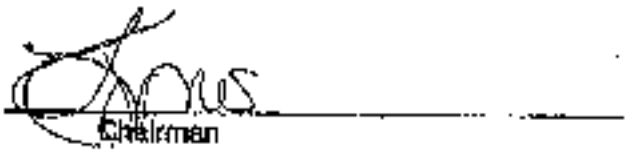
After discussion, it was determined by the Planning Group that Freese Nichols and Bill Mullican should provide a scope of work for review and consideration by the Group and that that document should be presented to the GMA at the next meeting. The motion to do so was approved unanimously.

Alan Day (Brazos Valley Groundwater Conservation District) then presented a resolution requesting the Joint Planning Group's support of the reassigning of a portion of the Brazos Valley Groundwater Conservation District that is currently in GMA 14 to GMA 12 by the Texas Water Development Board. After discussion, the motion to support was unanimously approved.

Discussion was made to set date and time for next meeting. A meeting was scheduled for Wednesday, May 22, at 10:00 am in the LSGCD Board Room. Each District will be notified.

Without further discussion and there being no further business, the meeting was adjourned at 11:34 a.m.

PASSED, APPROVED, AND ADOPTED THIS 22th day of May, 2013.



Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group
Meeting

Wednesday, May 22, 2013
10:08 AM

MEETING MINUTES

A regular meeting of the Upper Gulf Coast Aquifer Planning Area (GMA 14) was held Wednesday, May 22, 2013, at 10:08 a.m., in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 10:08 a.m. District representatives introduced themselves. Districts represented included: Lone Star GCD, Bluebonnet GCD, Lower Trinity GCD, Brazoria County GCD, and Southeast Texas GCD. Brazos Valley GCD was not represented. Also in attendance at said meeting were: Larry French, David Bradley, and Shirley Wade with the TWDB, Ron Neighbors, Harris Galveston Subsidence District; Robert Thompson, Ft. Bend Subsidence District; The Honorable John Bricden, Washington County Judge; "Podge" Willcox, Chambers County; Bill Mullican, Mullican and Associates; Jason Afinowicz, Freese and Nichols, Inc.; and members of the public. *(see Attachment "A" for a list of attendees).*

Kathy Jones began the meeting with a brief overview of the makeup of GMA 14 and the relationship to the 7 other counties within the area that are not in GMA's, but have coordinated with GMA 14 in the past. Ms. Jones then called for all posted notices. The next agenda item was discussion and approval of the minutes from the meeting on April 24th. Upon a motion by Kent Burkett (Brazoria County GCD), seconded by John Martin (Southeast Texas GCD) and unanimously carried, the meeting minutes for April 24, 2013, were approved.

Larry French, with the Texas Water Development Board gave an update of current items of interest to the GMA. Mr. French informed the group that the Water Development Board is currently conducting a technical review of the Houston Area Groundwater Model ("HAGM"). He thanked USGS for its help during the review and stated that the request to the Board was that it adopt the new HAGM as the GAM for GMA 14. It is anticipated that the review will be completed by the end of June, at which time a draft of the recommendations and findings will be circulated to the GMA 14 member districts for comment. After comments are received and considered, the report will be finalized. Mr. French offered the Water Development Board's assistance during the GMA review period. Mr. Bradley, of the TWDB, then discussed the Estimated Total Recoverable Storage project. It is anticipated that this effort will be completed by the end of the year.

Ms. Jones then asked for discussion of any recent activities of interest to or impacting the GMA 14 process. Mr. Zach Holland (Bluebonnet GCD) reported that a preliminary hearing was held in Bellville on Monday (May 2) to receive public comment on the permits to transport water outside of the Bluebonnet GCD's boundaries and to start the process of setting up the evidentiary hearing by the State Office of Administrative Hearings ("SOAH"). The first such hearing is scheduled for July 11 in Bellville.

Ms. Jones then asked Mr. Greg Ellis, the attorney representing the subsidence districts, to provide an update of any legislative highlights. Mr. Ellis reported that much was still in a state of flux; however, a bill raising the daily per diem for water conservation district board directors had been approved by both the House and Senate. The brackish groundwater bills have died and many other water bills will more than likely not make it before the deadlines to consider. Rules were suspended by the House to hear SJR 1, which would provide for a constitutional amendment to set up payments from the "rainy day" fund to other purposes including 2 billion dollars to water infrastructure. If the resolution carries, it will be subject to voter approval in November. Mr. Ellis then spoke about HB 4, which creates the water infrastructure fund and re-organizes the leadership of the Texas Water Development Board. A discussion of brackish groundwater and related bills followed. Mr. Mullican added that SB 1262 passed, resulting in the new deadline for submittal of DFC's being May of 2016. Mr. Mullican then explained the significance of the bill and new deadline to GMA's and the DFC process. He also stressed the importance of the DFC process and brackish waters and stated that he felt the groundwater districts needed to be proactive.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The meeting was then turned over to Paul R. Nelson (Lone Star GCD), and at 10:44 AM the GMA 14 Planning Interlocal Agreement Participants meeting was called to order.

A copy of the current financial report was provided to the participants. Mr. Nelson then went over the makeup of the Interlocal Agreement Participants (the "Participants"), which consisted of the 6 GMA 14 Districts, the participating counties, as well as the 2 subsidence districts. Mr. Nelson stated that the group would move forward under the premise that the group is intact and will remain in place for the purpose of accomplishing the current tasks required of the GMA.

Mr. Nelson then provided the Participants present with copies of 2 versions of the Interlocal Agreement, one copy being a reproduction of the document executed by the Participants during the last DFC process and the other being an edited copy provided by Mr. John Martin (Southeast Texas GCD). It was the decision of the Participants that the amendments proposed by Mr. Martin be reviewed individually and either voted in or out or altered until acceptable by the group. Mr. Zach Holland (Bluebonnet GCD) then made a motion to accept the changes approved by the group, to make appropriate changes to the address pages, and provide language addressing the creation of a special committee to participate in receiving information from the engineering consultant. The motion was seconded by Mr. Bill Jacobs (Lower Trinity GCD) and carried unanimously.

A discussion of the process of selecting consultants then ensued. It was agreed upon that the "contracting entity" (LSGCD) would be responsible for entering into a contract for services with the contractors and that selection would be made by identifying the most qualified respondent and at a price acceptable to the contracting agency. Judge Brieden then made a motion that Lone Star GCD be the contracting entity. The motion was seconded by Zach Holland (Bluebonnet GCD) and was carried unanimously.

Jason Afinowicz then made a presentation to the participants giving an overview of the Freese-Nichols proposal and an explanation of why the estimated cost for the work significantly exceeded similar work done during the establishment of the last DFC's. Mr. Afinowicz told the participants that much of the increase is due to the increased technical demands (model runs, subsidence, explanatory report, etc.) that are now required and that much of the expense (model runs) of the last effort was borne by the TWDB. The TWBD no longer has the resources available to assist and will no longer provide model runs to the GMAs. Mr. Afinowicz also stated that the cost could be reduced by limiting the number of model runs, coordinating the number of meetings required, and removing all redundancies between their current proposal and Mr. Mullican's submittal.

A general discussion of the redundancies between the two submittals and ways that the costs might be lowered followed. The number of models required, the number of meetings that will be necessary, and the other requirements that must be met in order to meet the established deadlines were addressed. Following these discussions, a motion was made by Kent Burkett (Brazoria County GCD) to approve Lone Star GCD to negotiate a contract with Freese and Nichols, Inc. and Mullican and Associates. The motion was seconded by Zach Holland (Bluebonnet GCD) and carried unanimously.

Kathy Jones told the group that negotiations would start as soon as possible and urged all members to go back to their respective governing bodies to seek approval of the Interlocal agreement and their participation levels. Mr. Afinowicz stated that the proposed funding level could be reduced by at least 20% and perhaps more, depending on the number of model runs and other technical requirements. Mr. Mullican added that the number of meetings required would have a significant impact on the final budget. It was also determined that the next meeting would include an in depth overview of the existing model results and that a working schedule would be established.

Kathy Jones announced members of the "Special Committee" to participate in receiving information from the engineering consultant consist of Kathy Turner Jones (Lone Star GCD), Kent Burkett (Brazoria County GCD), and Ron Neighbors (Subsidence Districts).

After additional discussion of the reasons the DFC's must be "re-established" and the importance of the DFC's to both the GCD's and the counties, the meeting of the GMA 14 Joint Planning Interlocal Agreement Participants was declared adjourned at 12:15 PM.

The GMA 14 Joint Planning Committee Meeting was re-opened. Ms. Jones stated that an item to fill the vacant Secretary position would be on the agenda for the next meeting.

Discussion was held to set the date and time for next meeting. A meeting was scheduled for Wednesday, June 26, at 10:00 AM in the LSGCD Board Room. Each District will be notified.

Without further discussion and there being no further business, the meeting was adjourned at 12:25 pm.

PASSED, APPROVED, AND ADOPTED THIS 26th day of June, 2013.

Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA (GMA 14)
MEMBER ATTENDANCE

June 26, 2013 Meeting

Member District	District Representative (Please Print)	Signature	Alternate (Please Print)	Signature
LSGCD	[illegible]	Kathy Jones		
Lower Trinity GCD	Bill Jacobs	Bill Jacobs		
Bluebonnet GCD				
Brazoria County GCD	Kent Burkett	[illegible]		
Southeast Texas GCD				
Brazos Valley GCD	Alan M. Day	[illegible]		

Attachment "A"

UPPER GULF COAST AQUIFER PLANNING AREA (GMA 14)
PUBLIC ATTENDANCE

June 26, 2013 Meeting

Name	District/Affiliation	Address	City/Zip	Email
Zack Holland	Bluebonnet GCD	PO Box 261	Navasota, 77868	zholland@bluebonnetgroundwater.org
Judge Willis	Chambers Co	P.O. Box 1859	Anahuac 77514	judge.gw@wildblue.net
Mark Evans	NHCRWA		Houston TX	mevans@nhcrwa.com
Bill Thomas	FNI		Austin	wjt@frase.com
Sarah Backhouse	TWDB		Austin	Sarah.backhouse@twdb.texas.gov
Larry French	TWDB		Austin	larry.french@twdb.texas.gov
Bill Mercer	Mercer & Associates			
John Martin	JET GCD	PO Box 1407, 75951	Jasper	JMartin@setgcd.org
Robert Thompson	HGSD			
Ron Neighbors	HGSD			
John Breeden	Wharton County			
[illegible]	BVGCD	Hearne, Tx	77859	adye@brazosvalleygcd.org
Mark C Kasmarek	USGS	WOODLANDS, TX	77385	mckasmar@usgs.gov
Kent Burkett	BCGCD		Angleton, TX	

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group
Meeting

Wednesday, June 26, 2013
10:08 AM

MEETING MINUTES

A regular meeting of the Upper Gulf Coast Aquifer Planning Area (GMA 14) was held Wednesday, June 26, 2013, at 10:08 a.m., in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 10:08 a.m. District representatives introduced themselves. Districts represented included: Lone Star GCD, Bluebonnet GCD, Lower Trinity GCD, Brazoria County GCD, Southeast Texas GCD and Brazos Valley GCD. Also in attendance at said meeting were: Larry French, and Sarah Backhouse with the Texas Water Development Board (TWDB), Ron Neighbors, Harris Galveston Subsidence District; Robert Thompson, Ft. Bend Subsidence District; The Honorable John Brieden, Washington County Judge; "Pudge" Willcox, Chambers County; Bill Mullican, Mullican and Associates, Jason Afinowicz and Bill Thamm with Freese and Nichols, Inc., Mark Evans, Chair of the Region H Planning Group; and members of the public. *(see Attachment "A" for a list of attendees).*

Kathy Jones began the meeting by asking for all present to introduce themselves and then called for any public comment. Having no one signed up to speak, Ms. Jones then asked for consideration of the approval of the minutes from the GMA 14 meeting of May 22, 2013. After discussion and upon a motion by Kent Burkett (Brazoria County GCD), seconded by Bill Jacobs (Lower Trinity GCD), the minutes for the May 22, 2013 meeting were approved. John Martin (Southeast Texas GCD) abstained from the vote.

Sarah Backhouse (TWDB) then distributed a new guidance document, providing information on how the TWDB will use official aquifer boundaries to estimate the recoverable storage and modeled available groundwater, what additional information the GMA needs to provide if aquifers are declared non-relevant, and what the DFC statement should include (identifying the aquifer, baseline year, and timetable). Mr. French (TWDB), then informed the group that the analysis of the Houston Area Groundwater Model had been completed and that a "preview" or draft copy of their findings had been presented to the USGS for their review and final comments. Mr. French stated that the overall analysis is that the Houston Area Groundwater Model is an improvement over the existing GAM. It is anticipated that the discussions with the USGS will be completed within a few weeks and at that time a final draft of findings will be given to the GMA 14 member districts for their review, comment, and questions as a part of the stakeholder process

in adopting the new model. Upon conclusion of that review and comment period, the TWDB will publish a final report.

Ms. Jones then called for nominations for the vacant position of Secretary of the GMA 14 Joint Planning Group. Mr. Kent Burkett (Brazoria County GCD) nominated Mr. Zach Holland (Bluebonnet GCD) for said position. Hearing no other names, the nomination was seconded by Mr. Bill Jacobs (Lower Trinity GCD) and approved unanimously.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Planning Interlocal Agreement Participants meeting was called to order at 10:29 am.

Ms. Jones discussed the revised Interlocal Agreement that had been distributed to all GCDs and participating counties. Ms. Jones pointed out that the agreement contained the scopes of work for the consultants that had been revised since the last meeting. These revisions reflected the efforts to eliminate any duplications of effort between the 2 consultants, and broke down Freese and Nichols, Inc.'s effort into 2 phases. Phase I reflects a minimal cost to proceed with the process and contained no new model runs. Phase II would be initiated if it were determined that a new model run was required and the means of how to fund Phase II would be discussed when and if it were determined that additional work was necessary. Ms. Jones then discussed the preliminary recommendation of proposed contributions by the participants, totaling $51,560. Discussions of the need for Phase II and the product of Phase I ensued between the Participants and the Consultants. Ms. Jones suggested that the 2 presentations on technical findings that were on the agenda be presented by Freese and Nichols prior to a continuation of the discussion of work phasing and funding.

Prior to those presentations, Mr. Bill Mullican of Mullican and Associates, told the Participants that the presentation that was to be made by Freese and Nichols contained information that was a prescribed part of Chapter 36.108 and is actually 2 different parts of the DFC process. He further stated that 36.108, parts *(b)* and *(c)*, speak to what GMA's, during the joint planning process, should do on an annual basis, as well as to the review of management plans and looking at the best available science. Mr. Mullican also stated that 36.108 (d) requires that district representatives in a GMA , in a joint planning meeting, propose DFC's and then take those proposed DFC's through a process of 9 points of consideration before finally voting on proposed DFCs. Next, the DFC's will go out to the GCDs for public hearings. Looking at this particular model run is the first step in the process; deciding whether or not the DFC's resulting from the model that these are the DFC's the group wants to take through the consideration process, or if there is additional work that the group wants to do before the list is finalized. Mr. Mullican further stated that to go back to adjust proposed DFC's would require additional consideration of the 9 elements contained in 36.108(d)(1-9). He then told the group that with the presentation, the group was complying with 36.108 (d).

Jason Alinowiez of Freese and Nichols, Inc., then distributed a spreadsheet detailing all of the available layers in the Gulf Coast Aquifer and summarizing those layers by groundwater

conservation district and by county. The data contrasted pumpage from the current TWDB GAM runs (from TWDB GAM Run 10-023, Scenario 3) from the last GMA joint-planning process (that concluded in 2010) with the pumpage and drawdown data from the most recent model (Houston Area Groundwater Model). Mr. Afinowicz then went through the various counties to demonstrate the differences in the results in the 2 models. He also noted that the new model (the Houston Area Groundwater Model) was done with a focus on a 5 county area (Brazoria, Fort Bend, Galveston, Harris, and Montgomery counties), and that no changes in pumpage or population/demand projections were applied to the counties and/or GMA's outside of those boundaries. A relatively direct comparison of the two models based on pumping projections from 2010 – 2060 was presented. Notable differences in drawdowns and pumping levels were noted for several counties in the GMA but outside the 5 county area of focus. Mr. Mullican added that the simplest and most straight forward way to approach this issue in the new model would be to take the pumping input files from GAM run 10-023 for all the counties except for the 5 counties considered in the most recent modeling effort and the modelers take the distribution of that pumping, which is what was agreed to during the last round of joint planning. Mr. Afinowicz pointed out that to adjust the pumpage to match a particular DFC would be very work intensive. The more direct method would be to review the pumpage figures and projected demands for each entity and once agreed upon, put those numbers into the model and determine the resulting DFC's.

A discussion of the budget summary sheet and suggested contributions then ensued. It was determined that with today's presentations and the work done to obtain the information presented, that the $8,000 Phase I was completed. It was further determined that in order to complete the technical support for the DFC process, the Freese and Nichols, Inc. Phase II work will need to be done. The fee for that work, included in the Interlocal agreement, is "not to exceed" $65,000. This scope of work did not include any model runs. It was the consensus of the group that at a minimum, one model run, using the parameters discussed above, would be required and it was estimated that such a run would require the expenditure of approximately $14,000. The budget to perform Phase I and Phase II, as well as the model and the scope submitted by Mullican and Associates was determined to total $129,000.

Once accepted by the group, Ms. Jones then led a discussion regarding how those costs should be equitably distributed. After discussion, it was the determination of the participants that Phase I and II costs (which includes Mr. Mullican's fee) would be distributed to the various GCD's, counties and subsidence districts based on an agreed upon percentage basis. It was further determined that the Lone Star GCD and the subsidence districts would not participate in the funding of the required additional model run, as they had participated in the creation of the new Houston Area Groundwater Model (also referred to as the new Upper Gulf Coast GAM). It was also decided that the additional model run would be funded based on county participation, therefore individual counties would pay a pro rata share of the total cost and the GCD's, other than Lone Star GCD, would pay shares based on the number of counties within their jurisdiction. Upon a motion made by Kent Burkett and seconded by Zach Holland, the proposal to divide the expenses as described above was unanimously approved by the participants. A copy of the breakdown of the distribution of budget contributions is attached hereto as *Attachment "B"*.

After further discussion relative to approval of the Interlocal Agreement and funding schedule by the affected boards and commissioner courts, the GMA 14 Joint Planning Interlocal Agreement Participants was declared adjourned at 11:37 AM.

The GMA 14 Joint Planning Committee Meeting was re-opened. Larry French, of the TWDB gave a brief summary of the governance changes that would take place as a result of House Bill ".

Discussion was held to set the date and time for next meeting. A meeting was tentatively scheduled for Wednesday, August 21, 2013, at 10:00 AM in the Lone Star GCD Board Room. Each District will be notified.

Without further discussion and there being no further business, the meeting was adjourned at 11:59 AM.

PASSED, APPROVED, AND ADOPTED THIS 18th day of September, 2013.

Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA (GMA 14) MEMBER ATTENDANCE

June 26, 2013 Meeting

Member District	District Representative (Please Print)	Signature	Alternate (Please Print)	Signature
LSGCD	[illegible]	Kathy Jones		
Lower Trinity GCD	Bill Jacobi	Bill Jacobi		
Blackhorse GCD				
Brazoria County GCD	Kent Burken	[illegible]		
Southeast Texas GCD				
Brazos Valley GCD	Alan M. Day	[illegible]		

Attachment "A"

UPPER GULF COAST AQUIFER PLANNING AREA (GMA 14)
PUBLIC ATTENDANCE

June 26, 2013
Meeting

Name	District/Affiliation	Address	City/Zip	Email
Zach Holland	Blue Ridge GCD	Po Box 261	Navasota, 77868	zholland@blueridgegroundwater.org
Paige Willcox	Chambers Co	P.O. Box 687	Anahuac 77514	paige.w@wcintexas.net
Mark Evans	NHCRWA		Kingwood TX	revans@nhcrwa.com
Bill Thomas	FNI		Austin	wjt@fnieee.com
Sarah Backhouse	TWDB		Austin	Sarah.backhouse@twdb.texas.gov
Larry French	TWDB		Austin	larry.french@twdb.texas.gov
Bill Mullins	Mullins & Associates			
John Martin	SETxCD	Box 807, 75951	Jasper	JMartin@setxcd.org
Robert Thompson	HGCD			
Ron Neighbors	HGCD			
Tom Brigham	Washington County			
[illegible]	BVGCD	Hearne, Tx	77859	adaye@brazoswell.gcd.org
Mark C Kesmarki	USGS	WOODLANDS, TX	77385	mckesmar@usgs.gov
Kent Burkett	BCGCD		Angleton, TX	

Attachment "A"

Phase I (Preliminary Phase Services): $51,560
Phase II: $65,000 – This cost is subject to results of Preliminary Phase Services.

List of Districts and Counties; Suggested Commitment Amount –

	PARTICIPANTS	AMOUNT
1	Bluebonnet GCD	8,000.00
2	Brazoria County GCD	7,000.00
3	Brazos Valley GCD	0.00
4	Lone Star GCD	8,000.00
5	Lower Trinity GCD	7,000.00
6	Southeast Texas GCD	7,000.00
7	Washington County	2,000.00
8	Liberty County	2,000.00
9	Chambers County	2,000.00
10	Jefferson County	2,000.00
11	Orange County	2,000.00
12	Harris Galveston Subsidence District	5,200.00
13	Fort Bend Subsidence District	5,200.00
	TOTAL	53,560.00

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Wednesday, September 18, 2013
9:10 AM

MEETING MINUTES

A regular meeting of the Upper Gulf Coast Aquifer Planning Area (GMA 14) was held Wednesday, September 18, 2013, at 9:10 a.m., in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 9:10 a.m. District representatives introduced themselves. Districts represented included: Bluebonnet GCD, Brazoria GCD, Lone Star GCD, Lower Trinity GCD and Southeast Texas GCD. Also in attendance at said meeting were: Larry French and Sarah Backhouse, Texas Water Development Board (TWDB); Ron Neighbors, Harris-Galveston Subsidence District; Robert Thompson, Fort Bend Subsidence District; The Honorable John Bricker, Washington County Judge; 'Pudge' Willcox, Chambers County; Bill Mullican, Mullican and Associates; Jason Afinowicz and Bill Tuttman, Freese and Nichols, Inc.; Mark Evans, Chair of the Region H Planning Group; and members of the public (*see Attachment "A" for a list of attendees*).

Kathy Turner Jones began the meeting by asking for a roll call of GMA 14 participating members and any comments. Ms. Jones proceeded with receipt and requests of posted notices from the group. Ms. Jones asked for consideration of the approval of the minutes from the GMA 14 meeting on June 26, 2013. After discussion and upon a motion by Ms. Jones (Lone Star GCD), seconded by Bill Jacobs (Lower Trinity GCD), the minutes for the June 26, 2013 meeting were approved unanimously.

Sarah Backhouse (TWDB) then distributed a new guidance document, providing information on the explanatory report of the desired future conditions (DFC) which summarized information needed for submission in the final DFC package to the TWDB. The guidance document also provided a quick reference and possible examples for inclusion in the explanatory report. Mr. French (TWDB), added that the TWDB has received a formal request from Brazos Valley GCD to be removed from GMA 14. Two options being considered are (1) staff and executive administrator approval of the request or (2) formal board approval, which would occur in October. According to Mr. French, there should not be any hindrance to moving the action to approval. Ms. Jones asked if additional action by the GMA was required. Mr. French answered that nothing should change with GMA 14 except that Brazos Valley GCD will no longer attend or be listed in GMA 14. Mr. French then updated the group on the Houston Area Groundwater Model as TWDB has received requests to consider it as the official groundwater availability model (GAM). Mr. French then went through the TWDB's review process of comparing the old GAM with new GAM. Findings have now been distributed to the group and posted on the TWDB website. The review and comment period is open through September 30, 2013 but the

TWDB has had informal, external requests to extend that period, which should be granted. There were some specific comparisons requested by Southeast Texas GCD to review differences in models. Through that review, TWDB encountered some anomalies in a non-district area, San Jacinto County, and the TWDB has reached out to USGS for adjustments which have been made. According to Mr. Fratesch, the review process has been good and will result in a better model. Based on current efforts and timelines, the HAGM should be approved in the next month or so as the new GAM. Discussion opened about the HAGM with Mr. Neighbors (HGSD) inquiring specifically about the anomaly. USGS addressed the anomaly in San Jacinto County and how it was being corrected and documented. These changes do not require a full re-evaluation through the review process, thus beginning anew is not required. Mr. Fratesch added that there has been great communication and exchange between TWDB and USGS and a good process for a good model.

Mr. Holland (Bluebonnet GCD) brought up points of discussion regarding his district's review of the models, turning the floor over to Dr. Bill Hutchison, Bluebonnet GCD consultant. Dr. Hutchison highlighted the pumping estimate differences as related to Bluebonnet GCD. Both models are the same from 1891 through 2000. HAGM deviates from DFCs quite a bit, presenting significant reductions in Bluebonnet GCD. The issue raised by Dr. Hutchinson is the different pumping regime in HAGM compared to the old GAM, which may have great effects on counties as it does in Bluebonnet GCD. Mr. Holland reiterated that this is information that Bluebonnet GCD had encountered that they wanted to make the group aware of. Dr. Hutchison added that neither model is right, just different, and needed to highlight those differences. Adjusting the pumping to the 10-023 GAM Run, as discussed in the June 26, 2013 meeting, should alleviate some differences, but will likely cause other changes as well. Kent Burkett (Brazoria County GCD) joined the meeting.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was called to order at 9:41 a.m.

Ms. Jones discussed the funding levels and participation and other aspects of the Interlocal Agreement. Funding needed to complete the scope of work is $129,000 and to date the collected/pledged funds equals $112,000 from participant contributions. Discussion opened regarding options for making up the difference. Remaining balances from previous joint planning reduced the funding shortfall to $13,000. A proposal for Lower Trinity GCD to seek $3,500 and the other Districts to seek $2,375 in FY 2015 funds to cover the costs was brought to the table. Further discussion ensued regarding likelihood of coming in under budget, and even asking Districts to participate in work efforts. There is still flexibility in place which will allow for completion of all tasks as efficiently as possible. Lone Star GCD offered to put together an addendum to or amendment of the Interlocal Agreement for the participants to take to their individual boards. Kent Burkett made the motion, seconded by Zach Holland and approved unanimously to have an addendum prepared by Lone Star GCD to budget request from Districts in Interlocal Agreement: $3,500 for Lower Trinity GCD, and $2,375 for Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, and Southeast Texas GCD.

The floor opened to briefing and consideration of updated GAM using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM, impacts of proposed DFCs on aquifer uses or conditions including conditions that differ substantially from one geographic area to another in GMA 14 (as required by Texas Water Code 36.108 (d)(3)), and on water supply needs and water management strategies included in the 2012 Texas State Water Plan for GMA 14 (as required by Texas Water Code Section 36.108 (d)(2)). Jason Afinowicz of Freese and Nichols, Inc. discussed three sets of handouts regarding these considerations. Ongoing response period on the proposed HAGM is being followed to determine when the GAM run can be completed. Revisions to the model are the largest component of work that should be completed by the end of October. General changes being sought are pumping data inputs and Jasper layer updates. It is anticipated that by the next meeting the new DFCs resulting from agreed to pumping scenarios will be available for consideration by the group.

Phase III is directed to the nine factors for consideration in 36.108 (d) to be included in the explanatory report and their support for Bill Mullican of Mullican and Associates, efforts. Mr. Afinowicz referenced TWDB Water Use Database to address aquifer uses and conditions that differ from one area to another in the region. The primary time frame evaluated was the time period from 2000-2011. Illustrations of historic and type of water use were provided by county, by use sector, and by groundwater conservation district. Mr. Mullican emphasized that the data and information considered was important for memorializing the considerations mandated by statute. Questions were asked regarding the source of information included in the TWDB Water Use Database. Discussions focused on the purpose of the consideration of water use during the joint-planning process. It was explained that during the discussions of potential desired future conditions, both variations in water use and hydrologic conditions may influence decisions on potential desired future conditions.

Mr. Afinowicz then shifted from the water use discussion to aquifer conditions. Information for consideration centered on the existing GAM runs available. These overall conditions will have more detail later. As seen by Mr. Afinowicz and Mr. Mullican, this is the information required for consideration by the group to meet the requirements of Texas Water Code Section 36.108 (d) (1). Further modeling efforts will provide information required for consideration by Texas Water Code Section 36.108 (d) (3) (to be presented at a later date). At the conclusion of the presentation by Mr. Afinowicz on water use and aquifer conditions, GMA 14 Joint Planning Interlocal Agreement Participants then participated in a discussion of the impacts of water use and aquifer conditions on potential desired future conditions. It was noted that topography may have a significant impact on aquifer conditions as represented in the GAM, especially in the updip areas of the aquifer. The results from ongoing efforts regarding subsidence were also discussed, but it was noted that additional results would be provided in more detail later in the joint planning process after the updated HGAM is finalized. One question asked regarding the general aquifer conditions in GMA 14, Mr. Mullican responded that, as illustrated in the presentation, some areas of GMA 14 were stable while other areas are undergoing dynamic changes as illustrated by the current potentiometric surface of the aquifers. Other comments included (1) that there some isolated areas where issues exist but that the majority of the area is relatively stable, and that it will be up to local districts to address the local issues, (2) the planning process has its quirks but is working, (3) will the pumpage that comes out of the

process be something that can be achieved, (4) growth in population and water use will be an issue, (5) questions on how the groundwater availability estimates coming out of the process will be used to manage the resource, and (6) that only by limiting water level declines will we be able to address subsidence issues.

Mr. Afinowicz presented the water supply needs and water management strategies from the 2012 State Water Plan based on the planning horizon of 2010 - 2060 and broken down into counties similar to the breakdown of the aquifer use data. Total water demands and total water supply needs were described. Total demands represent the water demand projections for individual water user groups over the 50-year planning horizon and water supply needs result when the currently available water supply is less than the projected water demands for a water user group or a wholesale water provider. A question was raised regarding the difference in water demands and water supply needs. Further discussion of the actual strategies being completed or implemented from the 2012 State Water Plan ensued. Questions regarding reuse in GMA 14 were raised and discussed. The need for implementation of Allen's Creek Reservoir was discussed. There was a substantive discussion focused on the strategies proposed for different needs for multiple counties. Mr. Mullican added that something that will be increasingly used and heard is 'project viability' when referencing projects in the State Water Plan due to House Bill 4 language intent and purpose. Mr. Neighbors commented that there is a flaw of relationships between the plan and the folks expected to implement solutions.

The GMA 14 Joint Planning Committee Meeting was re-opened. Mr. Mullican briefly brought up Proposition 6 regarding State Water Plan funding as part of the upcoming November elections.

Discussion was held to set the date and time for next meeting. It was unclear when the next meeting would be necessary, but wanted to block the third Wednesday of the month as it seems to work best in everyone's schedule. November would likely be the earliest meeting, but would be dependent on model work and formation of other mandated consideration and could slide later if necessary for a more meaningful and appropriate meeting. November 20, 2013, at 9:00 AM is tentatively scheduled as the next meeting in the Lone Star GCD Board Room and each interlocal participant will be notified.

Without further discussion and there being no further business, the meeting was adjourned at 11:59 AM.

PASSED, APPROVED, AND ADOPTED THIS 30 day of April, 2014.

Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA (GMA 14)
PUBLIC ATTENDANCE

September 18, 2013 Meeting

Name	District/Affiliation	Address	City/Zip	Email
Ben Hoyland	BCGCD	[illegible]	Alvin, TX 77511	[illegible]
Gene Stanton	USGS			gstanton@usgs.gov
Bill Hutchison	Consultant - BCGCD			billhutch@texas.rr.com
Kay Wilcox	Guest	Anahuac		
John Martin	SETGCD	Jasper, TX		[illegible]
Bill Jacobs	LTGCD	Livingston, TX		
Sarah Backhouse	TWDB	Austin		Sarah.backhouse@twdb.texas.gov
Robert Thompson	BCGCD			
Ron Neighbors	"			
Larry French	TWDB	Austin		larry.french@twdb.texas.gov
Kent Burkett	BCGCD			
Steven Butler	CH Hill	Austin		sbutler@chm.com
[illegible]	LSGCD	Conroe		

Attachment "A"

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Wednesday, April 30, 2014
9:00 AM

MEETING MINUTES

A regular meeting of the Upper Gulf Coast Aquifer Planning Area (GMA 14) scheduled for Wednesday, January 29, 2014, at 9:00 a.m., in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas was canceled due to inclement weather.

A regular meeting of GMA 14 scheduled for Wednesday, March 4, 2014, at 9:00 a.m., in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas was also canceled due to inclement weather.

A regular meeting of GMA 14 was held Wednesday, April 30, 2014, at 9:00 a.m., in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 9:10 a.m. District representatives introduced themselves. Districts represented included: Bluebonnet GCD, Lone Star GCD, Lower Trinity GCD and Southeast Texas GCD. Also in attendance at the meeting were: Larry French, Texas Water Development Board (TWDB); Mike Turco, Harris-Galveston Subsidence District; The Honorable John Brieden, Washington County Judge; "Pudge" Willcox, Chambers County; Bill Mullican, Mullican and Associates; Jason Afinowicz, Freese and Nichols, Inc.; and members of the public. Brazoria GCD and Robert Thompson, Fort Bend Subsidence District joined the meeting at 9:40 a.m. (*see Attachment "A" for a list of attendees*).

Kathy Turner Jones began the meeting by asking for a roll call of GMA 14 participating members and any comments. Ms. Jones proceeded with receipt and requests of posted notices from the group. Ms. Jones asked for consideration of the approval of the minutes from the GMA 14 meeting on September 18, 2013. After discussion and upon a motion by Zach Holland (Bluebonnet GCD), seconded by Bill Jacobs (Lower Trinity GCD), the minutes for the September 18, 2013 meeting were approved unanimously.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was called to order at 9:14 a.m.

Ms. Jones recognized Mark C. Kasmarek, representing the U.S. Geological Survey, for a presentation of information on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model (HAGM). Mr. Kasmarek documented updates to the model packages, simulation and water use period, and aquifer parameters utilized in the HAGM. These updates, though challenging to calibrate, demonstrate simulated and measured water levels agree well, in addition to agreement between simulated and measured land-surface subsidence in the areas participating in the development of the HAGM. While the new model does indicate simulated subsidence in the outlying districts, it does not provide any data regarding measured subsidence in these areas.

At the conclusion of the presentation, the floor opened to questions and discussion. Bill Mullican asked technical questions regarding the changes in hydraulic conductivity and inelastic and elastic storativity coefficients numbers and their basis. Mr. Mullican followed up with highlighting an issue being worked on and worked through by a subcommittee of TWCA, is the role of brackish groundwater in the DFC process, specifically regarding brackish groundwater volume estimates in the estimates of Modeled Available Groundwater (MAG). Referencing knowledge of brackish areas of the Gulf Coast Aquifer layers closer to the coast, the question was asked as whether or not the brackish areas only isolated or are they in hydrologic communication with areas containing fresh groundwater. Mr. Kasmarek answered with a specific example in Galveston County with saltwater encroachment in freshwater wells, and actually some up-coning in areas pumping high volumes. As the pumping was reduced and water levels increased due to recharge in the management area, the saltwater wedge was relaxed and pushed back downdip. The brackish-freshwater interface is continually moving and in direct hydrologic communication. Mark Lowry of Lone Star GCD opined if you were to drill brackish wells it would result in pulling the interface further inland and diminishing quality. The proximity to the coast and amount of pumping will dictate how quickly the effects are realized, Mr. Kasmarek added. Mike Turco also added that the aquifer does't care about the quality, but that removing water from that matrix would still be limited based on subsidence. Larry French asked about the criteria used to define fresh and brackish water in the HAGM. Mr. Kasmarek noted 1,000 mg/L as the boundary definition of fresh groundwater. Mr. French followed up with the HAGM modeled beyond that definition. Mr. Kasmarek noted that this model is specific to the freshwater only and brackish groundwater would not have an estimate of MAG. The cells which are greater than the 1,000 mg/L are turned off in the model. The lack of calibration targets was also a factor to turn the cells off.

Mr. French was given the floor to present information from the TWDB of items of interest to GMA 14. First, since the last meeting, TWDB has a new board member, Kathleen Jackson came to the Board about 6 weeks ago from Beaumont. She is eager to hear from and interact with folks around the State. Second, TWDB should be completing and submitting a report to the GMA regarding the total estimated recoverable storage. This report is statutorily required for all of the management areas. The report is currently under management review and will give volumetric estimates for all relevant aquifers in the region. However, they will not address any issues related to subsidence or quality resulting from attempts to produce the water. Finally, TWDB approved the HAGM as the updated GAM in February 2014 and the HAGM is now the adopted model for the region. As part of that approval package, information of the initial request to consider the HAGM as the state's GAM and technical analysis between the previous model and HAGM are provided to outline and inform the reasoning on how the HAGM addresses the criteria and is a

better representation for joint planning purposes. In addition, Mr. French outlined the review process and responses to stakeholder comments.

Ms. Jones began discussion and briefing of the approach and results from the predictive simulations utilizing GMA 14 approved pumping amounts in the updated GAM (also referred to as the DAGM) by turning the floor to Jason Afinowicz of Freese and Nichols, Inc. Mr. Afinowicz noted the presentation would cover the next few agenda items, but all would be covered individually for comment and discussion. Discussion began with review of the GAM run simulation of drawdowns with the approved pumping for the region by GMA 14 members. The second part of moving forward with the simulations is using the GAM run to define desired future conditions (DFCs), which will be the cornerstone of the formulations needed in the explanatory report. Again, this GAM run utilized the updated GAM. As part of the model development, updated projections of pumping were developed for Fort Bend, Harris, Galveston, and Montgomery counties. These updated estimates were utilized in this initial predictive simulation and the rest of the region utilized pumping numbers from GAM Run 10-023. A series of figures demonstrating the drawdowns for the predictive periods were shown for review. Significant updates to aquifer parameters, pumping packages and simulation of predictive periods were noted for the model. Drawdown in the Chicot Aquifer demonstrated expected trends and impacts from pumpage and some aquifer parameter adjustments. Drawdown in the Evangeline Aquifer is somewhat more dramatic, indicative of the adjustments made to aquifer parameters during the model update process. The Burkeville Aquitard also illustrated these trends. As the Jasper Aquifer contained the greatest aquifer parameter and pumping adjustments, the largest variations were subsequently documented for the Jasper Aquifer. This resulted in all drawdowns being greater in all counties for the Jasper Aquifer in the updated GAM than in the previous GAM. Each county was highlighted as to their changes and alterations based on the new, updated GAM. In this initial predictive simulation, it was typical for the pumping projections to go from the currently measured pumping directly to the fixed projected pumping rather than a staged, phased, or gradual increase over the 50-year predictive period. There was also a handout package which detailed all of the pumping and drawdown simulations for the predictive periods for reference comparing the previous and new model simulations.

After this review of results from the updated model, Mr. Mullican began a discussion of the need for any adjustments and additional model simulations based on alternative scenarios. He noted the step function of pumping is having a cumulative effect on the drawdowns and DFCs. Mr. Mullican again specifically highlighted the stepped pumping function, in place for the majority of the area, could be addressed in a subsequent alternative scenario for later consideration. This item on the agenda was intended to allow anyone to ask additional questions of the updated GAM and the desire to revisit how the pumping was put into the predictive simulation to perhaps, at a minimum, change the way the pumping increases over time for the counties based on 10-023. John Martin of Southeast Texas GCD asked with all of his counties encountering significant changes between the models, was the old model that "bad or wrong" to give such differences. Mr. French explained there wasn't a function of the model being flawed, but an update and differences in the data used. He also mentioned the question of the stepped pumping function which the GMA may want to address and may yield some of the desirable changes and better agreement with previous drawdown predictions.

Mr. Martin also inquired if the districts could reference the old model or if they had to use the new model. Mr. French noted that the Board will only use the new model, and to keep the point of reference and comparison, the new model should be used. TWDB did consider allowing the individual districts to reference one model or the other for their DFC expressions, but it was decided that since they have to focus on things on a regional scale where one district could affect another, a consistent and uniform model across the region would be the most beneficial tool. Mr. Holland voiced that the changes in the model are attributable to changes in pumping or aquifer parameter and overall bettered the modeling process. In a recent Bluebonnet GCD Board meeting considering this model and its best use and incorporation for the district's objectives and goals (i.e. permitting considerations, preventing and controlling subsidence), Bluebonnet GCD wished to express their DFCs not only with drawdowns but also with a subsidence statement. In Bluebonnet GCD's opinion, a subsidence-based DFC would highlight one of the greatest tools of the model in the subsidence calibration. Mr. Holland acknowledged that this may be more appropriate for discussion in the next item, but "maximum allowable" language referencing and expressing subsidence as the most limiting impact was the wish of Bluebonnet. Mr Holland noted that although the district does not have extensometers to directly measure subsidence, incorporating the drawdown estimates into thresholds to ensure that conditions do not reach the limit of causing subsidence would be their strategy. Although projections of subsidence have not been provided to the GMA yet, Mr. Holland reported that Bluebonnet GCD has already performed this analysis. Mr. Allnowicz acknowledged that the numbers would be available in a future meeting regarding discussion of subsidence as part of the explanatory report criteria. Mr. Mullican stated that the 36.108 conditions require the GMA to consider the impacts of the proposed DFC on subsidence and asked for clarification that Bluebonnet GCD seeks subsidence to be a condition of the MAG also. Mr. Holland reiterated it was not a function of the MAG but an expression of the DFC. The expression would be for the entire county rather than the layer-by-layer format used for the drawdown expressions. Mr. French added that it would definitely be a first, but there shouldn't be any reason why it couldn't be done. Mr. Holland further added that a subsidence based DFC would be consistent with the quantifiable criteria of a DFC, highlight the key components of the model, and emphasize the charge of a GCD to prevent subsidence. Mr. French illustrated that the creation of management zones would likely be the management path in implementing this type of DFC, Mr. Holland agreed.

Mr. Jacobs inquired about which model, HAGM or the old GAM, would be or should be used with his Management Plan which is due in January 2015. Mr. French replied that the HAGM would be expressly used. Mr. Jacobs again questioned the explanation to be given when the drawdowns have changed and district pumping has not. Mr. French echoed the previous discussion and Mr. Jacobs understanding of a different model predicts different numbers, aquifer parameters and pumping changes outside of your district are the primary cause for the differences. Drawdowns are also relative to the point in time which you began or started the measurement. Mr. Jacobs would follow up and begin the dialogue regarding his Management Plan with the appropriate TWDB staff. Judge Brierley asked for further clarification on the implementation of the predictive pumping as it immediately jumps from measured to projected pumping rather than a staggered or gradual increase over the 50 year planning window. He

questioned if that process would over exaggerate the drawdown and other changes from the model. Mr. Afinowicz answered that it would certainly have an impact. Judge Brieden mentioned that Harris, Galveston, Fort Bend, and Montgomery counties have the gradual changes in pumping projections, while all others don't. Mr. Mullican added that the step function of pumping is how the model handles the numbers. It is okay in a way, but a gradual increase would reduce impacts. Another reason these numbers are important, currently, is that regional water planning relies solely on the MAG which has to be utilized for groundwater availability. This is the reason why the estimates of MAG really matter to local communities as they are the basis for availability and State funding assistance. The parameters that GMA 14 adopts as DFCs are correlated to the MAG and both must be evaluated. The step function does allow for more water to be available upfront in the current and future State Water Plan and could allow for the short term projects to get off the ground quicker. Reality is this is what makes the GMA process so much more interesting. The GMA must weigh the effects of the numbers, both predicted and simulated, on the region. Mr. French added the Board's high attention to this issue as it continues to be fleshed out and implemented. The conundrum is between the planning and the technical elements. As a district goes about managing groundwater resources, the MAG is one component of consideration. In regional planning, the MAG is a cap. The Board has pulled staff together to develop policies moving forward reacting to the frustration concerns and complaints from around the State on how these numbers will be used as they update previous plans. Dedicated review of the pumping, its step function, and implementation are critical to ensuring that the numbers will be beneficial. Unintended consequences are the goal to avoid, but what is being dealt with, not just here but around the State.

Mr. Mullican re-centered to further discussions regarding the model or the need for additional model runs. Lone Star GCD wishes to pursue an additional model run to better align the pumping package with the current regulatory plan for the district. The only changes will be those requested within those counties, others will keep their current pumping numbers. Mr. Martin expressed wanting to bring the entire model numbers up to 2013 from 2009. Mr. Afinowicz and Mr. French stated that would be a change to the model which would have to be tested, calibrated, peer reviewed and essentially start the entire process over. The changes and differences in the drawdowns will be even more varied, and for a very short time frame, would not add anything to the overall goal and project of the tool. Mr. Turco added that considerations should stay within the bounds of different scenarios of the model, rather than altering the model which again is simply a predictive tool. Mr. Martin expressed confusion on the difficulty of adding four years of pumping to improve the accuracy of the model. Mr. Afinowicz restated it wouldn't be hard, but gathering the data and the time used would not add much in the way of results from the current model. Before moving discussions forward, Mr. Mullican reiterated Lone Star GCD's interest in an additional model run and encouraged anyone else who may have or want changes to get their information in quickly so one additional predictive simulation can be done. Members were encouraged to contact Ms. Jones and Mr. Mullican with their intent or factors to consider. Mr. Martin inquired about the cost of additional model runs. Mr. Mullican noted they would be dependent on the extent of the model run but would only be the responsibility of those participating in the new model run. Mr. Afinowicz noted that the bulk of those costs would be in data collection and its addition. Ms. Jones suggested any who were interested to email their desired changes and allow Mr. Afinowicz to put together a specific cost estimate. Mr. Holland suggested

placing a deadline for changes to be submitted. Acknowledging communications which must occur at the district level and the meetings lost to weather, the deadline for the Participant's request was set for May 21, 2014 in an effort to get back on track with the heavy load to be covered.

Discussions transitioned to briefing and consideration of draft statement of DFCs based on execution of the updated GAM. The draft document provided by the consultants was referenced with the understandings that, at least partially, due to the additional model run that the specific DFC expressions would change. The consultants used the template from the last adoption of the DFC, additional language required by 36.108, and specific DFCs for the subsidence districts to reflect changes. Mr. Holland again voiced Bluebonnet GCDs desires for a subsidence-based DFC statement. He also asked the requirements for deeming aquifers non-relevant, specifically noting the alluvium aquifers in the district. Mr. French detailed that process and justification required. Mr. Mullican encouraged all of the Participants to thoroughly review their numbers and expressions to ensure they are relevant or if changes need to be made that action is taken to resolve those issues now. He also referenced a specific template in the TWDB rules which address Mr. Holland's inquiry. Questions were asked regarding the use of total estimated recoverable storage received from the Board. The numbers are one of the 36.108 factors of considerations, but the GMA has not received the numbers to date. Mr. French added that they were in the final stages of being approved and should be available soon.

The group moved their discussions onto a briefing of the process for GMA 14 agreement for proposed DFCs during joint planning process. Mr. Mullican began discussion referring to the changes in the joint planning process in SB 660 from the 2011 Legislative Session. He noted that the further we get into and through the process, the more questions and clarifications we stumble upon. Mr. Mullican noted that there are more things that we want to think about proactively, rather than reactively, with one of those being the discussion of all the conditions and alternatives considered but not adopted and an explanation, per 36.108(d-3). The concern raised is, what does that mean? What is formal and informal consideration? There seems to be a need for the GMA to establish these criteria to be on the same page. He turned the floor to Shauna Fitzsimmons of Sledge Fancher law firm. One of the main focuses is not limited to ensuring that adopted DFCs are properly documented through the explanatory report, but more importantly the documentation of the alternatives which were considered but not adopted. If there is no control over what constitutes consideration of alternatives, the explanatory report can become unwieldy and overly burdensome. Ms. Fitzsimmons stated that it will be critical for GMA 14 to adopt procedures which state the time and process for considering DFCs versus those just discussed. A bright line rule or test will determine formal and informal discussions regarding considerations of DFCs. Ms. Fitzsimmons stated that it is very important, legally, to understand what the explanatory serves as; an administrative record for everything the GMA works on. She continued by stating that you can't go through this process then produce an explanatory report after the fact, it must be a running record book of the process and the steps taken. The statute is unclear on the detail required or needed. It is the GMAs ability to set the boundaries for formal DFC adoption to help the defense of the DFCs adopted. The process should be clear cut and streamlined to ensure that the GMA has done everything necessary procedurally to prevent challenges to the DFCs based on this clarity issue. She noted that this is important for three reasons. First, we don't want to have holes in our explanatory report regarding the formality of

DFC considerations whether approved, denied, or discussed. Second, we want to steer away from having explanations informally discussed or considered as any discussions at the district level (i.e. district board, staff, consultants, attorneys, etc), district to district, or district to GMA consultant. These criteria should be limited to discussions of the group and not an individual. Third, statements explaining considerations rejected must be careful not be used to discredit the adopted DFCs. Ms. Fitzsimmons used the example of agency rulemaking procedures. She proposed the GMA consider administrative procedures to be presented at the next GMA meeting and adopted by resolution to assist in this process. Ms. Jones added her support and highlighted the concerns and uncertainty of this process.

Discussion shifted to funding levels, participation, and any other aspects of the Interlocal Agreement. Updated financial documents of invoices and payments on work performed were presented by Ms. Jones. She reiterated that those participating in the additional model run would be responsible for those charges and would not affect or be factored into the current agreement. Also of note is the GMA shows a deficit for the overall task. Mr. Puckett proposed an allocation amendment to disperse the costs to those financially able to contribute additional funds be placed on the next agenda. Mr. Martin inquired if there would be additional costs from the consultants as there are phases which went over budget. Mr. Afinowicz stated that the budget and quote for the project would be final. Ms. Jones also suggested that all participants, districts especially, begin to budget a given amount every year to accrue the funds which will be necessary for future joint planning.

Recent activities of interest to or impacting the GMA 14 planning group were the focus of subsequent discussions. Mr. Holland documented that the contested case hearing before his district had been dismissed as the applications had been withdrawn in late January. Mr. Turco mentioned that as a follow up to the Bluebonnet GCD contested case hearing process, Fort Bend Subsidence District had been sued by parties related to that hearing. Mr. Holland added future rulemaking revisions the district would be undertaking in the near future. Ms. Jones furthered some clean up and clarification of Lone Star GCDs rulemaking and regulatory plan implementation. They have also audited their GRPs to ensure they are moving toward their goals of groundwater reduction. Mr. Nelson also announced an upcoming meeting of the Gulf Coast/Montgomery County Water Efficiency Network.

The GMA 14 Joint Planning Committee Meeting was re-opened at 11:37 AM.

Mr. Mullican gave a review of progress to date for the GMA 14 joint planning area. We have completed two of the nine consideration criteria, water use and water supply needs/water management strategies. Now that the HAGM is complete, the GMA can move forward to other criteria. The next meeting will have the results from that additional simulation, and three additional criteria considerations and the possibility of another. If there are any aquifers you don't have a DFC and you want one for this round of planning, we must get these addressed now. Alternatively, if you are looking to designations of non-relevant aquifers, we need to address these and get those into the proper format for the explanatory report. Mr. Martin inquired if there were non-relevant aquifers last time, do they need to be documented this round. Mr. Mullican recommended that if the source is a major or minor aquifer which has a DFC, it should

be documented. He requested that all those wishing to participate in an additional model run notify him by May 21, 2014.

A proposed date for the next meeting was discussed. Mr. Mullican suggested June 25, 2014. Mr. Martin inquired again about the storativity numbers being ready from the Board. Mr. French was confident the numbers would be available and dispersed before that meeting. Mr. Mullican added that if we can meet and tackle the lengthy and detailed agenda, we would be back on track after missing the last couple of meetings with only one or two criteria remaining to complete. Ms. Jones confirmed with consultants and Mr. French that June 25, 2014 at 9:00 AM was good, in addition to the districts and participants. She followed up a question on the length of meeting with Mr. Mullican. He mentioned that if he was able to include the extra criteria, the meeting would likely be longer than today's. Ms. Jones asked for any other agenda items which need to be addressed on future agendas. Mr. Burkett had finished an initial divvying of the remaining funding deficit and presented it to the group for initial consideration to be typed up for the next meeting. Mr. Willcox questioned if there was any way to require participation by non-GCD counties as this group sets numbers for them and yet they don't contribute. Mr. French stated that there isn't any way to require that participation. Discussion went into the efforts which have been undertaken to bring non-GCD areas to the table and the reason why GMA 14 set itself up accordingly. Mr. French suggested identifying water plan strategies tied to groundwater for those non-participating counties as a starter to understand where they may have a more direct link into this process. All counties and representatives are provided notice of all GMA 14.

Without further discussion and there being no further business, the meeting was adjourned at 12:00 PM.

PASSED, APPROVED AND ADOPTED THIS 24TH day of June, 2014

Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA (GMA 14)

30-Apr-14

MEMBER ATTENDANCE

Member District	District Representative (Please Print)	Signature	Alternate (Please Print)	Signature
LSGCD	Kathy Turner Jones			
Lower Trinity GCD				
Bluebonnet GCD				
Brazoria County GCD				
Southeast Texas GCD				

GMA 14
SIGN IN SHEET

April 30, 2014

NAME	AFFILIATION	CITY, STATE, ZIP	E-Mail
Jill Sawyer	Fort Bend County Resident	Richmond TX 77469	jillsawyer@aol.com
Jean Fonseca	FNT	Houston TX 77024	jdefonseca
Zack Holland	Richmond GCD	Needville, TX 77461	zholland@richmondgroundwater.org
Larry French	TWDB		larry.french@twdb.texas.gov
Charles W. Simpson Jr.	x	Humble TX	x
Bill Goodenough	Forester	Lufkin, TX	billgoodenough@forestergroup.com
BILL JACOBS	Lone County GCD	Livingston, Tx.	ljacobs@livingston.net
John Martin	Southeast GCD	Sour-TX	JMartin@scrcd.org
KIRK HANRATH	WASH. COUNTY	Brenham TX	Commissioner3@peoplepc.com
Dave Denmon	KRG	Hunter, TX	ddenmon@westerndeutsch.com
Mikell Mireles	Lake Conroe Communities Network	Conroe, TX	treasurer@lakeconroecn.org
KENT BURKETT	BCGCD	ANGLETON, TX	KENTBURKETT@GMAIL.COM
Susan Beck	Cypress/Fairbanks	Austin, TX 78723	sbeck@w-cham.com
AMY BEUSSINK	USGS	Schenectady, NY	arbeussi@usgs.gov

Judge Willeg in attendance
Judge Bridges

Attachment "A"

PO Box 3467, Conroe, Texas 77305
Phone: (936) 494-3436 Metro: (936) 441 - 3437

Public Comment Registration

Please complete and submit this form if you would like to speak or have a question for the speaker or Board.

Name: Bill Gosdin Date: 4/30/14

Address:

Who you are representing: Forestar Group / Lennar

Question: How will the total storage numbers be used in the DFC process

Exhibit Cover Sheet Page of

Total Amt of Pages

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Tuesday, June 24, 2014
1:30 PM

MEETING MINUTES

A regular meeting of GMA 14 was held Tuesday, June 24, 2014, at 1:30 PM, in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 1:30 PM, at which time the district representatives introduced themselves. The districts represented at the Joint Planning Group meeting included: Brazoria County GCD, Bluebonnet GCD, Lone Star GCD, Lower Trinity GCD and Southeast Texas GCD. Also in attendance at the meeting were: Jason Afinowicz, Freese and Nichols, Inc.; The Honorable John Brieden, Washington County Judge; Larry French, Texas Water Development Board (TWDB); Bill Mullican, Mullican and Associates; Robert Thompson, Fort Bend Subsidence District; Mike Turco, Harris-Galveston Subsidence District; 'Pudge' Willcox, Chambers County; and members of the public. (see *Attachment "A" for a list of attendees*).

Kathy Turner Jones began the meeting by asking for a roll call of GMA 14 participating members and any comments. Ms. Jones proceeded with receipt and requests of postal notices from the group. Ms. Jones asked for consideration of the approval of the minutes from the GMA 14 Joint Planning Group meeting on April 30, 2014. Paul Nelson (Lone Star GCD) was given the floor to discuss amendments to the revised draft minutes. These amendments were to correct typos and clarification of discussions regarding subsidence and its calibration in the model. After discussion and upon a motion by Kent Burkett (Brazoria County GCD), seconded by John Martin (Southeast Texas GCD), the minutes for the April 30, 2014 meeting were approved unanimously, as amended.

Ms. Jones recognized Ms. Jill Savory for public comment to the Joint Planning Group. After thanking the group, she presented information she researched regarding empowering the people making decisions with consideration of scientific studies. These comments were also summarized in a passed out handout.

Ms. Jones moved to discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning. Bill Mullican led discussion of responses from Bluebonnet GCD, Lower Trinity GCD, and Southeast Texas GCD. Bluebonnet GCD requested declaration of the river alluvium aquifers (Brazos, Navasota, San Bernard, San Jacinto, and Trinity) in its district and the Brazos River alluvium aquifer in Washington County as non-relevant aquifers for the

purposes of joint planning. Lower Trinity GCD and Southeast Texas GCD requested declaration of the Yegua Jackson Aquifer within their respective districts as non-relevant aquifers for the purposes of joint planning. Mr. Mullican stated he had received adequate information to document the declarations in the explanatory report if the Joint Planning Group took such action. Zach Holland made the motion to approve the requests by Bluebonnet GCD, Lower Trinity GCD, and Southeast Texas GCD of declaration of non-relevant aquifers for the purposes of joint planning. After a second by John Martin, the motion was approved unanimously.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was called to order at 1:44 PM.

Ms. Jones recognized Larry French for an agency update. Mr. French noted the completion and distribution of the total estimated recoverable storage (TERS) numbers for the aquifers in GMA 14. Based on the aquifers with current DFCs, including those which were just approved to be declared non-relevant aquifers, TERS numbers were explained and broken down to aquifer, district, and county level summaries. Mr. French also explained the history of the TERS numbers and the limitations on their use as management tools. After some discussion, the participating members agreed that they would like to request a written explanation of these limitations from the TWDB.

Ms. Jones called for the briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer. Jason Afinowicz updated the group on progress since the last meeting. He noted the nomenclature change to account for the updated GAM run as NGC GAM Run 2 (Run 2) to differentiate from the information considered at previous meetings. Run 2 was at the request of Lone Star GCD to revise pumping in the Lone Star GCD. Mr. Afinowicz provided maps and illustrations of the Run 2 results for consideration. Results from each county and each aquifer layer were detailed and outlined.

Ms. Jones next called for a briefing on draft statements of desired future conditions based on the execution of the updated NGC GAM Run 2. There were some additions made in relation to the Fort Bend and Harris-Galveston Subsidence Districts to represent their mission and goals. Also, as requested during the last GMA 14 meeting by Bluebonnet GCD, a subsidence DFC was added though the exact numbers will be confirmed when the subsidence numbers are extracted from the model run. Further changes would be needed for the aquifers declared non-relevant earlier in the meeting. At this point, this remains a draft document for further consideration.

Ms. Jones next called for a briefing and consideration of hydrological conditions, including for each aquifer in the management area, total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108(d)(3). Mr. Afinowicz reviewed a summary of the calculation of total estimated recoverable storage. This is a number documenting the volume of water in an aquifer. The number is a requirement for

consideration in statute, Mr. Afinowicz presented total estimated recoverable storage and water budget numbers by county and aquifer layer. Mr. Mullican reminded the group that water budget numbers will be implemented into future management plans for the districts. As this is part of the specific criteria to be considered and documented in the explanatory report, Mr. Mullican reiterated that if there is anything in addition to the information presented by Mr. Afinowicz that would be appropriate for further consideration, now would be the time to raise these to the group.

Next, Ms. Jones directed the group into a briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108(d)(4). Mr. Afinowicz presented available information from the models and limited other resources. Generally, there is limited interaction from the aquifer systems as a whole. However, the lower systems do have an interaction with surface water systems as documented and recognized specifically by the Lower Colorado River Authority, but that level of study has not been performed in GMA 14. In the Carrizo, Queen City, and Sparta aquifers, there is some information included in the Carrizo GAM. The Yegua Jackson Aquifer is the first area where interaction between groundwater and surface water is documented in detail. Mr. Afinowicz presented the compiled information for these systems similar in format to the previous presentations.

A briefing and discussion of the impacts of proposed desired future condition on subsidence, as required by Texas Water Code Chapter 36.108(d)(5) was next on the agenda. Mr. Afinowicz noted that this factor is a much more critical issue for this region than any other region in the State. Presented material focused on the studies and data directly from the subsidence districts and predicted outputs from the updated NGC GAM Run 2 for the areas outside of the subsidence districts. The subsidence package from the model gives a regional perspective on subsidence, but the localized studies are more beneficial and reliable to account for specific and localized occurrences and causes. The numbers represented were county averages from 2010 to 2070 assuming the pumpage in the NGC GAM Run 2. Potential subsidence is shown greatest around concentrated pumping centers and lower, distributed pumping shows the least or none at all.

Ms. Jones asked for a review of progress to date for GMA 14, remaining considerations, and future actions from Mr. Mullican. Remaining considerations are socio-economic impacts, impacts of proposed DFCs on private property rights, and feasibility of achievement of adopted DFCs. Mr. Mullican announced that he will send a prompt to the districts for discussion of how their rules and management plans work toward protecting private property rights in their districts. In addition, there is a catch-all for any other considerations not part of the specific criteria. Once these are completed, a draft of the desired future conditions will be presented. All of the criterion should be completed by the end of the year with finalization of the explanatory report to follow.

Discussion of funding levels, participation, and any other aspects of the Interlocal Agreement was led by Ms. Jones. The draft resolution distributed regarding the proposed administrative procedures for the consideration, proposal, and adoption of desired future conditions as proposed at the April 30, 2014 GMA 14 meeting was discussed, and Ms. Sharma Fitzsimmons, of Sledge Thatcher, PLLC, was available for questions. As the statute is silent on the procedural process

regarding the formal or informal consideration of DFCs to the extent the DFC must be evaluated using the nine statutory factors and included in the explanatory report, establishing such procedures upfront will will be of benefit to the clarity and fluidity of the process as well as ensure the development of an effective administrative record through the production of the explanatory report. Ms. Jones noted there had been several questions, comments, and feedback received which would be considered and implemented into a revised document. Ms. Fitzsimmons said that the 'Whereas' clauses in the resolution reference relevant statutes in the Water Code and provide the background for the document, and the substantive material is the language in the procedures section. Mr. Martin gave insight into his issues with the draft document. Mr. Martin outlined the procedure for a GCD rulemaking and adoption procedure with notice and hearing and noted that Chapter 36 does not give reference to handling these administrative procedures in the manner proposed. He then asked if the proposed administrative procedures should be handled as a rulemaking, or could they be challenged if we proceed as written. Ms. Fitzsimmons explained the intent and purpose of this document as more 'bylaws' for the GMA rather than rules adopted by districts. Mr. Martin raised another question of wording identifying a specific consultant, and how it may need to be generic to be better utilized by the GMA. Ms. Fitzsimmons noted the benefit of having a consultant involved in the process from the onset. The definition includes any consultant that the GMA contracts with and also names the current consultant. Mr. Martin added another question regarding collection and distribution of information to be brought before the GMA instead of through the consultant. Ms. Fitzsimmons noted that the receipt of written requests by the consultant is to ensure all necessary information is collected for an educated decision to be made by the GMA, not by the consultant. The GMA is the only decision maker for DFC considerations. Any potential conflicts of interest regarding the consultant should have been a part of the initial request for proposal and contract discussions. Mr. Martin inquired if there could or should be a cutoff date for receipt of information related to DFCs. Mr. Mullican noted that after the proposed DFCs and the individual public hearings held by the districts, there is a vehicle and requirement to submit all informat on and requested changes to the proposed DFCs to the GMA. Any and all of the requested changes would then have to be considered related to the nine factors. Mr. Martin brought up the point that we have just considered a new model run, and questioned whether we need to go back and complete the factors which were discussed with the previous model run. Mr. Mullican agreed that at a future meeting it would be a good idea to have an agenda item to ratify the previously considered factors with the updated model run. Ms. Jones asked for guidance for the draft document. Some wished to further review the document and Ms. Jones requested all comments to be submitted by July 7, 2014. Ms. Jones recognized Mr. Brian Sledge of Sledge Fancher, PLLC to highlight actions of other districts and GMAs related establishing the administrative record and its importance to the explanatory report. Ms. Jones reviewed the financial outlook of the Participants moving forward.

There was no presentation or discussion by districts of recent activities of interest to or impacting the GMA 14 planning group.

The GMA 14 Joint Planning Committee Meeting was re-opened a. 2:57 PM.

The next meeting date was discussed and set for Tuesday September 23, 2014, at 1:30 PM at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

Without further discussion and there being no further business, the meeting was adjourned at 3:00 PM.

PASSED, APPROVED, AND ADOPTED THIS 23rd day of September, 2014

Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

24-Jun-14

MEMBER ATTENDANCE

Member District	District Representative (Please Print)	Signature	Alternate (Please Print)	Signature
LSGCD		Kathy Jones		
Lower Trinity GCD				
Blueberner GCD				
Brazoria County GCD				
Southeast Texas GCD	John Martin			

GMA 14
SIGN IN SHEET

June 24, 2014

NAME	AFFILIATION	CITY, STATE, ZIP	E-Mail
Larry French	TWDB	Austin	larry.french@twdb.texas.gov
LANCE STAHL	HHW-SUD	Iowa Park	lstahl@comcast.net
Phillip Tower	FNI	Houston, TX 77024	phil.tower@fnii.com
[illegible]	[illegible]	Comal	
Zeff Weisinger	Weisinger Inc	Conroe	Suite3@weisinger.com
Michael Massey	Lake Conroe Community Network		treasurer@lakeconroecn.com
Elliot Barnes	Radcliff Bobbitt	Houston	ebarnes@chaplaw.com
Bill Jacobs	LTGCD	Livingston, TX	ltgcdist@livingston.net
Jill Sawyer	self	Richmond, TX	jillsawyer@aol.com
Sara Butler	CH&H Hill/Forestar	Austin, TX	SButler@chfm.com
Ray Kazanowski	BRP LLC	Houston TX	ray.kazanowski@nrgbp.com
Ken Burkett	BCGCD	Angleton, TX	
Andrew Chanosky	Surface Water Engineer	Bastrop Woodlands Partner	achanosky@mail.com
Amy Beussink	USGS		abeussink@usgs.gov

Attachment "A"

GMA 14
SIGN IN SHEET

June 24, 2014

NAME	AFFILIATION	CITY, STATE, ZIP	E-Mail
KIRK HANNATH	WASHINGTON COUNTY	→	COMMISSIONERKSO@YAHOO.COM

PO Box 2457, Austin, Texas 78768
Phone: (936) 494-3409 Metro: (936) 441-3409

Public Comment Registration

Please complete and submit this form if you would like to speak or have a question for the speaker or Board.

Name: Jill Sawyer Date: 6/24/2014

Address: Richmond TX

Who you are representing: Self

Question: 4:30

Comments

Sorry I'm late

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Tuesday, September 23, 2014
1:30 PM

MEETING MINUTES

A regular meeting of GMA 14 was held Tuesday, September 23, 2014, at 1:30 PM, in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 1:30 PM with a roll call of District representatives and Interlocal Agreement Participants. Districts represented included: Brazoria County GCD (joining at 2:15 PM), Bluebonnet GCD, Lone Star GCD, Lower Trinity GCD and Southeast Texas GCD. Interlocal Agreement Participants included: The Honorable John Brieden, Washington County Judge; and Mike Turco, Harris-Galveston Subsidence District & Fort Bend Subsidence District. Also in attendance at the meeting were: Texas Water Development Board Member Bech Bruun, Jason Afanowicz, Freese and Nichols, Inc.; Larry French, Texas Water Development Board (TWDB); Bill Mullican, Mullican and Associates; and members of the public. (*see Attachment "A" for a list of attendees*).

With no registered public comment, Ms. Jones proceeded with receipt and requests of posted notices from the group. Ms. Jones then asked for consideration of the approval of the minutes from the GMA 14 meeting on June 24, 2014. After discussion and upon a motion by Mr. Martin, seconded by Mr. Jacobs the minutes for the June 24, 2014 meeting were approved unanimously.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was called to order at 1:42 PM

Ms. Jones began this portion of the meeting by continuing discussions of the nine factors set forth in Texas Water Code Section 36.108, Subsection (d), each of which must be considered by the member districts before voting on the proposed DFCs for the aquifers in GMA 14. In previous meetings, we considered factors (1) through (5) listed in the statute, including aquifer uses or conditions within the management area, water supply needs and management strategies provided in the state water plan, hydrological conditions such as the total estimated recoverable storage, average annual recharge, inflows, and discharge for each aquifer, other environmental impacts, and subsidence. Today we will consider factors (6) and (7) regarding socioeconomic impacts and impacts on property rights.

Ms. Jones called for the briefing and discussion of the socioeconomic impacts reasonably expected to occur as a result of the DFCs, as required by Texas Water Code Section 36.108(d)(6). Mr. Mullican had prepared a presentation brief to the group on this issue (*see Attachment "B" for slides*). After an in depth history of socioeconomic impact analysis and its origins in State water planning, Mr. Mullican read into the record from a qualitative perspective, both positive and negative socioeconomic impacts he found to potentially result from implementation of proposed DFCs;

- Proposed DFCs may require conversion to alternative supply, which may have increased costs associated to infrastructure, operation, and maintenance;
- Proposed DFCs may reduce/eliminate the costs of lowering pumps and either drilling or deepening wells;
- Proposed DFCs may reduce/eliminate the costs associated with subsidence (including legal costs assigned to parties determined to be liable);
- Proposed DFCs may serve to sustain/enhance economic growth due to assurances provided y diversified water portfolio;
- Alternatives to proposed DFCs may result in short-term reduction in utility rates due to reduction in cost of water management strategy implementation; and
- Alternatives to proposed DFCs may result in significant but unquantified production costs due to transition from confined to unconfined conditions in local aquifers.

Mr. Mullican then requested each GMA Representative and Interlocal Participant to answer to and speak on these considerations in relation to their individual representative area.

Mr. Turco began the discussion reflecting on how this list affects the subsidence districts with subsidence being a big issue for the area. For the purpose of this consideration, the qualitative approach is beneficial. There are lots of costs associated with conversion from source to source that are certainly socioeconomic impacts from their regulatory plan perspective and the DFCs proposed by this group. Mr. Turco did suggest the addition of potential economic impact from base flow loss to estuaries, which needs more thought. Overall, it is a complete list summing the impact from a well-rounded view.

Mr. Holland agreed with the overall general qualitative approach being applicable not only from an individual district perspective, but for the area at large. The specific item which stood out in his mind was the proposed DFCs reduction or elimination of costs to lower pumps and either drilling or deepening wells. With older wells, 40 plus years old, completed much shallower, generally less than 150 feet total depth, these wells need to be deepened into more saturated sands for quality and sustainability of the well regardless of the DFC to protect from the shallow fluctuations over time, placing these wells in a more confined than unconfined system. Though there will certainly be varied socioeconomic impacts across the area from a reduction or elimination of these costs, there may be some inherent increases as the standards and depths of new or replacement wells have changed over time.

Ms. Jones gave a statement into the record for use and documentation into the explanatory report regarding Lone Star GCD's approach and consideration of socioeconomic impacts reasonably expected to occur (*see Attachment "C" for Lone Star GCD*).

Mr. Durkett noted that he had nothing to add after the formal statements from Ms. Jones.

Mr. Jacobs commented on surface water available from the City of Houston in Lake Livingston. The costs of running that water to other systems which have been solely dependent on groundwater are of interest. Some entities looking to replacement wells and/or new wells are more strategically placing them to easily provide for and add to existing infrastructure, greatly reflecting costs and impacts.

Mr. Martin noted that his district is the location of the two largest reservoirs in the state and has only one significant surface water user located within his district. He also contrasted the large expected growth of Ms. Jones district (Montgomery County) to his district, with Southeast Texas GCD not witnessing or expecting significant growth at all. Their DFCs are actually factored to encourage growth and bring economic resources to the area. Mr. Martin also echoed Mr. Holland's statement regarding the older, shallower wells in his district.

Judge Brieden was alarmed that Region G showed no water needs for Washington County. The whole reason why he is at the table is to ensure that the County's needs are met throughout planning and to be proactive process. Surface water is a primary driver for the County as their large population center has transitioned to surface water over groundwater. The 2011 drought did challenge their county, especially as weekend or seasonal properties have taken off in the rural areas with the felt need for ponds filled from groundwater wells, causing well issues. The DFCs are important to us for our current and future needs with projected growth to support.

Ms. Jones brought up a point of quality issues which did not seem to be addressed specifically by any of the considerations with increased costs of treatment from quality declines. With no further discussion, Mr. Mullican reiterated that this is not the only or last opportunity to amend this list and items discussed related to socioeconomic impacts reasonably expected to occur.

Ms. Jones moved to the next topic of a briefing and discussion of the impacts on the interests and rights in private property in considering DFCs by the districts, as required by Texas Water Code Section 36.108(d)(7). Mr. Mullican again was given the floor to present and outline the framework and guidance of the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater, as recognized under Texas Water Code Section 36.002, specifically what the section does and does not do (*see attachment "B" for slides*). The procedural requirements for what should be considered in reviewing the private property rights factor are not prescribed in statute nor do TWDB rules provide any additional guidance. As such, Mr. Mullican established the following list of topics suggested for discussion:

- Existing uses within the GCD;
- Projected future uses within the GCD;
- Investment-backed expectations of existing users and property owners within the GCD;
- Long-term viability of groundwater resources in area;
- Availability of water to all properties and ability to allocate MAG through rules after DFC adoption;

- Whether immediate cutbacks would be required in setting a particular DFC or whether cutbacks, if any, would need to occur over certain timeframes;
- For outcrop areas, how the outcrop depletes rapidly in dry times, and whether drought rules or triggers based on the DFC/MAG for the outcrop could be beneficial to ensure viability of the resource during dry times;
- Economic consequences to existing users (i.e. cost to drop pumps, reconfigure or drill new wells upon water table dropping, etc.). Also consider the reverse – economic consequences of less water available to protect the existing users from the economic consequences relevant to existing users – reaching a balance between these two dynamics;
- Those GCDs with existing rules developed based on the current DFC might find it helpful to review the rules that the GCD considers relevant as we work to adopt DFCs over the next year. For example, the rules and Management Plan in place based on the current DFCs can help determine how a GCD currently impacts private property rights and whether those same interests are important as we work to adopt DFCs over the next two years; and
- Focusing on finding a balance, as that balance is defined by each GCD, between all of these considerations.

Mr. Mullican again directed each GMA Representative and Interested Participant to answer to and speak on these considerations in relation to their individual representative area.

Judge Brieden gave thoughts on balance between the ownership and competing pressure of use across property bounds when using the same resource. How one can negatively affect your neighbor and minimize development is a dynamic that must be considered for the future. How all of these things fit together impact the growth and availability of supply to ultimately drive decision making.

Mr. Martin highlighted a couple of ways that his district protects private property rights. One being that his district's enabling legislation specifically states that a permit cannot be required for any well capable of less than 25,000 gallons per day. Secondly, is his district's goal to meet the Chapter 36 requirement of "highest practicable use" balanced with the other required factors and as evidenced by the current GMA 14 GAM Run.

Mr. Jacobs added a couple of his district approaches being through drought contingency plans for all users. In addition, any changes in the district's rules are also reflective of considerations of private property rights.

Ms. Jones read a statement into the record for use and documentation into the explanatory report regarding Lone Star GCD's approach and considerations on impacts on the interests and rights in private property (*see Attachment "D" for Lone Star GCD*).

Mr. Holland highlighted the placement of the ownership in Chapter 36. Chapter 36 is the backbone and the skeleton of GCD creation and fleshed out through enabling legislation, district rules, and Management Plan, giving a fundamental principal to GCDs to not only recognize but protect those rights. The DFCs are what is perceived today that the aquifer will tolerate from an

impact standpoint that will not damage the aquifer as a whole. What we know and have available today will fail in comparison with what we will know tomorrow. The important thing to remember with the DFCs, rules, management plans, and so on, is that they are able, and going, to change to reflect advances in science. Private property rights should be at the forefront, but also continued advances in the science, to conserve, preserve, and protect the resources.

Mr. Turco expanded on the primary purpose of the subsidence districts is to protect property from subsidence and do so through the regulation of groundwater. With the advancement of sciences over the years, the subsidence districts update regulatory plans to provide the most viable use of resources while stopping the subsidence throughout the region. These planning areas are at different conversion rates across the district, some down to 10% groundwater use, which has reflected in subsidence reductions. Still allow property owners to withdraw water, just have to meet the regulatory requirements in place through a fair share approach rather than a specific amount. We will continue to collect data to advance science, ensure our regulatory plan is reasonable, alternative sources are available, so that property owners can get the water they need and ensure the mix between groundwater and alternative water are sufficient to address subsidence in the local area.

Mr. Burkett read a prepared statement into the record for use and documentation into the explanatory report Brazoria County GCD's approach and considerations on impacts on the interests and rights in private property (*see Attachment "E" for prepared statement*).

With no additional thoughts, Mr. Mullican again reiterated that this is not the only or last opportunity to amend this list and items related to the consideration of the impact on the interests and rights in private property. Mr. Mullican requested each District Representative and Interlocal Participant to memorialize their comments and submit them for direct use in the explanatory report.

At the close of this discussion, Ms. Jones directed attention to a standing agenda item to discuss funding levels, participation, and any other aspects of the Interlocal Agreement. Mr. Burkett asked for clarification that an estimated $5000.00 deficit remained in covering the contracts, referencing the financials which were provided. Ms. Jones confirmed the remaining deficit which would be addressed in a future meeting. There was no discussion or action taken.

The floor was opened for presentation and discussion by Members and participants of recent activities of interest to or impacting the GMA 14 planning group. Mr. Turco opened with a summation of activities wrapping up before the subsidence districts. Mr. Holland noted the district rules revisions to be considered in October by the district. Mr. Jacobs updated on the Lower Trinity GCD's Management Plan adoption process. Mr. Martin announced congratulations and bittersweet sentiments of the retirement of Mr. Jacobs at the end of the year. The group shared their well wishes, support, and appreciation for Mr. Jacobs and his district moving forward. Ms. Jones called attention to the revised draft Resolution Establishing Procedures for the Consideration, Proposal, and Adoption of DFCs by GMA 14. At our meeting in June, Shauna Fitzsimmons, with Sledge Fancher, reviewed the procedures set forth in the Resolution and answered various questions regarding the Resolution and the procedures

provided in it, and at that meeting, we decided to allow for an additional period of time to enable District Members the opportunity to submit comments or proposed revisions to the Resolution. All comments were submitted to Ms. Jones, which were then forwarded to Ms. Fitzsimmons. Comments were received from Southeast Texas GCD and Bluebonnet GCD, and each comment has been specifically addressed.

As Ms. Fitzsimmons has reiterated, the purpose of adopting these procedures is to clearly define the process by which the GMA shall consider, propose, and adopt DFCs, as such procedure is unclear under the statute. Additionally, the adoption of these procedures will ensure that the Member Districts comply with the statutory requirements applicable to the establishment of DFCs and that the explanatory report includes all the necessary information to create an administrative record that is defensible in the event the DFC are appealed after adoption. Ms. Jones asked Ms. Fitzsimmons to take the floor to review the changes to the draft resolution and answer any questions.

Ms. Fitzsimmons summarized the draft, its purpose, and the changes incorporated from the previous draft discussed at the previous meeting. With the importance of the explanatory report, it is equally important to create a defensible report in the formal consideration of DFCs and the procedures which those formal considerations will be based.

Ms. Jones advised everyone to read these procedures thoroughly as action will be taken at our next meeting to approve the resolution establishing the procedures. Ms. Jones requested all to please send any final comments regarding the procedures no later than October 17th.

Ms. Jones recognized TWDB Member Brunn for Board announcements or comments. Board Member Brunn voiced his appreciation of being at the meeting and expanded on a point from Mr. Mullican's presentation. The new Board is looking to be more involved in all areas of water, not only because of personal interest but the intent and directive of the Legislature in restructuring TWDB. Anything that you encounter from a GMA to your individual business, we have an open door policy and look forward to working with you.

Mr. French gave a quick agency update on GMA related work. First was Mr. Jacob's referenced Management Plan being reviewed and should be completed in the near future. He also extended his congratulations Mr. Lambs again on his retirement. Second was a formal request from GMA 14 to give additional explanation and background to the total estimated recoverable storage number which the Executive Administrator responded to and Ms. Jones forwarded the response to the members.

With no further discussion in terms of recent activities or interest to the GMA planning group Ms. Jones asked for a motion to adjourn the meeting of the GMA 14 Interlocal Agreement participants and reconvene the Joint Planning Group meeting. Such motion was made by Mr. Burkett and seconded by Mr. Martin, adjourning the meeting of the GMA 14 Interlocal Agreement Participants and reconvening the Joint Planning Group meeting at 3:36 PM

Ms. Jones directed discussion of the progress to date for GMA 14 Joint Planning and remaining requirements. Mr. Mullican was given the floor and stated that the GMA will not make the deadline to include this round of DFCs into the current Regional Water Plan. He continued to summarize progress and highlight next meeting agenda discussion and action items of Texas Water Code Section 36.108(d)(8) regarding the feasibility of achieving proposed DFCs, Texas Water Code Section 36.108(d)(9) regarding other factors deemed for consideration by the GMA, and review and consideration of "non-relevant" aquifers documentation.

The next meeting date was discussed and set for Tuesday November 18, 2014, at 1:30 PM at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

Without further discussion and there being no further business, following a motion by Mr. Martin and seconded by Mr. Burkett, the meeting was adjourned at 3:43 PM.

PASSED, APPROVED, AND ADOPTED THIS 18 day of November, 2014

Chairman

ATTEST:

Secretary

GMA 14
SIGN IN SHEET

September 23, 2014

NAME	AFFILIATION	CITY, STATE, ZIP	E-Mail
Larry French	TWDB	Austin	larry.french@twdb.texas.gov
Kevin Spencer	RW Harden & Assoc	Austin	kevin@rwharden.com
LANCE Stahl	HMW-SUD	Tomball	lestahl@comcast.net
Bill Jacobs	Lower Trinity GCD	Livingston	ltgcdbill@livingston.net
J.L. Martin	Southeast Texas GD	Jasper, TX	jmartin@setcd.org
John Seifert	LB Engineering	Houston, TX	jseifert@lbengineering.com
Carlotta Langford			Carlotta@CarlottaLangford.net
Michael Massey	LCCN	Conroe, TX	treasurer@lakeconroeCN.com
KIRK HANRAHAN	Neath County	→	kirkhanrahan@peoplepc.com
Joe Stevens	City of Cut Bank Montana		jstevens@cutbankmt.com
Elizabeth Ferry	Thornhill Group	Round Rock, TX	eferry@thgi-water.com
Byron Beeves	City of Shenandoah	→	bbeeves@shenandoahtx.us
Scott Taylor	City of Conroe	Conroe, TX	staylor@cityofconroe.org
Susan Butler	Cedar Hill Courier	Austin, TX	sbutler@c-n2.com

Attachment "A"

Attachment "A"

GMA 14
SIGN IN SHEET

September 23, 2014

NAME	AFFILIATION	CITY, STATE, ZIP	E-Mail
Jill Sawey		Richmond TX 77469	jillsawey@aol.com
Kent Lindquist	BOARD		

Attachment "A"

Attachment "A"

UPPER GULF COAST AQUIFER PLANNING AREA (GMA 14)

23-Sep-14

MEMBER ATTENDANCE

Member District	District Representative (Please Print)	Signature	Alternate (Please Print)	Signature
LSGCD				
Lower Trinity GCD				
Bluebonnet GCD				
Brazoria County GCD				
Southeast Texas GCD				

Attachment A

Attachment "B"

Groundwater Management Area 14 Meeting

Lone Star Groundwater Conservation District Offices

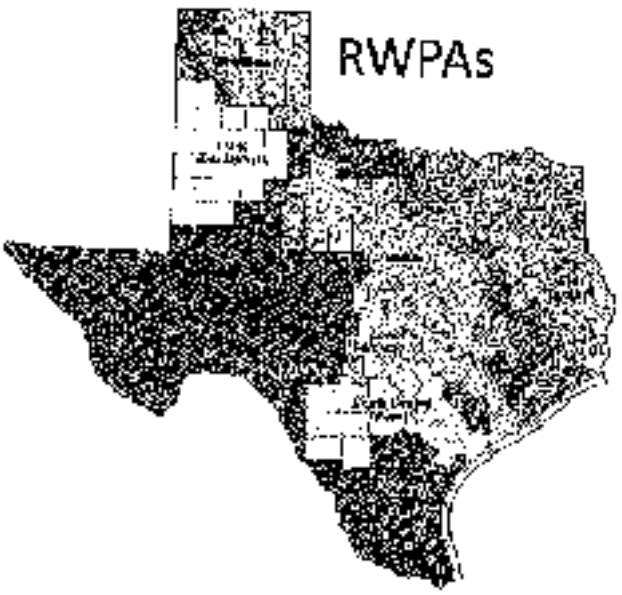
Conroe, Texas

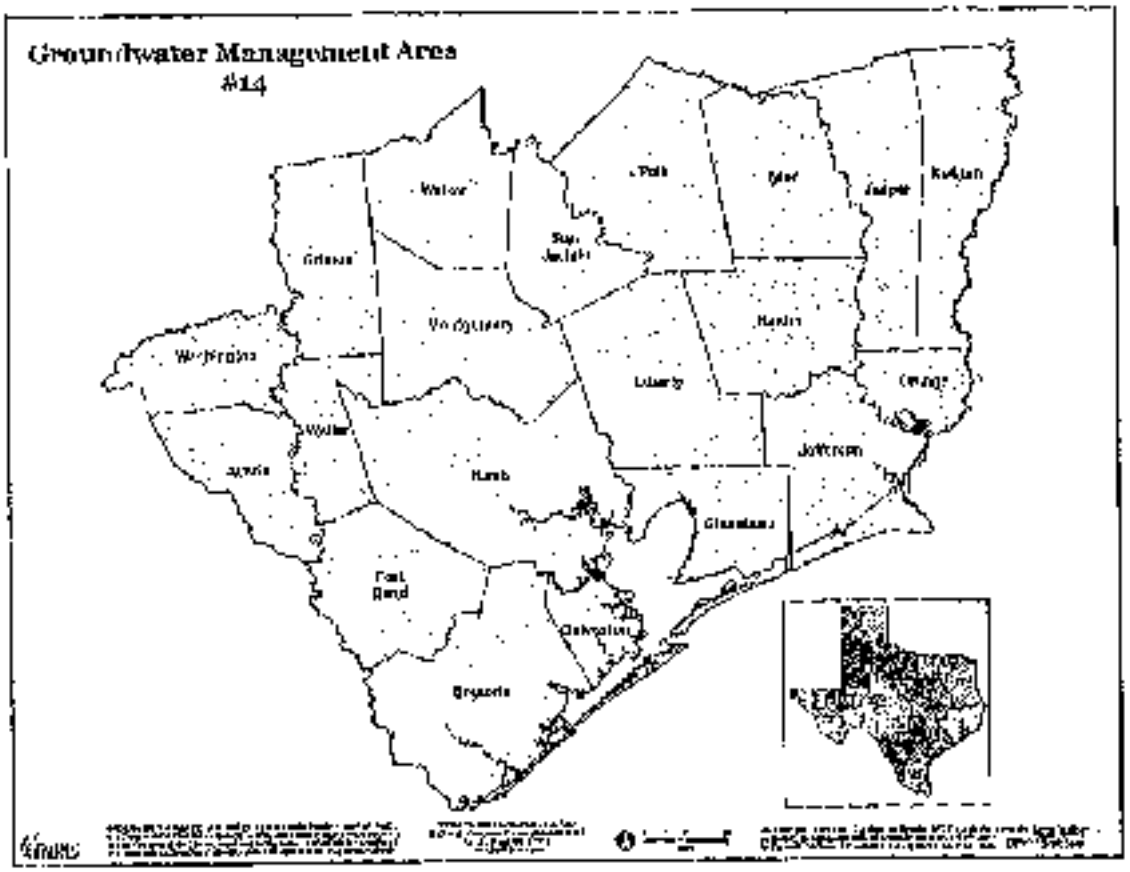
September 23, 2014

Today's Considerations

- **TWC Section 36.108 (d) (6) – socioeconomic impacts reasonably expected to occur**
- TWC Section 36.108 (d) (7) – impact on the interests and rights in private property

GMAs


RWPAs


Groundwater Management Area
#14
Polk
Tyler
Jasper
Newton
Orange
Liberty
Harris
Jefferson
Chambers
Galveston
Brazoria
Fort Bend
Waller
Montgomery
Grimes
Walker
Austin
Colorado
Wharton
Matagorda

Socioeconomic Impacts and Water Planning in Texas – A Brief History

- Texas Water Code Chapter 16.051 (a) the board shall prepare, develop, formulate, and adopt a comprehensive state water plan that . . . shall provide for . . . further economic development (companion provision in TWC Chapter 16.053 (a, b) for regional water plans).
- Texas Administrative Code (TAC), Title 31, Chapter 357.7 (4)(A) states, "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs.*"

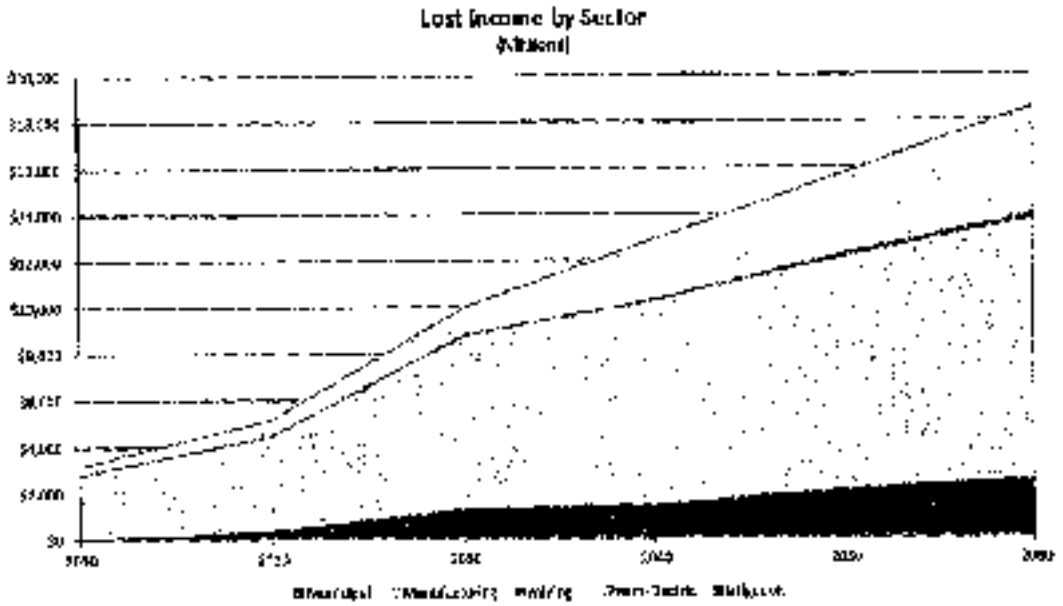
Socioeconomic Impacts and Water Planning in Texas – A Brief History (cont.)

- TAC, Title 31, Chapter 357.40 (a) RWPs shall include a quantitative description of the socioeconomic impacts of not meeting the identified water needs pursuant to §357.33(c) of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands).

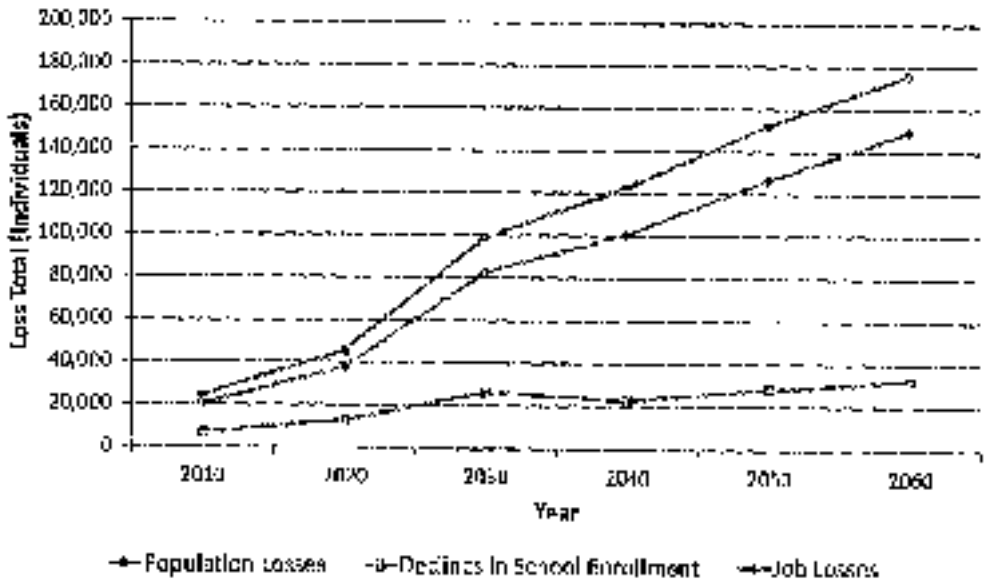
Socioeconomic Impacts Analysis

- Executed by TWDB at request of RWPGs
- Uses water supply needs from Regional Water Plan
- Point estimates of 1-year drought at 10-year intervals
- Analysis attempts to measure the impacts in the event that water user groups do not meet their identified water supply needs associated with a drought of record for one year.
- Multiple impacts examined
  - Sales, income, and tax revenue
  - Jobs
  - Population
  - School enrollment
- Results incorporated into final Regional Water Plan

Socioeconomic Impacts Analysis – 2011 Region H Water Plan



Socioeconomic Impact Analysis – 2011 Region H Water Plan



Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

- Regional Water Planning (from TWDB)
  - Generate Input-Output Models combined with Social Accounting Models (IO/SAM) and develop economic baselines. Utilizes IMPLAN (Impact for Planning Analysis) software.
    - Economic baseline developed for counties, planning regions, and the state based on variables for 528 economic sectors as follows:

Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

- output – total production of goods and services measured by gross sales revenues
- final sales – sales to end user in Texas (a region) and exports out of region
- Employment – number of full and part-time jobs required by a given industry
- Regional income – total payroll costs paid by industries, corporate income, rental income, and interest payments
- Business taxes – sales, excise, fees, licenses and other taxes paid during normal operation

Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

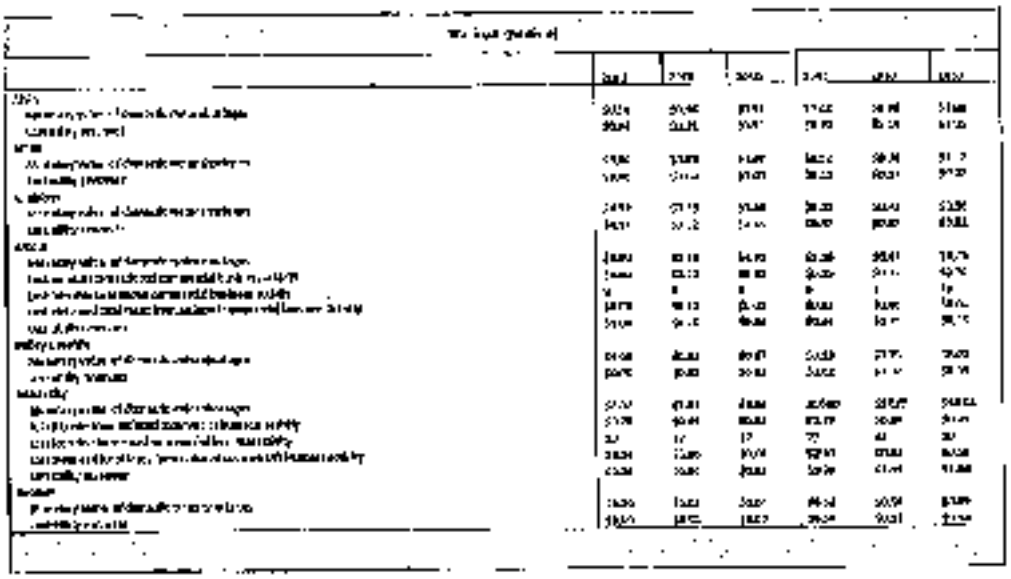
- Regional Water Planning (from TWDB - cont.)
  - Estimate direct and indirect impacts to business, industry, and agriculture
  - Impact associated with domestic water usage
- While useful for planning purposes, socioeconomic impacts developed for regional water planning do not represent a benefit-cost analysis.
- Analysis only executed for water user groups with needs for additional water supply.

Impacts by County for the Brazos G Regional Water Planning Area ($ millions)

Milam County (5millions)						
	2020	2030	2040	2050	2060	2070
Wilbarger Creek SUD						
Monetary value of domestic water shortages	$0.39	$1.16	$2.10	$12.50	$13.01	$[illegible]
Lost income from reduced economic activity	$0.01	$0.03	$0.06	$2.18	$2.23	$2.10
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	80	80	100
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.31	$0.18	$0.00
Lost utility revenues	$0.58	$1.08	$1.95	$1.07	$1.09	$2.11
Sloan-Gaylor						
Lost income due to reduced economic activity	$0.00	$[illegible]	$[illegible]	$[illegible]	$[illegible]	$[illegible]
Lost state and local business taxes & revenues due to reduced economic activity	$0.00	$[illegible]	$[illegible]	$[illegible]	$[illegible]	$[illegible]
Lost jobs due to reduced electric generation	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

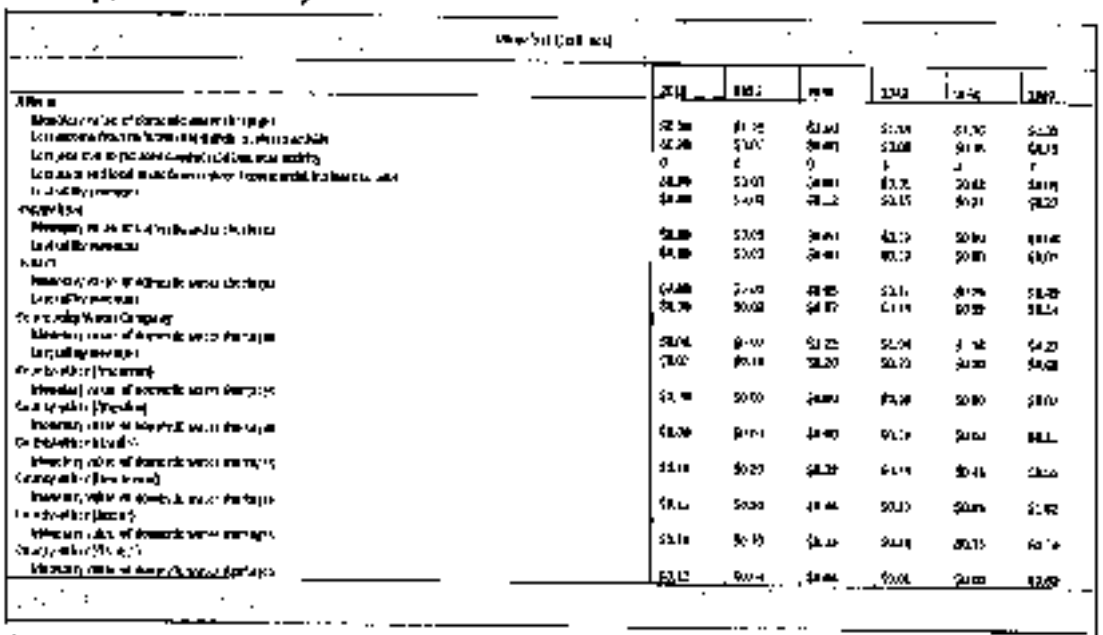
The only other county in GMA 14 within the Brazos G Regional Water Planning Area is Washington County, which did not have any water supply needs in the 2011 Brazos G Regional Water Plan. For full analysis, see TWDB correspondence to Dale Spurgin from Stuart Norvell dated May 17, 2010, titled "Socioeconomic impact analysis of not meeting water needs for the 2011 Brazos G Regional Water Plan."

Impacts on Water User Group for the Region H Water Planning Area ($ millions)



Impacts by county are not presented in the 2011 Region H Water Plan. For full analysis, see TWDB correspondence to the Honorable Mark Evans from Stuart Norvell dated May 19, 2010, titled "Socioeconomic impact analysis of not meeting water needs for the 2011 Region H Regional Water Plan."

Impacts on Water User Group for the Region I Water Planning Area ($ millions)



Impacts by county are not presented in the 2011 East Texas Regional Water Plan. For full analysis, see TWDB correspondence to Kelley Holcomb from Stuart Norvell dated June 1, 2010, titled "Socioeconomic Impact analysis of not meeting water needs for the 2011 East Texas Regional Water Plan."

Potential socioeconomic impact of proposed DFCs

During the first round of joint-planning (2005 – 2010), the TWDB adopted rules to describe what is to be considered in the petition process. With the passage of Senate Bill 660, these **rules were repealed**.

TAC § 356.45. Board Evaluation, Consideration, and Deliberation

(a) The executive administrator shall prepare a list of findings based on evidence received at the hearing and may also provide a summary, analysis, and recommendations relating to revisions to districts' plans and desired future conditions to the board.

Potential socioeconomic impact of proposed DFCs (cont. – note, these rules repealed with passage of SB 660 in 2011)

TAC § 356.45. Board Evaluation, Consideration, and Deliberation (cont.)

(b) The executive administrator or the board may, at any stage of the process described in this subchapter, terminate the proceedings on a petition when an agreement is reached resolving the petition or a petition has been withdrawn. Any such agreements shall become a part of the record.

(c) The board shall base any recommended revisions to a plan and to the desired future conditions only on evidence in the hearing record. The board shall consider the following criteria when determining whether a desired future condition is reasonable:

Potential socioeconomic impact of proposed DFCs (cont. – note, these rules repealed with passage of SB 660 in 2011)

(1) the adopted desired future conditions are physically possible and the consideration given groundwater use;

(2) the socio-economic impacts reasonably expected to occur;

(3) the environmental impacts including, but not limited to, impacts to spring flow or other interaction between groundwater and surface water;

(4) the state's policy and legislative directives;

(5) the impact on private property rights;

(6) the reasonable and prudent development of the state's groundwater resources; and

(7) any other information relevant to the specific desired future condition.

Petitions from the first round and socioeconomic impacts considered

- GMA 1
  - TWDB report dated February 10, 2010
- GMA 12
  - TWDB report dated June 13, 2012

Potential socioeconomic impact of proposed DFCs

- TWC Chapter 36.108 (d) and (d) (6) states, "the districts shall consider groundwater availability models and other data or information for the management area and shall propose for adoption desired future conditions for the relevant aquifers within the management area. Before voting on the proposed desired future conditions of the aquifers . . . the districts shall consider **socioeconomic impacts reasonably expected to occur**;"
- Proposed DFCs are quantitative descriptions at specific points in time (decadal) of groundwater resources in a management area.
- This requirement was added to the requirements of joint planning with the passage of Senate Bill 660 in 2011.

Potential socioeconomic impact of proposed DFCs

- From a qualitative perspective, both positive and negative socioeconomic impacts may potentially result from implementation of proposed DFCs.
  - Proposed DFCs may require conversion to alternative supply, which may have increased costs associated to infrastructure, operation, and maintenance.
  - Proposed DFCs may reduce/eliminate the costs of lowering pumps and either drilling or deepening of wells.
  - Proposed DFCs may reduce/eliminate the costs associated with subsidence (including legal costs assigned to parties determined to be liable).

Potential socioeconomic impact of proposed DFCs

- Positive and negative socioeconomic impacts potentially resulting from implementation of proposed DFCs:
  - Proposed DFCs may serve to sustain/enhance economic growth due to assurances provided by diversified water portfolio.
  - Alternatives to proposed DFCs may result in short-term reduction in utility rates due to reduction in cost of water management strategy implementation.
  - Alternatives to proposed DFCs may result in significant but unquantified production costs due to transition from confined to unconfined conditions in local aquifers.

Today's Considerations

- TWC Section 36.108 (d) (6) – socioeconomic impacts reasonably expected to occur
- **TWC Section 36.108 (d) (7) – impact on the interests and rights in private property**

Texas Water Code Section 36.108 (d) (7)

Consideration of the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater, as recognized under Texas Water Code Section 36.002.

Texas Water Code Section 36.108 (d) (7)

For reference, Texas Water Code Section 36.002 states:

(a) The legislature recognizes that a landowner owns the groundwater below the surface of the landowner's land as real property.

(b) The groundwater ownership and rights described by this section:

(1) entitle the landowner, including a landowner's lessees, heirs, or assigns, to drill for and produce the groundwater below the surface of real property, subject to Subsection (d), without causing waste or malicious drainage of other property or negligently causing subsidence, but does not entitle a landowner, including a landowner's lessees, heirs, or assigns, to the right to capture a specific amount of groundwater below the surface of that landowner's land; and

Texas Water Code Section 36.108 (d) (7)

For your reference, Texas Water Code Section 36.002 states (cont.):

(2) do not affect the existence of common law defenses or other defenses to liability under the rule of capture.

(c) Nothing in this code shall be construed as granting the authority to deprive or divest a landowner, including a landowner's lessees, heirs, or assigns, of the groundwater ownership and rights described by this section.

Texas Water Code 36.002

- *(d) This section does not:*
- *(1) prohibit a district from limiting or prohibiting the drilling of a well by a landowner for failure or inability to comply with minimum well spacing or tract size requirements adopted by the district;*
- *(2) affect the ability of a district to regulate groundwater production as authorized under Section 36.113, 36.116, or 36.122 or otherwise under this chapter or a special law governing a district; or*
- *(3) require that a rule adopted by a district allocate to each landowner a proportionate share of available groundwater for production from the aquifer based on the number of acres owned by the landowner.*

Texas Water Code 36.002

- *(e) This section does not affect the ability to regulate groundwater in any manner authorized under:*
- *(1) Chapter 626, Acts of the 73rd Legislature, Regular Session, 1993, for the Edwards Aquifer Authority;*
- *(2) Chapter 8801, Special District Local Laws Code, for the Harris-Galveston Subsidence District; and*
- *(3) Chapter 8834, Special District Local Laws Code, for the Fort Bend Subsidence District.*

The protection of private property rights by GCDs in GMA 14

The procedural requirements for what should be considered in reviewing the private property rights factor are not prescribed in statute nor do TWDB rules provide any additional guidance. The following list of topics are suggested for discussion:

- Existing uses within the GCD
- Projected future uses within the GCD
- Investment-backed expectations of existing users and property owners within the GCD

The protection of private property rights by GCDs in GMA 14

(Continued)

- Long-term viability of groundwater resources in area
- Availability of water to all properties and ability to allocate MAG through rules after DFC adoption
- Whether immediate cutbacks would be required in setting a particular DFC or whether cutbacks, if any, would need to occur over a certain timeframe

The protection of private property rights by GCDs in GMA 14 (Continued)

- For outcrop areas, how the outcrop depletes rapidly in dry times, and whether drought rules or triggers based on the DFC/MAG for the outcrop could be beneficial to ensure viability of the resource during dry times

- Economic consequences to existing users (i.e., cost to drop pumps, reconfigure or drill new wells upon water table dropping, etc.). Also consider the reverse—economic consequences of less water available to protect the existing users from the economic consequences relevant to existing users—reaching a balance between these two dynamics.

The protection of private property rights by GCDs in GMA 14 (Continued)

- Those GCDs with existing rules developed based on the current DFC might find it helpful to review the rules that the GCD considers relevant as we work to adopt DFCs over the next year. For example, the rules and Management Plan in place based on the current DFCs can help determine how a GCD currently impacts private property rights and whether those same interests are important as we work to adopt DFCs over the next 2 years.
- Focusing on finding a balance, as that balance is defined by each GCD, between all of these considerations

Next meeting

- TWC 36.108 (d) (8) – feasibility of achieving proposed desired future condition.
- TWC 36.108 (d) (9) – other factors
- Review and consideration of "non-relevant" aquifer documentation

Attachment "C"

GMA 14 Establishment of Desired Future Conditions ("DFCs")
Socioeconomic Impacts in the Lone Star Groundwater Conservation District

In considering the socioeconomic impacts reasonably expected to occur as a result of the DFCs, it is necessary to address the fact that the proposed DFCs may require conversion to alternative water supplies, which may have increased costs associated with infrastructure, operation, and maintenance. This impact is primarily significant for the Lone Star Groundwater Conservation District ("Lone Star" or the "District") because the District has already adopted a District Regulatory Plan that anticipates both conservation and the future partial conversion to alternative water supplies to ensure the long-term sustainability of the groundwater resources in the Gulf Coast Aquifer.

The cost of producing groundwater when groundwater levels were near the land surface historically was the cheapest source of water available to Montgomery County residents. But, Montgomery County has relied almost exclusively on Gulf Coast Aquifer groundwater for its entire history, and water levels in the aquifers have dropped substantially because of the continued population and economic growth in the county. The population of Montgomery County in 1960 was around 26,000, doubled to 50,000 by 1970, more than doubled again to 128,000 by 1980, and is approximately half a million today. Virtually all of that growth has occurred using solely Gulf Coast Aquifer groundwater resources. And we have seen drops in water levels in the aquifer of 200 to 300 feet in that time, and 300 to 400 foot declines in some areas from predevelopment conditions. And, moreover, in just 35 years from now, we are expected to have over one million people in the county.

Additionally, there are socioeconomic impacts to increased water level declines. The more levels decline, the greater the cost to produce groundwater. These costs can include energy costs to lift the groundwater to the land surface, and the cost of deepening pumps and wells to maintain well yields, or having to drill new wells. There are also the costs of land subsidence, which can result in increased flooding related to changed drainage patterns and ponding of water in big rain events. And, of course, the biggest cost associated with continued depletion of aquifer levels is if you get to the point where the primary water source for the county becomes no longer economically viable because the economic costs of the number of wells you have to drill and the operational costs of producing the water get to a point where they are no longer affordable, and the impacts that could have to economic growth in the county.

So, Lone Star's Board of Directors has tried to stay ahead of the curve in light of the District's tremendous historical and projected economic and population growth, and we know that continued economic growth depends upon having a reliable and affordable long-term water supply to support it. For that reason, Lone Star's Board of Directors has taken an approach towards making the Gulf Coast Aquifer resources in the county sustainable and reliable over the long-term. And, that sustainable approach is reflected in these DFCs.

So, the primary way that the DFCs for Montgomery County contribute in a positive way under a socioeconomic analysis is that the District is supporting economic growth and protecting the investment backed expectations of historical users, and ensuring groundwater is available

under all properties to new users, by managing the aquifer on a long-term sustainable basis and reducing or eliminating water level declines and the economic consequences of those declines.

On the other hand, managing the aquifer in this sustainable manner in light of the District's growth projections means that water users will continue to have to develop alternative water supply strategies, including surface water resources, Catahoula Aquifer resources, water reuse projects, desalination projects, and others. And there are obviously socioeconomic impacts associated with the development of those alternative water supplies, which is a reality for us and a huge concern for many in the District. But there is also a near-term and long-term socioeconomic benefit to the citizens of Montgomery County and its economy of now having this diversified water supply portfolio in the county, where there has historically been only a single source of supply.

Lone Star spent a great deal of time and effort in the last decade working on studies identifying available alternative water sources and the costs associated with them, and the District will continue to do so in the future. Lone Star has structured its regulatory plan and rules to achieve these DFCs in a way that reduces the cost of developing alternative water supplies to the extent possible. For example, the District's regulations are structured so that all of the available surface water resources in Lake Conroe can be used in the most affordable manner possible—by taking surface water the shortest distance possible from the lake into the high density areas where it can be used, and allowing continued use of groundwater by users located far away from the lake so that new infrastructure costs can be minimized. Also, because new supplies and new operational facilities, such as water treatment facilities, are implemented in large conversions rather than incrementally, the District's rules allow groundwater production averaging over the planning period to achieve the DFCs so that growth can continue to occur on groundwater until a new alternative water supply facility is brought on-line, and then over-convert, then grow on groundwater again until it is time for another facility. The DFCs and regulations are also structured to give water users plenty of lead time to secure those supplies and minimize disruption to their activities, with a full decade of advanced notice of the District's groundwater reductions and requirements for users to develop groundwater reduction plans and demonstrate incremental progress towards achieving them in order to minimize and economic disruption when the initial conversion occurs in 2016. The DFCs reflect that, in allowing the continued growth on groundwater until 2016 and the groundwater reductions after that date.

For these reasons, it seems necessary, at least for Lone Star, to give more weight and consideration to the socioeconomic impacts associated with both the conversion to alternative water supplies and with the benefits of the District's DFCs and regulatory plan on eliminating water level declines in the Gulf Coast Aquifer and providing users with a long-term sustainable and reliable supply of groundwater from the Gulf Coast Aquifer, and from the new diversified water supply portfolio that has developed in Montgomery County. Given all of those considerations, the District believes that the socioeconomic benefits of these DFCs and the regulatory plan used to achieve them outweigh the costs.

And, as the District better understands how the aquifer and its water levels respond after the District's first conversion effort in 2016, the District will continue to evaluate ways to make sure we are getting the most out of the groundwater resources in Montgomery County for near-

term and long-term needs and continue to adjust the District's DFCs and regulatory strategy to ensure that.

Attachment "D"

GMA 14 Establishment of Desired Future Conditions ("DFCs") Effects on Property Rights in the Lone Star Groundwater Conservation District

Since its creation in 2001, the Lone Star Groundwater Conservation District ("Lone Star" or the "District") has carefully considered and respected the property rights of all Montgomery County landowners when creating any rule or regulation. Because the District, its Management Plan and groundwater availability numbers, and its Rules pre-dated the creation of the DFCs concept by the legislature in 2005, the District had already determined a path for groundwater management and protection of groundwater resources prior to the first establishment of DFCs by GMA 14. The Lone Star board of directors' policy goal for groundwater management in Montgomery County was clearly established in its first management plan and in its first rules—to ensure the long-term viability of our aquifers and the long-term ability of landowners to sustainably produce groundwater in order to protect private property rights in the county and ensure continued economic growth from sustainable and reliable water supplies. That concept, sustainable long-term groundwater management, is reflected in both the current DFCs and the DFCs that are being considered for adoption for Montgomery County and the Lone Star Groundwater Conservation District.

Soon after its creation, the District conducted a series of studies that confirmed that groundwater was being pumped from the Gulf Coast Aquifer at a rate that significantly exceeded its recharge. Pumping had already begun to cause problems for many property owners in the county, with declining water levels, decreased well yields, and problems related to needing to lower pumps or drill new wells. The District's technical consultants estimated an overall effective recharge rate to the Gulf Coast Aquifer for withdrawal in Montgomery County of 64,000 acre feet per year. Pumping amounts already exceeded that recharge rate, and were impacting the groundwater levels in water wells in much of the county.

The Lone Star Board of Directors embarked upon a strategy of reducing groundwater production across the county to sustainable levels, and to identify alternative water sources, to ensure long-term viability of groundwater resources and a diversified water supply. That strategy is reflected in the District Rules, the District Management Plan, the District Regulatory Plan, and the DFCs being considered for Montgomery County.

That strategy is spelled out in great detail in Phase II(B) of the District Regulatory Plan and in the District Management Plan. But, simply stated, it strikes a careful balance of protecting the property rights of historical users to realize their investment-backed expectations while allowing all property owners in the county an opportunity to drill for and produce groundwater; it requires Large Volume Groundwater Users to reduce their production to 70 percent of 2009 levels by the year 2016 so that overall groundwater pumping from the Gulf Coast Aquifer will be reduced to long-term sustainable levels for the benefit of all property owners. The District adopted the first phase of its Regulatory Plan in 2006, giving large water users a 10-year lead time to identify and secure alternative water sources or conservation strategies before the 30 percent reduction went into effect. Subsequent phases of the Regulatory Plan made sure that those large users were making incremental progress towards achieving the

reductions, by requiring the preparation and submission of Water Resources Assessment Plans and Groundwater Reduction Plans.

The result of these strategic efforts by the Lone Star Groundwater Conservation District is that all large users currently have an approved Groundwater Reduction Plan of their choosing, which contains strategies to achieve the necessary groundwater pumping reductions in the Gulf Coast Aquifer to ensure its long-term viability for all property owners in the county. As stated earlier, another effect of the District's strategic plan is that the County's water supplies have diversified from almost 100 percent reliance on the Gulf Coast Aquifer to multiple water supply strategies including surface water, reuse, groundwater production from the Catahoula Aquifer, and others, which benefits all property owners and their rights.

The District's groundwater management strategy is an adaptive one. Once the District is able to evaluate the effects of the 2016 groundwater reduction on the various layers of the Gulf Coast Aquifer, it will be able to determine whether additional groundwater resources may be developed in the future in all or some parts of the county and to what extent. Clearly, owners of existing water wells will expect continued availability of water. Existing property owners in the county will expect to be able to use their property in a manner that meets their investment-backed expectations, regardless of whether they have their own water wells or rely on a water supplier to provide water to their properties. New property owners will have similar expectations.

The District's DFCs and the regulations designed to achieve them are designed to ensure that these expectations are met and are designed to strike that balance for property owners—reducing groundwater pumpage to an amount that will stabilize water levels for long-term economically viable pumping, protection of investments, and allowing access by new users. The District faces huge increases in population and economic growth, and knows that that will add significant demands on the water resources in the county. The District is committed to staying ahead of the curve to ensure that reliable and affordable water supplies are available throughout the county. These DFCs and the District's regulations will ensure that property owners can expect to continue to enjoy adequate water supplies, that the economic growth of Montgomery County will continue to be strong, and that the negative impacts of excessive withdrawals such as land subsidence, increased pumpage costs, and lowering water table levels and the impacts of those on property owners will be minimized.

Attachment "E"

- Existing uses within the GCD
  - Water usage is Brazoria County has varied over the past 30 years. Some of this variation has caused a reduction in demand due to shifts in irrigated agriculture and particularly rice production. In contract municipal demands have grown substantially over this time and represent the largest demand in the county. Usage estimates for the period from 2006-2010, as presented in the District's 2012 Regulatory Plan, average 45,723 acre-feet per year and peak at 52,145 acre-feet per year. Although the observed average pumpage is below the long-term average pumpage level considered in the draft DFC simulation (50,400 acre-feet per year) the peak pumpage identified exceeds this threshold.
- Projected future uses within the GCD
  - Overall water demand is expected to grow in Brazoria County over the next 50 years. In particular, the municipal sector which has the greatest reliance on groundwater, is expected to grow by 66.6 percent by 2060. Irrigation use is expected to be level over this time, but recent droughts and scarcity of water may encourage more use of groundwater in providing for irrigated agriculture in the future.
- Investment-backed expectations of existing users and property owners within the GCD
  - There are significant investments in industrial and agricultural facilities, businesses, homes, and infrastructure that may be impacted by land subsidence caused by over production of groundwater. Regulations to prevent overproduction of groundwater will prevent subsidence and protect those investments. Recent discussion involving water supply in Brazoria County facilitated through Region H, The Water For Our Future Task Force, and, most recently, the regional facility study conducted by the Brazosport Water Authority (BWA) have brought attention to the somewhat narrow margins of water supply available from the Gulf Coast Aquifer and have encouraged exploration of alternative supplies in light of this limitation. Development of future groundwater-based supplies is being conducted with open dialogue between the water supply and regulatory communities regarding the potential implications of groundwater reduction should such measures become necessary in the future.
- Long-term viability of groundwater resources in area
  - The District is engaged in a long-term process to assess, based on the best available science, the availability of groundwater that may be developed in a responsible manner in Brazoria County. Current demand projections and estimates of availability suggest a need for regulation of pumpage to acceptable limits at some point in the future to achieve the proposed DFC, but the District has not yet reached a decision on how this is to be accomplished.
- Availability of water to all properties and ability to allocate MAG through rules after DFC adoption
  - The District currently issues permits based on reasonable demand for a beneficial use without waste. Every property owner in the District may produce groundwater either through a permit or for an exempt use as long as the groundwater is put to a beneficial use without waste. Aggregate groundwater production levels do not currently exceed the MAG, but future demand will certainly exceed those levels

in the near future. The District Board will establish appropriate policies to ensure aggregate production will be limited to a level that will ensure achieving the DFC.

- Whether immediate cutbacks would be required in setting a particular DFC or whether cutbacks, if any, would need to occur over a certain timeframe
    - Although the District foresees the potential need for production limitations or reductions to be put in place, it is not prepared to do so at this time without further study into the current level of water use and the impacts of groundwater pumpage on the Gulf Coast Aquifer within Brazoria County.
- For outcrop areas, how the outcrop depletes rapidly in dry times, and whether drought rules or triggers based on the DFC/MAG for the outcrop could be beneficial to ensure viability of the resource during dry times
    - The Gulf Coast Aquifer outcrops in Brazoria County by way of surface interactions through the Chicot formation. A large portion of the water present in the formation is estimated to originate from direct recharge compared to later inflow from areas updip from Brazoria County. It is conceivable that limitations placed on pumping in this layer may provide relief from short-term impacts related to groundwater supply during drought conditions. However, the current monitoring that has been conducted for the Chicot formation within the County has not conclusively demonstrated a seasonal influence on water levels that may encourage such a policy.
- Economic consequences to existing users (i.e., cost to drop pumps, reconfigure or drill new wells upon water table dropping, etc...). Also consider the reverse—economic consequences of less water available to protect the existing users from the economic consequences relevant to existing users—reaching a balance between these two dynamics
    - The District has not yet engaged in a cost-benefit analysis of potential regulations in order to achieve the DFC versus the cost of impacts to existing users. The economic impact of subsidence, as demonstrated in Harris County and Galveston County between 1906 and 2000 (http://hgsubsidence.org/wp-content/uploads/2013/07/SubsidenceMap1906-2000.pdf), would be significant.
- Those GCDs with existing rules developed based on the current DFC might find it helpful to review the rules that the GCD considers relevant as we work to adopt DFCs over the next 2 years. For example, the rules and Management Plan in place based on the current DFCs can help determine how a GCD currently impacts private property rights and whether those same interests are important as we work to adopt DFCs over the next 2 years
    - N/A
- Focusing on finding a balance, as that balance is defined by each GCD, between all of these considerations
    - The District will continue to strive to provide a balance between the protection of current resources, protecting property from land subsidence and protecting wells currently in production. The District will also plan for future water demand balancing existing wells and those that may be developed in the future (wells drilled to develop currently unutilized groundwater resources).

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Tuesday, November 18, 2014
1:30 PM

MEETING MINUTES

A regular meeting of GMA 14 was held Tuesday, November 18, 2014, at 1:30 PM, in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 1:30 PM with a roll call of District representatives and Interlocal Agreement Participants. Districts represented included: Brazoria County GCD (Joining at 2:15 PM), Bluebonnet GCD, Lone Star GCD, Lower Trinity GCD and Southeast Texas GCD. Interlocal Agreement Participants included: The Honorable John Brieden, Washington County Judge; Robert Thompson, Fort Bend Subsidence District, and Mike Turco, Harris-Galveston Subsidence District. Also in attendance at the meeting were: Jason Afinowicz, Freese and Nichols, Inc.; Larry French and Nathan Van Dorn, Texas Water Development Board (TWDB); Bill Mullican, Mullican and Associates; and members of the public (*see Attachment "A" for a list of attendees*).

Mr. Nathan Van Dorn was introduced by Mr. Larry French as a member of the Groundwater Technical Assistance section and will be the point of contact for GMA 14.

With no registered public comment, Ms. Jones proceeded with receipt and requests of posted notices from District representatives. Ms. Jones then called for consideration of the approval of the minutes from the GMA 14 meeting on September 23, 2014. After discussion and upon a motion by Mr. Jacobs, seconded by Mr. Marin the minutes for the September 23, 2014 meeting were approved unanimously.

Ms. Jones next opened the floor to discussion and possible action regarding approval of a resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14. Ms. Jones noted that the agenda was designed under the assumption of approval of the procedures given no additional comments were received. Mr. Martin opened discussion related to Section 2.02 language of GCD Board documentation of GMA representative. Mr. Martin assumed that all of the representatives had been delegated by their respective Boards, but was unsure how, or if, that had been documented by or reported to the GMA. Ms. Shauna Fitzsimmons of Sledge Fancher PLLC was recognized to assist in answering the concerns. Ms. Fitzsimmons clarified that this was a procedural measure

carried over from other GMAs and focused on the future administrative procedures moving forward. Ms. Fitzsimmons suggested striking the language of a Board President's action to appoint the GMA representative to be reflective of the current works and composition of the GMA. Mr. Holland noted that there should be some documentation in minutes identifying representatives by GCDs, if not in the GCD minutes dating back to the inception of the GMA process. Ms. Jones commented that Lone Star GCD documents representation on the GMA to be a responsibility and duty of the position of the General Manager, not a specific person, in order to maintain efficiency and Board action in the case of a name change. To alleviate the issue raised, Mr. Martin made a motion that the Resolution be amended by striking Section 2.02 and Section 2.03 was amended to reflect the suites and the current structure of the GMA representation and documentation, as laid out by Ms. Fitzsimmons. Mr. Holland seconded the motion. With no further discussion, the motion carried unanimously.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was called to order at 1:44 PM

Ms. Jones began this portion of the meeting with a briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108(d)(3). Mr. Mullican was given the floor for a presentation (*see Attachment "B" for presentation*). He gave a refresher of where the GMA has been and where the GMA is at present and moving forward. From September 2013 to June 2014, Freese & Nichols executed two GAM Runs. The second run addressed adjustments to pumping levels and pumping locations in Brazoria County and Montgomery County. The second model simulation and the corresponding draft statements of desired future conditions were presented to the GMA at the June 2014 meeting. That simulation has been the foundation of the considerations the GMA has compared and run through the desired future conditions criteria found in 36.108 (d) (1-9). It was noted that to this point, GMA 14 District representatives have completed a preliminary consideration of the first seven criteria. With the presentation of the last criteria today, and with the action taken with the resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions, we will consider action to take draft DFCs statements from June 2014 to start the process at the next meeting to run through the full criteria

Mr. Mullican outlined his evaluation of the feasibility of achieving the DFCs under consideration. Mr. Mullican stated that to meet the requirements of this "consideration", it is very important to recognize and understand the historical perspective of the joint-planning process. When HB 1763 first passed, it was simple in directing GCDs to adopt DFCs. If someone

did not like the DFCs, they could petition the TWDB to determine if the DFC was reasonable, but there were no protocols for procedures on which to base this determination. Shortly after the legislation passed, members of the TWDB began expressing concerns at being forced to be the judge and jury on the DFCs without knowing what they were supposed to be reviewing or considering in making the determination of reasonableness. Therefore, the TWDB amended its rules related to the petition process to include a number of elements or factors that the TWDB would consider to determine reasonableness. Adopting the amended rules prior to submission of DFCs during the first round of joint planning was important to ensure that the rules would not be criticized for protecting established DFCs. One of the criteria of those rules included a question of whether the DFC was "physically possible". Physically possible and physically compatible are the two references from the rules which were factored for GMA consideration under the old rules. However, with the passage of Senate Bill 660 in 2013, the feasibility requirement is now in statute, and thus no longer is necessary to be included in TWDB rules. Therefore, the GMA will need to rely on the former TWDB rules regarding the feasibility or in other words (physically possible) as the legislative intent. The test for TWDB through the petitions received at the conclusion of the first round of joint planning was to see if the DFC could be modeled using the TWDB's official groundwater availability model (GAM) for the aquifer in question to determine if the adopted DFC was physically possible. The GAM must abide by the laws of groundwater flow to be successful. If the model is successful with the parameters placed within and reflected an outcome not contradicted or negated by real world data, the DFC was determined to be physically possible and met the test. For the most part, this test came pretty close as outlined in an example from the Panhandle (GMA 1). However, there were also examples where the test failed a DFC. With the pumping estimations provided and input into the MAGM, the model being successfully executed, and by the results in the draft statement of DFC from the June 24, 2014 meeting, Mr. Mullican concludes that the DFCs are physically possible and therefore feasible. There is an enhanced expectation from this process in the current round of joint planning. The GMA has a tremendous amount of information which has been made available for review and consideration into this step. Where there are not direct correlations to be made between the supply and demand projections, consideration might be possible. Mr. Mullican concluded his presentation reiterating the differences from the first and second rounds of joint planning considerations and asked for guidance and recommendations of different or additional ways the GMA wishes to evaluate feasibility. He gave an example of modeled groundwater historical use on county by county basis compared to estimates of modeled available groundwater (MAG). It was noted that all but two counties have MAGs in 2070 that are greater than historical use. Mr. Mullican asked for each representative participant to weigh in on the subject matter.

Mr. Martin voiced his thoughts of approval of the way the item was laid out and that the DFCs appear to be physically possible. Judge Brandon also liked the layout from the models in relation to where we are today and moving forward. Mr. Jacobs echoed the previous comments and added that the GMA seems to be in a better place than through the first round. Ms. Jones added,

appreciation for the information provided and the discussion on such topics. Mr. Holland noted the concern and lack of guidance with relation to feasibility compared to the other criteria. He believes we are in a good spot especially considering the change in model and the localized updates and we're within the bounds of the model, like it or hate it.

Ms. Jones recognized a question from the public, Mr. Bill Goodrum of Forestar Group. The question read into the record by Ms. Jones asked how the total estimated recoverable storage (TERS) would be factored into the DFC. Mr. Mullican stated that the TERS are part of the criteria which must be considered in the development of the DFCs. Mr. Goodrum stated that he was still unclear on the issue and restated the question by stating that if you look at the total amount of water in storage and you compare it to the MAG, the two don't jive. How does what you model as available compare with what is shown in storage? Mr. Mullican outlined that the GMA is tasked with achieving a balancing test between the highest practicable use and the duties to conserve and manage the groundwater resources. There is some question as to whether or not the TERS are practicable and there has been much debate thereof. The balancing test will have to be documented and defined by the GMA and has been part of the discussions leading through all of the criteria. Mr. Mike Thornhill of Thornhill Group followed up with a question of how the conversations and discussions related to TERS will be articulated in the explanatory report. Mr. Mullican stated that the meeting minutes, specifically the September 23, 2014 meeting minutes, would be used to extrapolate comments for the discussion. Mr. Thornhill asked for a general summary of what that would technically be now. Mr. Mullican again reiterated the use of minutes of the discussions, specifically with regards to private property rights, which was very substantive. With no further questions, Ms. Jones thanked Mr. Mullican for his presentation.

Ms. Jones called for a discussion of funding levels, participation, and any other aspects of the Interlocal Agreement. The GMA was reminded of discussions at the last meeting of the financing of the consulting contracts and where there was a portion of the consulting contract inadvertently left off at the time of the original pledges creating the deficit. Mr. Burkett worked to create a proposal off of the sets of financials laid out by Ms. Jones. Lone Star GCD has also incurred the legal expenses in relation to the administrative procedures development and is requesting the GMA to reimburse a portion of those costs, as requested by the Lone Star GCD Board. Ms. Jones tabled the action until the end of the meeting to allow Mr. Burkett to continue to put the numbers together for a proposal.

Ms. Jones asked for any presentations and discussions by Districts of recent activities of interest to or impacting the GMA 14 planning group. Mr. Holland noted that Bluebonnet GCD had recently updated the rules for the District at the October meeting. Ms. Jones commented that Lone Star GCD has been working on amendments to rules and regulatory plans. They have held hearings and a public workshop to address questions and provide information.

With no further discussion in terms of recent activities or interest to the GMA planning group Ms. Jones adjourned the meeting of the GMA 14 Interlocal Agreement Participants and reconvening the Joint Planning Group meeting at 2:23 PM.

Ms. Jones called for the discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14. For the record, in accordance with the previously approved administrative procedures, this DFC option was provided in writing to the Member Districts and the contracted consultant at least 14 days prior to today and reviewed by the contracted consultant at least seven (7) days prior to today. A two-thirds vote is required for passage. Ms. Jones outlined the email dated November 4, 2014 and called for discussion or comment and reiterated that this is not the final vote but to advance the draft DFCs through the procedures developed. Mr. Mullican outlined the procedures adopted to formalize what is required by the GMA to go through all formal considerations of the eight factors. This action is again to advance the draft DFCs through the procedures and at the next meeting perform the formal consideration of draft DFCs against the eight criteria. Approval of this action will require this draft to be documented and formally considered in the explanatory report. Mr. Holland asked if the vote was only on the DFCs included in the memorandum, or the full text with preamble included. Mr. Mullican noted that the action is only for the DFC; everything else will result from action moving forward. Mr. Holland commented to the wishes to flesh out documentation of the HAGM, the DFCs, and specifically to his District, the use of subsidence numbers. Mr. Mullican noted that a technical report would be included to document the development of the HAGM and that each District will receive a draft explanatory report open to feedback and recommendations. Mr. Holland asked for additional clarification regarding the process for DFC adoption. Mr. Mullican asked the Chair to allow some discussion related to the next agenda item of briefing and discussion of progress to date for GMA 14 and remaining requirements and schedule. With approval, Mr. Mullican outlined that the GMA at its next meeting could potentially approve the DFCs and begin the individual District's hearing schedule clock to receive feedback and comments from the public on the DFCs and supporting materials. It will be a very long meeting, there will be an action item on the agenda, but he does not feel there is high likelihood of that action being taken at the next meeting, possibly a month later. Mr. Holland asked if there is a rush for this action today. Due to the lack of action on the procedures at the last meeting because they were inadvertently left off the agenda, Mr. Holland voiced discomfort for acting on the procedures which were not approved or in place at the time we began disseminating the information. The resolution was adopted today and therefore the deadlines and procedures begin today. Mr. Mullican noted that there would be a necessity for another meeting if the action was not taken today. Ms. Fitzsimmons added the procedures adopted require four votes for approval and this action is very preliminary and through written request and indicates that those DFC options rise to the level of formal consideration and there is another step for action. As we are past this point, these procedures are primarily for future DFC development and to have that administrative record set. Mr. Holland voiced his appreciation for

the work and explanation and motion to ensure that having the procedures seemingly employed retroactively would not create legal or defensible issues. Ms. Fitzsimmons reiterated that it would not create any of these issues and that it is ultimately the decision of the GMA Member Districts. This action does not shut the door to any other written requests for other or future DFCs. With no further discussion, Ms. Jones entertained a motion to approve the DFC options for formal consideration by the district representatives as required by the adopted *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 3.03*. The motion was made by Mr. Burkett and seconded by Ms. Jones. The motion carried with a vote of 4-1, Mr. Holland voting nay.

Ms. Jones called for discussion of the next meeting date and briefing of progress, remaining requirements and schedule moving forward. Mr. Mullican reiterated his previous discussion of the next meeting to walk through the draft DFC options in relation to the criteria. The goal is to have the draft documents for review at the next meeting at least a few weeks prior, depending on scheduling. The next meeting date was discussed and set for Tuesday February 24, 2015, at 1:30 PM at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

Ms. Jones called back the discussion related to the funding levels, participation and other aspects of the Interlocal Agreement. Ms. Jones will work with Mr. Burkett to formulate into a spreadsheet the calculations for presentation at the next meeting.

Ms. Jones asked if there were any other questions or comments from the public. Mr. Jill Savory of Fort Bend County commented that she completely disagrees with the formation of the DFCs and believes they do not represent everything adequately. Without further discussion or comment and there being no further business, the meeting was adjourned at 2:50 PM.

PASSED, APPROVED, AND ADOPTED THIS 4th day of May, 2015

Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Thursday, May 28, 2015
9:00 AM

MEETING MINUTES

A regular meeting of GMA 14 was held Thursday, May 28, 2015, at 9:00 AM, in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 9:08 AM with a roll call of District representatives and Interlocal Agreement Participants. Districts represented included: Kent Burkett, Brazoria County GCD (joining at 9:24 AM), Zach Holland, Bluebonnet GCD, Kathy Turner Jones, Lone Star GCD, Gary Ashmore, Lower Trinity GCD and John Martin, Southeast Texas GCD. Interlocal Agreement Participants included: The Honorable John Brieden, Washington County Judge; Pudge Willcox, Chambers County; Robert Thompson, Fort Bend Subsidence District, and Mike Turco, Harris-Galveston Subsidence District. Also in attendance at the meeting were: Jason Afinowicz, Freese and Nichols, Inc.; Larry French, Texas Water Development Board (TWDB); Bill Mullican, Mullican and Associates; and members of the public (*see Attachment "A" for a list of attendees*).

Ms. Jones welcomed everyone to the meeting and recognized District Representatives, Interlocal Agreement Participants, Agency Representatives, staff, and consultants for introduction.

Mr. Ken Kramer, representing as the volunteer Water Resources Chair of the Lone Star Chapter of the Sierra Club and himself as a resident living and owning property within GMA 14, was recognized to address the group with public comment. Mr. Kramer noted he has been involved with water issues in Texas for over four decades. One of the things the Sierra Club and himself have focused on is marshalling groundwater and surface water resources to be sustained over time to provide and protect growth, values, and a strong environment. All GMAs have encountered controversial issues, but it is important to maintain focus on generations and be conservative of those resources. Mr. Kramer encouraged the GMA members to stick to their guns to make sure the decisions made allow people in the future to have the groundwater resources we currently enjoy for decades into the future. He looks forward to working with the GMA as the process continues and supports the efforts of groundwater conservation. With further public comment registered for Agenda Item #7 presentations, Ms. Jones proceeded with receipt and requests of posted notices from the group. Ms. Jones then asked for consideration of the approval of the minutes from the GMA 14 meeting on November 18, 2014. After discussion

and upon a motion by Mr. Martin, seconded by Mr. Holland the minutes for the November 18, 2014 meeting were approved unanimously.

Ms. Jones next recognized Mr. French for a presentation of information from the TWDB and discussions of items of interest to the GMA. Mr. French noted TWDB is currently reviewing the initially prepared plans (IPPs) submitted by the 16 regional water planning groups (RWPGs). The final regional water plans are due to the TWDB in January, 2016. Mr. French also stated that the TWDB is working to accelerate their process to adopt the State Water Plan in 2016. Typically the timeline for adoption is late in the year, however the TWDB is considering moving up that official adoption timeline to possibly the middle of or even earlier in 2016 to take advantage of and accelerate providing more SWIFT funding for approved projects. When the TWDB takes the action of adoption of the 2017 State Water Plan, whatever DFCs have officially been adopted by the GMA as of that date will be the DFCs required to be implemented by the RWPG in preparation of the 2021 regional water plans and 2022 State Water Plan. If the GMA wants to insure their current DFCs being worked on are implemented into the next State Water Plan, the official GMA adoption must occur prior to the TWDB adoption of the 2017 State Water Plan. For example, if TWDB adopts the State Water Plan mid-2016, GMA adoption proposals would have to occur 6-9 months prior to that adoption. Now RWPGs can have the option of using DFCs adopted subsequent to that timeline and would likely do so, but they are not required to do so. That potential schedule change was of interest and needed to be passed along for the knowledge and understanding of the GMA and concluded the item of news from TWDB.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was called to order at 9:19 AM.

Ms. Jones noted this item is placed on today's agenda to offer an opportunity for others to discuss the possibility of considering alternative DFC options in addition to those options currently under formal consideration. With that said, it is important to note to our public attending today, as required by the administrative procedures adopted by GMA 14, for a DFC option to be formally considered as a potential candidate for proposal and adoption by the District Members, the DFC option must be requested in writing and approved by the Member District Representatives for formal consideration. A district representative must request a DFC option to be approved for formal consideration by submitting, no less than 14 days before a GMA 14 joint planning meeting, a written request to each Member District and the Contracted Consultant, in this case Bill Mullican and Freese & Nichols. As Ms. Jones was about to open the

floor to the agenda item, Mr. Martin raised a point of order (*see Attachment "B" for the point of order*). Ms. Jones thanked Mr. Martin for his point of order and moved into the agenda item of receiving technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint planning process. All entities/individuals appearing before GMA 14 for this agenda item were afforded 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be documented in the GMA 14 Explanatory Report.

Mr. Mike Massey representing Lake Conroe Communities Network (LCCN) was recognized and asked to formally introduce himself and who he represents. Mr. Massey proceeded to provide comments from a handout (*see Attachment "C" for LCCN comments*).

It was brought to the attention of the Chair that there needed to be action taken on Mr. Martin's point of order. Mr. Martin made the motion to accept the point of order. Mr. Holland asked for clarification of the desired action from the point of order, and added that it was his understanding that the point of order meant that the group would hear the presentations with the understanding that any alternative desired future conditions options possibly proposed are not raised to formal consideration due to their not being included to date through the GMA 14 administrative procedures. Mr. Martin confirmed that all we are hearing is the presentations at this time. Ms. Jones added that was the intent of the agenda item. Judge Brieden seconded the motion. With no further discussion, Ms. Jones called for a vote which passed 8-1 with Mr. Holland voting against.

Ms. Jones next recognized Mr. Michael R. Thornhill, P.G. of Thornhill Group, Inc. representing Montgomery County Investor Owned Utilities (*see Attachment "D" for Thornhill presentation slides*). Mr. Thornhill began by acknowledging Mr. Martin's comments and noting that while his presentation would center on work and discussions performed in Montgomery County, they would be presenting alternative desired future conditions options for consideration to Lone Star GCD as well as the other District Members as he believes the desired future conditions should be aquifer wide. He then proceeded with his presentation.

Next, Ms. Jones recognized Ms. Susan Butler of CH2M, presenting on behalf of Mr. Bill Goodrum, with Forestar Real Estate Group. Ms. Butler presented prepared comments to the group (*see Attachment "E" for Forestar comments*). Ms. Jones added comments regarding the participation of Liberty County in the GMA as an Interlocal Participant. Liberty County was a participant in the initial planning cycle. When the efforts began to move forward with the current cycle the GMA reached out multiple times to welcome them back. Unfortunately the Commissioners Court did not feel the need to participate. Ms. Jones encouraged Forestar to communicate and try to renew the interest of the Commissioners Court as well.

Ms. Jones recognized Mr. Marty Jones of Sprouse, Shader, Smith PLLC, an attorney representing Quadvest and Stoeker Corporation. Mr. Marty Jones expanded on a brief point

made earlier by Mr. Thornhill with his presentation (*see Attachment "F" for Jones presentation slides*). He concluded his comments that property rights may be affected by the use of political subdivision lines as discernible, substantial differences in uses or aquifer conditions in establishing DFCs and a more prudent approach would be to adopt a single DFC for the aquifer on the whole to distance the GMA from legal challenges of "discernible, substantial differences" between political lines.

Ms. Jones recognized Mr. Kevin Spencer of R.W. Harden & Associates, Inc., representing the City of Conroe. Mr. Spencer focused his presentation on artesian aquifers, specifically the Jasper layer of the Gulf Coast Aquifer, and storage-based DFCs as possible alternatives (*see Attachment "G" for Spencer presentation slides and handout*). Mr. Spencer concluded his presentation by acknowledging that though their desired alternative was not being proposed or considered today, they wanted to throw out a number of 95% of the total storage remaining in 2070, stating that it would be completely achievable, easily monitored, and account for effects of all pumpage and the regional nature of the aquifer.

With no further discussion in terms of recent activities or interest to the GMA planning group Ms. Jones adjourned the meeting of the GMA 14 Interlocal Agreement Participants and reconvening the Joint Planning Group meeting at 10:23 AM.

Ms. Jones called the next agenda item of a discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for GMA 14, Section 3.04*. Ms. Jones noted that today the GMA will be taking a vote for the approval of the only DFC option currently under formal consideration by the District Members. To date, the GMA has completed its consideration of the nine criteria required by Section 36.108(d) (1-9) of the Texas Water Code prior to the adoption of proposed DFCs. Ms. Jones added that now, according to the GMA 14 administrative procedures, District Representatives need to approve the DFC option as a candidate for adoption as a proposed DFC. At the next GMA 14 meeting we will have the opportunity to vote to approve the DFC as the proposed DFC. Mr. Martin asked about a tentative date for scheduling the next GMA 14 meeting to move the process along. Mr. Martin emphasized the importance of moving the process along and not derailing too much and proposed June 24, 2015 at 9:00AM. Mr. Holland opened discussion referencing the presenters/presentations expressing their intent to work directly and primarily with Lone Star GCD to propose either DFC alternatives or amendments to the currently considered options. From his understanding of the administrative procedures, prior to the point of order action taken, the GMA had the option of taking any proposals from the presenters/presentations and amending the considered options. Part of Section 3.04 is going through each DFC and outlining the relation and consideration of the nine factors. Mr. Holland then asked for clarity, as to whether or not that is a discussion for today's meeting or for the next meeting. Mr. Mullican responded that when the group adopted the administrative procedures in November, there was some discussion of the fact that the group has already been through the

nine factors. The question then is, are we going to go all the way back through all of the discussions for this one particular potential DFC. Mr. Mullican then pointed out that is was generally agreed to at that point and time that in some form we had already had several meetings worth of discussions and considerations of the factors and there were three options on the table. With the documentations in the minutes, the GMA could ratify all of the consideration discussions to the DFC consideration. Or the GMA could come back and present an executive summary of the presentations and information presented over the last couple of years. The third option was for Mr. Afinowicz and Mr. Mullican to schedule an all-day meeting and go through them at the same level of detail that the group went through the originally. Mr. Holland asked for clarification that where the GMA is today is moving the current considerations forward to the next meeting for consideration as the adopted DFC for action and starting the 90-day public hearing process. Mr. Mullican noted that according to the *Administrative Procedures Section 3.04*, GMA 14 District Representatives would elevate the DFC to go through the considerations of the nine factors. Mr. Martin then asked if a summary of the nine considerations would be sufficient, as the considerations have already been discussed. Mr. Mullican remarked that it could be as simple as ratifying all of the discussions the group had in the past, However, Mr. Mullican also pointed out that on a couple issues, for example socioeconomic impacts, private property rights impacts, and even feasibility, there was at least an implied commitment that we would revisit to ensure the list of socioeconomic impacts, private property rights impacts, and the approach taken on the feasibility analysis was still agreeable with everyone. Mr. Mullican suggested a somewhat extended executive summary overview of exactly what we have covered up to this point. Mr. Martin inquired of the time needed for such a review. Mr. Mullican commented that between Mr. Afinowicz and himself it could be taken care of in a couple of hours. Mr. Mullican summarized that the vote today is to make the potential DFC approved in November under *Administrative Procedures Section 3.03* eligible to go through the nine considerations. Mr. Martin asked if we had actually done that at the last meeting. Mr. Mullican stated that they had not, and asked that the group recall there are four (4) votes required for DFCs. If a DFC is submitted to the GMA for consideration you first have to vote that it is official because somebody may walk in asking for artesian pressure to be restored to pre-1900 levels and you don't want to document that in the explanatory report, so it would never rise to passing the first hurdle. The second vote is to formally say this DFC is to be run through the nine considerations, but doesn't mean that you aren't going to add other DFC considerations, just that this DFC has risen to the level of considering the nine factors. Mr. Mullican then presented a draft document he believed necessary for the benefit of showing the significant events that have occurred over the past couple of years in relation of our progression of the DFC process. Ms. Jones stated that the Lone Star GCD Board has discussed their position regarding this matter and realizes there will be potential alternative DFCs presented to the Lone Star GCD for consideration, but at this time the Lone Star GCD Board feels we need to move forward but want to make it known to the public and GMA 14 that should these alternative DFCs be brought to and approved by the Lone Star GCD, GMA 14 will then need to consider the potential

alternative DFCs, realizing that would be a cost to Lone Star GCD as part of the planning. Mr. Holland questioned the process outlined in the administrative procedures for further clarity. He asked whether or not moving these DFCs forward today, then to have Lone Star GCD propose an alternative DFC to be brought back to the GMA, is it amending the DFC that is at this point or are we starting the entire administrative procedures over; will or would we have agenda items for the Section 3.02, 3.03, and 3.04 to catch the alternative up to where we are at the present. Ms. Jones noted that we have to know more specifics before we can answer that, but that we don't want to slow down the train. Mr. Holland recognized the specifics of the request will determine how they have to be handled, but questioned if we can get all of that done at one meeting or are we looking at another three meetings process to get those alternative DFCs considered. Mr. Mullican commented the administrative procedures contemplate the ability of the GMA to run more than one potential DFC through the process. So at the next meeting, for example if these DFC options are approved to move forward, we will complete the consideration process on that potential DFC. At the same time, if Lone Star GCD submits their request 14-days prior to that meeting and everything needed is included for evaluation, the GMA could at that same meeting take action to begin the process, similar to the vote today, to run the alternative DFCs through the nine considerations. Mr. Mullican then stated that the GMA could not perform those considerations at that meeting because we would have had no preparation whatsoever to begin that consideration process, so we would have to perform that at a subsequent meeting. Mr. Burkett asked if there would be additional costs. Mr. Jones noted again that if Lone Star GCD were to propose an alternative DFCs for consideration, they would bear any additional costs associated with the alternative DFCs. Mr. Holland asked if it would be better to push the June considered meeting back an additional 30 days to provide opportunity for possible alternatives to be submitted and considered since we are looking at an additional meeting for any alternative to be run through the factors. Mr. Holland then asked if an additional 60 days allow enough time to conduct everything in a single meeting. Mr. Mullican stated that the vote on the eligible DFC options and meeting date are two different actions. Mr. Holland added that the whole purpose of the next meeting is to potentially take action on the DFCs to start the 90-day hearing process. Mr. Mullican stated that action would be eligible to be taken, but it wasn't mandatory or required at that meeting, just that we would be at that step in the process. Mr. Holland redirected that if alternatives DFCs are proposed at the next meeting, we would not be able to take action on the eligible DFC because we have other alternatives that are in the process but have not completed the considerations. Mr. Mullican stated that it all depends if the GMA decides to support the eligible DFCs or the alternatives DFCs as it takes a two-thirds vote. Mr. Holland reiterated that he is trying to clarify the process and make it as easy as possible on everybody. Ms. Jones noted that comments from Mr. French of the accelerated timeline TWDB is looking at for the regional water plan mentioned earlier in the meeting is something to keep in mind. Mr. Holland noted that the regional water plan is a major driver in this process and it had been his understanding from the beginning of this round of joint planning and the reason why we are much further along in the GMA process was the attempt to get on the same timeline as the regional plan. In trying to

move forward, scheduling a June meeting where we may not be able to get anything done and then scheduling additional meeting, Mr. Holland noted his intentions to clarify and understand how to incorporate the administrative procedures and understand them in practice to best and efficiently utilize the time and efforts of everyone involved with the likelihood of alternative DFCs being proposed. Mr. Holland made the motion of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to *Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for GMA 14, Section 3.04*. Mr. Martin seconded. Mr. Jones called for a record voted. Each member voted in the affirmative.

Ms. Jones asked Mr. Mullican if there were any further briefing and discussion of progress to date for GMA 14 and remaining requirements and schedule as the item had been well discussed in relation to the previous agenda item. Mr. Mullican noted that everything had been well covered. He asked the GMA members to remember that whenever the GMA does finally adopt a proposed DFC we will get back together all of the information reviewed and used throughout the entire process of your considerations which will take a small amount of time to accumulate.

Ms. Jones asked for any presentations and discussions by Districts of recent activities of interest to or impacting the GMA 14 planning group. Ms. Jones commented that Lone Star GCD's hearings and public workshops and the work on amendments to rules and regulatory plans had been well aired through the events of the meeting.

Mr. Jones called for discussion of next meeting date, location, and agenda items. Ms. Jones asked for a note for future agenda items to have a financial item to allow for more robust discussions and noted that copies of the financials are at the seats of the members and interlocal participants. In recalling earlier discussions of possible meeting dates, Ms. Jones asked for further discussion and proposal for dates and times. Mr. Burkett followed up on a more clear answer to Mr. Holland's previous inquiries. If this body wanted to consider or progress the DFCs on the table as well as having the option of considering other alternative DFCs, in terms of times and number of meetings, how best would we accomplish those two tasks, i.e. further consideration of current DFC and leaving option open for consideration of other DFCs. Do we have a meeting in June or is it postponed to a later date to give consideration of those factors? Mr. Mullican responded that this represented two different questions. The first question is how long do we delay or allow for, if in fact Lone Star is going to hear and adopt alternative DFC consideration, Mr. Holland noted the June meeting gives two weeks to get something presented and approved through the Lone Star Board and get the 14 day requirement met. Ms. Jones added how or what would be added or play into an anticipated June agenda. Mr. Mullican stated that the Lone Star Board Meeting is June 9th, 14 day deadline is June 11th. That would mean in one meeting you would be getting a presentation and the Board would be agreeable. Ms. Jones stated that it is unlikely that timeline could be met and added that she is not suggesting we don't go with July but that we may not even be ready then. We would want the opportunity for review and ample consideration of anything presented to the District. Mr. Burkett added that right now we

only have one DFC on the table and he feels certain based on comments and presentations today that there will be alternatives proposed. Mr. Burkett noted that Lone Star GCD will take those under consideration and if recommended, the body of GMA 14 will want to take those under consideration, so therefore there are two or more meetings. Mr. Mullican stated there would be at least two meetings. If Lone Star GCD were to approve an alternative DFC in time for this round of joint planning, GMA 14 would have to have at least two meetings to resolve the considerations and would likely be looking at three meetings. Mr. Martin interjected and recognized his District's attorney Mr. John Stover. Mr. Stover stated the GMA has been working on this process for over a year and now after the ship has already sailed, Conroe wants the GMA to recall it. Mr. Stover then stated that based on the presentations today he felt there will be alternatives but he is very positive it will have impact to the drawdowns on the DFCs for every District present. His question was why accommodate the City of Conroe at this point. Mr. Stover added that, "They have been sitting around for three years, knowing what is going on here. My client has spent a lot of time and money to get where we are today and it does not matter if Lone Star GCD picks up the tab, it is just too late. When somebody is going to impact you negatively that has to be what will happen with these proposals, if they have something that will mitigate that why did they not show it today. It is not in the interest of the GMA to slow down today for Conroe who has finally looked at the picture and said they don't like this. My client wants to move forward and the GMA has the ability to modify these DFCs annually and let Lone Star and these people work on their problem, come back later in the process and modify it then". Mr. Burkett asked if there were other legal counsel present for Districts who would have anything to add to the comments from the standpoint of the GMA or individual Districts. Mr. Greg Ellis was recognized, representing Harris-Galveston Subsidence District, Fort Bend Subsidence District, Brazoria County GCD, and Lower Trinity GCD, and noted that it is up to the individual districts to present whatever DFCs it determines are relevant. He did concede that this does seem late in the process to be relooking at options. Follow the best policy for your district, there is nothing legally binding outside of 36.108 for considerations and doesn't say which DFC must be considered or not. Ms. Jones drew discussion back to setting a date that works for everyone. Mr. Martin commented he was not worried about being accommodating and proposed June 25, 2015 at 9:00AM as being about 30 days from today to allow us to move forward. Mr. Burkett recalled from earlier discussions June 24, 2015 was discussed and asked if it was an option. Mr. Turco noted that as long as it was a morning meeting it would allow him to get back for his board meeting that afternoon. Mr. Martin amended his motion to Wednesday June 24, 2015, at 9:00 AM at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303, seconded by Mr. Burkett. With Ms. Jones abstaining, the vote passed 4-0.

Ms. Jones asked if there were any other questions or comments from the public. Ms. Jill Savory, of Fort Bend County and soon to be a Montgomery County resident, commented that she completely disagrees with the DFCs and does see all the work, been to these meetings, and seen the non-questions being answered back and forth when Mr. Mullican presents things. And she

realizes there is a lot of money supporting wanting to hurry up and fund the DFC so other projects can move forward, but the problem she sees is the information in the models. She prepared an entire presentation during the Fort Bend and Harris County Groundwater hearing here recently and provided substantial evidence on how USGS groundwater resources division has neglected some of their duties and she highly recommended downloading the presentation from the website or she would be happy to provide you a copy. She thinks moving forward; having a reason to adopt a DFC would be a wise decision. She further stated that she knows the group thinks that what they are doing is helping move progress along, but if you do not have a problem to begin with she does not see the need to move forward. One of the many things she has brought to several people's attention, if your DFC is based on what the water levels are in these wells and essentially already know it is a conflict of interest of boundary laws of jurisdiction of a governmental body and urge caution in adopting DFCs. Mr. Marty Jones was recognized to clarify his point that the City of Conroe is proposing additional DFCs to Lone Star GCD, and that the intent of the City of Conroe is to present an alternative DFC at least for the Jasper Aquifer to all GCDs in the GMA. Mr. Scott Weisinger, Lone Star GCD Board Member, was recognized and wanted the GMA to know that the Lone Star GCD got a letter from Austin from the local legislative delegation that asked the District to slow things down. This isn't something that was just generated within Montgomery County, we got a letter. Mr. Weisinger stated that there is a lot going on that GMA 14 did not know and are not getting all the information. Ms. Jones added that anyone who would like a copy of that letter can contact her and it will be provided. Mr. Willcox added a comment of his feelings of strong support of public input to decision issues. It sounds like 95% of the problem is going to have to be changed in Austin. In hearing all of the presentations today, this group has followed what it is bound to in State Law. My point is, you really need to start now for the next legislative session and make visits to the committees and representatives when the whole ballgame is in their court and we are trying to do what they have said to do. If an entity does not follow what the State has outlined, the entity is disqualified from substantial assistance. Keep talking and move the discussions higher as well.

Without further discussion or comment and there being no further business, the meeting was adjourned at 11:04 AM.

PASSED, APPROVED, AND ADOPTED THIS 24 day of June

Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Wednesday, June 24, 2015
9:00 AM

MEETING MINUTES

A regular meeting of GMA 14 was held Wednesday, June 24, 2015, at 9:00 AM, in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 9:00 AM with a roll call of District Representatives and Interlocal Agreement Participants. Districts represented included: Kent Burkett, Brazoria County GCD (joining at 9:47 AM), Zach Holland, Bluebonnet GCD, Kathy Turner Jones, Lone Star GCD, Gary Ashmore, Lower Trinity GCD and John Martin, Southeast Texas GCD. Interlocal Agreement Participants included: The Honorable John Brieden, Washington County Judge; and Mike Turco, Harris-Galveston Subsidence District. Also in attendance at the meeting were: Jason Afinowicz, Freese and Nichols, Inc.; Larry French and Natalie Ballew, Texas Water Development Board (TWDB); Bill Mullican, Mullican and Associates; and members of the public (*see **Attachment "A" for a list of attendees***).

Ms. Jones welcomed everyone to the meeting and recognized Districts, Interlocal Agreement Participants, agency, staff, and consultants for introduction.

Ms. Jones proceeded with receipt and requests of posted notices from District Representatives. Ms. Jones then asked for consideration of minutes from the GMA 14 meeting on May 28, 2015. After discussion and upon a motion by Mr. Holland, seconded by Mr. Martin the minutes for the May 28, 2015 meeting were approved unanimously.

Ms. Jones next recognized Mr. French for comments from the TWDB and discussions of items of interest to the GMA. Mr. French noted the retirement of TWDB Chairman Carlos Rubenstein effective August 31, 2015. Mr. French went on to announce that Governor Abbott has named Board Member Bech Bruun as the new Chairman of the TWDB. Mr. French also mentioned four educational videos recently uploaded to the groundwater section of the TWDB website and encouraged everyone to view and utilize them.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was called to order at 9:10 AM.

Ms. Jones noted the group would conduct the posted discussion of funding levels, participation and any other aspects for the Interlocal Agreement and take possible action after Mr. Burkett joined the meeting.

Ms. Jones called for a briefing by contracted consultants regarding any desired future condition (DFC) options requested in writing by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Section 3.01 – 3.02 and recognized Mr. Mullican. Mr. Mullican noted that the GMA has not received any alternative options for consideration. Therefore, no action was taken.

Ms. Jones asked for the review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d) (1-9) and in accordance with the GMA 14 Administrative Procedures. This item prompts the further review of the statutory criteria set forth in Texas Water Code Section 36.108(d) (1-9), which is consistent with the administrative procedures adopted by the GMA. Referencing the last GMA 14 joint planning meeting, the Member Districts approved the DFC option that resulted from the second run of the HAGM as a candidate for adoption as a proposed DFC for the Gulf Coast Aquifer System. Although in previous meetings GMA 14 District Representatives and Interlocal Agreement Participants have spent a great deal of time discussing the statutory criteria required in Section 36.108(d), Sections 3.04 and 3.05 of the administrative procedures instruct the GMA to further review this information now that the DFC option is eligible to become the proposed DFC. Ms. Jones recognized Mr. Afinowicz and Mr. Mullican to lead the discussion (*see **Attachment "B" Review of Proposed DFCs & Statutory Criteria from Texas Water Code Section 36.108(d) (1-9)***). Mr. Mullican began with an outline of the discussions scheduled for the meeting (*slides 2-3*). Mr. Mullican noted each previous meeting which the statutory criteria were discussed individually for reference. In addition, he noted that after today's meeting, a specific agenda item for each of the nine factors will have taken place during at least two different meetings. Mr. Afinowicz then began a discussion focused on the groundwater availability model (GAM) update and GAM development summary (*slide 4-6*). Discussion continued with the model process and results which went into the formulation of the DFC statements (*slide 7-36*).

Mr. Afinowicz then began addressing individual criteria to be considered during the joint-planning process. First, Texas Water Code Section 36.108(d) (1) "aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another;" was discussed (*slide 37-68*). Mr. Afinowicz focused in particular on the differences in groundwater use that is recorded in the more urban counties in GMA 14 versus the much smaller levels of groundwater production that generally occurs in the more rural areas of GMA 14. The counties with the most significant levels of groundwater production in recent

history were highlighted as Harris, Ft. Bend, and Montgomery counties. Aquifer uses for recent history were presented at aquifer/county/GCD levels.

Texas Water Code Section 36.108(d) (2) "the water supply needs and water management strategies included in the state water plan;" was the next factor discussed (*slide 69-85*). Again, the demographic dynamics documented in the more urban areas of GMA 14 also recorded the greatest level of water supply needs in GMA 14. Water management strategies in the 2012 State Water Plan were discussed. It was highlighted that there are no water supply needs in the GMA 14 region for which recommended water management strategies are not sufficient to meet all projected water supply needs. Water supply needs were presented at a county level the 20 counties in GMA 14 along with county-specific recommended water management strategies.

Third, Texas Water Code Section 36.108(d)(3) "hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge;" was discussed (*slide 86-149*). A significant portion of this discussion focused on the TWDB's report of total estimated recoverable storage for all relevant aquifers on a county by county basis throughout GMA 14. In addition, water budget information quantifying recharge, discharge, and cross-formational flow was presented for all relevant aquifers on a county by county basis for GMA 14.

The next factor considered, as required by Texas Water Code Section 36.108(d) (4) "other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water;" was discussed (*slide 150-155*). It was noted that especially for the Gulf Coast Aquifer System, there is very little surface water – groundwater interaction regionally, except in outcrop areas. Furthermore, it was noted that due to the model architecture utilized in construction of the HAGM, there is no quantifiable level of interaction that can be extracted from the HAGM to provide additional information. It was noted, however, that studies just to the west of GMA 14 in the Lower Colorado watershed have documented this limited interaction in outcrop areas.

The fifth required factor, as stated in Texas Water Code, Section 36.108(d) (5) "the impact on subsidence" was discussed (slide 156-160). Mr. Afinowicz noted that the primary areas of subsidence in GMA 14 have been documented in Harris, Galveston, Ft. Bend, and Montgomery Counties. Mr. Turco stated that the PRESS model results were limited to the PRESS model sites that exist mostly within the Subsidence District. He went on to say that to this point in time, no one other than the Subsidence Districts have PRESS results. Further, the SUBS package in the HAGM was utilized for the rest of the GMA. Mr. Turco reiterated that the PRESS model results were limited to the PRESS sites that exist mostly within the Subsidence Districts (Harris, Galveston, Fort Bend counties)".

Mr. Mullican then led the GMA in a dissuasion of the next factor to be considered, as stated in Texas Water Code Section 36.108(d) (6) "socioeconomic impacts reasonably expected to occur" was discussed (*slide 161-176*). After a discussion of quantitative socioeconomic impacts of not meeting projected water supply needs based on information reported by Regions G, H, and I in the 2011 regional water plans respectively,, Mr. Mullican provided an overview of socioeconomic impacts identified and discussed during the GMA 14 meeting on September 23, 2014 The following socioeconomic impacts from the proposed DFC options were reviewed:

- Proposed DFCs may require conversion to alternative supply, which may have increased costs associated to infrastructure, operation, and maintenance.
- Proposed DFCs may reduce/eliminate the costs of lowering pumps and either drilling or deepening of wells.
- Proposed DFCs may reduce/eliminate the costs associated with subsidence (including legal costs assigned to parties determined to be liable).
- Proposed DFCs may serve to sustain/enhance economic growth due to assurances provided by diversified water portfolio.
- Alternatives to proposed DFCs may result in short-term reduction in utility rates due to reduction in cost of water management strategy implementation.
- Alternatives to proposed DFCs may result in significant but unquantified production costs due to transition from confined to unconfined conditions in local aquifers.

Mr. Mullican asked for any further discussion from individual members on this item. Mr. Turco began by adding comments on work the Subsidence District has done to evaluate the impacts of subsidence on the region. Subsidence can have detrimental impact on development and growth of the area. He noted a study utilized by the Subsidence District from 1975 by Jonathan Larson which looked at these impacts from subsidence and made conclusions of costs of several billions of dollars associated with those impacts. More recent work done by the Houston Geologic Society looking at subsidence and related faulting which report that impacts on infrastructure easily climb into the billions of dollars, something the Subsidence District takes very seriously in their analyses. Mr. Mullican asked for references to those reports for documentation (see ***Attachment "C"***). Mr. Holland noted the comprehensive list of socioeconomic impacts that has been developed summarizes and covers the vast array of positives and negatives as discussed to date. He does not believe that the DFCs are knowingly or intentionally leaning or emphasizing the negative and the goal is to balance or stay positive on this front end, acknowledging that they could change moving forward. Ms. Jones commented that Lone Star GCD is very in tune to these considerations and referenced the September 23, 2014 statement provided (see ***Attachment "D"***). Mr. Burkett also referenced and re-read his statement from the September 23, 2014 meeting (see ***Attachment "E"***). Mr. Ashmore had nothing to add to the discussion. Mr. Martin agreed that the list compiled was a good effort and emphasized that this is an ongoing process. Judge Brieden agreed with the discussions and wants to make sure that there is a balance from the outcrop to downdip areas. Mr. Mullican noted that this might be a good time to take a short

break. Ms. Jones agreed and briefly recessed the meeting at 10:25 AM before discussing the remaining factors.

Ms. Jones called the meeting back to order at 10:39 AM and returned the floor to Mr. Mullican to continue in the statutory criteria discussions. Mr. Mullican noted though there are nine factors for consideration, the ninth is "any other information relevant to the specific desired future conditions" which he has not received any additional information for consideration from GMA 14. Such request could be made at any time during the joint-planning process. The next factor considered, as stated in Texas Water Code Section 36.108(d)(7) "the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater, as recognized under Texas Water Code Section 36.002;" was then discussed (*slide 177-182*). Mr. Mullican asked for further or additional discussion from individual members on this item. Judge Brieden began by referencing the previous discussion from September 23, 2014 and had nothing further to add. Mr. Martin noted the balance behind the DFC process aimed at protecting private property rights. He added that both today's meeting and previous meetings were valuable discussions. Mr. Ashmore and Mr. Burkett did not have anything further to add. Ms. Jones read the following statement into the record:

> On September 23, 2014, the GMA 14 Member Districts and joint planning agreement participants held a public meeting to discuss the impacts on the interests and rights in private property in the development of DFCs for the relevant aquifers in GMA 14 pursuant to Section 36.108(d)(7) of the Texas Water Code. At the time of this discussion, the only DFCs on the table for consideration by the GMA were the DFCs that resulted from the HAGM Run No. 2, which are described in terms of acceptable drawdown levels for each subdivision of the Gulf Coast Aquifer, including the Chicot, Evangeline, Burkeville, and Jasper, for each county located within GMA 14.
>
> On behalf of the Lone Star Groundwater Conservation District, I, Kathy Jones, General Manager and representative for Lone Star, provided a statement at the September 23, 2014, meeting that specifically addressed, in detail, the District's continued effort to consider and respect the private property rights of all landowners in Montgomery County. In this statement I also discussed the impacts to the private property rights based on the DFCs under consideration. This statement has been memorialized in the minutes from the September 23, 2014, public meeting.
>
> To date, no other DFC option has been approved for formal consideration by the Member Districts of GMA 14. Thus, in revisiting the statutory criteria in Chapter 36 of the Water Code prior to voting on proposed DFCs, it is important to note the significant amount of work that the District has already completed in its consideration of the impacts to private property rights based on the DFCs currently before the GMA, as described in the statement I made at the GMA 14 meeting on September 23, 2014. Nonetheless, without restating everything that was said at that meeting, I would like to reiterate a couple important points on the topic of private property rights.
>
> In 2001, Lone Star GCD was created as a solution to preserve and protect the groundwater recourses in Montgomery County. More specifically, the District was

created to address the increased water costs of pumping associated with declining water levels in the Gulf Coast Aquifer as a result of the continued population and economic growth in Montgomery Groundwater. After conducting various scientific studies, the District Board ultimately made the policy decision to manage the Gulf Coast Aquifer on a sustainability basis to ensure the long-term viability of the aquifer and the long-term ability of landowners to sustainably produce groundwater in order to protect private property rights in the county. In that regard, the District designated the total amount of groundwater to be available for production and use in the District as the amount of effective annual recharge to the Gulf Coast Aquifer within Montgomery County so that, in the long-term, groundwater levels would stop declining.

This strategy is reflected in the District Rules, the District Management Plan, the District Regulatory Plan, and the DFCs currently under formal consideration for Montgomery County. Overall, the strategy strikes a careful balance of protecting the property rights of historical users to realize their investment-backed expectations while allowing all property owners, including new users, in the county an opportunity to drill for and produce groundwater. For a more detailed analysis of the District's consideration of impacts to private property rights, please reference the September 23, 2014, meeting minutes or contact the District.

Mr. Holland commented that the detailed discussion from the September 23, 2014 meeting covered and documented this topic well. He echoed Mr. Martin's comments of the DFC process being a planning process. He added that he does not feel it was ever supposed to be the regulatory framework it has unfortunately warped into. When implementation occurs and there are different impacts or not working the way they were originally laid out or envisioned, it is his responsibility to bring them back to this group and get them changed. To be reflective of the real world while dealing and planning for water on paper should be the goal. Mr. Holland noted Texas Water Code Section 36.002 as the foundation and backbone on which groundwater conservation districts are formed. Mr. Turco did not have anything additional to add.

The final factor considered, Texas Water Code Section 36.108(d) (8) "the feasibility of achieving the desired future conditions" was discussed (*slide 183-190*). Mr. Mullican reviewed feasibility analysis presented to GMA 14 on November 18, 2014. This discussion included a review of the history of DFCs from a feasibility perspective, and how this has been utilized both in the past and the present as being a determination of whether or not a proposed DFC was physically possible. It was noted that in each case where this was an issue during the first round of joint planning, a DFC was determined to be physically possible if it could be modeled using the currently adopted GAM. Another element considered with respect to the question of feasibility is whether or not the GCDs represented have sufficient regulatory authority to develop, adopt, and enforce rules necessary to achieve the DFC. Mr. Mullican then concluded that since the proposed DFCs have been successfully modeled using the HAGM, and since all five GCDs in GMA 14 and the two Subsidence Districts have sufficient authority to establish and enforce rules necessary to achieve the DFCs, then it was his determination that the proposed DFCs are feasible.

Ms. Jones then recalled the item previously skipped to discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action turning the discussion over to Mr. Burkett. Mr. Burkett noted the invoices from and payments to date for the consultants, pledges collected to date, and the general understanding of the remaining items to be completed for future invoices from the consultants. Mr. Burkett added if there is a balance at the next meeting, this body will be asked for guidance on addressing that balance at that time.

Upon a motion by Mr. Burkett, seconded by Mr. Turco, Ms. Jones adjourned the meeting of the GMA 14 Interlocal Agreement Participants and reconvening the Joint Planning Group meeting at 10:58 AM.

Ms. Jones reconvened the GMA 14 meeting and called for the discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03. With no options or amendments submitted to GMA 14 by a District Representative, there was no action to be taken.

Ms. Jones asked for discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108(d) (1-9) and in accordance with GMA 14 Administrative Procedures, Section 3.04.

Ms. Jones recognized Mr. Marty Jones to address his public comment. Mr. Marty Jones stated that the importance of the GMA and DFC process today can't be understated. Jones noted that this planning process, as stated previously by Mr. Holland, becomes regulatory when the DFCs are adopted and then implemented into the five different GCD rules, and yet there are areas with no rules or implementation because they are non-GCD areas. Mr. Marty Jones referenced his discussion at the May 28, 2015 meeting. Mr. Jones proceeded to outline a specific example related to his client, Quadvest. Quadvest has a project which straddles the Liberty-Montgomery County line. He questioned if the hydrologic conditions right on the county line were so unique or different to justify different DFCs. He further expected the explanatory report to address that specific county line as the Jasper layer, for example, runs contiguous through across county lines. He concluded he sees no justification for these DFCs and outlined this concept of geographic boundaries being used for delineating DFCs in a previous letter in relation to the Marrs case. Mr. Marty Jones further requested a copy of his letter be part of the record. To further his point, would be the example of the county in the Panhandle with the Ogallala Aquifer on the north side of the Canadian River is actually and physically separated from the Ogallala Aquifer on the south side of the Canadian River to the extent pumping on the north side cannot affect people on the south side. Mr. Jones noted there are different water districts on the north and south sides, and appropriately so, and there can be different DFCs because the pumping on one side does not affect the other. In tying the Panhandle example back to the Liberty County-Montgomery County example, people in Liberty County who have no rule or regulations on their

production can pump water from landowners in Montgomery County, who because of the adopted DFC cannot protect themselves. He concluded that would be the case on every county line a DFC has been established. Mr. Marty Jones urged the GMA to respect the TWDB guidance and the Legislative intent of 36.108, not simply come together and agree on each county boundary DFC, but adopting aquifer-wide DFCs is the only way you truly engage the process and protect private property.

Ms. Jones thanked him for his comments. Since there had been no new DFC options for formal consideration, in accordance to administrative procedures, there was no action to be considered.

Ms. Jones moved to discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108(d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05. She noted that today, according to the administrative procedures adopted by GMA 14, there was one set of DFC options that have now formally been considered according to the requirements set forth in Section 36.108 of the Texas Water Code and therefore the DFC option was now eligible for approval by the GMA as the proposed DFCs, which will then be sent to the individual districts for a 90-day comment period and public hearing. Ms. Jones asked Mr. Mullican if there was anything additional before formal discussion or action on this item. Mr. Mullican noted the information provided regarding the balancing test of the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area as documented in Texas Water Code Section 36.108(d-2). While this has been within the discussions previous, he has provided a draft document summarizing these discussions which will continue to be developed throughout development of the explanatory report. He noted that all of the information considered by GMA 14 during the development of proposed DFCs must be disseminated to each district and made available to the public. Mr. Burkett remarked that during the 90-day comment period each district must hold a public hearing. Mr. Martin clarified that there was no requirement when the hearing was held, just within the comment period. Mr. Mullican also referenced the draft timeline document which was introduced at the last meeting and would be updated and provided with the information packet when distributed to the GCDs.

Ms. Jones opened discussion by the GMA 14 members. Mr. Holland noted there may be a request for additional aquifers to be deemed non-relevant for the purposes of joint planning when individual GCDs submit their summary reports at the conclusion of the public comment period. . Ms. Jones recognized Mr. Paul Nelson to read a prepared statement into the record on behalf of Mr. Willcox representing Chambers County who was unable to attend the meeting (*see **Attachment "F" for Willcox letter***). Ms. Jones directed discussion to the proposed resolution. Mr. Mullican documented the comments and revisions made to the resolution. Mr. Turco added a statement of appreciation from the Subsidence Districts to the GMA for their work, coordination, and cooperation throughout this process. Ms. Jones then called for a motion to adopt Resolution 2015-01 for the approval of proposed desired future conditions for all relevant aquifers in GMA

14. With the motion made by Mr. Burkett, seconded by Mr. Martin, the motion passed unanimously.

Ms. Jones next asked for a briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements. Mr. Mullican was asked for a short timeline of next steps. Mr. Mullican stated the 90 day comment period begins when the information is posted and provided to the GCDs. After the close of the comment period, each GCD must compile comments received and respond to all comments in a summary report. Mr. Ashmore asked about draft timeline and if it only included to-date accomplishments or if it laid out future dates which were needed. Mr. Mullican noted that at this time the draft is only what has been done, but he would revise and document the still-to-come future meetings or action items. Mr. Mullican outlined the process moving forward for the group.

Ms. Jones asked for any presentations and discussions by Districts of recent activities of interest to or impacting the GMA 14 planning group. Ms. Jones documented correspondence received by LSGCD on behalf of GMA 14 (*see **Attachment "G", correspondence received by LSGCD***).

Mr. Jones called for discussion of next meeting date, location, and agenda items. A tentative date of Wednesday October 28, 2015, at 10:00 AM at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303, was proposed and agreed upon with the acknowledgment the date could be changed if necessary for completion of District summaries of comments received during the 90-day period.

Without further discussion or comment and there being no further business, the meeting was adjourned at 11:35 AM.

PASSED, APPROVED, AND ADOPTED THIS 28 day of October

Chairman

ATTEST:

Secretary

RESOLUTION FOR THE APPROVAL OF PROPOSED DESIRED FUTURE CONDITIONS FOR ALL AQUIFERS IN GROUNDWATER MANAGEMENT AREA 14

Whereas, pursuant to Section 35.004 of the Texas Water Code, the Texas Water Development Board ("TWDB") has designated groundwater management areas that, together, cover all major and minor aquifers in the state; and

Whereas, each groundwater management area was designated with the objective of providing the most suitable area for the management of groundwater resources; and

Whereas, through Title 31, Section 356.21 of the Texas Administrative Code, the TWDB has designated the area encompassing all of Austin, Brazoria, Chambers, Fort Bend, Galveston, Grimes, Hardin, Harris, Jasper, Jefferson, Liberty, Montgomery, Newton, Orange, Polk, San Jacinto, Tyler, Walker, Waller, and Washington counties as Groundwater Management Area No. 14 ("GMA 14"); and

Whereas, GMA 14 includes all or portions of areas subject to groundwater regulation by Bluebonnet Groundwater Conservation District (Austin, Grimes, Walker, and Waller counties), Brazoria County Groundwater Conservation District (Brazoria County), Lone Star Groundwater Conservation District (Montgomery County), Lower Trinity Groundwater Conservation District (Polk and San Jacinto counties), and Southeast Texas Groundwater Conservation District (Hardin, Jasper, Newton, and Tyler counties) (the "Member Districts"); and

Whereas, the Member Districts are authorized by Chapter 36, Texas Water Code, to engage in joint planning activities for the coordinated management of the aquifers located in GMA 14, and in that regard, shall establish desired future conditions ("DFCs") for the relevant aquifers within GMA 14; and

Whereas Fort Bend Subsidence District (Fort Bend County), Harris-Galveston Subsidence District (Galveston and Harris counties), and other stakeholders within GMA 14 from Chambers County, and Washington County also contributed to the development of DFCs for GMA 14; and

Whereas, Section 36.108 of the Texas Water Code requires the Member Districts in GMA 14 to consider groundwater availability models and other data or information for the management area and vote on a proposal for the adoption of DFCs for each relevant aquifer within GMA 14 by May 1, 2016; and

Whereas, the Member Districts within GMA 14 secured hydrogeologic and engineering consulting services to provide technical support in their efforts to establish requisite DFCs; and

Whereas, in developing the proposed DFCs for the relevant aquifers within GMA 14, the Member Districts in GMA 14 considered the nine statutory factors set forth in Section 36.108(d) of the Texas Water Code:

- aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another,
- the water supply needs and water management strategies included in the state water plan,
- hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge,
- other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water,
- the impact on subsidence,
- socioeconomic impacts reasonably expected to occur,
- the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002,
- the feasibility of achieving the desired future condition, and
- any other information relevant to the specific desired future conditions; and

Whereas, pursuant to Section 36.108(d-2), the Member Districts also considered in their development of proposed DFCs the balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area; and

Whereas, the Member Districts used this information to developed proposed DFCs for the portions of the northern segment of the Gulf Coast Aquifer that occurs within the bounds of GMA 14; and

Whereas, TWDB conducted an evaluation of the Houston Area Groundwater Model ("HAGM") and adopted it as the updated Northern Gulf Coast Groundwater Availability Model ("GAM"); and

Whereas, the Members Districts conducted a model run of the updated Northern Gulf Coast GAM for the purpose of evaluating drawdown in the Northern Gulf Coast Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-052 MAG for the Carrizo-Wilcox Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-053 MAG for the Queen City Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-054 MAG for the Sparta Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-055 MAG for the Yegua-Jackson Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-30 MAG for the Brazos River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-31 MAG for the Navasota River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-32 MAG for the San Bernard River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-33 MAG for the San Jacinto River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-34 MAG for the Trinity River Alluvium Aquifer; and

Whereas, during joint meetings noticed and conducted pursuant to Section 36.108(e) of the Texas Water Code, the Member Districts considered GAMs and other data and information relevant to the development of DFCs for GMA 14, including input and comments from stakeholders within GMA 14; and

Whereas, the Member Districts find that all notice requirements for a meeting, held this day, to take up and consider the approval of the proposed DFCs as described herein for GMA 14 have been, and are, satisfied; and

Whereas, Texas Water Code Section 36.0015(b), as amended by House Bill 200 during the 84th Texas Legislature states that "(b) In order to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions, consistent with the objectives of Section 59, Article XVI, Texas Constitution, groundwater conservation districts may be created as provided by this chapter. Groundwater conservation districts created as provided by this chapter are the state's preferred method of groundwater management in order to protect property rights, balance the conservation and development of groundwater to meet the needs of this state, and use the best available science in the conservation and development of groundwater through rules developed, adopted, and promulgated by a district in accordance with the provisions of this chapter"; and

Whereas, the Member Districts find that the proposed DFCs provided herein for establishment are each merited and necessary for the effective and prudent management of groundwater resources within GMA 14, and have otherwise been developed in accordance with, and do satisfy the obligations imposed by, Chapter 36 of the Texas Water Code and all other applicable laws of the State of Texas.

Now, therefore, be it resolved by the Member Districts of GMA 14 that the following proposed DFCs are each hereby established:

Formations of the Gulf Coast Aquifer

Austin County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 76 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Austin County should not exceed approximately 2.83 feet by the year 2070.

Brazoria County (BCGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 27 feet after 61 years.

Chambers County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 32 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 30 feet after 61 years.

Grimes County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 6 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 52 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Grimes County should not exceed approximately 0.12 feet by the year 2070.

Hardin County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 21 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 27 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 29 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 89 feet after 61 years.

Jasper County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 41 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 46 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 40 feet after 61 years.

Jefferson County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 15 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 17 feet after 61 years.

Liberty County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 27 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 29 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 25 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 120 feet after 61 years.

Montgomery County (LSGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 26 feet after 61 years.

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 34 feet after 61 years.

Newton County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 35 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 45 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 44 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 37 feet after 61 years.

Orange County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 14 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 16 feet after 61 years.

Polk County (LTGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 26 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 10 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 15 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 73 feet after 61 years.

San Jacinto County (LTGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 22 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 19 feet after 61 years.

- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 19 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 108 feet after 61 years.

Tyler County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 35 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 30 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 62 feet after 61 years.

Walker County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 9 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Walker County should not exceed approximately 0.04 feet by the year 2070.

Waller County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 40 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 101 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Waller County should not exceed approximately 4.73 feet by the year 2070.

Washington County

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 1 foot after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 16 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 48 feet after 61 years.

Formations in Fort Bend, Galveston, and Harris counties

Groundwater Management Area 14 (GMA 14) efforts to determine DFCs is primarily an aquifer water-level based approach to describe the regional and local desires for the aquifer beneath them. The GMA process requires Groundwater Conservation Districts (GCDs) to determine the DFCs for the entire GMA, regardless of whether each county is included within a GCD. The Fort Bend Subsidence District (FBSD) and the Harris-Galveston Subsidence District (HGSD), operating in Fort Bend County and Harris and Galveston counties, respectively, regulate groundwater for the purpose of ending land surface subsidence within their jurisdiction. They are not GCDs and operate considerably different from the typical GCD. Therefore, in an official context these three counties are "unrepresented" but the GCDs within GMA-14 must still determine the DFC for these counties.

Both FBSD and HGSD have participated in an unofficial role to aid the GCDs within GMA-14 with their evaluation of Fort Bend, Galveston and Harris County information. The groundwater pumpage within these three counties even though regulated is still greater than the sum of all other counties within GMA-14. FBSD and HGSD recognize that the projected groundwater pumpage from these three counties will impact the decisions of GMA-14 throughout a large portion of the area. FBSD and HGSD have provided considerable historical and projected groundwater pumpage data and details of regulations to assist GMA-14 in incorporating these counties in the overall GMA-14 DFCs. FBSD and HGSD cannot however, present DFCs for these three counties in terms of aquifer water-level changes over time. The FBSD and HGSD regulations do not specifically address water-levels nor do they designate a specific pumping limit, rather the regulations are based on limitations of groundwater as a percentage of total water demand. The percentage of groundwater to total water demand is decreased over time, as total water demand increases.

The goal of both FBSD and HGSD is to end land surface subsidence that is caused by man's pumpage of groundwater. There is a clearly established link between the over-pumpage of groundwater and land surface subsidence. The DFCs within the aquifer beneath Fort Bend, Galveston, and Harris counties has no easily defined relationship to water-levels. The DFC for FBSD and HGSD is the reduction and halting of the compaction of clay layers within the aquifer caused by the over-pumpage of groundwater. Stated more simply, the DFC for these three counties is that future land surface subsidence be avoided. That stated, HGSD and FBSD have adopted regulations, most recently in 2013, that require the reduction of

groundwater pumpage and the conversion to alternate water sources, while balancing with the realistic ability of the permittees to achieve compliance with these regulations. This effort was accomplished with the aid of computer models and information specific to the missions of FBSD and HGSD and outside of the revised Northern Gulf Coast GAM (NGCGAM) adopted by the TWDB.

Within HGSD, from central to southeastern Harris County and all of Galveston County (Regulatory Areas 1 and 2), virtually all permittees have achieved compliance with previous and current HGSD regulations. Subsidence has been halted and water-levels within the aquifer have risen dramatically in these areas. However, in northern and western areas of Harris County (Regulatory Area 3), the HGSD regulations have allowed groundwater pumpage to continue until the required reductions in 2010, 2025, and 2035. With these scheduled reductions in groundwater pumpage, subsidence will slow dramatically and even be halted with water-levels stabilizing and in later years rising.

Within FBSD, from central to northern and eastern Fort Bend County (Regulatory Area A), the regulations call for reductions of groundwater pumpage in 2014/2016, and 2025. Similar to HGSD's Regulatory Area 3, subsidence within FBSD Regulatory Area A will slow dramatically and even be halted with water-levels stabilizing and in later years rising.

In both HGSD and FBSD, because of the percentage based approach to regulations, groundwater pumpage will increase until scheduled reductions in milestone years (ex: 2010, 2014/2016, 2025, and 2035). In between milestone years, groundwater pumpage will increase with the assumed increase in total water demand from an assumed increase in population. In order to demonstrate the DFC of these three counties using water-level changes, the area of previous groundwater-to-alternative water conversions must be separated from future conversions AND each annual time step must be depicted.

The HG5D and FBSD have submitted to GMA-14 their current regulations and projected groundwater pumpage projections through the year 2070. This data has been divided into the grid cells/layers relative to the NGCGAM and utilized by the GCDs in development of their DFCs.

Groundwater pumpage within GMA-14 from Fort Bend, Galveston, and Harris counties is regulated by FBSD and HGSD, non GCD governmental agencies (the only GMA in Texas with this occurrence) and the missions of HGSD and FBSD are vastly different from GCDs and do not fit well with a water-level designed DFC process). The groundwater pumpage projections developed in recognition of the HGSD and FBSD regulatory plans have been utilized without adjustment by GMA14 in the DFC process. Therefore, the DFCs adopted by GMA-14 are consistent with the HGSD and FBSD regulatory plans.

Carrizo Sand Aquifer

Grimes County (BGCD)

- From estimated 2010 conditions, the average drawdown of the Carrizo Sand Aquifer should not exceed approximately 52.8 feet average draw down across the area of occurrence of the aquifer.

Walker County (BGCD)

- From estimated 2010 conditions, the average drawdown of the Carrizo Sand Aquifer should not exceed approximately 45.7 feet average draw down across the area of occurrence of the aquifer.

Queen City Aquifer

Grimes County (BGCD)

- From estimated 2010 conditions, the average drawdown of the Queen City Aquifer should not exceed approximately 16.8 feet average draw down across the area of occurrence of the aquifer.

Walker County (BGCD)

- From estimated 2010 conditions, the average drawdown of the Queen City Aquifer should not exceed approximately 21.0 feet average draw down across the area of occurrence of the aquifer.

Sparta Aquifer

Grimes County (BGCD)

- From estimated 2010 conditions, the average drawdown of the Sparta Aquifer should not exceed approximately 14 feet average draw down across the area of occurrence of the aquifer.

Walker County (BGCD)

- From estimated 2010 conditions, the average drawdown of the Sparta Aquifer should not exceed approximately 19.5 feet average draw down across the area of occurrence of the aquifer.

Yegua-Jackson Aquifer

Grimes County (BGCD)

- From estimated 2010 conditions, the average drawdown of the unconfined portion of the Yegua should not exceed approximately 10 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the confined portion of the Yegua should not exceed approximately 15 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the brackish confined portion of the Yegua should not exceed approximately 20 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the unconfined portion of the Jackson should not exceed approximately 10 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the confined portion of the Jackson should not exceed approximately 15 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the brackish confined portion of the Jackson should not exceed approximately 20 feet average draw down across the area of occurrence of the aquifer.

Jasper County (STGCD)

- The portion of the Yegua-Jackson occurring in Jasper County is declared non-relevant.

Newton County (STGCD)

- The portion of the Yegua-Jackson occurring in Newton County is declared non-relevant.

Polk County (LTGCD)

- The portion of the Yegua-Jackson occurring in Polk County is declared non-relevant.

Tyler County (STGCD)

- The portion of the Yegua-Jackson occurring in Tyler County is declared non-relevant.

Walker County (BGCD)

- From estimated 2010 conditions, the average drawdown of the unconfined portion of the Yegua should not exceed approximately 10 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the confined portion of the Yegua should not exceed approximately 15 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the brackish confined portion of the Yegua should not exceed approximately 20 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the unconfined portion of the Jackson should not exceed approximately 10 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the confined portion of the Jackson should not exceed approximately 15 feet average draw down across the area of occurrence of the aquifer.

- From estimated 2010 conditions, the average drawdown of the brackish confined portion of the Jackson should not exceed approximately 20 feet average draw down across the area of occurrence of the aquifer.

Woshington County

- From estimated 2010 conditions, no additional drawdown of the Yegua Jackson across the area of occurrence of the aquifer.

River Alluvium Aquifers

Austin County (BGCD)

- The portion of the Brazos River Alluvium occurring in Austin County is declared non-relevant.

- The portion of the San Bernard River Alluvium occurring in Austin County is declared non-relevant.

Grimes County (BGCD)

- The portion of the Brazos River Alluvium occurring in Grimes County is declared non-relevant.
- The portion of the Navasota River Alluvium occurring in Grimes County is declared non-relevant.

Walker County (BGCD)

- The portion of the San Jacinto River Alluvium occurring in Walker County is declared non-relevant.
- The portion of the Trinity River Alluvium occurring in Walker County is declared non-relevant.

Waller County (BGCD)

- The portion of the Brazos River Alluvium occurring in Walker County is declared non-relevant.

Washington County

- The portion of the Brazos River Alluvium occurring in Washington County is declared non-relevant.

And it is so ordered and passed this XX day of XXX, 2015.

Signed _____ Sign Here

Mr. Zach Holland Bluebonnet Groundwater Conservation District

Signed _____ Sign Here

Mr. Kent Burkett Brazoria County Groundwater Conservation District

Signed _____ Sig Here

Mr. Kathy Jones Lone Star Groundwater Conservation District

Signed _____ Sig Here

Mr. Gary Ashcraft Lower Trinity Groundwater Conservation District

Signed _____ Sign Here

Mr. John Martin Southeast Texas Groundwater Conservation District

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Wednesday, October 28, 2015
10:00 AM

MEETING MINUTES

A regular meeting of GMA 14 was held Wednesday, October 28, 2015, at 10:00 AM, in the board room of the Lone Star Groundwater Conservation District located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones (Lone Star GCD) at 10:02 AM with a roll call of District representatives and Interlocal Agreement Participants. Districts represented included: Kent Burkett, Brazoria County GCD, Zach Holland, Bluebonnet GCD, Kathy Turner Jones, Lone Star GCD, Gary Ashmore, Lower Trinity GCD and John Martin, Southeast Texas GCD. Interlocal Agreement Participants included: The Honorable John Brieden, Washington County Judge; Robert Thompson, Fort Bend Subsidence District; and Mike Turco, Harris-Galveston Subsidence District. Also in attendance at the meeting were: Jason Afinowicz, Freese and Nichols, Inc.; Natalie Ballew, GMA 14 Liaison with Texas Water Development Board (TWDB); Bill Mullican, Mullican and Associates; and members of the public (*see **Attachment "A" for a list of attendees***).

Ms. Jones welcomed everyone to the meeting and recognized District, Interlocal Agreement Participants, Agency, staff, and consultants for introduction.

Ms. Jones called for and opened the floor to public comment. Mr. Marty Jones filled out a card and wished to reserve his comments for the agenda item where Bluebonnet GCD's revisions would be discussed.

Ms. Jones proceeded with receipt and requests of posted notices from the group. Ms. Jones then asked for consideration of the approval of the minutes from the GMA 14 meeting on June 24, 2015. After discussion and upon a motion by Mr. Burkett, seconded by Mr. Martin the minutes for the June 24, 2015 meeting were approved unanimously.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was called to order at 10:06 AM.

Ms. Jones next recognized Ms. Ballew for a presentation of information from the TWDB and discussions of items of interest to the GMA. Ms. Ballew noted the two stakeholder comment opportunities are currently in progress at the TWDB stemming from recent legislation. Ms. Ballew also noted that each district should have received exempt use estimates for their district. The TWDB has also rolled out a new groundwater viewer, *Water Data Interactive*, now available through their website. Finally, Ms. Ballew noted the availability of a new submitted driller's report database.

Ms. Jones called for the discussion of funding levels, participation and any other aspects for the Interlocal Agreement Participants and take possible action. Ms. Jones gave the floor to Mr. Burkett who reviewed and outlined the financials provided.

Ms. Jones called for the presentation and discussion of summary reports submitted by each groundwater conservation district (District) in GMA 14 and any Districts' suggested revisions to the proposed desired future conditions, as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested. Ms. Jones noted at the last joint planning meeting the member District Representatives voted to approve the proposed DFCs, and those proposed DFCs were subsequently distributed to the individual Districts in the management area. A period of not less than 90 days was provided to allow for public comments on the proposed DFCs, and during this comment period each District held a public hearing on the proposed DFCs. After the public hearing, each District was required to compile for consideration at today's meeting a summary report of the relevant comments received, any suggested revisions to the proposed DFCs, and the basis for the revisions pursuant to Texas Water Code Section 36.108 (d-2). Ms. Jones noted each District representative would be called on to present their District's summary report and any alternative DFCs or revisions that their board had requested. Ms. Jones stated that the agenda was not set up to allow public comment on the summary reports, however, Mr. Marty Jones was recognized to provide his previously reserved comments. Mr. Marty Jones noted the proposed changes tendered by Blueshornet GCD. He was observing how such proposals would be handled through the process, specifically if a comment period would be provided.

Mr. Martin, General Manager for the Southeast Texas GCD, provided the District's summary report with proposed language changes approved by the board (*see Attachment "B" for SETGCD Summary Report*).

Mr. Ashmore, General Manager for the Lower Trinity GCD called on Mr. Greg Ellis, District's counsel, to provide the District's summary report. Mr. Ellis provided the District's statement

with proposed non-substantive language changes approved by the board regarding the articulation of the DFCs to the resolution (*see **Attachment "C" for LTGCD Summary Report***).

Mr. Burkett, General Manager for the Brazoria County GCD, also called on Mr. Greg Ellis, District's counsel, to provide the District's summary report. Mr. Ellis provided the District's statement with proposed non-substantive language changes approved by the board regarding the articulation of the DFCs to the resolution (*see **Attachment "D" for BCGCD Summary Report***).

Mr. Holland, General Manager of the Bluebonnet GCD next provided the District's statement with proposed non-substantive language changes approved by the board (*see **Attachment "E" for BGCD Summary Report***). Proposed changes to the resolution were to the articulation of the DFCs and specific notation and citing of the model run utilized by the GMA. Mr. Holland noted the requirement for a draft explanatory report to be compiled prior to formal approval of the DFCs.

Ms. Jones, General Manager of Lone Star GCD then called on Mr. Mullican to provide the District's summary report and any alternative DFCs or revisions that their board had requested. Mr. Mullican provided the District's statement approved by the board (*see **Attachment "F" for LSGCD Summary Report***).

Ms. Jones called for a discussion and consideration of any additional or supplemental information or criteria relative to the proposed DFCs for inclusion in the explanatory report. Following the presentation and review of all member Districts' summary reports and suggested revisions, Ms. Jones asked if there was any additional information that would be requested to be placed into consideration based on the comments received. Mr. Martin, Mr. Ashmore, and Mr. Burkett noted nothing further for addition from their Districts. Mr. Holland reiterated the non-substantive language addition of aquifer-wide DFC articulation to the existing resolution, the reference and citation of the specific model run, and the importance of a draft explanatory report prior to final adoption of the DFCs. Ms. Jones noted nothing further for addition from LSGCD.

Ms. Jones adjourned the meeting of the GMA 14 Interlocal Agreement Participants and reconvening the Joint Planning Group meeting at 10:43 AM.

Ms. Jones reconvened the GMA 14 meeting and called for the discussion, consideration, and possible action of suggested revisions to proposed DFCs or alternate DFCs included in the submittal summary reports. Ms. Jones recognized Mr. Mullican for additional comments. Mr. Mullican went through a redline version of the resolution to highlight the requested changes previously discussed in the summary reports by the District members. Mr. Mullican noted in response to Bluebonnet GCD request for a model write up that Freese and Nichols, Inc. had completed that in a June 2014 memo which will be included in the explanatory report. Mr. Mullican noted this reference to the redline version of the resolution. The aquifer-wide DFC articulation language from Brazoria County GCD and Lower Trinity GCD, with Bluebonnet GCD revisions, was noted as a non-substantive change. Mr. Mullican referenced material from

GAM Rule 10-023 documenting similar statistical presentation of aquifer-wide with county-by-county language from the previous DFC planning cycle. Mr. Mullican noted Bluebonnet GCD revisions to the designation of Carrizo Sand, Sparta, Queen City, and Yegua-Jackson Aquifers in Grimes and Walker Counties as not relevant for the purposes of joint planning.

Ms. Jones called for a discussion, consideration, possible action of final adoption of DFCs and timing and development of the explanatory report. Ms. Jones recognized Mr. Mullican to begin discussions. Mr. Mullican gave his interpretation of statute regarding the explanatory report. Based on nature of the project, the explanatory report cannot be compiled until the DFC statements have more finality to pull all the pieces of the explanatory report together. Mr. Mullican noted the cornerstone to the explanatory report is the balancing test document which had been distributed prior to 90-day comment period. Assuming some finality to the DFC statement, Mr. Mullican proposed his intent to produce a draft explanatory report in 30 days, have a couple weeks for comments, and come back with comment document to accompany the draft for the group's benefit to see what revisions were made and why others were not made by consultants. The group would then be able to finalize the DFCs and the submission of the explanatory report. Mr. Mullican noted there were no statutory timelines regarding the explanatory report, though there are in TWDB rules as noted by Mr. Holland. Mr. Burkett made a motion to approve the statement of the DFCs as set forth in the resolution as amended October 28, 2015 for purposes of drafting the explanatory report. No additional comments shall be considered or revisions made to the statement of the DFCs. Once the draft explanatory report is complete, the GMA shall consider the information in the draft report and take action to formally adopt the statement of the DFCs. The motion was seconded by Mr. Martin. Upon further discussion and clarity of the motion by the group, Ms. Jones called for a roll call vote by the member Districts. Each member District, Mr. Burkett, Brazoria County GCD, Mr. Holland, Bluebonnet GCD, Ms. Jones, Lone Star GCD, Mr. Ashmore, Lower Trinity GCD and Mr. Martin, Southeast Texas GCD voted in favor of the motion.

Ms. Jones next asked for a briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements. Mr. Mullican was asked for a short timeline of next steps. Mr. Mullican stated he would begin pulling together the draft explanatory report of the administrative record established, comments received, and GMA input. Mr. Mullican indicated early January should be a target for wrapping up.

Ms. Jones asked for any presentations and discussions by Districts of recent activities of interest to or impacting the GMA 14 planning group. Ms. Jones noted the lawsuit filed against LSGCD.

Mr. Jones called for discussion of next meeting date, location, and agenda items. With the next meeting contingent on completion and comment on the draft explanatory report, Mr. Mullican recommended an early January date to be held at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303. Noted in discussion was the timing of holidays and the possibility of District board action needed, a poll

for available January or February meeting dates would be sent to the group. No tentative date was set.

Without further discussion or comment and there being no further business, the meeting was adjourned at 11:24 AM.

PASSED, APPROVED, AND ADOPTED THIS 19 day of April, 2016

Chairman

ATTEST:

Secretary

UPPER GULF COAST AQUIFER PLANNING AREA
(GMA 14)

Joint Planning Group Meeting

Friday, April 29, 2016
9:00 AM

MEETING MINUTES

A regular meeting of Groundwater Management Area 14 (GMA 14) was held Friday, April 29, 2016, at 9:00 a.m., in the board room of the Lone Star Groundwater Conservation District (Lone Star GCD) located at 655 Conroe Park North Drive, Conroe, Texas.

The meeting was called to order by Kathy Turner Jones, Lone Star GCD) at 9:03 a.m. with a roll call of District Representatives and Interlocal Agreement Participants. Districts represented included: Kent Burkett, Brazoria County GCD; Zach Holland, Bluebonnet GCD; Kathy Turner Jones, Lone Star GCD; Gary Ashmore, Lower Trinity GCD; and John Martin, Southeast Texas GCD. Interlocal Agreement Participants included: The Honorable John Brieden, Washington County Judge (who arrived at 9:12 a.m.); Pudge Willcox, Chambers County; Robert Thompson, Fort Bend Subsidence District; and Mike Turco, Harris-Galveston Subsidence District. Also in attendance at the meeting were: Jason Afinowicz, Freese and Nichols, Inc.; Larry French, Texas Water Development Board (TWDB); Bill Mullican, Mullican and Associates; and members of the public (*see Attachment "A" for a list of attendees*).

Ms. Jones recognized the TWDB's Larry French, Division Director for the Groundwater Resources Division, for being in attendance. She then welcomed everyone to the meeting, asking District Representatives, Interlocal Agreement Participants, Agency Representatives, staff, and consultants for introduction.

Ms. Jones opened the meeting for public comment. No one sought to provide public comment.

Ms. Jones proceeded with receipt and requests of posted notices from the group.

Ms. Jones then asked for consideration of the approval of the minutes from the GMA 14 meeting held on October 28, 2015. A motion to approve the minutes was made by Kent Burkett and seconded by John Martin. The motion carried unanimously.

Meeting convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.

Led by a presentation by Mr. Burkett, the GMA 14 Joint Planning Interlocal Agreement Participants discussed possible action regarding amendments to Work Order No. 3 for joint-

planning activities as established during current round of joint planning as well as amendments to the budget for GMA 14 Interlocal Agreement participants that may be necessary or required. Mr. Burkett reviewed a one-page summary of GMA 14 financials. Furthermore, if accepted, Mr. Burkett stated that Mr. Mullican's services, specific to Work Order No. 3, would no longer be required and Mr. Afinowicz's services, specific to Work Order No. 3, would only be minimally required going forward. Judge Brieden asked for additional clarification. Mr. Afinowicz explained that, hypothetically, and with no major changes, he did not anticipate any additional cost. Mr. Martin suggested the representatives approve the item and revaluate going forward. A motion to approve the budget amendments as presented by Mr. Burkett for Mullican and Associates and Freese and Nichols, Inc. was made by Michael Turco, and the motion was seconded by Kent Burkett. The motion carried unanimously.

The GMA 14 Joint Planning Interlocal Agreement Participants meeting was adjourned at 9:20 a.m.

Meeting reconvened as a meeting of the GMA 14 District Representatives only.

The GMA 14 District Representatives discussed possible action to adopt the Desired Future Conditions for the relevant aquifers in GMA 14 by resolution as required by Section 36.108(d-3) of the Texas Water Code. Mr. Mullican explained that, compared to the October 28, 2015 resolution, the current resolution under consideration is nearly identical. The only minor exception, he explained, being that the Yegua-Jackson Aquifer in Washington County was added to the list of non-relevant aquifers in the resolution. A motion to adopt the Resolution for the Approval of the Desired Future Conditions for all Aquifers in Groundwater Management Area 14 was made by Kent Burkett, and the motion was seconded by Gary Ashmore. Zach Holland abstained. The motion carried by a two-thirds vote of approval by the District Representatives as required by Section 36.108(d-3) of the Texas Water Code.

The GMA 14 District Representatives discussed possible action authorizing the GMA 14 Chair and the contracted consultant, on behalf of the GMA 14 District Representatives, to submit the explanatory report and all other required documentation regarding submission of adopted Desired Future Conditions to the Texas Water Development Board and authorizing the GMA 14 Chair to make any minor, technical, or grammatical changes consistent with the DFCs adopted prior to submission. Mr. Mullican explained that there are four minor items remaining before the report may be officially completed: filling in appropriate dates throughout explanatory report; accepting all revisions that have been made since the April 3rd draft of the explanatory report; populating Appendix A, regarding TWDB's checklist; and affixing Jason Afinowicz's professional engineer seal to the report and affixing Bill Mullican's professional geoscientist seal. Before voting on a motion, Mr. Martin expressed his gratitude to the many who had been involved and their collaborative efforts in preparing the final version of the explanatory report. Ms. Jones echoed his sentiment, adding that it has become a great product. Also before voting on a motion, Mr. Holland, to Mr. Mullican, asked why the explanatory report had not already

been finalized to a state where it could be submitted by 5 p.m. the same day, April 29, 2016. Mr. Mullican explained that neither he nor Mr. Afinowicz had their official seals with them. Moreover, Mr. Mullican emphasized that, regarding Appendix A, he did not want to rush any potential changes within an hour's time. He projected the report would be ready next week.

A motion to authorize the GMA 14 Chair to work with the contracted consultant to make the final edits to the Explanatory Report as discussed at the meeting and submit the report to the TWDB as required by Section 36.108(d-3) of the Texas Water Code was made by John Martin, and the motion was seconded by Kent Burkett. Zach Holland abstained. The motion carried.

Without further discussion or comment and there being no further business, the meeting was adjourned at 9:32 a.m.

PASSED, APPROVED, AND ADOPTED THIS 29 day of April, 2016

Chairman

ATTEST:

Secretary

RESOLUTION FOR THE APPROVAL OF DESIRED FUTURE CONDITIONS FOR ALL AQUIFERS IN GROUNDWATER MANAGEMENT AREA 14

Whereas, pursuant to Section 35.004 of the Texas Water Code, the Texas Water Development Board ("TWDB") has designated groundwater management areas that, together, cover all major and minor aquifers in the state; and

Whereas, each groundwater management area was designated with the objective of providing the most suitable area for the management of groundwater resources; and

Whereas, through Title 31, Section 356.21 of the Texas Administrative Code, the TWDB has designated the area encompassing all of Austin, Brazoria, Chambers, Fort Bend, Galveston, Grimes, Hardin, Harris, Jasper, Jefferson, Liberty, Montgomery, Newton, Orange, Polk, San Jacinto, Tyler, Walker, Waller, and Washington counties as Groundwater Management Area No. 14 ("GMA 14"); and

Whereas, GMA 14 includes all or portions of areas subject to groundwater regulation by Bluebonnet Groundwater Conservation District (Austin, Grimes, Walker, and Waller counties), Brazoria County Groundwater Conservation District (Brazoria County), Lone Star Groundwater Conservation District (Montgomery County), Lower Trinity Groundwater Conservation District (Polk and San Jacinto counties), and Southeast Texas Groundwater Conservation District (Hardin, Jasper, Newton, and Tyler counties) (the "Member Districts"); and

Whereas, the Member Districts are authorized by Chapter 36, Texas Water Code, to engage in joint planning activities for the coordinated management of the aquifers located in GMA 14, and in that regard, shall establish desired future conditions ("DFCs") for the relevant aquifers within GMA 14; and

Whereas Fort Bend Subsidence District (Fort Bend County), Harris-Galveston Subsidence District (Galveston and Harris counties), and other stakeholders within GMA 14 from Chambers County, and Washington County also contributed to the development of DFCs for GMA 14; and

Whereas, Section 36.108 of the Texas Water Code requires the Member Districts in GMA 14 to consider groundwater availability models and other data or information for the management area and vote on a proposal for the adoption of DFCs for each relevant aquifer within GMA 14 by May 1, 2016; and

Whereas, the Member Districts within GMA 14 secured hydrogeologic and engineering consulting services to provide technical support in their efforts to establish requisite DFCs; and

Whereas, in developing the proposed DFCs for the relevant aquifers within GMA 14, the Member Districts in GMA 14 considered the nine statutory factors set forth in Section 36.108(d) of the Texas Water Code:

- aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another,
- the water supply needs and water management strategies included in the state water plan,
- hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge,
- other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water,
- the impact on subsidence,
- socioeconomic impacts reasonably expected to occur,
- the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002,
- the feasibility of achieving the desired future condition, and
- any other information relevant to the specific desired future conditions; and

Whereas, pursuant to Section 36.108(d-2), the Member Districts also considered in their development of proposed DFCs the balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area; and

Whereas, the Member Districts used this information to developed proposed DFCs for the portions of the northern segment of the Gulf Coast Aquifer that occurs within the bounds of GMA 14; and

Whereas, TWDB conducted an evaluation of the Houston Area Groundwater Model ("HAGM") and adopted it as the updated Northern Gulf Coast Groundwater Availability Model ("GAM"); and

Whereas, the Members Districts conducted a model run of the updated Northern Gulf Coast GAM specifically identified as GAM Run 2 for the purpose of evaluating drawdown in the Northern Gulf Coast Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-052 MAG for the Carrizo-Wilcox Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-053 MAG for the Queen City Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-054 MAG for the Sparta Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-055 MAG for the Yegua-Jackson Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-30 MAG for the Brazos River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-31 MAG for the Navasota River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-32 MAG for the San Bernard River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-33 MAG for the San Jacinto River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-34 MAG for the Trinity River Alluvium Aquifer; and

Whereas, during joint meetings noticed and conducted pursuant to Section 36.108(e) of the Texas Water Code, the Member Districts considered GAMs and other data and information relevant to the development of DFCs for GMA 14, including input and comments from stakeholders within GMA 14; and

Whereas, the Member Districts find that all notice requirements for a meeting, held this day, to take up and consider the approval of the proposed DFCs as described herein for GMA 14 have been, and are, satisfied; and

Whereas, Texas Water Code Section 36.0015(b), as amended by House Bill 200 during the 84th Texas Legislature states that "(b) In order to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions, consistent with the objectives of Section 59, Article XVI, Texas Constitution, groundwater conservation districts may be created as provided by this chapter. Groundwater conservation districts created as provided by this chapter are the state's preferred method of groundwater management in order to protect property rights, balance the conservation and development of groundwater to meet the needs of this state, and use the best available science in the conservation and development of groundwater through rules developed, adopted, and promulgated by a district in accordance with the provisions of this chapter"; and

Whereas, the Member Districts find that the proposed DFCs provided herein for establishment are each merited and necessary for the effective and prudent management of groundwater resources within GMA 14, and have otherwise been developed in accordance with, and do satisfy the obligations imposed by, Chapter 36 of the Texas Water Code and all other applicable laws of the State of Texas.

Now, therefore, be it resolved by the Member Districts of GMA 14 that the following DFCs are each hereby established:

Formations of the Gulf Coast Aquifer

DFCs for the Gulf Coast Aquifer are hereby adopted, as documented by and incorporating herein GAM Run 2, at two scales, which do not differ substantively in their application; the first being for GMA 14 in its entirety, and also, to better facilitate the management and conservation of groundwater resources at the individual groundwater conservation district level after considering the statutory criteria set forth under Section 36.108(d), Water Code, on a county-by-county basis. DFCs for GMA 14 for the Gulf Coast Aquifer are as follows:

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 28.3 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 23.6 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 18.5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 66.2 feet after 61 years.

Austin County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 76 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Austin County should not exceed approximately 2.83 feet by the year 2070.

Brazoria County (BCGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 27 feet after 61 years.

Chambers County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 32 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 30 feet after 61 years.

Grimes County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 6 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 52 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Grimes County should not exceed approximately 0.12 feet by the year 2070.

Hardin County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 21 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 27 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 29 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 89 feet after 61 years.

Jasper County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 41 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 46 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 40 feet after 61 years.

Jefferson County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 15 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 17 feet after 61 years.

Liberty County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 27 feet after 61 years.

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 29 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 25 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 120 feet after 61 years.

Montgomery County (LSGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 26 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 34 feet after 61 years.

Newton County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 35 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 45 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 44 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 37 feet after 61 years.

Orange County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 14 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 16 feet after 61 years.

Polk County (LTGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 26 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 10 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 15 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 73 feet after 61 years.

San Jacinto County (LTGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 22 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 19 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 19 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 108 feet after 61 years.

Tyler County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 35 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 30 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 62 feet after 61 years.

Walker County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 9 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Walker County should not exceed approximately 0.04 feet by the year 2070.

Waller County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 40 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 101 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Waller County should not exceed approximately 4.73 feet by the year 2070.

Washington County

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 1 foot after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 16 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 48 feet after 61 years.

Formations in Fort Bend, Galveston, and Harris counties

Groundwater Management Area 14 (GMA 14) efforts to determine DFCs is primarily an aquifer water-level based approach to describe the regional and local desires for the aquifer beneath them. The GMA process requires Groundwater Conservation Districts (GCDs) to determine the DFCs for the entire GMA, regardless of whether each county is included within a GCD. The Fort Bend Subsidence District (FBSD) and the Harris-Galveston Subsidence District (HGSD), operating in Fort Bend County and Harris and Galveston counties, respectively, regulate groundwater for the purpose of ending land surface subsidence within their jurisdiction. They are not GCDs and operate considerably different from the typical GCD. Therefore, in an official context these three counties are "unrepresented" but the GCDs within GMA-14 must still determine the DFC for these counties.

Both FBSD and HGSD have participated in an unofficial role to aid the GCDs within GMA-14 with their evaluation of Fort Bend, Galveston and Harris County information. The groundwater pumpage within these three counties even though regulated is still greater than the sum of all other counties within GMA-14. FBSD and HGSD recognize that the projected groundwater pumpage from these three counties will impact the decisions of GMA-14 throughout a large portion of the area. FBSD and HGSD have provided considerable historical and projected groundwater pumpage data and details of regulations to assist GMA-14 in incorporating these counties in the overall GMA-14 DFCs. FBSD and HGSD cannot however, present DFCs for these three counties in terms of aquifer water-level changes over time. The FBSD and HGSD regulations do not specifically address water-levels nor do they designate a specific pumping limit, rather the regulations are based on limitations of groundwater as a percentage of total water demand. The percentage of groundwater to total water demand is decreased over time, as total water demand increases.

The goal of both FBSD and HGSD is to end land surface subsidence that is caused by man's pumpage of groundwater. There is a clearly established link between the over-pumpage of groundwater and land surface subsidence. The DFCs within the aquifer beneath Fort Bend, Galveston, and Harris counties has no easily defined relationship to water-levels. The DFC for FBSD and HGSD is the reduction and halting of the compaction of clay layers within the aquifer caused by the over-pumpage of groundwater. Stated more simply, the DFC for these three counties is that future land surface subsidence be avoided. That stated, HGSD and FBSD have adopted regulations, most recently in 2013, that require the reduction of

groundwater pumpage and the conversion to alternate water sources, while balancing with the realistic ability of the permittees to achieve compliance with these regulations. This effort was accomplished with the aid of computer models and information specific to the missions of FBSD and HGSD and outside of the revised Northern Gulf Coast GAM (NGCGAM) adopted by the TWDB.

Within HGSD, from central to southeastern Harris County and all of Galveston County (Regulatory Areas 1 and 2), virtually all permittees have achieved compliance with previous and current HGSD regulations. Subsidence has been halted and water-levels within the aquifer have risen dramatically in these areas. However, in northern and western areas of Harris County (Regulatory Area 3), the HGSD regulations have allowed groundwater pumpage to continue until the required reductions in 2010, 2025, and 2035. With these scheduled reductions in groundwater pumpage, subsidence will slow dramatically and even be halted with water-levels stabilizing and in later years rising.

Within FBSD, from central to northern and eastern Fort Bend County (Regulatory Area A), the regulations call for reductions of groundwater pumpage in 2014/2016, and 2025. Similar to HGSD's Regulatory Area 3, subsidence within FBSD Regulatory Area A will slow dramatically and even be halted with water-levels stabilizing and in later years rising.

In both HGSD and FBSD, because of the percentage based approach to regulations, groundwater pumpage will increase until scheduled reductions in milestone years (ex: 2010, 2014/2016, 2025, and 2035). In between milestone years, groundwater pumpage will increase with the assumed increase in total water demand from an assumed increase in population. In order to demonstrate the DFC of these three counties using water-level changes, the area of previous groundwater-to-alternative water conversions must be separated from future conversions AND each annual time step must be depicted.

The HGSD and FBSD have submitted to GMA-14 their current regulations and projected groundwater pumpage projections through the year 2070. This data has been divided into the grid cells/layers relative to the NGCGAM and utilized by the GCDs in development of their DFCs.

Groundwater pumpage within GMA-14 from Fort Bend, Galveston, and Harris counties is regulated by FBSD and HGSD, non GCD governmental agencies (the only GMA in Texas with this occurrence) and the missions of HGSD and FBSD are vastly different from GCDs and do not fit well with a water-level designed DFC process). The groundwater pumpage projections developed in recognition of the HGSD and FBSD regulatory plans have been utilized without adjustment by GMA14 in the DFC process. Therefore, the DFCs adopted by GMA-14 are consistent with the HGSD and FBSD regulatory plans.

Carrizo Sand Aquifer

Grimes County (BGCD)

- The portion of the Carrizo Sand Aquifer occurring in Grimes County is declared non-relevant.

Walker County (BGCD)

- The portion of the Carrizo Sand Aquifer occurring in Walker County is declared non-relevant.

Queen City Aquifer

Grimes County (BGCD)

- The portion of the Queen City Aquifer occurring in Grimes County is declared non-relevant..

Walker County (BGCD)

- The portion of the Queen City Aquifer occurring in Walker County is declared non-relevant..

Sparta Aquifer

Grimes County (BGCD)

- The portion of the Sparta Aquifer occurring in Grimes County is declared non-relevant..

Walker County (BGCD)

- The portion of the Sparta Aquifer occurring in Walker County is declared non-relevant.

Yegua-Jackson Aquifer

Grimes County (BGCD)

- The portion of the Yegua Jackson Aquifer occurring in Grimes County is declared non-relevant..
-

Jasper County (STGCD)

- The portion of the Yegua-Jackson occurring in Jasper County is declared non-relevant.

-

Newton County (STGCD)

- The portion of the Yegua-Jackson occurring in Newton County is declared non-relevant.

Polk County (LTGCD)

- The portion of the Yegua-Jackson occurring in Polk County is declared non-relevant.

Tyler County (STGCD)

- The portion of the Yegua-Jackson occurring in Tyler County is declared non-relevant.

Walker County (BGCD)

- The portion of the Yegua Jackson Aquifer occurring in Walker County is declared non-relevant..

Washington County

- The portion of the Yegua Jackson Aquifer occurring in Washington County is declared non-relevant..

River Alluvium Aquifers

Austin County (BGCD)

- The portion of the Brazos River Alluvium occurring in Austin County is declared non-relevant.
- The portion of the San Bernard River Alluvium occurring in Austin County is declared non-relevant.

Grimes County (BGCD)

- The portion of the Brazos River Alluvium occurring in Grimes County is declared non-relevant.
- The portion of the Navasota River Alluvium occurring in Grimes County is declared non-relevant.

Walker County (BGCD)

- The portion of the San Jacinto River Alluvium occurring in Walker County is declared non-relevant.
- The portion of the Trinity River Alluvium occurring in Walker County is declared non-relevant.

Waller County (BGCD)

- The portion of the Brazos River Alluvium occurring in Walker County is declared non-relevant.

Washington County

- The portion of the Brazos River Alluvium occurring in Washington County is declared non-relevant.

And it is so ordered and passed this 29th day of April, 2016.

Signed _____

Mr. Zach Holland Bluebonnet Groundwater Conservation District

Signed _____

Mr. Kent Burkett Brazoria County Groundwater Conservation District

Signed _____

Ms. Kathy Turner Jones Lone Star Groundwater Conservation District

Signed _____

Mr. Gary Ashmore Lower Trinity Groundwater Conservation District

Signed _____

Mr. John Martin Southeast Texas Groundwater Conservation District

GMA 14

SECRETARY OF STATE

Open Meeting Archive

Agency Name:	Groundwater Management Area 14
Date of Meeting:	04/24/2013
Time of Meeting:	09:30 AM
Board:	Groundwater Management Area 14 Joint Planning Committee
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Status:	Active
Date of Submission:	04/11/2013
Additional Information Obtained From:	Paul R. Nelson; (936) 494-3436 or pnelson@lonestargcd.org
Emergency Mtg:	N
Agenda:	1)Call to order 2)Public Comment 3)Receipt of Posted Notices 4)Approval of April 25, 2012 Minutes 5)Update and report from the Texas Water Development Board 6)GMA 14 Inter-local Agreements Financial Report 7)Discussion and overview relating to non-exempt Well Development, Operating, Aggregation and Transportation Applications of Electro Purification LLC currently filed with the Bluebonnet GCD-Zach HoLand 8)Overview of results of the Regional Groundwater Update Project; discussion of possible effects on GMA 14 and path forward-Freese and Nichols 9)Discussion and possible action regarding a request by the Brazos Valley GCD to amend the boundaries of GMA 12 and GMA 14 to transfer southern tip of Brazos Valley GCD From GMA 14 to GMA 12, pursuant to Tex. Admin. Code 356.22-Alan Day 10)Discussion of next meeting date, location, and agenda items 11)Adjourn
TRD ID:	20130023?3

Datestamp: 04/11/2013 12:57 PM

Archive Date: 04/26/2013

Open Meeting Archive

Agency Name:	Groundwater Management Area 14
Date of Meeting:	05/22/2013
Time of Meeting:	10:00 AM
Board:	Groundwater Management Area 14
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Status:	Active
Date of Submission:	05/08/2013
Additional Information Obtained From:	Paul R. Nelson; pnelson@lonestargcd.org 936/494-3436
Emergency Mtg:	N
Agenda:	1. Call to order 2. Welcome and Introductions 3. Public Comment (Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers) 4. Receipt of Posted Notices 5. Discussion and possible action to approve minutes of April 24, 2013 GMA 14 Joint Planning Meeting. 6. Presentation of information from the Texas Water Development Board and discussion of items of interst to the GMA 7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group. Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants. 8. GMA 14 Interlocal Agreements Financial Report 9. Discussion and possible action to approve action plan for GMA 14 to reach statutory

mandates
a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 26.108 and presentation of proposed scope of services
GMA 14 Interlocal Agreement Participants meeting will be adjourned
10. Legislative update - SB 1282 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

TRD ID: 2013002978
Datestamp: 05/08/2013 03:05 PM
Archive Date: 05/24/2013

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Open Meeting Archive

Agency Name:	Groundwater Management Area 14
Date of Meeting:	06/26/2013
Time of Meeting:	10:00 AM
Board:	Groundwater Management Area 14
Street Location:	655 Conroe Park North
City Location:	Conroe
State Location:	TX
Status:	Active
Date of Submission:	06/13/2013
Additional Information Obtained From:	Paul R. Nelson 936-494-3436
Emergency Mtg:	N
Agenda:	1) Call to order 2)Welcome and Introduce 3)Public Comment 4)Receipt of Public Notices 5)Discussion and possible action to approve minutes of May 22, 2013 GMA 14 Joint Planning Meeting 6)Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA 7)Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 Planning group. 8)Discuss and take possible action on the filing of the currently vacant position of Secretary of the Joint Planning Committee. Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants 9)Discuss funding levels, participation, and other aspects of the Interlocal Agreement and

mandates
a. Discuss and take possible action to approve Interlocal Agreement Related to Joint Planning in GMA 14 including discussion of funding availability from each entity proposed to be a participant in the agreement.
b. Discuss, consider and take possible action on the procurement of professional services to support the development of desired future conditions during the current joint-planning effort in GMA 14 as required by Texas Water Code 26.108 and presentation of proposed scope of services
GMA 14 Interlocal Agreement Participants meeting will be adjourned
10. Legislative update - SB 1282 (DFC extension bill voted out of House 5/7/13)
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

TRD ID: 2013002978
Datestamp: 05/08/2013 03:05 PM
Archive Date: 05/24/2013

take possible action.
10)Technical presentation on existing draft Northern Gulf Coast Groundwater Availability Model, including projections of drawdown and pumping through 2070
11)Presentation, discussion, and consideration of a model output from the existing draft Northern Gulf Coast Groundwater Availability Model with respect to currently adopted Desired Future Conditions and estimates of Modeled Available Groundwater throughout GMA 14, and the need for, if any, additional studies or analysis to satisfy requirements of Texas Water Code 36.108(d)

TRD ID: 2013003947

Datestamp: 06/13/2013 02:37 PM

Archive Date: 06/26/2013

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Open Meeting Submission

Success!

Row inserted

TRD:	20130035870
Date Posted:	08/30/2013
Status:	Accepted
Agency Id:	1022
Date of Submission:	08/30/2013
Agency Name:	Groundwater Management Area 14
Board:	Groundwater Management Area 14
Liaison Id:	1
Date of Meeting:	09/18/2013
Time of Meeting:	09:00 AM (**##:## AM Local Time**)
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Liaison Name:	Paul R. Nelson
Additional Information Obtained From:	Paul R. Nelson--pnelson@lonestarged.org or Phone: 936-494-3436

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING
NOTICE OF OPEN MEETING
As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Brazos Valley GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, September 18, 2013, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.
At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:
1. Call to order
2. Welcome and Introductions

Agenda:

3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 26, 2013 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussion of items of interest to the GMA
7. Presentation and Discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action(s).
9. Briefing and consideration of updated GAM Run using pumping scenarios developed for GAM Run 10-023 and for the updated Northern Gulf Coast GAM.
10. Briefing and consideration of the impacts of proposed Desired Future Conditions on aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in Ground Water Management Area 14 (as required by Texas Water Code 36.108 (d)(1). 11. Briefing and consideration of the impacts of proposed Desired Future Conditions on water supply needs and water management strategies included in the 2012 Texas State Water Plan for Groundwater Management Area 14 (as required by Texas Water Code 36.108 (d)(2).
GMA 14 Interlocal Agreement Participants meeting will be adjourned
12. Discussion of new legislation/statutes/rules affecting districts
13. Discussion of next meeting date, location, and agenda items.
14. Adjourn
GMA 14 Planning Group Page | 2 09/18/13 Agenda
Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.
Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of September, 2013 at _____.m.
_____/s/ Kathy Turner Jones_____
Kathy Turner Jones, Chairman
GMA 14 Planning Group
_____, Deputy Clerk
_____ County, Texas

New

Open Meeting Submission

Success!
Row inserted

TRD:	20140002547
Date Posted:	04/08/2014
Status:	Accepted
Agency Id:	1022
Date of Submission:	04/08/2014
Agency Name:	Groundwater Management Area 14
Board:	Groundwater Management Area 14
Liaison Id:	1
Date of Meeting:	04/30/2014
Time of Meeting:	09:00 AM (##:## **AM Local Time**)
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Liaison Name:	Paul R. Nelson
Additional Information Obtained From:	Paul R Nelson: pnelson@lonestargcd.org or 936-494-3436
Agenda:	GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING NOTICE OF OPEN MEETING As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, April 30, 2014, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 18, 2013 GMA 14 Joint Planning Meeting.
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
6. Presentation of information from the U.S. Geological Survey on the approach, conceptual model, model development, model calibration, and review process for the Houston Area Groundwater Model.
7. Presentation of information from the Texas Water Development Board and discussion of items of interest to GMA 14 including status of review of Houston Area Groundwater Model.
8. Briefing and discussion of approach and results from the predictive simulation utilizing GMA 14 approved pumping amounts in the Houston Area Groundwater Model.
9. Discussion and consideration of any possible actions deemed necessary by GMA 14 Joint Planning Interlocal Agreement Participants regarding results from Houston Area Groundwater Model
10. Briefing and consideration of draft statement of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM (also referred to as the UAGM).
11. Briefing and discussion of process for GMA 14 agreement for proposed Desired Future Conditions during joint-planning process.
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
GMA 14 Interlocal Agreement Participants meeting will be adjourned.
14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.

16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of April, 2014 at _____ m.

__ _/s/ Kathy Turner Jones_____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

____ _____, Deputy Clerk
_____ _ County, Texas

New

Open Meeting Submission

Success!

Row inserted

TRD:	20140064126
Date Posted:	06/06/2014
Status:	Accepted
Agency Id:	1022
Date of Submission:	06/06/2014
Agency Name:	Groundwater Management Area 14
Board:	Groundwater Management Area 14
Committee:	Groundwater Management Area 14
Liaison Id:	1
Date of Meeting:	06/24/2014
Time of Meeting:	01:30 PM **(##:## AM Local Time)**
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Liaison Name:	Paul R. Nelson
Additional Information Obtained From:	Paul R. Nelson
Agenda:	GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING NOTICE OF OPEN MEETING As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD., Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, June 24, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of April 30, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and consideration of aquifers located in whole or in part in GMA 14 for which requests have been received for possible declaration as non-relevant aquifers for the purposes of joint planning.
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
7. Briefing and consideration of results from the modified predictive simulation utilizing GMA 14 approved pumping amounts in the updated Northern Gulf Coast Aquifer (also referred to as the Houston Area Groundwater Model).
8. Briefing on draft statements of Desired Future Conditions based on execution of the updated Northern Gulf Coast Aquifer GAM.
9. Briefing and consideration of hydrological conditions, including for each aquifer in the management area total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code Chapter 36.108 (d) (3)
10. Briefing and discussion of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code Chapter 36.108 (d) (4).
11. Briefing and discussion of the impacts of proposed desired future conditions on subsidence, as required by Texas Water Code Chapter 36.108 (d) (5).
12. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
13. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
GMA 14 Interlocal Agreement Participants meeting will be adjourned
14. Review of progress to date for Groundwater Management Area 14 Joint Planning.
15. Discussion of next meeting date, location, and agenda items.

16. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, ___ County, Texas, on this, the ____ day of June, 2014 at _____.m.

_/s/ Kathy Turner Jones_____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk
_____ County, Texas

New

Open Meeting Submission

Success!

Row inserted

TRD:	2014006604
Date Posted:	09/09/2014
Status:	Accepted
Agency Id:	1022
Date of Submission:	09/09/2014
Agency Name:	Groundwater Management Area 14
Board:	Groundwater Management Area 14
Committee:	Groundwater Management Area 14
Liaison Id:	1
Date of Meeting:	09/23/2014
Time of Meeting:	01:30 PM (##:## AM Local Time)
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Liaison Name:	Paul R. Nelson
Additional Information Obtained From:	Paul R. Nelson, pnelson@lonestarged.org 936-494-3436
Agenda:	GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING NOTICE OF OPEN MEETING As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, September 23, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe,

Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2014 GMA 14 Joint Planning Meeting.
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
6. Briefing and discussion of the socioeconomic impacts reasonably expected to occur, as required by Texas Water Code Chapter 36.108 (d) (6).
7. Briefing and discussion on the impact on the interests and rights in private property, as required by Texas Water Code Chapter 36.108 (d) (7).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
GMA 14 Interlocal Agreement Participants meeting will be adjourned
10. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul K. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of September, 2014 at _____, m.

/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk
_____ County, Texas

New

Open Meeting Submission

Success!
Row inserted

TRD:	2014008010
Date Posted:	11/05/2014
Status:	Accepted
Agency Id:	1022
Date of Submission:	11/05/2014
Agency Name:	Groundwater Management Area 14
Board:	Groundwater Management Area 14
Committee:	Groundwater Management Area 14
Liaison Id:	1
Date of Meeting:	11/18/2014
Time of Meeting:	01:30 PM (##:## AM Local Time)
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Liaison Name:	Paul R. Nelson
Additional Information Obtained From:	Paul R Nelson, pnelson@lonestargcd.org 936-494-3436
Agenda:	GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING NOTICE OF OPEN MEETING As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD,, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Tuesday, November 18, 2014, at 1:30 pm at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe,

Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee possible action:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of September 23, 2014 GMA 14 Joint Planning Meeting.
6. Discussion and possible action regarding approval of resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions (DFCs) for aquifers for GMA 14.
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
7. Briefing and discussion of the feasibility of achieving the desired future conditions under consideration, as required by Texas Water Code Chapter 36.108 (d) (8).
8. Discuss funding levels, participation, and any other aspects of the Interlocal Agreement and take possible action.
9. Presentation and discussion by Districts of recent activities of interest to or impacting the GMA 14 planning group.
GMA 14 Interlocal Agreement Participants meeting will be adjourned
10. Discussion and possible action to approve DFC(s) option(s) for formal consideration by the district representatives of GMA 14 pursuant to the previously adopted administrative procedures for the consideration, proposal, and adoption of DFCs for GMA 14
11. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
12. Discussion of next meeting date, location, and agenda items.
13. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3696.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the ___ day of November, 2014 at _____m.

_____/s/ Kathy Turner Jones_____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk
_____ County, Texas

New

[redacted]

Current Meeting Notice

Agency Name:	**Groundwater Management Area 14**
Date of Meeting:	05/28/2015
Time of Meeting:	09:00 AM **(Local Time)**
Board:	Groundwater Management Area 14
Committee:	Groundwater Management Area 14
Status:	Accepted
Street Location:	655 Conroe Park Drive
City Location:	Conroe
Meeting State:	TX
TRD#:	20150031 14
Submit Date:	05/08/2015
Emergency Meeting?:	No
Additional Information Obtained From:	Paul R Nelson, pnelson@lonestargcd.org 936-494-5436
Agenda:	GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING NOTICE OF OPEN MEETING As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Thursday, May 28, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303. At this meeting, the following business may be considered and recommended for Joint Planning Committee action: 1. Call to order 2. Welcome and Introductions 3. Public Comment: (Public comment is limited to a maximum of 5 minutes per speaker and/or 20 minutes

total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of November 18, 2014 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants.
7. GMA 14 District Representatives are currently considering desired future conditions options for relevant aquifers within GMA 14, as required by Texas Water Code Section 36.108 (d). GMA 14 District Representatives will receive technical presentations from entities/individuals in GMA 14 who desire to propose possible alternative desired future conditions options from those currently being discussed in the joint-planning process. Time permitting, all entities/individuals appearing before GMA 14 for this agenda item will be afforded up to 15 minutes to make technical presentations on alternative desired future condition options. All proposed alternative desired future conditions options presented will be considered by GMA 14 District Representatives and results of those considerations documented in the GMA 14 Explanatory Report, as required by Texas Water Code Section 36.108.
GMA 14 Interlocal Agreement Participants meeting will be adjourned
8. Discussion and consideration of approving eligible DFC options to be formally considered as a potential candidate for proposal and adoption according to Administrative Procedures for the Consideration, Proposal, and Adoption of Desired Future Conditions for Groundwater Management Area 14, Section 3.04.
9. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
10. Presentation and Discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
11. Discussion of next meeting date, location, and agenda items.
12. Adjourn
GMA 14 Planning Group Page | 1 5.28.2015 Agenda (final)
Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul
R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303;
prelson@lonestargcd.org, or (936) 494-3436.
Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the
_____ day of May, 2015 at _____.m.
/s/ Kathy Turner Jones
Kathy Turner Jones, Chairman
GMA 14 Planning Group
_____, Deputy Clerk
_____ County, Texas
GMA

Open Meeting Archive

Agency Name:	Groundwater Management Area 14
Date of Meeting:	06/24/2015
Time of Meeting:	09:00 AM
Board:	Lone Star Groundwater Conservation District
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Status:	Active
Date of Submission:	06/09/2015
Additional Information Obtained From:	Paul R. Nelson, Assistant General Manager: 936-494-3436 pnelson@lonestarged.org
Emergency Mtg:	N

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING
NOTICE OF OPEN MEETING
As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD will be held on Wednesday, June 24, 2015, at 9:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.
At this meeting, the following business may be considered and recommended for Joint Planning Committee action:
1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)

Agenda:

4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of May 28, 2015 GMA 14 Joint Planning Meeting.
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to the GMA.
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants
1. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
2. Briefing by contracted consultants regarding any DFC options requested in writing and by a District Representative for formal consideration during the GMA 14 joint planning meeting in accordance with GMA 14 Administrative Procedures, Sections 3.01 – 3.02.
3. Review and discussion of the statutory criteria considered by GMA 14 as set forth in Texas Water Code Section 36.108(d)(1)-(9) and in accordance with the GMA 14 Administrative Procedures.
GMA 14 Interlocal Agreement Participants meeting will be adjourned
4. Discussion and possible action to approve any DFC options and amended DFC options submitted to GMA 14 by a District Representative to be formally considered in accordance with GMA 14 Administrative Procedures, Section 3.03.
5. Discussion and possible action to approve any DFC options currently under formal consideration to be further reviewed as candidates for evaluation in accordance with Texas Water Code Section 36.108 (d) (1)-(9) in accordance with GMA 14 Administrative Procedures, Section 3.04.
6. Discussion and possible action to approve an eligible DFC option as the proposed DFC as required by Texas Water Code Sections 36.108 (d) and (d-2) and in accordance with GMA 14 Administrative Procedures, Section 3.05.
7. Briefing and discussion of progress to date for Groundwater Management Area 14 Joint Planning and remaining requirements and schedule.
GMA 14 Planning Group Page | 2 6.24.2015 Agenda
8. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
9. Discussion of next meeting date, location, and agenda items.
10. Adjourn
Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.
Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of June, 2015 at _____.m.
_____/s/ Kathy Turner Jones_____
Kathy Turner Jones, Chairman
GMA 14 Planning Group
_____, Deputy Clerk
_____ County, Texas

TRD ID: 2015003919

Datestamp: 06/09/2015 06:39 PM

Archive Date: 06/26/2015

Open Meeting Archive

Agency Name:	Groundwater Management Area 14
Date of Meeting:	10/28/2015
Time of Meeting:	10:00 AM
Board:	Lone Star Groundwater Conservation District
Committee:	GMA 14
Street Location:	655 Conroe Park North Drive
City Location:	Conroe
State Location:	TX
Status:	Active
Date of Submission:	10/14/2015
Additional Information Obtained From:	Paul R. Nelson 936-494-3436 or pnelson@lonestargcd.org
Emergency Mtg:	N

GROUNDWATER MANAGEMENT AREA 14 JOINT PLANNING COMMITTEE MEETING

NOTICE OF OPEN MEETING

As required by Section 36.108(e), Texas Water Code, a meeting of the Groundwater Management Area 14 Joint Planning Committee, comprised of representatives from the following groundwater conservation districts located wholly or partially within Groundwater Management Area 14: Bluebonnet GCD, Brazoria County GCD, Lone Star GCD, Lower Trinity GCD, and Southeast Texas GCD, will be held on Wednesday, October 28, 2015, at 10:00 am at the offices of the Lone Star Groundwater Conservation District, located at 655 Conroe Park North, Conroe, Texas 77303.

At this meeting, the following business may be considered and recommended for Joint Planning Committee action:

Agenda:

1. Call to order
2. Welcome and Introductions
3. Public Comment
(Public comment is limited to a maximum of 5 minutes per speaker and/or 30 minutes total for all speakers)
4. Receipt of Posted Notices
5. Discussion and possible action to approve minutes of June 24, 2015, Groundwater Management Area 14 Joint Planning Meeting.
Meeting will be convened as a meeting of the GMA 14 Joint Planning Interlocal Agreement Participants
6. Presentation of information from the Texas Water Development Board and discussions of items of interest to Groundwater Management Area 14 (GMA 14).
7. Discuss funding levels, participation and any other aspects for the Interlocal Agreement and take possible action.
8. Presentation and discussion of Summary Reports submitted by each Groundwater Conservation District (District) in GMA 14 and any Districts' suggested revisions to the proposed Desired Future Conditions, as required by Texas Water Code Section 36.108 (d-2), and any additional information that District Representatives may provide in response to comments received or revisions suggested.
9. Discussion and consideration of any additional or supplemental information or criteria relative to the proposed Desired Future Conditions for inclusion in the Explanatory Report.

GMA 14 Interlocal Agreement Participants meeting will be adjourned
10. Discussion, consideration, and possible action of suggested revisions to proposed Desired Future Conditions or alternate Desire Future Conditions included in the submitted Summary Reports.
11. Discussion, consideration, possible action of final adoption of Desired Future Conditions and timing and development of the Explanatory Report.
12. Briefing and discussion of progress to date for GMA 14 Joint Planning and remaining requirements and schedule.
13. Presentation and discussion by Districts of recent activities of interest or impacting the GMA 14 planning group.
14. Discussion of next meeting date, location, and agenda items.
15. Adjourn

Further information, questions, or comments concerning any aspect of this meeting should be directed to Mr. Paul R. Nelson of Lone Star Groundwater Conservation District, 655 Conroe Park North Drive, Conroe, TX 77303; pnelson@lonestargcd.org, or (936) 494-3436.

Come to hand and posted on a Bulletin Board in the Courthouse, _____ County, Texas, on this, the _____ day of October, 2015 at _____.m.

_____/s/ Kathy Turner Jones_____
Kathy Turner Jones, Chairman
GMA 14 Planning Group

_____, Deputy Clerk
_____ County, Texas

TRD ID: 2015007034
Datestamp: 10/14/2015 12:16 PM
Archive Date: 10/30/2015

GMA 14

DFC CERTIFICATIONS

BLUEBONNET GCD

DAYSTAR PUBLISHING, INC.
Dba The Times Tribune
PO Box 1549, Brookshire, Texas 77423

PUBLISHER'S AFFIDAVIT

Proof of Publication Provided to

BLUEBONNET GROUNDWATER CONSERVATION DISTRICT

See attached tear sheet(s) for:

08-27-15 NOTICE OF HEARING ON PROPOSED DESIRED FUTURE CONDITIONS

Before me, the undersigned authority, on this day personally appeared Janice A. Mincy, Publisher of The Times Tribune, a weekly newspaper of general circulation, published at Brookshire, in Waller County, Texas, who deposes and says that the advertisement, as per copy attached, was published in the regular issue(s):

THURSDAY, AUGUST 27, 2015

Janice A. Mincy
Signed

NOTARY

Subscribed and sworn to before me this the 31st day of August 2015

LORI HENNEKE
Notary Public, State of Texas
My Commission Expires
February 16, 2019

AFFP

Bluebonnet Goundwater

Affidavit of Publication

STATE OF TEXAS }
COUNTY OF WALKER } SS

Bluebonnet

Rita Haiceman, being duly sworn, says:

That he is Publisher of the The Huntsville Item, a daily newspaper of general circulation, printed and published in Huntsville, Walker County, Texas; that the publication, a copy of which is attached hereto, was published in the said newspaper on the following dates:

August 25, 2015

That said newspaper was regularly issued and circulated on those dates.
SIGNED:

Rita Haiceman

Publisher

Subscribed to and sworn to me this 25th day of August 2015.

William F. Hamilton

William F. Hamilton, Notary Public, Walker County, Texas

My commission expires: April 08, 2019

00010671 00003233

*** LEGALS III ***

WILLIAM F. HAMILTON
Notary Public
STATE OF TEXAS
My Comm. Exp. April 8, 2019

Affidavit of Publication

The State of Texas
County of Grimes

Before me, the undersigned authority, on this day personally appeared Angel Resendez of the Navasota Examiner, who being by me duly sworn, upon oath deposes and says: that the attached notice was published in the Navasota Examiner; a newspaper published in the English language and of general circulation in Grimes County, Texas for more than one year prior to the date of first publication of said notice in the issue(s) of August 26 2015 and that the attached newspaper clipping is true and correct copy of said published notice.

Signed Angel Resendez

Sworn to and subscribed before me this 26 day of August 2015.

Carrie L Little

Notary Public in and for the State of Texas

CARRIE LYNN LITTLE
NOTARY PUBLIC
STATE OF TEXAS
03-29-2017

PUBLISHER'S AFFIDAVIT

"I solemnly swear that the above notice was published once in *"THE BELLVILLE TIMES"* newspaper, for the service of citation or notice of Publication, and the date borne by the issue of the newspaper in which said notice was published was 8-27-15."

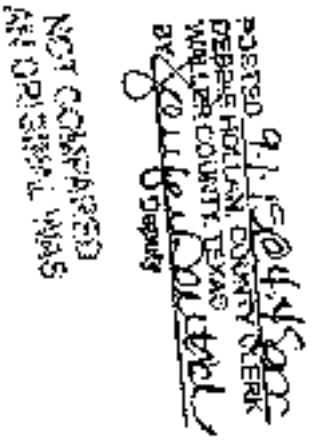
Publisher

SWORN TO AND SUBSCRIBED BEFORE ME by Brian White
on this the 27th day of August 2015

Notary Public, State of Texas

MARGARET SCHNEIDER
Notary Public, State of Texas
Commission Expires 01-22-2016

BLUEBONNET GROUNDWATER CONSERVATION DISTRICT



Public Hearing on Proposed Desired Future Conditions

Wednesday, September 16, 2015
6:00 PM

Bluebonnet Groundwater Conservation District
Board Room, Suite B & C
303 East Washington Avenue
Navasota, Texas

AGENDA

1. Call to order

2. Public Comment
   (Public comment is limited to a maximum of 3 minutes per speaker and/or 30 minutes total time for all speakers)

3. Hearing on the proposed desired future conditions-Discussion and possible action regarding public comment on the proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer, Carrizo-Wilcox Aquifer, and Yegua-Jackson Aquifer underlying Austin, Grimes, Walker, and/or Waller Counties, Texas, in accordance with Section 36.108(d-2) of the Texas Water Code. The acceptable levels of drawdown for each subdivision of the aquifer are measured in terms of water level drawdowns over the proposed current planning cycle measured in feet from 2009 estimated water levels or from 1890 estimated subsidence conditions. For Bluebonnet GCD, the relevant proposed DFCs include the following:

   Formations of the Gulf Coast Aquifer

   Austin County
   - From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
   - From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 23 feet after 61 years.
   - From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 23 feet after 61 years
   - From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 76 feet after 61 years.
   - From estimated year 1890 conditions, the maximum subsidence in Austin County should not exceed approximately 2.83 feet by the year 2070.

Grimes County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 6 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 52 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Grimes County should not exceed approximately 0.12 feet by the year 2070.

Walker County

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 9 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Walker County should not exceed approximately 0.04 feet by the year 2070.

Waller County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 40 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 101 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Waller County should not exceed approximately 4.73 feet by the year 2070.

Carrizo Sand Aquifer

Grimes County

- From estimated 2010 conditions, the average drawdown of the Carrizo Sand Aquifer should not exceed approximately 52.8 feet average draw down across the area of occurrence of the aquifer.

Walker County

- From estimated 2010 conditions, the average drawdown of the Carrizo Sand Aquifer should not exceed approximately 45.7 feet average draw down across the area of occurrence of the aquifer.

Queen City Aquifer

Grimes County

- From estimated 2010 conditions, the average drawdown of the Queen City Aquifer should not exceed approximately 16.8 feet average draw down across the area of occurrence of the aquifer.

Walker County

- From estimated 2010 conditions, the average drawdown of the Queen City Aquifer should not exceed approximately 21.0 feet average draw down across the area of occurrence of the aquifer.

Sparta Aquifer

Grimes County

- From estimated 2010 conditions, the average drawdown of the Sparta Aquifer should not exceed approximately 14 feet average draw down across the area of occurrence of the aquifer.

Walker County

- From estimated 2010 conditions, the average drawdown of the Sparta Aquifer should not exceed approximately 19.5 feet average draw down across the area of occurrence of the aquifer.

Yegua-Jackson Aquifer

Grimes County

- From estimated 2010 conditions, the average drawdown of the unconfined portion of the Yegua should not exceed approximately 10 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the confined portion of the Yegua should not exceed approximately 15 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the brackish confined portion of the Yegua should not exceed approximately 20 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the unconfined portion of the Jackson should not exceed approximately 10 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the confined portion of the Jackson should not exceed approximately 15 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the brackish confined portion of the Jackson should not exceed approximately 20 feet average draw down across the area of occurrence of the aquifer.

Walker County

- From estimated 2010 conditions, the average drawdown of the unconfined portion of the Yegua should not exceed approximately 10 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the confined portion of the Yegua should not exceed approximately 15 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the brackish confined portion of the Yegua should not exceed approximately 20 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the unconfined portion of the Jackson should not exceed approximately 10 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the confined portion of the Jackson should not exceed approximately 15 feet average draw down across the area of occurrence of the aquifer.
- From estimated 2010 conditions, the average drawdown of the brackish confined portion of the Jackson should not exceed approximately 20 feet average draw down across the area of occurrence of the aquifer.

4. Adjourn

Agenda items may be considered, discussed and/or acted upon in a different order than the order set forth above.

Executive Session

The Board of Directors of the Bluebonnet Groundwater Conservation District reserves the right to adjourn into Executive (Closed) Session at any time during the course of this meeting to discuss any of the items listed on this agenda, as authorized by the Texas Government Code, Sections 551.071 (Consultations with Attorney), 551.072 (Deliberations about Real Property), 551.073 (Deliberations about Gifts and Donations), 551.074 (Personnel Matters), 551.076 (Deliberations about Security Devices), and 551.086 (Economic Development). No final action will be taken in Executive Session.

BLUEBONNET GROUNDWATER CONSERVATION DISTRICT

Board of Directors Meeting
And "Desired Future Conditions" Public Hearing

Wednesday, September 16, 2015
6:00 PM

Bluebonnet Groundwater Conservation District
Board Room, Suite B & C
303 East Washington Avenue
Navasota, Texas

In attendance:
Directors - Beckendorff, Blezinger. Browne, Eppler, Hopper, Huebner, Minze, Morrison, Patout, and Reed
Staff - General Manager Holland, Office Manager Proffitt, and Registration Assistant Milatovich
Consultants – Attorney Dugat and Hydrologist Dr. Hutchison
Visitors - Michael Thornhill and Bob Renbarger.

Minutes of the Public Hearing

1. **Call to order.**
   There being a quorum present, the public hearing on Desired Future Conditions the President called to order at 6:10 PM.

2. **Public Comment.**
   Mr. Michael Thornhill, Thornhill Group, Inc., on behalf of Quadvest and other investment owned utilities of Montgomery and other counties – Proposed that DFCs should be aquifer based rather than subdivided by county lines which do not represent hydro-geological boundaries. Mr. Thornhill proposed that for the Jasper aquifer 97% of storage from predevelopment of the aquifer remain in storage in 2070, for the Evangeline aquifer, 98% and for the Chicot aquifer 97%. These proposed alternative DFCs will be submitted in writing to the District by October 5, 2015.

3. **Discussion and hearing on the proposed desired future conditions-Discussion and possible action regarding public comment on the proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer, Carrizo-Wilcox Aquifer, and Yegua-Jackson Aquifer underlying Austin, Grimes, Walker, and/or Waller Counties, Texas, in accordance with Section 36.108(d-2) of the Texas Water Code.**
   General Manager Holland outlined the joint planning process and timeline of actions to date and remaining for the Board and GMA 14. GM Holland proposed the Carrizo, Queen-City, Sparta, and Yegua-Jackson Aquifers in Grimes and Walker Counties be considered not relevant for purposes of joint planning process. Dr. Hutchison agreed with General Manager Holland's proposal adding decisions regarding these aquifers by the Bluebonnet GCD will have no affect on surrounding Districts.
   Director Reed moved that the Board direct the GM and consultants to complete the documentation required to designate the Carrizo, Queen City, Sparta, and Yegua-Jackson Aquifers in Grimes and Walker Counties as not relevant for the purposes of joint planning. Director Morrison seconded. ***Motion carried.***

4. **Adjourn.**
   Public Hearing on Desired Future Conditions was adjourned by the President at 6:28 PM.

Minutes of the Public Hearing

5. **Call to order.**
There being a quorum present, the President called the meeting to order at 6:29 PM.

6. **Public Comment.**
No comments were made.

7. **Discussion and possible action to approve Amended FY 2015 District Budget.**
GM Holland presented and reviewed the amended FY 2015 District Budget.
Director Minze asked about the permit revenues item of the budged. GM Holland documented increases associated with permitting of hydraulic fracturing wells, new non-exempt wells, and replacement wells completed within the District. Director Minze moved that the Board approve the amended FY 2015 District Budget. Director Browne seconded, ***motion carried.***

8. **Discussion and possible action to approve FY 2016 District Budget**
GM Holland presented and reviewed the FY 2016 District Budget. GM Holland noted the addition of the retirement plan item as approved by the Executive Committee following the presentation from the Texas County & District Retirement System with 4% employee contribution and 100% District matching. GM Holland also outlined an item directed toward redevelopment of District database structure into a new platform. Several questions were asked regarding the direction and outlook on the redevelopment project. Director Morrison moved that the Board approve FY 2016 District Budget. Director Eppler seconded, ***motion carried.***

9. **Discussion and possible action to approve designations for Money Market Account**
GM Holland presented and reviewed the designations for the Money Market Account. Discussions continued regarding the redevelopment project and it appearing both in the budget and as a designation. Director Browne moved that the Board approve the designations for the Money Market Account. Director Morrison seconded, ***motion carried.***

10. **Discussion and possible action to designate dates and times for FY 2016 Board of Directors Meetings**
Director Reed asked for clarification if there was a meeting next week (Sept. 21, 2015) as indicated in the memo. Director Eppler pointed out this is a typo and should be Sept. 21, 2016.
GM Holland noted the July 20, 2016 meeting date will be addressed for rescheduling at the April 20, 2016 Board Meeting due to conflict with groundwater conferences occurring that week. A correction noted by Director Eppler to the September meeting year was offered as an amendment.
Director Reed moved that the Board designate the dates and times for FY 2016 Board Meetings as amended. Director Beckendorff seconded, ***motion carried.***

11. **Adjourn**
The meeting was adjourned by the President at 7:08 PM.

The above minutes of the Public Hearing of the Future Desired Conditions and regular meeting of the Board of Directors of the Bluebonnet Groundwater Conservation District held on September 16, 2015 were approved and adopted by that Board on October 21, 2015.

J Jared Patout, President

ATTEST:

Zach Holland, General Manager

BRAZORIA GCD

Filed 08/21/2015 10:21:23 AM

Joyce Hudman
County Clerk
Brazoria County, Texas

NOTICE OF PUBLIC HEARING

BRAZORIA COUNTY GROUNDWATER CONSERVATION DISTRICT BOARD OF DIRECTORS

Notice is hereby given that the Board of Directors of the Brazoria County Groundwater Conservation District will hold a public hearing at **4:00 p.m. on Thursday, September 10, 2015** in the District Office, Court House West Annex, 451 N. Velasco Street, Suite 140, Angleton, Texas. After the public hearing the Board will deliberate, discuss, consider or take final action on any or all of the following matters:

A. Resolution for approval of proposed desired future conditions for all aquifers in Groundwater Management Area 14

A copy of the Resolution is available for viewing at the District's office.

Any person who desires to appear and present testimony, evidence, exhibits, or other information may do so in person, by counsel or both. Copies of the rules governing the conduct of the hearing are available at the District's office. Special arrangements for disabled persons may be made by calling (979) 864-1078.

Sheridyn Plent

Sheridyn Plent
Administrator for District

Filed: 9/4/2015 9:[illegible] AM

Joyce Hudman

County Clerk

Brazoria County, Texas

NOTICE OF MEETING OF THE BRAZORIA COUNTY GROUNDWATER CONSERVATION DISTRICT BOARD OF DIRECTORS

Notice is hereby given that the Board of Directors of the Brazoria County Groundwater Conservation District will meet at 4:00 p.m. on Thursday, September 10, 2015 in the District Office, Court House West Annex, 451 N. Velasco Street, Suite 140, Angleton, Texas. At said meeting the Board will deliberate, discuss, consider and / or take final action on any or all of the following matters:

AGENDA

I. CALL TO ORDER

II. ROLL CALL

III. APPROVE MINUTES OF THE MEETING OF: August 13, 2015

IV. PUBLIC APPEARANCES:

Members of the public may request permission to address the Board of Directors. Specific factual information or a recitation of existing policy may be furnished in response to an inquiry made by a member of the general public, but any deliberation, discussion, or decision with respect to ay subject about which the inquiry was made shall be limited to a proposal to place such subject on the agenda for a subsequent meeting for which notice is provided in compliance with the Texas Open Meetings Act unless said notice appears herein. The public is reminded that there is a five (5) minute time limit as outlined in Brazoria County Groundwater Conservation District Order #07-06-05 dated June 14, 2007.

V. FORMAL REPORTS AND PRESENTATIONS:

A. USGS – Presentation of 2015 Water Level Attitudes and Changes

B. Freese & Nichols, Inc. – Present analysis of BCGCD Spatial Data

VI. NEW BUSINESS:

A. Fiscal:

Filed 09/04/2015 08:12:38 AM
Joyce Hudman
County Clerk
Brazoria County, Texas

1. Financial Report

2. Approve Invoices for payment

3. Approve FY2015 Budget Amendment

4. Approve FY2016 Administrative Fee Schedule

5. Approve FY2016 Budget

B. Administrative:

1. Approve proposal from Freese & Nichols, Inc. to Prepare the 2015 Annual Report

2. Conduct public hearing and consider action regarding permit applications:

	Owner	Well Location	City	Alloc.	Purpose
1.	Tony Wills	22254 SH 35	Sweeny	1,000,000	Commercial
2.	KS & JS RV Park	9333 Cr 400	Angleton	200,000	Public Supply
3.	Hayes Family Partnership	9830 Hwy 35	Jones Creek	2,000,000	Commercial
4.	Cedar Lawn Haven of Rest, Inc.	1014 Sinclair	West Columbia	500,000	Other
5.	Tony Gebhardt	280 Baker Rd	Freeport	2,000,000	Other
6.	Next International	0940 Brookside	Brookside	1,000,000	Commercial
7.	Sharmco Industries	33002 FM 2004	Clute	2,000,000	Public Supply

3. Conduct public hearing regarding the proposed Desired Future Conditions for Groundwater Management Area 14 and consider approval of Resolution 2015 -01

4. Exempt Use Well Registration Report

Filed 9/8/2015 9:12:55 AM
Joyce Hudman
Joyce Hudman
County Clerk
Brazoria County, Texas

5. Review current drought monitor report

6. Schedule public hearing on Thursday, October 8, 2015 at 4:00 p.m. in the District Office to consider permit applications

VII. POSSIBLE FUTURE AGENDA ITEMS:

VIII. ADJOURN

Sheridan Plant
Administrator for District

NOTE: Items will not necessarily be presented in the order they are posted
The Brazoria County Groundwater Conservation District is committed to compliance with the Americans with Disabilities Act (ADA). Reasonable accommodations and equal opportunity for effective communications will be provided upon request. Please contact the Brazoria County Groundwater Conservation District Office at (979) 864-1078 at least 24 hours in advance if accommodation is needed.

MINUTES OF THE MEETING OF THE BOARD OF DIRECTORS OF THE BRAZORIA COUNTY GROUNDWATER CONSERVATION DISTRICT

The Board of Directors of the Brazoria County Groundwater Conservation District met Thursday, the 10th day of September, 2015, at 4:00 p.m. in the Brazoria County Groundwater Conservation District Office, 451 N. Velasco Street, 1st Floor, Suite 140, Angleton, Texas.

The meeting was called to order by Director Mueller at 4:00 p.m.

The roll was called of the duly constituted members of the Board, to wit:

Alan Mueller	President
Dennis Davenport	Vice President
Raymond Felder	Secretary
Ronnie Goolsby	Assistant Secretary
Patrick O'Day	Director

All of said Directors were present except Directors Felder and O'Day, thus constituting a quorum.

Also present for all or part of the meeting were the following: Kent Burkett, General Manager, Sherry Plenti, Administrative Assistant, Greg Ellis, General Counsel, Jason Afinowicz and Philip Tauber of Freese & Nichols, Inc., Mark Kasmarek and David Brown with U.S.G.S., Marvin Jones and Terry Gebhardt.

APPROVE MINUTES:

Motion by Director Mueller; Seconded by Director Goolsby that the Minutes from the meeting on August 13, 2015 be approved as presented. Motion approved with all present voting aye.

FORMAL REPORTS AND PRESENTATIONS:

U.S.G.S. representatives gave a presentation to the Board regarding the 2015 Water Level Altitudes and Changes, and answered related questions posed by Board members.

The report by Freese & Nichols, Inc., regarding the analysis of BCGCD spatial data was deferred until the October 8, 2015 Board Meeting.

FINANCIAL REPORT AND BUDGET SUMMARY:

The September, 2015 Statement of Revenues, Expenditures and Changes in Fund Balance was presented for review and a budget status report was given by the General Manager. No action was taken.

APPROVE INVOICES FOR PAYMENT:

Motion by Director Mueller; Seconded by Director Davenport that the invoices presented be approved for payment. Motion approved with all present voting aye.

APPROVE FY 2015 BUDGET AMENDMENT:

Motion by Director Mueller; Seconded by Director Davenport to approve the proposed amendment to the FY 2015 Budget. Motion approved with all present voting aye.

APPROVE FY 2015 ADMINISTRATIVE FEE SCHEDULE:

Motion by Director Davenport; Seconded by Director Goolsby to approve the Administrative Fee Schedule for FY 2016 to reflect no change in fee rates. Motion approved with all present voting aye.

APPROVE FY 2016 BUDGET:

Motion by Director Davenport; Seconded by Director Goolsby to approve the FY 2016 Budget as presented. Motion approved with all present voting aye.

APPROVE PROPOSAL FROM FREESE & NICHOLS, INC., TO PREPARE THE 2015 ANNUAL REPORT:

Motion by Director Davenport; Seconded by Director Goolsby to approve the proposal by Freese & Nichols, Inc. to prepare and present the 2015 Annual Report to the Board of Directors for a fee of $4,000.00. Motion approved with all present voting aye.

OPEN PUBLIC HEARING REGARDING PERMIT APPLICATIONS:

Motion by Director Davenport; Seconded by Director Goolsby to OPEN a public hearing regarding applications for permits received.

	Owner	Well Location	City	Alloc.	Purpose
1.	Tony White	20794 Sh 35	Sweeny	1,000,000	Commercial
2.	Ks & Js RV Park	8835 Ot 602	Brazoria	200,000	Public Supply
3.	Hayes Family Partnership	9630 Hwy 36	Jones Creek	2,000,000	Commercial
4.	Cedar Lawn Haven of Rest, Inc.	1014 Sinclair	West Columbia	500,000	Other
5.	Terry Caldwell	250 Baker Rd	Friendswood	2,000,000	Other
6.	Idex International	3943 Brookside	Brookside	1,000,000	Commercial
7.	Sherman Industries	33002 FM 2004	Clute	2,000,000	Public Supply

Motion approved with all present voting aye.

CLOSE PUBLIC HEARING REGARDING PERMIT APPLICATIONS:

Motion by Director Davenport; Seconded by Director Mueller that the public hearing regarding applications for permits received be CLOSED. Motion approved with all present voting aye.

APPROVE PERMIT APPLICATIONS:

Motion by Director Mueller; Seconded by Director Goolsby that Items 1, 2, 3, 4, 6 & 7 be approved as presented. Motion approved with all present voting aye.

Motion by Director Mueller; Seconded by Director Goolsby to approve Item 5 as presented conditioned upon the volume of groundwater exported is limited to incidental use. An Export Permit will not be required nor Export fees assessed as long as the condition is met. Motion approved with all present voting aye.

SUMMARY OF PERMITS APPROVED	
Total Wells:	7
New Wells:	7
Existing:	0
PWS	2
C/D	3
Other	2

OPEN PUBLIC HEARING REGARDING PROPOSED DESIRED FUTURE CONDITIONS FOR GMA 14:

Motion by Director Mueller; Seconded by Director Davenport to OPEN a public hearing regarding the proposed Desired Future Conditions for Groundwater Management Area 14. Motion approved with all present voting aye.

The public hearing was opened and a presentation of the Desired Future Conditions for GMA 14 as prepared by the committee representing the member Districts was given by representatives from Freese & Nichols, Inc.. Discussion followed and the floor was opened to public comment.

Mr. Marvin Jones, representing Quadvest Inc., the City of Conroe and other plaintiffs in the Lone Star GCD litigation, spoke before the Board in opposition to the proposed desired future conditions, and presented a report prepared by R W Harden & Associates related to the desired future conditions for the Gulf Coast Aquifer within GMA 14.

CLOSE PUBLIC HEARING REGARDING PROPOSED DESIRED FUTURE CONDITIONS FOR GMA 14:

With no additional public comments to be heard, the Motion was made by Director Davenport; Seconded by Director Goolsby to close the public hearing regarding proposed Desired Future Conditions for Groundwater Management Area 14.

EXEMPT USE WELL REGISTRATION REPORT:

The Exempt Well Registration Report for the current period was reviewed. No action was taken.

DROUGHT MONITOR REPORT:

The U.S. Drought Monitor map for the State of Texas for September, 2015 was presented for review. No action was taken.

SET HEARING DATE FOR PERMIT APPLICATIONS:

Motion by Director Mueller; Seconded by Director Davenport that a public hearing to consider approval of permit applications or amendments be set for the next meeting of the Board of Directors on Thursday, October 8, 2015 at 4:00 p.m. in the District Office and that the applicants be duly notified. Motion approved with all present voting aye.

POSSIBLE FUTURE AGENDA ITEMS:

1. Adopt Desire Future Conditions for GMA 14 on October 8, 2015
2. Consider Directors and Officers Liability Policy

ADJOURN:

As there were no further matters to be heard, the motion to adjourn was made by Director Mueller and seconded by Director Goolsby. All present voting aye. The meeting was adjourned at 5:55 p.m.

Approved this 20th day of October, 2015

Raymond D. Felder
Secretary, Board of Directors

LONE STAR GCD

HOUSTON COMMUNITY NEWSPAPERS & MEDIA GROUP

AFFIDAVIT OF PUBLICATION

STATE OF TEXAS
COUNTY OF MONTGOMERY

Personally appeared before the undersigned, a Notary Public within and for said County and State, Jennifer Underferth, Representative for Jason Joseph, General Manager and Publisher of The Courier, a newspaper of general circulation in the County of Montgomery, State of Texas. Who being duly sworn, states under oath that the report of Legal Notices, a true copy of which is hereto annexed was published in said newspaper in its issue(s) of the

26th day of August, 2015
2nd day of September, 2015
_____ day of _____, 2015
_____ day of _____, 2015
_____ day of _____, 2015
_____ day of _____, 2015
_____ day of _____, 2015
_____ day of _____, 2015

Publisher's Representative

Sworn to and subscribed before me this 18 day of September, 2015

Notary Public

My commission expires on(stamp) _____

SUSAN M. CITY
Notary Public, State of Texas
My Commission Expires
September 03, 2016

LONE STAR GROUNDWATER CONSERVATION DISTRICT
NOTICE OF HEARING ON DESIRED FUTURE CONDITIONS
September 17, 2015

NOTICE IS HEREBY GIVEN to all interested persons within Montgomery County, Texas

That the Board of Directors of the Lone Star Groundwater Conservation District ("Lone Star GCD") will hold a public hearing and accept public comment on the proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer underlying Montgomery County, Texas, in accordance with Section 36.108(d-2) of the Texas Water Code. The purpose of the hearing is to provide interested persons of the public the opportunity to appear and provide comments to the Lone Star GCD related to the proposed DFCs.

The Lone Star GCD is one of five groundwater conservation districts located wholly or partially within Groundwater Management Area 14 ("GMA 14"); the other districts in GMA 14 include Brazoria Groundwater Conservation District, Brazoria Groundwater Conservation District, Lower Trinity Groundwater Conservation District, and Southeast Texas Groundwater Conservation District. At the last GMA 14 joint planning meeting, held on June 24, 2015, the district representatives voted unanimously to approve the proposed DFCs, which have been distributed to the districts for a 90 day comment period and public hearing.

The proposed DFCs approved by the district representatives of GMA 14 are described in terms of acceptable drawdown levels for each subdivision of the Gulf Coast Aquifer, including the Chicot, Evangeline, Burkeville, and Jasper, for each county located within GMA 14, or the land surface subsidence limit, as applicable. The acceptable levels of drawdown for each subdivision of the aquifer are measured in terms of water level projections over the projected current planning cycle (measured in feet from 2009 estimated water levels). For Montgomery County, the relevant proposed DFCs include the following:

- From estimated year 2009 conditions, the average draw down of the Chicot aquifer should not exceed approximately 26 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline aquifer should not exceed approximately 41 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper aquifer should not exceed approximately 34 feet after 61 years.

This hearing will be held on September 17, 2015, beginning at 3:30 p.m., at the Lone Star GCD office in the James B. "Jim" Worley Board Room, 655 Conroe Park North Drive, Conroe, Texas 77303.

Any person who desires to appear at the hearing and present comment or other information on the proposed DFCs may do so in person, by legal representative, or both. Limits may be placed on the amount of time that each person is allowed to present verbal comments, but written comments may also be submitted. Those wishing to provide advanced written comment on the proposed DFCs may also do so prior to the hearing date by regular mail services addressed to Kathy Turner Jones, Lone Star GCD General Manager at 655 Conroe Park North Drive, Conroe, Texas 77303, or by facsimile at (936) 494-3438. (Note: Written comments will be accepted through October 5, 2015.) The hearing packet in this matter may be recessed from day to day or continued where appropriate.

This public hearing is available to all persons regardless of disability. If you require special assistance to attend the hearing, please contact the Lone Star GCD at (936) 494-3455 at least 24 hours in advance of the hearing.

A copy of the proposed DFCs may be requested by mail at the address below, is available for reviewing or downloading at www.lonestargcd.com, and may be reviewed, inspected, or obtained in person at the Lone Star GCD office located at 655 Conroe Park North Drive, Conroe, Texas 77303. All questions or requests for additional information regarding the proposed DFCs may be submitted to Lone Star GCD General Manager, Kathy Turner Jones. Please contact Ms. Jones by telephone at (936) 494-3426 or by visiting the Lone Star GCD office located at 655 Conroe Park North Drive, Conroe, Texas 77303.

DC CR26, 09/07/15

PUBLISHER'S AFFIDAVIT
STATE OF TEXAS
COUNTY OF MONTGOMERY

BEFORE ME, THE UNDERSIGNED AUTHORITY, ON THIS DAY PERSONALLY APPEARED MONTE WEST WHO BEING BY ME DULY SWORN, DEPOSES AND SAYS THAT HE IS AN AGENT TO THE PUBLISHER OF THE MONTGOMERY COUNTY NEWS, THAT SAID NEWSPAPER IS REGULARLY PUBLISHED IN MONTGOMERY COUNTY, TEXAS, AND GENERALLY CIRCULATED IN MONTGOMERY COUNTY, TEXAS; AND THAT THE NOTICE, A COPY OF WHICH IS HEREAFTER ATTACHED, WAS PUBLISHED IN SAID NEWSPAPER ON THE FOLLOWING DAYS:

20th DAY(S) OF August, 2015.

Cite/Cause# Public Notice For Sept. 17, 2015 Hearing

MERRILY THOMPSON
Notary Public, State of Texas
My Commission Expires
January 02, 2019

PUBLISHER/PUBLISHER'S REPRESENTATIVE, MONTE WEST

NOTARY:

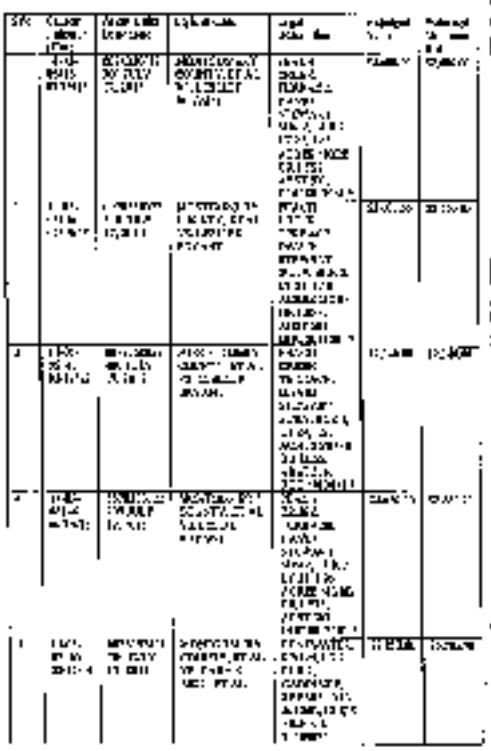
MY COMMISSION EXPIRES: 01-02-2019 AFFIX NOTARY SEAL ABOVE:

SWORN AND SUBSCRIBED TO ME ON THIS THE 21st DAY OF August, 2015, TO CERTIFY WHICH WITNESS MY HAND AND SEAL OF OFFICE.

NOTARY PUBLIC SIGNATURE IN AND FOR THE STATE OF TEXAS

MERRILY THOMPSON
PRINTED OR TYPED NAME OF NOTARY PUBLIC

LEGAL LEGAL LEGAL LEGAL LEGAL LEGAL LEGAL LEGAL



PUBLIC NOTICE
Lone Star Groundwater Conservation District
Notice of Hearing on Desired Future Conditions
September 17, 2015
1:00 p.m.
655 Conroe Park North Drive
Conroe, TX 77303
Published Dates: August 26, and September 2, 2015

PUBLIC NOTICE

SELF STORAGE STORAGE OF GOODS WILL BE HELD AT WAREHOUSE IN ACCORDANCE WITH THE PROVISIONS OF CHAPTER 59 OF THE TEXAS PROPERTY CODE. THE FOLLOWING UNITS WILL BE SOLD AT PUBLIC SALE TO THE HIGHEST BIDDER TO SATISFY A LANDLORD'S LIEN AGAINST SAID UNITS ON SEPTEMBER 18, 2015 AT 11:00AM AT 18444 N. FRAZIER ST. CONROE, TX 77304. MISCELLANEOUS, HOUSEHOLD GOODS AND PERSONAL EFFECTS OF TENANT: UNIT 1101 - JAMES CHAMBERS, ASHLEY TOWARD, ROBERT RAY, JESSICA RAY. UNIT 1102 - DAVID BROWN. PAYMENTS WILL BE MADE IN CASH ONLY AND MUST BE MADE AT THE TIME OF SALE. RESERVES THE RIGHT TO REJECT ANY AND ALL BIDS. AUCTION BY SOUTHWEST SALES.
PUBLISH DATES: 8/26/15 AND 09/02/15

Just for $25 per week see your ad here and on our website www.montgomerycountynews.net

WANTED WANTED WANTED WANTED

Help Wanted Now Hiring Apply in person with resume at The Pizza Store 9479 Eva St. Montgomery, TX 77316

AUTO AUTO AUTO AUTO

2013 Equinox $22,000
2013 Chevy Equinox LT, black, FWD, 15,000 miles, Single owner, like new....Only, nothing for any of amount. Call Larry C 936-806-3754

DRIVERS DRIVERS DRIVERS DRIVERS

DRIVER - SPK sign-on bonus! Up to 2900/wk pw. New equipment. Outstanding pay/bonus/benefits. Safety bonus. Dedicated. Flatbed with PCDS. No hopper/belts. CDL-A/2 yrs TT exp. req. Call 855 205 6861.

HOMES HOMES HOMES HOMES

Advertising begins at the start time by your county, Single and Double Wide homes. Historical homes of the county. Top Ridge Realty 936-588-1188 Open 7 days Monday 10:00 to 5:00 874 SH 105 East TX. Huntsville, TX 77340

New 3 story 6 apt. Fully Audited Income only $3,250 Gated investment apt. 936-449-0100 Open 7 days Mon-Sat 10:00 to 5:00 874 SH 105 E Huntsville, TX 77340 Keyway Investments.com

CLASSIFIED ADS, 936-449-NEWS (6397)

or email

news@montgomerycountynews.net

MARK TURNBULL
COUNTY CLERK
MONTGOMERY COUNTY

P.O. BOX 968
CONROE, TX 77305

(936) 539-7885
(281) 364-4200 EXT. 7885

CERTIFICATE OF POSTING

The State of Texas
County of Montgomery

I, Mark Turnbull, County Clerk of Montgomery County, Texas do hereby certify that on the 21 day of August 2015, at 3:55 a(m)(pm), a notice was presented to me for

Cane Ten Municipal Utility District

This notice is posted on the bulletin board at the Courthouse at 300 N. Main and on the County Clerk internet website:

http://gov.propertyinfo.com/tx-montgomery/

Anyone wishing to view the original meeting notice on file may do so at 210 W. Davis, Suite 106, Conroe, Texas during regular business hours.

Executed this 16 day of December 2015

MONTGOMERY COUNTY TEXAS * COUNTY CLERK * COUNTY OF

MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

BY _____ DEPUTY

Doc# 15-134??

POSTED
[illegible] 2015 at [illegible]
[illegible] Tawnee
COUNTY CLERK, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

LONE STAR GROUNDWATER CONSERVATION DISTRICT
NOTICE OF HEARING ON DESIRED FUTURE CONDITIONS
September 17, 2015

NOTICE IS HEREBY GIVEN to all interested persons within Montgomery County, Texas:

That the Board of Directors of the Lone Star Groundwater Conservation District ("Lone Star GCD") will hold a public hearing and accept public comment on the proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer underlying Montgomery County, Texas, in accordance with Section 36.108(d-2) of the Texas Water Code. The purpose of the hearing is to provide interested members of the public the opportunity to appear and provide comments to the Lone Star GCD related to the proposed DFCs.

The Lone Star GCD is one of five groundwater conservation districts located wholly or partially within Groundwater Management Area 14 ("GMA 14"); the other districts in GMA 14 include Bluebonnet Groundwater Conservation District, Brazoria Groundwater Conservation District, Lower Trinity Groundwater Conservation District, and Southeast Texas Groundwater Conservation District. At the joint GMA 14 joint planning meeting, held on June 24, 2015, the district representatives voted unanimously to approve the proposed DFCs which have been distributed to the districts for a 90-day comment period and public hearing.

The proposed DFCs approved by the district representatives of GMA 14 are described in terms of acceptable drawdown levels for each subdivision of the Gulf Coast Aquifer, including the Chicot, Evangeline, Burkeville, and Jasper, for each county located within GMA 14, or in terms of surface groundwater, as applicable. The acceptable levels of drawdown for each subdivision of the aquifer are measured in terms of water level groundwater over the proposed current planning cycle presented in feet, from 2009 estimated water levels. For Montgomery County, the relevant proposed DFCs include the following:

- From estimated year 2009 conditions, the average draw down of the Chicot aquifer should not exceed approximately 29 feet after 81 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline aquifer should not exceed approximately 44 feet after 81 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 44 feet after 81 years.
- From estimated year 2009 conditions, the average draw down of the Jasper aquifer should not exceed approximately 34 feet after 81 years.

This meeting will be held on September 17, 2015, beginning at 6:30 p.m., at the Lone Star GCD office in the Jimmie B. "Jim" Wesley Board Room, 655 Conroe Park North Drive, Conroe, Texas 77303.

Any person who desires to appear at the hearing and present written or other information on the proposed DFCs may do so in person, by legal representative, or both. Limits may be placed on the amount of time that each person is allowed to present verbal comments, but written comments may also be submitted. Those wishing to pray do so/present written comments on the proposed DFCs may also do so prior to the hearing date by regular mail, services addressed to Kathy Turner Jones, Lone Star GCD General Manager at 655 Conroe Park North Drive, Conroe, Texas 77303, or by facsimile at (936) 494-3438. (Note: Written comments will be accepted through October 6, 2015.) The hearing posted in this notice may be recessed from day to day or continued where appropriate.

This public hearing is available to all persons regardless of disability. If you require special assistance to attend the hearing, please contact the Lone Star GCD at (936) 494-3491 at least 24 hours in advance of the hearing.

A copy of the proposed DFCs may be requested by email at jones@lonestargcd.org, is available for viewing or downloading at www.lonestargcd.org, and may be reviewed, inspected, or obtained in person at the Lone Star GCD office located at 655 Conroe Park North Drive, Conroe, Texas 77303. All questions or requests for additional information regarding the proposed DFCs may be submitted to Lone Star GCD General Manager, Kathy Turner Jones. Please contact Ms. Jones by telephone at (936) 494-3436 or by visiting the Lone Star GCD office located at 655 Conroe Park North Drive, Conroe, Texas 77303.

END OF AD

Kathy Turner Jones, General Manager
Lone Star Groundwater Conservation District
655 Conroe Park North Drive
Conroe, Texas 77303
(936) 494-3436
(936) 494-3438 (fax)

Doc# 15-14943
POSTED
09/16/2015 8:12AM
Tiffany Bource
MARK TURNBULL, COUNTY CLERK
MONTGOMERY COUNTY, TEXAS

LONE STAR GROUNDWATER CONSERVATION DISTRICT
NOTICE OF PUBLIC HEARING ON PROPOSED DFC's

8:30 a.m., Thursday, September 17, 2015
Lone Star GCD – James B. "Jim" Wesley Board Room
655 Conroe Park North Drive
Conroe, Texas 77303

The Lone Star GCD Board of Directors has scheduled a public hearing to accept public comment on the proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer underlying Montgomery County, Texas, in accordance with Section 36.108(d-2) of the Texas Water Code. The purpose of the hearing is to provide interested members of the public the opportunity to appear and provide comments to the Lone Star GCD related to the proposed DFCs.

The Notice of Hearing on Desired Future Conditions, as provided in the attached document, shall be considered incorporated in its entirety hereto.

ATTACHMENT

Attachment A: LONE STAR GROUNDWATER CONSERVATION DISTRICT
NOTICE OF HEARING ON DESIRED FUTURE CONDITIONS
September 17, 2015

1. Call to Order and Declare Hearing Open to the Public
2. Roll Call
3. Presentation on proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer underlying Montgomery County, Texas in accordance with Section 36.108(d-2) of the Texas Water Code
4. Receive public comments related to the proposed DFC's.
5. Adjourn Public Hearing

The attached agenda schedule for the meeting of the District represents an estimate of the order for the indicated items and is subject to change at any time.

This public work session is available to all persons regardless of disability. If you require special assistance to attend the work session, please contact the Lone Star GCD at 936/494-3436 at least 24 hours in advance of the work session.

At any time during any of the above meetings and in compliance with the Texas Open Meetings Act, Chapter 551, Government Code, Vernon's Texas Codes, Annotated, the Lone Star Groundwater Conservation District Board may meet in executive session on any of the above agenda items for consultation concerning attorney-client matters (§551.071); deliberation regarding real property (§551.072); deliberation regarding prospective gift (§551.073); personnel matters (§551.074); and deliberation regarding security devices (§551.076). Any subject discussed in executive session may be subject to action during an open meeting.

Certification

I, the undersigned authority, do hereby certify that on September 14, 2015, at or before 8:30 a.m., I posted and filed the above notice of Board work session with the Montgomery County Clerk's office and also posted a copy in the front window of the Lone Star GCD office in a place convenient and readily accessible to the general public at all times and that it will remain so posted continuously for at least 72 hours preceding the scheduled time of said Board work session in accordance with the Texas Government Code, Chapter 551.

Kathy Turner Jones, General Manager
Lone Star Groundwater Conservation District

ATTACHMENT A:

LONE STAR GROUNDWATER CONSERVATION DISTRICT
NOTICE OF HEARING ON DESIRED FUTURE CONDITIONS

September 17, 2015

NOTICE IS HEREBY GIVEN to all interested persons within Montgomery County, Texas:

That the Board of Directors of the Lone Star Groundwater Conservation District ("Lone Star GCD") will hold a public hearing and accept public comment on the proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer underlying Montgomery County, Texas, in accordance with Section 36.108(d-2) of the Texas Water Code. The purpose of the hearing is to provide interested members of the public the opportunity to appear and provide comments to the Lone Star GCD relative to the proposed DFCs.

The Lone Star GCD is one of ten groundwater conservation districts located wholly or partially within Groundwater Management Area 14 ("GMA 14"); the other districts in GMA 14 include Bluebonnet Groundwater Conservation District, Brazos Groundwater Conservation District, Lower Trinity Groundwater Conservation District, and Southeast Texas Groundwater Conservation District. At the last GMA 14 joint planning meeting, held on June 24, 2015, the district representatives voted unanimously to approve the proposed DFCs, which have been distributed to the districts for a 90-day comment period and public hearing.

The proposed DFCs approved by the district representatives of GMA 14 are described in terms of acceptable drawdown levels for each subdivision of the Gulf Coast Aquifer, including the Chicot, Evangeline, Burkeville, and Jasper, for each county located within GMA 14, or in the surface subsidence, as applicable. The acceptable levels of drawdown for each subdivision of the aquifer are measured in terms of water level drawdowns over the proposed current planning cycle measured in feet from 2009 actual water levels. For Montgomery County, the relevant proposed DFCs include the following:

- From estimated year 2009 conditions, the average draw down of the Chicot aquifer should not exceed approximately 23 feet after 81 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline aquifer should not exceed approximately -4 feet after 81 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately -4 feet after 81 years.
- From estimated year 2009 conditions, the average draw down of the Jasper aquifer should not exceed approximately 34 feet after 81 years.

The hearing will be held on September 17, 2015, beginning at 9:30 a.m., at the Lone Star GCD office in the James R. "Jim" Wesley Board Room, 655 Conroe Park North Drive, Conroe, Texas 77303.

Any person who desires to appear at the hearing and present comment or other information on the proposed DFCs may do so in person, by legal representative, or both. Limits may be placed on the amount of time that each person is allowed to present verbal comments, but written comments may also be submitted. Those wishing to provide advanced written comment on the proposed DFCs may also do so prior to the hearing date by regular mail services addressed to Kelly Turner Jones, Lone Star GCD General Manager at 655 Conroe Park North Drive, Conroe, Texas 77303, or by facsimile at (936) 494-3138. (Note: Written comments will be accepted through October 4, 2015.) The hearing posted in this notice may be recessed from day to day or continued where appropriate.

This public hearing is available to all persons regardless of disability. If you require special assistance to attend the hearing, please contact the Lone Star GCD at (936) 494-3129 at least 24 hours in advance of the hearing.

A copy of the proposed DFCs may be requested by email at kjones@lonestargcd.org, is available for reviewing or downloading at www.lonestargcd.org, and may be reviewed, inspected, or obtained in person at the Lone Star GCD office located at 655 Conroe Park North Drive, Conroe, Texas 77303. All questions or requests for additional information regarding the proposed DFCs may be submitted to Lone Star GCD General Manager, Kelly Turner Jones. Please contact Ms. Jones by telephone at (936) 494-3129 or by visiting the Lone Star GCD office located at: 655 Conroe Park North Drive, Conroe, Texas 77303.

LONE STAR
GROUNDWATER CONSERVATION DISTRICT

September 17, 2015

MINUTES OF PUBLIC HEARING ON GROUNDWATER MANAGEMENT AREA 14 PROPOSED DESIRED FUTURE CONDITIONS

The Board of Directors of the Lone Star Groundwater Conservation District ("District") met in regular session, open to the public, in the District Board Room located at 655 Conroe Park North Drive, Conroe, Texas, within the boundaries of the District on September 17, 2015.

President Tramm called to order the Public Hearing on Groundwater Management Area (GMA) 14 proposed Desired Future Conditions (DFCs) at 8:50 a.m.

The roll was called of the members of the Board of Directors, to wit:

Sam W. Baker
John Bleyl, PE
Jace Houston
Roy McCoy, Jr.
Rick McTett
Jim Stinson, PE
Richard J. Tramm
Scott Weisinger, PG
W. R. Wood

Members of the Board were present, with the exception of Director Baker, Director Houston, Director McCoy, and Director Weisinger, thus constituting a quorum of the Board of Directors. Also, in attendance were Kathy Turner Jones, District General Manager; Brian Sledge, General Counsel; Shauna Fitzsimmons, Attorney; Mark Lowry, District Consultant; District staff; and members of the public. *Copies of the public sign-in sheets are attached hereto as Exhibit "A".*

President Tramm announced that the public hearing on proposed DFCs was called to order and open to the public. President Tramm stated that the purpose of the public hearing was for the Board of Directors to hear comments on the proposed DFCs adopted by Groundwater Management Area 14 (GMA 14) that are relevant to the District. President Tramm noted for the record that notice of this hearing was published and posted as required by Section 36.060(b) and (c) of the Texas Water Code. President Tramm stated that the adopted proposed DFCs were developed by the various groundwater conservation district representatives that comprise GMA 14. President Tramm stated that it is the District's current intention that the Board of Directors will discuss the summary report and any suggested revisions in conjunction with the regular October Board of Directors meeting on October 13th, and that comments will be accepted until 5 PM, October 5, 2015.

Bill Mullican, who serves as a consultant for GMA 14 on the DFC development process, gave an overview of the DFC process and the proposed DFCs that have been adopted by GMA 14 and are being considered during the current 90-day public comment period. Mr. Mullican discussed the different GMAs in Texas with a focus on GMA 14, the new DFC adoption process, the GMA 14 considerations of the nine statutory factors set forth in Section 36.108, Water Code, set forth in Section 36.108(d-2), Water Code, the statutory balancing test, and the DFCs proposed for Montgomery County. Mr. Mullican noted that information regarding the proposed DFCs, including meeting agendas, all public comments, presentations, reports, and other relevant documentation, has been made available to the public for the duration of the 90-day public comment period. A link to where all relevant information is included in Mr. Mullican's presentation. *A copy of the presentation is attached hereto as Exhibit "B".*

Public comments received:

Scott Sustman, President of the Lake Conroe Communities Network, presented written testimony. The primary focus of Mr. Sustman's comments were centered on the socioeconomic impacts of fluctuating water levels at Lake Conroe. *A copy of the testimony is attached hereto as Exhibit "C".*

Mike Thornhill, a hydrogeologist with the Thornhill Group, and representing Quadvest, provided oral comments stating his belief that the proposed DFCs are not valid legally, based on his interpretation of Texas water law. Mr. Thornhill's comments primarily focused on his belief that DFCs should be aquifer-based. Mr. Thornhill did not provide any written comments or provide a written presentation during the hearing.

Bob Harden, a hydrogeologist with R W Harden & Associates and representing the City of Conroe, gave a presentation on artesian pressure versus water table storage in aquifers. *A copy of the presentation is attached hereto as Exhibit "D".*

Marty Jones, an attorney with Sprouse, Shrader, Smith PLLC, and representing Quadvest, provided oral comments in support of comments previously made during the hearing. He stated that all the districts in GMA 14 should unite and consider joint planning and have a DFC for each aquifer, in lieu of what he considers to be DFCs based on county boundaries. Mr. Jones did not provide any written comments for the hearing, however, he had previously submitted a letter to all districts in GMA 14 and asked that it be included in the record. *A copy of the letter, dated August 25, 2015, is attached hereto as Exhibit "E".*

Wade Oliver, a hydrogeologist with INTERA, Inc., representing Montgomery County WCID #1, Porter Special Utility District, San Jacinto River Authority, Southern Montgomery County Municipal Utility District, The Woodlands Joint Powers Agency, City of Houston, Fort Bend Subsidence District, Harris-Galveston Subsidence District, and the North Harris County Regional Water Authority, provided a presentation on the factors that GCDs must consider when adopting proposed DFCs. As part of this presentation, Mr. Oliver provided a technical overview of the concept of Total Estimated Recoverable Storage that must be considered when adopting proposed DFCs and compared it to the functional realities of maintaining artesian head in water wells in confined aquifers. *A copy of the presentation is attached hereto as Exhibit "F".*

Van Kelly, with INTERA, Inc., and representing Montgomery County WCID #1, Porter Special Utility District, San Jacinto River Authority, Southern Montgomery County Municipal

Utility District, The Woodlands Joint Powers Agency, City of Houston, Fort Bend Subsidence District, Harris-Galveston Subsidence District, and the North Harris County Regional Water Authority, provided a presentation on debunking proposed storage-based (TERS) Desired Future Conditions that have been suggested by some of the other commenters who are in opposition to the adopted proposed DFCs developed by GMA 14. In summary, Mr. Kelley highlighted that DFCs based on TERS are out of step with the District's Mission Statement, that they do not represent "better science," that there is no logical basis for the storage-based DFCs that have been suggested by other commenters to the District, and that those suggested storage-based DFCs are based on "reverse engineering" just as the commenters who have recommended them have complained of when referring to the DFCs developed by GMA 14. A *copy of the presentation is attached hereto as Exhibit "G".*

President Tramm announced that the sign-in sheet indicated that everyone who wanted to present comments on the proposed DFCs had now done so, but asked if there was anyone present who desired to provide comments. No one present at the hearing indicated a desire to present further comment. President Tramm then noted that the administrative record would remain open for the submission of any additional written comments to the District until 5:00 PM, October 5, 2015.

President Tramm adjourned the public hearing on GMA 14 proposed DFCs at 10:43 a.m.

PASSED, APPROVED, AND ADOPTED THIS 13TH DAY OF OCTOBER, 2015.

Rick Moffatt, Board Secretary

SIGN IN SHEET

September 17, 2015
Public Hearing

Do you wish to speak on an agenda item?	NAME	CITY, STATE, ZIP	E-Mail
	Chris Dodek	Houston, Tx, 77019	cdodek@lbbaustin.com
	Bob Hayden	Austin	bob.hayden@rwharden.com
	Mark Johnson	Mineola, Tx 75773	mark.johnson@steen.us
	Pat Gustman	Mid-County, Tx	Gustmanpg@Hotmail.com
	Van Kelem	Austin, Tx 78704	vkelleyatt@aol.com
	Mike Thornhill	Round Rock, Tx 78664	mthornhill@kjfirm.com
	Wade Oliver	Houston, TX	woliver@mea.com
	Chad Ondrias	Houston Tx	condrias@mea.com
	Kenia Cobb	Pflugerville, Tx	Kenia.cobb@pflugerville.tx.us
	Clark Beaver	Salado, Tx	beaver@tlc.com
	Byron Beaver	Shenandoah, Tx	bbeavers@hotmail.com
	Mark Evans		mevans@lbbaustin.com
	Lance Stahl	Tomball, Tx	Hmud-SUD
	Charles Sowell	Montgomery, Tx	[illegible]

Exhibit "A"

SIGN IN SHEET

September 17, 2015
Public Hearing

Do you wish to speak on an agenda item?	NAME	CITY, STATE, ZIP	E-Mail
	Simon Sweet	Cypress, TX 77433	
	Dick Berry	Montgomery, TX	
	(illegible)	Conroe, TX 77305	
	Kenneth Lehberg	Kemah, TX	
	Dana Duncan		
	D.A. Brown	77355	
	Sally Dunlavy	Conroe, TX	

Exhibit "A"

PO Box 2407, Ozona, Texas 76943
Phone: (325) 392-2476 Metro: (915) 141-3427

Public Comment Registration

Please complete and submit this form if you would like to speak or have a question for the Board.

Name: Mike Thornhill Date: 9/17/15

Address: 1101 S. Main St. Box 208 Rankin 79778

Who you are representing: Self

Question: DFC

PO Box 2407, Ozona, Texas 76943
Phone: (325) 392-2476 Metro: (915) 141-3427

Public Comment Registration

Please complete and submit this form if you would like to speak or have a question for the Board.

Name: Shelly Dishman Date: 9/17/15

Address: 124 Fair Park Dr Montgomery Tx 77356

Who you are representing: Lone Cedar Groundwater Conservation District

Question: I have a statement at this time

PO Box 2407, Ozona, Texas 76943
Phone: (325) 392-2476 Metro: (915) 141-3427

Public Comment Registration

Please complete and submit this form if you would like to speak or have a question for the Board.

Name: Mayor Thompson Date: 09/17/15

Address: 102 S. Taylor Ave. Ste.

Who you are representing: Self

Question:

PO Box 2407, Ozona, Texas 76943
Phone: (325) 392-2476 Metro: (915) 141-3427

Public Comment Registration

Please complete and submit this form if you would like to speak or have a question for the speaker or Board.

Name: Bob Hayden Date: 9-17-2015

Address: Box 1x

Who you are representing: City of Ozona

Question:

PO Box 409, Liberty, Texas 77575
Phone: (936) 336-4516 Metro (936) 441-3467

Public Comment Registration

Please complete and submit this form if you would like to speak or have a question for the Board.

Name: Wade Oliver Date: 9/17/2015

Address: 91 Sugar Creek Cabs Blvd Ste 500 Sugar Land TX

Who you are representing: INEOS Inc.

Question: Speak

PO Box 409, Liberty, Texas 77575
Phone: (936) 336-4516 Metro (936) 441-3467

Public Comment Registration

Please complete and submit this form if you would like to speak or have a question for the Board.

Name: [illegible] Date: 9/17/15

Address: [illegible]

Who you are representing: [illegible]

Question: [illegible]

Speak

LOWER TRINITY
GCD

LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT
NOTICE OF PUBLIC HEARING ON DESIRED FUTURE CONDITIONS

POLK COUNTY ENTERPRISE
EIN# 74-1456949
P.O. Box 1276
Livingston, Texas 77351

STATE OF TEXAS]

AFFIDAVIT OF PUBLICATION

COUNTY OF POLK]

My name is Alvin Holley and I am Publisher of the POLK COUNTY ENTERPRISE. I am over the age of 18, have personal knowledge of the facts stated herein, and am otherwise competent to make this affidavit.

The POLK COUNTY ENTERPRISE is a legal newspaper publication Under Texas law, headquartered and regularly published in Polk County, Texas. It is a newspaper of general circulation and generally circulated in Polk County.

The attachment hereto was published in the POLK COUNTY ENTERPRISE, at or below our lowest rate, in its publication as follows:

No. 1 Date August 20 2015
No. _____ Date _____ 2015
No. _____ Date _____ 2015
No. _____ Date _____ 2015

Publication Fee $ 246.50

Alvin Holley

SUBSCRIBED AND SWORN TO BEFORE me this the 20th day of August, 2015.

Georgia S. Bailey
Notary Public in and for the State of Texas
My commission expires 10/31/2016

GEORGIA S. BAILEY
NOTARY PUBLIC
STATE OF TEXAS

NOTICE OF PUBLIC HEARING AND REGULAR MEETING NOTICE FOR THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

The Board of Directors of the Lower Trinity Groundwater Conservation District will hold a Public Hearing on Proposed Rule Changes on Friday, September 11, at 10:00 a.m. at the Polk County Annex, Room 165, located at 311 E. Church Street in Livingston, Texas. The Public Hearing will be held in conjunction with the District's regular monthly Board meeting to include the discussion of a proposed DFC and explanatory report. The subject of the Rulemaking hearing is to take public comment on the proposed changes. Proposed changes would revise the Provisions of Rule 4- Fees and Reports to include a waiver of quarterly payment for non-exempt well operators that uses less than 250,000 gallons per quarter. Operators will still be required to provide quarterly water pumpage reports to the District, but only submit the full payment at the end of each year. The General Manager will determine annual eligibility. Proposed Changes would revise the provisions of Rule 4- Fees and Reports section 4.1 to include the reference to which statutory provisions passed during the 2015 Legislative session. Proposed Changes would revise the provisions of Rule 4- Fees and Reports section 4.3 to include a minimum late fee of $50.00 per month to be charged instead of 5% per month if the calculated 5% is less than $50.00 as determined by the General Manager. A draft copy of the proposed rule changes can be viewed on the District's website, www.lgcd.org. Any comments or concerns can be submitted to the District's office via mail or email, lgcd@sbcglobal.net; or via telephone (936)327-0594 prior to the hearing.

NOTICE OF PUBLIC HEARING ON DESIRED FUTURE CONDITIONS FOR
LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

SAN JACINTO NEWS TIMES
EIN#74-1456949
P.O. BOX 1589
SUMMERLAND, TX 77371

STATE OF TEXAS)

AFFIDAVIT OF PUBLICATION

COUNTY OF SAN JACINTO)

My name is Alvin Holley, and I am publisher of the SAN JACINTO NEWS TIMES. I am over the age of 18, have personal knowledge of the facts stated herein, and am otherwise competent to make this affidavit.

The SAN JACINTO NEWS TIMES is a legal newspaper publication under Texas law, headquartered and regularly published in San Jacinto County, Texas. It is a newspaper of general circulation, and is generally circulated in San Jacinto County.

The attached legal was published in the SAN JACINTO NEWS TIMES at or below our lowest rate to the public in the following issues:

No. 1 Date August 20 , 2015
No. ____ Date _____, 2015
No. ____ Date _____, 2015
No. ____ Date _____, 2015

Publication Fee $ 246.50

Alvin Holley, Publisher

SUBSCRIBED AND SWORN TO UNTO ME this the 28th day of August, 2015.

Georgia S. Holley
Notary Public, in and for the State of Texas
My Commission expires 10/31/2016

GEORGIA S. PADLEY
NOTARY PUBLIC
STATE OF TEXAS

PUBLIC HEARING AND REGULAR MEETING NOTICE FOR THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

The Board of Directors of the Lower Trinity Groundwater Conservation District will hold a Public Hearing on Proposed Rule Changes on Friday, September 4, 2015 at 10:00 a.m. at the Polk County Office of Texas A&M Forest Service, Room 175, located at 602 S. Church Street in Livingston, Texas. The Public Hearing will be held in conjunction with the District's regularly scheduled meeting to include the adoption of a proposed Rule 4 and Replacement Report. The subject of the Rulemaking hearing is to take public comment on the proposed rule changes. Proposed changes would revise the provisions of Rule 4 – Fees and Reports, to include a method of quarterly payments for non-exempt well operators that produce more than 250,000 gallons per quarter. Operators will still be required to provide quarterly meter pumpage reports to the District, but only submit the total payment at the end of each year. The General Manager will determine before [illegible], [illegible]. Proposed Changes would revise the provisions of Rule 4 – Fees and Reports section [illegible] to include the provisions to match statutory provisions passed during the 2015 Legislative session. Proposed Changes would revise the provisions of Rule 4 – Fees and Reports section 4.01 to include a minimum fee of $20.00 per month to be charged instead of 1% per month if the calculated 1% is less than $20.00 to be determined by the General Manager. A draft copy of the proposed rule changes may be viewed on the District's website, www.lowertrinitygcd.org. Any comments or concerns can be submitted to the District's office via mail or email, lowertrinitygcd@sbcglobal.net, or via telephone prior to the hearing.

2015-102

Lower Trinity Groundwater Conservation District

Office: (936) 327-9191
Fax: (936) 327-9202
Email: LowerTrinity@Livingston.net
P.O. Box 1429 Livingston, TX 77351
Gen'l Mgr: Gregg Ashworth, A.K. "Kyle" Zedlitzka

LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

TO: THE BOARD OF DIRECTORS OF THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT AND ALL OTHER INTERESTED PARTIES.

Notice is given that the Board of Directors of the **Lower Trinity Groundwater Conservation District** will hold a regular meeting on September 15, 2015 at 10:30 AM. At the Polk County Office Annex, Room 105, located at 402 E. Church Street in Livingston, Texas.

The agenda items of business may be considered, discussed and/or acted upon in a different order than the order set forth below. Public comment is limited to 5 minutes per speaker and/or 30 minutes total for all speakers.

AGENDA:

1. Call to order;
2. Welcome and introductions;
3. Public Comments on proposed DFCs;
4. Public Comments on proposed Rules Change;

   Meeting will be convened for regular board meeting business.
5. Public Comments for regular District business;
6. Reading and action if any, of prior meeting minutes, (July 10, 2015);
7. Items discussion and possible action on proposed DFCs;
8. Board discussion and possible action on proposed Rule Changes;
9. General Manager Report - (July - August 2015);
10. Treasurer and Financial Reports, including Investments;
11. The next scheduled Board meeting is November 9, 2015;
12. Adjourn.

2015-103

Lower Trinity Groundwater Conservation District

Office: (936) 327-5931 Fax: (936) 327-5513
P.O. Box 1879 Livingston, TX 77351
Email: ltgcd@livingston.net
Web: www.ltgcd.org, Like us on Facebook

NOTICE OF PUBLIC HEARING AND REGULAR MEETING NOTICE FOR THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT
September 11, 2015

NOTICE IS HEREBY GIVEN to all interested persons within Polk and San Jacinto Counties, Texas: That the Board of Directors of the Lower Trinity Groundwater Conservation District ("Lower Trinity GCD") will hold a public hearing and accept public comment on Proposed Rule Changes on Friday, September 11, at 10:30 a.m., at the Polk County Office Annex, Room 175, located at 602 E. Church Street in Livingston, Texas.

This Public Hearing will be held in conjunction with the District's regular monthly board meeting to include the discussion and possible action on proposed DFC's and Explanatory report. The subject of the Rulemaking hearing is to take public comment on the proposed rule changes.

- Proposed changes would revise the provisions of Rule 4 – Fees and Reports, to include a waiver of quarterly payments for non-exempt well operators that use less than 250,000 gallons per quarter. Operators will still be required to provide quarterly water pumpage reports to the District, but only submit the total payment at the end of each year. The General Manager will determine who is eligible.
- Proposed Changes would revise the provisions of Rule 4 – Fees and Reports section 4.5. To update the references to match statutory provisions passed during the 2015 Legislative session regarding exported water outside the District.
- Proposed Changes would revise the provisions of Rule 4 – Fees and Reports section 4.8. To include a minimum fee for all $50.00 per month to be charged to users of 1K per month or less calculated 1K at a cost from $50.00 to be determined by the General Manager.

A draft copy of the proposed rule changes can be viewed on the District's website, www.ltgcd.org. Any comments or questions can be submitted to the District's office via mail or email, ltgcdtexas@livingston.net, or via telephone 936-327-5931 prior to the hearing.

2015-104

Lower Trinity Groundwater Conservation District

Office: (936) 327-4191 Fax: (936) 327-4192
P.O. Box 1678 Livingston, TX 77351
Email: info@lowertrinity.org
Web: www.lowertrinity.org

NOTICE OF PUBLIC HEARING ON DESIRED FUTURE CONDITIONS FOR THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

September 11, 2015

NOTICE IS HEREBY GIVEN to all interested persons in Polk and San Jacinto Counties, Texas, that the Board of Directors of the Lower Trinity Groundwater Conservation District (Lower Trinity GCD) will hold a joint hearing and receive public comment on proposed desired future conditions (DFCs) for the Gulf Coast Aquifer within Polk and San Jacinto Counties, Texas, in accordance with Section 36.108(d-4) of the Texas Water Code. The purpose of the hearing is to provide interested members of the public the opportunity to appear and provide comments to the Lower Trinity GCD Board on the proposed DFCs.

The Lower Trinity GCD is one of five groundwater conservation districts located within Groundwater Management Area 12 (GMA 12), the other districts in GMA 12 are the Fox Pasture Groundwater Conservation District, Trinity Groundwater Conservation District, Lone Star Groundwater Conservation District, and Southeast Texas Groundwater Conservation District. At the last GMA 12 joint planning meeting, held on June 24, 2015, the district representatives voted unanimously to approve the proposed DFCs, which have been submitted to the districts for a 90-day comment period and public hearing.

The proposed DFCs approved by the district representatives of GMA 12 are described in terms of acceptable drawdown, with the establishment of the Gulf Coast Aquifer, including the Chicot, Evangeline, and Jasper, for each county located within GMA 12, as the desired future conditions, as applicable. The acceptable levels of drawdown for each subdivision of the aquifer are presented in terms of water level drawdowns over the proposed current planning cycle measured in feet from 2009 estimated water levels. For Polk and San Jacinto Counties, the relevant proposed DFCs include the following:

- From estimated year 2009 conditions, the average drawdown of the Chicot aquifer shall not exceed approximately 26 feet for Polk County and 32 feet for San Jacinto County after 61 years.
- From estimated year 2009 conditions, the average drawdown of the Evangeline aquifer shall not exceed approximately 16 feet for Polk County and 19 feet for San Jacinto County after 61 years.
- From estimated year 2009 conditions, the average drawdown of the Burkeville confining unit shall not exceed approximately 15 feet for Polk County and 19 feet for San Jacinto County after 61 years.
- From estimated year 2009 conditions, the average drawdown of the Jasper aquifer shall not exceed approximately 71 feet for Polk County and 268 feet for San Jacinto County after 61 years.

This hearing will be held on September 11, 2015, beginning at 10:30 a.m. at the Polk County Office Annex, Room 175, located at 520 E. Church St in Livingston, Texas.

Any person who desires to appear at the hearing and present comments or other information on the proposed DFCs may do so in person, by legal representative, or both. He/she may be placed on the agenda of this hearing in order to present verbal comments, but written comments may also be submitted. Those wishing to provide advanced written comments on the proposed DFCs may do so prior to the hearing date by regular mail or electronic submittal to Gary Ashworth, Lower Trinity GCD General Manager at (936) 327-4191, Livingston TX 77351 or at fax/info@lowertrinity.org (936) 327-4192.

This public hearing is available to all persons regardless of disability. If you require special assistance to attend the hearing, please contact the Lower Trinity GCD at (936) 327-4191 at least 24 hours in advance of the hearing.

A copy of the proposed DFCs may be requested by mail at the district's physical address and may be viewed and downloaded from the district's website. Additionally, the proposed DFCs may be reviewed, inspected, or obtained in person at the Lower Trinity GCD office located at the district's office at 602 E. Church Street, Room 141 in Livingston, TX. All questions regarding the proposed DFCs and additional information regarding the proposed DFCs may be submitted to Lower Trinity GCD Deputy Field Supervisor Cory Atkinson. Please contact Mr. Atkinson by telephone at (936) 327-4191 or by visiting the Lower Trinity GCD office located at 602 E. Church St in Livingston, TX 77351.

000003544

Lower Trinity Groundwater Conservation District

Office: (936) 327-1191 Fax: (936) 327-1622
P.O. Box 1870 Livingston, TX 77351
Email: LowerTrinity@livingston.net
Glen Harry Ashworth, Jr., General Manager

NOTICE OF PUBLIC HEARING ON DESIRED FUTURE CONDITIONS FOR THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

September 11, 2015

NOTICE IS HEREBY GIVEN to all interested parties within Polk and San Jacinto Counties, Texas that the Board of Directors of the Lower Trinity Groundwater Conservation District ("Lower Trinity GCD") will hold a public hearing, and accept public comment on the proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer System within Polk and San Jacinto Counties, Texas, in accordance with Section 36.108(d-3) of the Texas Water Code. The purpose of the hearing is to provide interested members of the public the opportunity to review and provide comments to the Lower Trinity GCD related to the proposed DFCs.

The Lower Trinity GCD is one of five groundwater conservation districts located within Groundwater Management Area 14 ("GMA 14") the other districts in GMA 14 include the Region C Water Planning Group, Groundwater Conservation District, Inc., Southeast Texas Groundwater Conservation District, Trinity Glen Rose Groundwater Conservation District, and Southeast Texas Groundwater Conservation District. At the last GMA 14 joint planning meeting, held on June 24, 2015, the district representatives voted unanimously to approve the proposed DFCs, which have been distributed to the districts for a 90 day comment period and public hearing.

The proposed DFCs adopted by the majority representatives of GMA 14 are described in terms of managed groundwater levels for each relevant layer of the Gulf Coast Aquifer, including the Chicot, Evangeline, Burkeville, and Jasper. For each county located within GMA 14, which has had average subsidence, or applicable, the acceptable levels of drawdown for each subdivision of the aquifer are measured in terms of water level drawdown over the proposed planning cycle measured in feet from 2010 estimated water levels. For Polk and San Jacinto Counties, the relevant proposed DFCs include the following:

- Desired estimated year 2070 average drawdown of the Chicot Aquifer should not exceed approximately 26 feet for Polk County and 29 feet for San Jacinto County after 60 years.
- Desired estimated year 2070 average drawdown of the Evangeline Aquifer should not exceed approximately 19 feet for Polk County and 17 feet for San Jacinto County after 60 years.
- Desired estimated year 2070 average drawdown of the Burkeville Confining Unit should not exceed approximately 16 feet for Polk County and 19 feet for San Jacinto County after 60 years.
- Desired estimated year 2070 average drawdown of the Jasper Aquifer should not exceed approximately 75 feet for Polk County and 108 feet for San Jacinto County after 60 years.

This hearing will be held on September 11, 2015, beginning at 6:00 p.m. at the Polk County Office Annex, Room 175, located at 402 E. Church St. in Livingston, Texas.

Any person who desires to appear at the hearing and present comments or testimony regarding the proposed DFCs may do so. All persons, by legal representative or both, may be heard on the subject of the DFCs; however, in order to allow for an orderly hearing, written comments may also be submitted. Those wishing to provide advance written comments on the proposed DFCs may also do so prior to the hearing date by regular mail service, writing to Glen Ashworth, Lower Trinity GCD General Manager at P.O. Box 1870, Livingston, TX 77351 or by facsimile at (936) 327-1622.

This public hearing is available to all persons regardless of disability. If you require special assistance to attend the hearing, please contact the Lower Trinity GCD at (936) 327-1191 at least 24 hours in advance of the hearing.

A copy of the proposed DFCs may be requested by email at LowerTrinity@livingston.net and is available for downloading at www.lowertrinitygcd.com or may be reviewed, inspected, or obtained in person at the Lower Trinity GCD office located at the District office at 402 E. Church Street, Room 161 in Livingston, TX. All questions or requests for additional information regarding the proposed DFCs may be submitted to Lower Trinity GCD General Manager, Glen A. Ashworth, Jr. Mr. Ashworth is available at (936) 327-1191 or by visiting the Lower Trinity GCD office located at 402 E. Church St in Livingston, TX 77351.

Polk County Texas

Lower Trinity Groundwater Conservation District

Office: (936) 327-0703 Fax: (936) 327-0704
P.O. Box 1373 Livingston, TX 77351
Email: LowerTrinity@livingston.net
Web: LowerTrinityGroundwater.com

NOTICE OF PUBLIC HEARING AND REGULAR MEETING NOTICE FOR THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT
September 21, 2015

NOTICE IS HEREBY GIVEN to all interested persons within Polk and San Jacinto Counties, Texas: That the Board of Directors of the Lower Trinity Groundwater Conservation District ("Lower Trinity GCD") will hold a public hearing and accept public comment on Proposed Rule Changes on Friday, September 11, at 10:30 a.m. at the Polk County Office Annex, Room 225, located at 602 N. Church Street in Livingston, Texas.

This Public Hearing will be held in conjunction with the District's regular monthly Board meeting to include the discussion and possible action on proposed LTGCD's end of Legislatory report. The subject of the Rulemaking Hearing is to take public comment on the proposed rule changes.

- Proposed changes would revise the provisions of Rule 4 – Fees and Reports to include a waiver of quarterly pay reports for non-exempt well operators that use less than 250,000 gallons per quarter. Operators will still be required to provide quarterly water pumpage reports to the District, but only submit the total pumpage at the end of each year. The General Manager will determine waiver eligibility.
- Proposed Changes would revise the provisions of Rule 4 – Fees and Reports section 4.1. To update the references to match statutory provisions passed during the 2015 Legislative session regarding export of water outside the District.
- Proposed Changes would revise the provisions of Rule 4 – Fees and Reports section 4.4. To include a minimum fee fee of $50.00 per month to be charged instead of $5 per month if the established 0% is less than $50.00 as determined by the General Manager.

A draft copy of the proposed rule changes can be viewed on the District's website, www.ltgcd.org. Any comments or concerns can be submitted to the District's office via mail or email, ltgcddistrict@livingston.net, or via telephone 936-327-0703 prior to the hearing.

Posted on: F Jan 30
San Jacinto County
at [illegible] 2015 at [illegible]
[illegible]

Office (936) 327-0331
Fax (936) 327 9330
Email: LowerTrinityDistrict@Livingston.net
P.O. Box 1370 Livingston, TX 77351
GM: Gary Johnson, AAI; Capital Resources

Lower Trinity Groundwater Conservation District

LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

TO: THE BOARD OF DIRECTORS OF THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT AND ALL OTHER INTERESTED PARTIES.

Notice is given that the Board of Directors of the **Lower Trinity Groundwater Conservation District will** hold a regular meeting on September 11, 2015 at 10:30 AM. At the Polk County Office Annex, Room 125, located at 102 E. Church Street in Livingston, Texas.

The agenda items of business may be considered, discussed and/or acted upon in a different order than the order set forth. Below. Public comment is limited to 5 minutes per speaker and/or 30 minutes total for all speakers.

AGENDA:

1. Call to order
2. Welcome and introductions
3. Public Comments on proposed DFCs:
4. Public Comments on proposed Rules Changes:
   Meeting will be convened for regular Board meeting business.
5. Public Comments for regular District business:
6. Reading and action if any, of prior meeting minutes, (July 10, 2015);
7. Board discussion and possible action on proposed DFCs;
8. Board discussion and possible action on proposed Rule Changes;
9. Generaral Manager Report – (July- August 2015);
10. Treasurer and Financial Reports, including Investments;
11. The next scheduled Board meeting is November 6, 2015;
12. Adjourn.

Posted for 72 hrs on the
Polk County Courthouse
Bulletin Board on 9/8/2015 at 11:30 a.m.
by Travis Judy.

Lower Trinity Groundwater Conservation District

P.O. Box 1575 Livingston, TX 77351
Scott.Lily@LowerTrinity.org
Office (936) 327-6993 Fax (936) 327-6233

LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT
BOARD OF DIRECTORS MEETING MINUTES
September 11, 2018

Present: Board of Directors Clyde Jordan, Wesley Smith, Charles Whitten, Randy Baker, and Ashley Reeves. In attendance were also Gary Ashmore, Crystal Reddicks, Marvin Jones and Patrick Cabaniss.

Board President, Clyde Jordan called the meeting to order at 10:00 A.M.

The meeting was opened up for Public Comments regarding the proposed DFCs for the Lower Trinity Groundwater Conservation District. Mr. Marvin Jones, an attorney representing the City of Conroe in a lawsuit against the Lone Star Groundwater Conservation District addressed the board members and conveyed his client's opinion regarding the proposed DFCs for Montgomery County. Mr. Jones submitted a document into record dated March 16, 2018 with the subject of (a) status of joint planning in groundwater management areas; and (b) use of "geographic areas" in establishing district future conditions. (Document attached to minutes). Mr. Jones spoke for approximately 30 minutes with the board members. The Public comment period was closed as no other persons where present to speak on the subject.

The meeting was opened up for Public Comments regarding the purposed rules changes to the Lower Trinity Groundwater Conservation District, Rule #4. The Public comment period was closed as no persons where present to speak on the subject.

The meeting was reconvened for regular board meeting business, there where no public comments regarding regular board business.

Ashley Reeves made a motion to adopt the proposed rule changes, Randy Baker seconded, all approved: Proposed change #1 would revise the provisions of Rule 4 – Fees and Reports. To include a waiver of quarterly payments for non-exempt well operators that uses less than 250,000 gallons per quarter. Operators will still be required to provide quarterly water pumpage reports to the District, but only submit the total payment at the end of each year. The General Manager will determine waiver eligibility. Proposed Change #2 would revise the provisions of Rule 4 – Fees and Reports section 4.1. To update the references to match statutory provisions passed during the 2015 Legislative session regarding export of water outside the District. Proposed Change #3 would revise the provisions of Rule 4 – Fees and Reports, section 4.3, To include a minimum late fee of $10.00 per month to be charged instead of 1% per month if the calculated 1% is less than $50.00 as determined by the General Manager. These rules changes will improve the District administration processes and lower costs for Non-Exempt well operators associated with pumpage pay fees.

The board reviewed the past minutes from the July 10, 2018 Board of Directors meeting. Charles Whitten motioned that the minutes be accepted, Randy Baker seconded the motion and all board members approved.

Ashley Reeves made a motion to approve the proposed DFCs and to have Gary Ashmore vote to approve the proposed DFCS in the future GMA 14 board meetings. (The aquifer-wide DFCs for GMA 14 and the DFCs for each specific aquifer and County.) Randy Baker seconded, all board members approved.

Gary Ashmore presented the General Manager's report for July and August, 2018.

Income for the District YTD Actual was $71,596.56, New Permits, $450.00, Annual Operating Permits, $2,600.00, Water Pumping Fees, $67,940.63, Interest Income, $100.05, Late Fees, $350.00, Miscellaneous Income, $75.48. The expenses for the district YTD is $80,964.00.

Lower Trinity Groundwater Conservation District

Office: (936) 327-9151
Fax: (936) 327-0532
Email: LowerTrinityGCD@livingston.net
P.O. Box 1879 Livingston, TX 77351
Gilda Gage Johnson, A.G. Crystal Reddicks

LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

TO: THE BOARD OF DIRECTORS OF THE LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT AND ALL OTHER INTERESTED PARTIES.

Notice is given that the Board of Directors of the **Lower Trinity Groundwater Conservation District will** hold a regular meeting on September 11, 2015 at 10:30 AM. At the Polk County Office Annex, Room 125, located at 514 E. Church Street in Livingston, Texas.

The agenda items of business may be considered, discussed and/or acted upon in a different order than the order set forth below. Public comment is limited to 5 minutes per speaker and/or 30 minutes total for all speakers.

AGENDA:

1. Call to order:
2. Welcome and introductions:
3. Public Comments on proposed DFCs:
4. Public Comments on proposed Rules Changes:
   Meeting will be convened for regular Board meeting business.
5. Public Comments for regular District business:
6. Reading and action if any, of prior meeting minutes: (July 10, 2015):
7. Board discussion and possible action on proposed DFCs:
8. Board discussion and possible action on proposed Rule Changes:
9. General Manager Report – (July- August 2015):
10. Treasurer and Financial Reports, including Investments:
11. The next scheduled Board meeting is November 6, 2015:
12. Adjourn.

Received for Filing on
the 31st day of August
at 11:30 o'clock A M
by Tonya Jones

DROUGHT STATUS: As of September 7, 2015, the district is in a D1 & D2 Moderate Drought condition, according to the Texas Water Development Board and WOAA. Expected to last through the end of October. (Rules require D2-D3 for 3 months).

NEW EXEMPT WELL PERMITS ISSUED: July 2015 = 16 exempt permits; 9 POLK and 7 SJC (2014= 21 Wells 13 Polk, 8 SJC) August 26,15= 14 exempt permits; 5 POLK and 9 SJC (2014= 10 Wells 7 Polk, 3 SJC) Total Wells YTD: 2015=71 Wells (1,NE) (2014= 92 Wells, 3,NE) Down 29.0%

DISTRICT WATER USAGE STATISTICS: Water usage reported YTD: 881,581,728 gallons (2014=939,972,025 gallons) Down 6.6%

GMA14 & TAGD UPDATES: The next quarterly GMA14 meeting is scheduled for October 28, 2015 in Conroe, TX. Gary Ashmore attended the annual TAGD meeting on August 25-27, 2015 in San Marcos, TX

DISTRICT DATABASE: Currently 90% complete on building a database of all well registrations and permits issued. Next steps, create district mapping of registered wells.

QUARTERLY REPORT: LBJCD has been requested to present a quarterly report to the Polk County Commissioners on September 22, 2015 @ 10:00am.

GROUNDWATER MANAGEMENT PLAN: The following Water Plan Goals have been completed for 2015: 11a Well Registrations, 11B2 Recording Wells, 11B3 Public Presentation 11T1 Drought Monitoring, 11C District Ivvfrastructure, 11D Study Water Quality, 11F3 Economic Impact (DFCs), 11G Public Information Distribution.

Aubrey Reeves presented the Financial Report ending 08/08/2015, with a checking account balance of $14,811.89. The Escrow account balance is $1,494.56 and the TexPool Investment account balance of $54,056.43 and the accounts payables are $1,377.85 for a total balance of $81,425.25. Our interest income off our District CD investments amount is $1,056.43 No unusual spending items or bills this past month occurred. Randy Baker motioned that we accept the Financial report and approve payment of all outstanding bills. Wesley Smith seconded and all board members approved.

The board had a lengthy discussion regarding the potential need to ask the States legislative body to allow for future increases in water utility pumping fees by the District. The current fee structure was structured and implemented based on having a larger population with Liberty County in the District and having revenues in excess of $80K per year. Liberty County did not vote to join the District and current revenue is less than $40K per year. The board asked Gary Ashmore to create a set of data showing what other water districts fee schedules are and to present it at the next board meeting.

The next scheduled Board Meeting is November 6, 2015 at 10:30AM, in room 175 of the Polk County Office Annex

Randy Baker motioned that meeting adjourn with Wesley Smith seconding, the motion, all board members approved.

Aubrey Reeves - Secretary

Date

LOWER TRINITY GROUNDWATER CONSERVATION DISTRICT

DFC Public Hearing Meeting Sign-In Sheet

Subject: Desired Future Condition

Meeting Date: September 11, 2018

Facilitator:
Lower Trinity Groundwater Conservation District

Place/Room:
602 East Church Street | Millgeton, Texas
Room 175

Name:	Mailing Address:	Whom the person represents if not themselves.	Do you wish to make written or oral comments? Written	Oral
Mason Hamm	705 S Dixon Ft Worth TX 76104	Quadvest LP	✓	✓
Patrick Cissell				

SOUTHEAST TEXAS GCD

Publishers Affidavit

Acct #0503932107 Job #1985437Q1 Tear Sheet Attached
Name SOUTHEAST TEXAS GROUNDWATER 1901199 N34266340

STATE OF TEXAS
COUNTY OF JEFFERSON

BEFORE ME, THE UNDERSIGNED AUTHORITY, ON THIS DAY PERSONALLY APPEARED Victoria Bond

WHO BEING BY ME DULY SWORN, DEPOSES AND SAYS THAT HE/SHE IS A NEWSPAPER REPRESENTATIVE

FOR THE BEAUMONT ENTERPRISE; THAT SAID NEWSPAPER REGULARLY PUBLISHED IN JEFFERSON COUNTY

CIRCULATED IN JEFFERSON, HARDIN, TYLER, NEWTON, ORANGE, CASHER, LIBERTY, HARDIN, CHAMBERS,

SAN JACINTO, ANGELINA AND GALVESTON COUNTY(COUNTIES), TEXAS; THAT THE ATTACHED NOTICE

IN SAID NEWSPAPER ON THE FOLLOWING DATE(S), TO WIT:
08-26-15

Victoria Bond
NEWSPAPER REPRESENTATIVE

SWORN AND SUBSCRIBED TO BEFORE ME, THIS 27TH DAY OF AUGUST 2015,

TO CERTIFY WHICH WITNESS MY HAND AND SEAL OF OFFICE.

Erika Acevedo
NOTARY PUBLIC IN AND FOR
THE STATE OF TEXAS

ERIKA ACEVEDO
PRINT OR TYPE NAME OF NOTARY PUBLIC
MY COMMISSION EXPIRES 4/3/2016

ERIKA ACEVEDO
NOTARY PUBLIC, STATE OF TEXAS
MY COMMISSION EXPIRES
APRIL 3, 2016

By The Numbers

By David Thompson

0 Number of times opposing Sam Houston since 2010.

1 Winning season since graduation of players in 2010.

3 Career tackles by Caleb Berry, who ended his career at LSU with school records for completions, passing yards and touchdowns.

5 Home games this season for Lamar, which played seven at Provost Umphrey Stadium last year.

7 Number of consecutive exemptions Deputy Brigadier needs to pass for new commander Mark Pulvara for the school record.

8 Win total from last year, which tied a school-record number of wins since 1984.

8 Predicted finish for Lamar, which was third in 2014, by Southland Conference coaches and sports information directors.

13 Turnovers with Lamar over the past two years, the most visits to a two-year stretch since 1978-79 seasons.

17 Players from Southlake Carroll on the two teams.

60 Percentage of field goals (12 of 20) made by Lamar kicker Chris Ault.

67 Catches by senior wide receiver Deggie Bagshaw in 2014.

70 Margin in TAC loss to Texas A&M (2012), the worst defeat in school history.

82 Number of home victories, first at Cardinal Stadium (opened in 1968), and as orchestrated Homer Umphrey Stadium.

259 Lamar's single-game rushing record, set in 1988 by Darrin Mendelsohn.

HARDIN COUNTY NEWS

Classified Ads call 409-755-4912

www.thehardincountynews.com

Legal Notices

SOUTHEAST TEXAS GROUNDWATER CONSERVATION DISTRICT NOTICE OF HEARING ON DESIRED FUTURE CONDITIONS September 10, 2015

NOTICE IS HEREBY GIVEN to all interested persons within Hardin, Jasper, Newton and Tyler Counties, Texas.

That the Board of Directors of the Southeast Texas Groundwater Conservation District (SETGCD) will hold a public hearing and accept public comment on the proposed desired future conditions (DFCs) for the Gulf Coast Aquifer underlying the District in accordance with Section 36.108(d-4) of the Texas Water Code. The purpose of the hearing is to provide interested members of the public the opportunity to submit oral and written comments to the SETGCD related to the proposed DFCs.

The SETGCD is one of the groundwater conservation districts that have been created wholly or partially within Groundwater Management Area 14 (GMA 14). The other districts in GMA 14 are Bluebonnet GCD, Gateway GCD, Lower Trinity GCD, Mid-East Texas GCD, Post Oak Savannah GCD, Prairie GCD, Region B GCD, Region C GCD, Sandy Land GCD, and Trinity GCD. In April 2015, the district representatives voted unanimously to approve the proposed DFCs which have been distributed to the districts for a 90 day comment period and public hearing.

The proposed DFCs approved by the district representatives of GMA 14 are quantified in terms of cumulative drawdown levels for each subdivision of the Gulf Coast Aquifer between the Colmesneil, Evangeline, Burkeville and Jasper (or Southern) outcrop located within GMA 14, or in and adjacent subdivisions, as applicable. The cumulative levels of drawdown for each subdivision are measured in terms of water level drawdowns over the proposed current planning cycle measured in feet from 2009 conditions. For the SETGCD, the relevant proposed DFCs look to the following:

Hardin County

- From estimated year 2009 conditions, the average drawdown of the Chicot Aquifer should not exceed approximately 31 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Evangeline Aquifer should not exceed approximately 77 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Burkeville Confining Unit should not exceed approximately 39 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Jasper Aquifer should not exceed approximately 09 feet after 81 years.

Jasper County

- From estimated year 2009 conditions, the average drawdown of the Chicot Aquifer should not exceed approximately 33 feet after 81 years.

Legal Notices

- From estimated year 2009 conditions, the average drawdown of the Evangeline Aquifer should not exceed approximately 41 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Burkeville Confining Unit should not exceed approximately 48 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Jasper Aquifer should not exceed approximately 40 feet after 81 years.

Newton County

- From estimated year 2009 conditions, the average drawdown of the Chicot Aquifer should not exceed approximately 40 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Evangeline Aquifer should not exceed approximately 77 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Burkeville Confining Unit should not exceed approximately 44 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Jasper Aquifer should not exceed approximately 27 feet after 81 years.

Tyler County

- From estimated year 2009 conditions, the average drawdown of the Chicot Aquifer should not exceed approximately 42 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Evangeline Aquifer should not exceed approximately 54 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Burkeville Confining Unit should not exceed approximately 39 feet after 81 years.
- From estimated year 2009 conditions, the average drawdown of the Jasper Aquifer should not exceed approximately 32 feet after 81 years.

[illegible] will be held on September 10, 2015, beginning at 9:00 a.m. at the Jasper Senior Activity Center located at 812 S. [illegible], Jasper, Texas. Interested persons may attend the hearing and present written comments on the proposed DFCs. Persons may do so in person, or legal representative, or both. Limits may be placed on the amount of time that each person is allowed to present verbal comments, but written comments may also be submitted. Those wishing to provide advanced written comment on the proposed DFCs may also do so prior to the hearing date by regular mail addressed or delivered to John Mumbi, Staff Hydrologist, SETGCD, at P.O. Box 1486, Jasper, Texas 75951, or by facsimile at (409) 384-5390. Written comments will be accepted through September 9, 2015. The hearing period in this notice may be reopened from day to day as convenient and appropriate.

This public hearing is available to all persons of disabilities if needed. If you require spe-

Legal Notices

cial facilities to attend the hearing, please contact the Southeast Texas GCD at (409) 384-5577 at least 24 hours in advance of the hearing.

A copy of the proposed DFCs may be examined by email at jmumbi@setgcd.org, at website for review as of that meeting at www.setgcd.org, and may be reviewed, inspected, or obtained in person at the Southeast Texas GCD office located at: 109 E. Austin, Jasper, Texas 75951. All questions or requests for additional information regarding the proposed DFCs may be submitted to John Mumbi, Please contact Mr. Mumbi at the address or telephone at (409) 384-5577 or by visiting the Southeast Texas GCD office.

Legal Notices

[illegible]

Legal Notices

[illegible]

Legal Notices

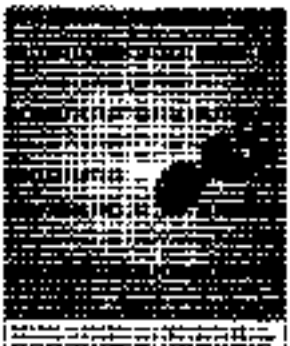
[illegible]

CHRISTUS JASPER MEMORIAL Hospital

RN'S

- RN POOL – Full-time Flexible RN's (Including Part-time, Seasonal positions might include ER, OB, or ER. Must be willing to work in all departments if needed.
- RN PRN – Full-time, Part-time
- Med/Surg – Full-time PM

To apply and to view full list of available positions, please go to www.christusjasper.org
Equal opportunity employer M/F/D/V



Drivers Needed

The Jasper Independent School District is looking for individuals to transport students to and from school during both the am and pm routes. A CDL with train qualified applicants with a class C license. CDL with P and S endorsement. Competitive pay, flexible work schedule, and full benefits package. Applications can be obtained at 504 Bolling Ave. or call (409) 384-5959

PUBLISHER'S AFFIDAVIT

STATE OF TEXAS
COUNTY OF NEWTON

BEFORE ME, THE UNDERSIGNED AUTHORITY, ON THIS DAY PERSONALLY APPEARED SHAWN WILKERSON, WHO BEING BY ME DULY SWORN, DEPOSES AND SAYS THAT HE/SHE IS THE PUBLISHER OF THE NEWTON COUNTY NEWS THAT SAID NEWSPAPER IS REGULARLY PUBLISHED IN NEWTON COUNTY, TEXAS, AND GENERALLY CIRCULATED IN NEWTON COUNTY, TEXAS; AND THAT THE NOTICE, A COPY OF WHICH IS HERETO ATTACHED, WAS PUBLISHED IN SAID NEWSPAPER ON THE FOLLOWING DAYS: August 19, 2015 (Legal Notice).

PUBLISHER/PUBLISHER'S REPRESENTATIVE

SWORN AND SUBSCRIBED TO ME ON THIS THE 28th DAY OF

AUGUST, 2015 TO CERTIFY WHICH WITNESS MY HAND AND SEAL OF OFFICE.

NOTARY PUBLIC IN AND FOR THE STATE OF TEXAS

KARYN LYNN LOBB
Notary Public, State of Texas
My Commission Expires
December 06, 2016

KARYN LYNN LOBB
PRINT OR TYPE NAME OF NOTARY PUBLIC
MY COMMISSION EXPIRES 12/6/16

(Affix Notary Seal Above)

Classified Ads

For Rent

[illegible]

[illegible]

[illegible]

NOTICE

[illegible]

Employment

[illegible]

[illegible]

For Sale

Legals

NOTICE OF SHERIFF'S SALE
THE STATE OF TEXAS
County of Hardin

By virtue of this to me directed and issued by the Clerk of the District Court of Hardin County on the 3rd day of July, 2016, and to me as Sheriff directed and delivered, I did on the 5th day of July, 2016, levy upon the following described property, to-wit: All of Lot Number Seventeen (17), in Block Number Two (2), of Sandy Point Subdivision, Section Two (2), an addition to Hardin County, Texas, according to the map or plat thereof recorded in Volume 5, Page 5, of the Map Records of Hardin County, Texas. Said property being levied on as the property of Defendant, Jeffrey Scott Hall, and will on the first Tuesday in September, 2016, the same being the 6th day of said month, at the Courthouse door of said County, in the City of Kountze, between the hours of 10:00 A.M. and 4:00 P.M., by virtue of said levy and said writ of execution, I will sell said above described property as the property of said Jeffrey Scott Hall.

And in compliance with law, I give this notice by posting up a copy hereof, for three consecutive weeks immediately preceding said day of sale, at the Courthouse door of said County, and by publication in the Hardin County News, a newspaper printed in said County.

Witness my hand this 5th day of July, 2016.

Oscar Perkins
Sheriff
Hardin County, Texas

By: Deputy

[illegible]

[illegible]

[illegible]

AFFIDAVIT OF PUBLICATION

STATE OF TEXAS
COUNTY OF TYLER

Before me, the undersigned, Notary Public in the County of Tyler, State of Texas, personally appeared Kelli Barnes, known to me, who after being duly sworn by me, on her oath, deposes and says that she is the General Manager of the TYLER COUNTY BOOSTER, a newspaper published in said county; that a Legal Notice, a copy of which is attached, was published in said newspaper for one (1) week the date-to-wit:

August 20, 2015

Kelli Barnes, General Manager

SUBSCRIBED AND SWORN TO before me
This, the 26th day of August 2015

DEBORAH A. MCCLUSKEY
NOTARY PUBLIC
TYLER COUNTY, TEXAS

DEBORAH A. MCCLUSKEY
Notary Public, State of Texas
My Commission Expires
December 10, 2015

LEGAL NOTICE

SOUTHEAST TEXAS GROUNDWATER CONSERVATION DISTRICT NOTICE OF HEARING ON DESIRED FUTURE CONDITIONS September 10, 2015 NOTICE IS HEREBY GIVEN to all interested persons within Hardin, Jasper, Newton and Tyler Counties, Texas: That the Board of Directors of the Southeast Texas Groundwater Conservation District ("SETGCD") will hold a public hearing and accept public comment on the proposed desired future conditions ("DFCs") for the Gulf Coast Aquifer underlying the District, in accordance with Section 36.108(d-2) of the Texas Water Code. The purpose of the hearing is to provide interested members of the public the opportunity to appear and provide comments to the SETGCD related to the proposed DFCs. The SETGCD is one of five groundwater conservation districts located wholly or partially within Groundwater Management Area 14 ("GMA 14"); the other districts in GMA 14 include Bluebonnet GCD, Brazoria GCD, Lower Trinity GCD, and Lone Star GCD. At the last GMA 14 joint planning meeting, held on June 24, 2015, the district representatives voted unanimously to approve the proposed DFCs, which have been distributed to the districts for a 90-day comment period and public hearing. The proposed DFCs approved by the district representatives of GMA 14 are described in terms of acceptable drawdown levels for each subdivision of the Gulf Coast Aquifer, including the Chicot, Evangeline, Burkeville, and Jasper, for each county located within GMA 14, or in land surface subsidence, as applicable. The acceptable levels of drawdown for each subdivision of the aquifer are measured in terms of water level drawdowns over the proposed current planning cycle measured in feet from 2009 estimated water levels. For the SETGCD, the relevant proposed DFCs include the following: Hardin County • From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 21 feet after 61 years. • From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately: 27 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Burkeville Confining Unit should not exceed approximately: 29 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately: 89 feet after 61 years. Jasper County •From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately: 41 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Burkeville Confining Unit should not exceed approximately: 46 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately: 40 feet after 61 years. Newton County •From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 35 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately: 45 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Burkeville Confining Unit should not exceed approximately: 44 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately: 37 feet after 61 years. Tyler County •From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 42 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately: 35 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Burkeville Confining Unit should not exceed approximately: 30 feet after 61 years. •From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately: 62 feet after 61 years. This hearing will be held on September 10, 2015, beginning at 9:00 a.m., at the Jasper Newton Electric Co-op Community Room located at 812 S. Margaret Ave., Kirbyville, TX 75956. Any person who desires to appear at the hearing and present comment or other information on the proposed DFCs may do so in person, by legal representative, or both. Limits may be placed on the amount of time that each person is allowed to present verbal comments, but written comments may also be submitted. Those wishing to provide advanced written comment on the proposed DFCs may also do so prior to the hearing date by regular mail services addressed to John Martin, Southeast Texas GCD, at P.O. Box 1407, Jasper, Texas 75951, or by facsimile at (409) 383-0799. Written Comments will be accepted through October 4, 2015. The hearing posted in this notice may be recessed from day to day or continued where appropriate. This public hearing is available to all persons regardless of disability. If you require special assistance to attend the hearing, please contact the Southeast Texas GCD at (409) 383-1577 at least 24 hours in advance of the hearing. A copy of the proposed DFCs may be requested by email at jmartin@setgcd.org, is available for reviewing or downloading at www.setgcd.org, and may be reviewed, inspected, or obtained in person at the Southeast Texas GCD office located at 103 E. Houston, Jasper, Texas 75951. All questions or requests for additional information regarding the proposed DFCs may be submitted to John Martin. Please contact Mr. Martin by telephone at (409) 383-1577 or by visiting the Southeast Texas GCD office. (34-1t-)

Tyler Co
300 stars

Southeast Texas Groundwater Conservation District

NOTICE is given that the Board of Directors of the Southeast Texas Groundwater Conservation District will hold a public hearing and monthly board meeting on Thursday September 10, 2015 starting at 9:00 a.m., at the Jasper-Newton Electric Co-op. meeting room, at 812 S. Margaret Avenue, in Kirbyville, Texas 75956 in accordance with the Texas Open Meeting Act, Chapter 551 of the Texas Government Code or (as amended).

Public Hearing 9:00 a.m.

NOTICE is given that the Southeast Texas Groundwater Conservation District ("District") will hold a Public Hearing on Thursday September 10, 2015 9:00 a.m., at the Jasper-Newton Electric Co-op. meeting room located at 812 S. Margaret Avenue, in Kirbyville, Texas 75956. The Public Hearing is to receive public comments on the proposed Desired Future Conditions ("DFCs").

The proposed DFCs can be reviewed at the District Office at 103 E. Houston, Jasper, TX 75951 and are also available on the District website at www.setgcd.org. Further information can also be obtained by contacting the District at P.O. Box 1407, Jasper, Texas 75951; phone number (409) 383-1577.

Public Hearing

1. Open public hearing;
2. Receive public comment; and
3. Close public hearing.

Regular Board Meeting (to begin immediately after the close of the public hearing):

The items of business to be considered, discussed and acted on during the meeting are as follows:

1. Call to order;
2. Public comment (Comments are restricted to 3 minutes with a total of all comments limited to 30 minutes);
3. Discussion and possible action to approve the minutes of the July 9, 2015 Board meeting;
4. Review, discussion and possible action on the August and September Treasurer's Reports and approval of payables presented;
5. Discussion and possible action regarding annual financial auditors;
6 At the discretion of the President, the Board may adjourn into closed session pursuant to Texas Open Meeting Act, Texas Government Code, Chapter 551.071;
7. Discussion and possible action regarding GMA 14 and DFCs;
8. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
9. Manager's Report, to include: Jasper County Courthouse Annex update, TAGD Groundwater Summit, website update, B&L Water Well Service update, and drought conditions;
10. Establish date, time and place of next meeting; and;
11. Meeting adjourned.

John M. Martin
General Manager

FILED FOR RECORD
2015 SEP -2 PM 3:34
GLENDA ALSTON
COUNTY CLERK
HARDIN COUNTY, TEXAS

Southeast Texas Groundwater Conservation District

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9. Manager's Report, to include: Jasper County Courthouse Annex update, TAGD Groundwater Summit, website update, B&L Water Well Service update, and drought conditions;
10. Establish date, time and place of next meeting; and;
11. Meeting adjourned.

John M. Martin
General Manager

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED SEP 02 2015

By Holly Thomas
DEPUTY

Southeast Texas Groundwater Conservation District

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5. Discussion and possible action regarding annual financial auditors;
6. At the discretion of the President, the Board may adjourn into closed session pursuant to Texas Open Meeting Act, Texas Government Code, Chapter 551.071;
7. Discussion and possible action regarding GMA 14 and DFCs;
8. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
9. Manager's Report, to include: Jasper County Courthouse Annex update, TAGD Groundwater Summit, website update, B&L Water Well Service update, and drought conditions;
10. Establish date, time and place of next meeting; and;
11. Meeting adjourned.

John M. Martin
General Manager

FILED FOR RECORD
2015 SEP -2 PM 3:34
GLENDA ALSTON
COUNTY CLERK
HARDIN COUNTY, TEXAS

POSTED
SEP 02 2015
TIME 11:15 A
BY: Shane Clark
DEPUTY, JASPER COUNTY CLERK

5425

Southeast Texas Groundwater Conservation District

NOTICE is given that the Board of Directors of the Southeast Texas Groundwater Conservation District will hold a public hearing and monthly board meeting on Thursday September 10, 2015 starting at 9:00 a.m., at the Jasper-Newton Electric Co-op. meeting room, at 812 S. Margaret Avenue, in Kirbyville, Texas 75956 in accordance with the Texas Open Meeting Act, Chapter 551 of the Texas Government Code or (as amended)

Public Hearing 9:00 a.m.

NOTICE is given that the Southeast Texas Groundwater Conservation District ("District") will hold a Public Hearing on Thursday September 10, 2015 9:00 a.m., at the Jasper-Newton Electric Co-op, meeting room located at 812 S. Margaret Avenue, in Kirbyville, Texas 75956. The Public Hearing is to receive public comments on the proposed Desired Future Conditions ("DFCs").

The proposed DFCs can be reviewed at the District Office at 103 E. Houston, Jasper, TX 75951 and are also available on the District website at www.setcd.org. Further information can also be obtained by contacting the District at P.O. Box 1407, Jasper, Texas 75951; phone number (409) 383-1577.

Public Hearing

1. Open public hearing;
2. Receive public comment; and
3. Close public hearing.

Regular Board Meeting (to begin immediately after the close of the public hearing):

The items of business to be considered, discussed and acted on during the meeting are as follows:

1. Call to order;
2. Public comment (Comments are restricted to 3 minutes with a total of all comments limited to 30 minutes);
3. Discussion and possible action to approve the minutes of the July 9, 2015 Board meeting;
4. Review, discussion and possible action on the August and September Treasurer's Reports and approval of payables presented;
5. Discussion and possible action regarding annual financial audit;
6. At the discretion of the President the Board may adjourn into closed session pursuant to Texas Open Meeting Act, Texas Government Code, Chapter 551.071;
7. Discussion and possible action regarding GMA 14 and DFCs;
8. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
9. Manager's Report, to include: Jasper County Courthouse Annex update, TAGD Groundwater Summit, website update, R&L Water Well Service update, and drought conditions;
10. Establish date, time and place of next meeting; and;
11. Meeting adjourned.

John M. Martin
General Manager

Southeast Texas Groundwater Conservation District

NOTICE is given that the Board of Directors of the Southeast Texas Groundwater Conservation District will hold a public hearing and monthly board meeting on Thursday September 10, 2015 starting at 9:00 a.m., at the Jasper-Newton Electric Co-op. meeting room, at 812 S. Margaret Avenue, in Kirbyville, Texas 75956 In accordance with the Texas Open Meeting Act, Chapter 551 of the Texas Government Code or (as amended).

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Public Hearing

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2. Receive public comment; and
3. Close public hearing.

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7. Discussion and possible action regarding GMA 14 and DFCs;
8. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
9. Manager's Report, to include: Jasper County Courthouse Annex update, TAGD Groundwater Summit, website update, B&L Water Well Service update, and drought conditions;
10. Establish date, time and place of next meeting; and;
11. Meeting adjourned.

NO. _____ TIME 2:45pm

John M. Martin
General Manager

SEP 02 2015

[illegible] TYLER COUNTY, TEXAS

By: [illegible]

Southeast Texas Groundwater Conservation District

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The proposed DFCs can be reviewed at the District Office at 103 E. Houston, Jasper, TX 75951 and are also available on the District website at www.setgcd.org. Further information can also be obtained by contacting the District at P.O. Box 1407, Jasper, Texas 75951; phone number (409) 383-1577.

Public Hearing

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7. Discussion and possible action regarding GMA 14 and DFCs;
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9. Manager's Report, to include: Jasper County Courthouse Annex update, TAGD Groundwater Summit, website update, B&L Water Well Service update, and drought conditions;
10. Establish date, time and place of next meeting; and;
11. Meeting adjourned.

John M. Martin
General Manager

Posted On: 09/03/2015 at: 6:30 am
At Office / On Website
By:
Title: General Manager

Southeast Texas Groundwater Conservation District

NOTICE is given that the Board of Directors of the Southeast Texas Groundwater Conservation District will hold a public hearing and monthly board meeting on Thursday October 8, 2015 starting at 9:00 a.m., at the Jasper-Newton Electric Co-op. meeting room, at 812 S. Margaret Avenue, in Kirbyville, Texas 75956 in accordance with the Texas Open Meeting Act, Chapter 551 of the Texas Government Code or (as amended).

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The permit application can be reviewed at the District Office at 103 E. Houston, Jasper, TX 75951. Further information can also be obtained by contacting the District at P.O. Box 1407, Jasper, Texas 75951; phone number (409) 383-1577.

Public Hearing

1. Open public hearing;
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4. Discussion and possible action on the October Treasurer's Reports and approval of payables presented;
5. Presentation of the District's 3rd Quarter, 2015 Investment Report;
6. Discussion and possible action regarding Daniel Ayres' request for drilling, operating, and transfer permits for a proposed new well to be located 1063 C.R. 2076 Newton, TX 75966;
7. At the discretion of the President, the Board may adjourn into closed session pursuant to Texas Open Meeting Act, Texas Government Code, Chapter 551.071 and 551.074;
8. Discussion and possible action to adopt the District's 2016 budget, as presented or with any amendments made at the time of the meeting;
9. Discussion and possible action regarding GMA 14 and DFCs;
10. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
11. Manager's Report, to include: Region I WPG; B&L Water Well Service update, and drought conditions;
12. Establish date, time and place of next meeting; and;
13. Meeting adjourned.

John M. Martin
General Manager

Posted On: 10/01/2015 at: 11:15 am
At Office / On Website
By:
Title: General Manager

Southeast Texas Groundwater Conservation District

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The permit application can be reviewed at the District Office at 103 E. Houston, Jasper, TX 75951. Further information can also be obtained by contacting the District at P.O. Box 1407, Jasper, Texas 75951; phone number (409) 383-1577.

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10. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
11. Manager's Report, to include: Region I WPG; B&L Water Well Service update, and drought conditions;
12. Establish date, time and place of next meeting; and;
13. Meeting adjourned.

John M. Martin
General Manager

DEBBIE NEWMAN, COUNTY CLERK
JASPER COUNTY, TEXAS

FILED OCT 01 2015

By _____
DEPUTY

5449

Southeast Texas Groundwater Conservation District

NOTICE is given that the Board of Directors of the Southeast Texas Groundwater Conservation District will hold a public hearing and monthly board meeting on Thursday October 8, 2015 starting at 9:00 a.m., at the Jasper-Newton Electric Co-op. meeting room, at 812 S. Margaret Avenue, in Kirbyville, Texas 75956 in accordance with the Texas Open Meeting Act, Chapter 551 of the Texas Government Code as (as amended).

Public Hearing 9:00 a.m.

NOTICE is given that the Southeast Texas Groundwater Conservation District ("District") will hold a Public Hearing on Thursday October 8, 2015 9:00 a.m. at the Jasper-Newton Electric Co-op. meeting room located at 812 S. Margaret Avenue, in Kirbyville, Texas 75956. The Public Hearing is to hear comments on the request of Daniel Ayres for permits to drill and operate a non-exempt well.

The permit application can be reviewed at the District Office at 103 E. Houston, Jasper, TX 75951. Further information can also be obtained by contacting the District at P.O. Box 1407, Jasper, Texas 75951, phone number (409) 383-1577.

Public Hearing

1. Open public hearing;
2. Receive public comment; and
3. Close public hearing.

Regular Board Meeting (to begin immediately after the close of the public hearing):

The items of business to be considered, discussed and acted on during the meeting are as follows:

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4. Discussion and possible action on the October Treasurer's Reports and approval of payables presented;
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6. Discussion and possible action regarding Daniel Ayres' request for drilling, operating, and transfer permits for a proposed new well to be located 1083 C.R. 2070 Newton, TX 75966;
7. At the discretion of the President, the Board may adjourn into closed session pursuant to Texas Open Meeting Act, Texas Government Code, Chapter 551.071 and 551.074;
8. Discussion and possible action to adopt the District's 2016 budget, as presented or with any amendments made at the time of the meeting;
9. Discussion and possible action regarding GMA 14 and DFCs;
10. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
11. Manager's Report, to include: Region I WPG; R&I Water Well Service update, and drought conditions;
12. Establish date, time and place of next meeting, and;
13. Meeting adjourned.

John M. Martin
General Manager

POSTED
OCT 01 2015
TIME 11:16 A.M.
BY: [signature]
SHERRIE ELDRIDGE, COUNTY CLERK

John M. Martin Log Off

Open Meeting Submission

TRD:	201500690
Date Posted:	10/01/2015
Status:	Accepted
Agency Id:	1416
Date of Submission:	10/01/2015
Agency Name:	Southeast Texas Groundwater Conservation District
Board:	Southeast Texas Groundwater Conservation District
Date of Meeting:	10/08/2015
Time of Meeting:	09:00 AM (##:## AM Local Time)
Street Location:	812 S. Margaret Avenue
City:	Kirbyville
State:	TX
Liaison Name:	John M. Martin
Liaison Id:	3
Additional Information Obtained From:	John Martin (409) 383-1577

Public Hearing

1. Open public hearing;
2. Receive public comment; and
3. Close public hearing.

Regular Board Meeting (to begin immediately after the close of the public hearing):

Agenda:

The items of business to be considered, discussed and acted on during the meeting are as follows:

1. Call to order;
2. Public comment (Comments are restricted to 3 minutes with a total of all comments limited to 30 minutes);
3. Discussion and possible action to approve the minutes of the September 10, 2015 Board meeting;

4. Discussion and possible action on the October Treasurer's Reports and approval of payables presented;
5. Presentation of the District's 3rd Quarter, 2015 Investment Report;
6. Discussion and possible action regarding Daniel Ayres' request for drilling, operating, and transfer permits for a proposed new well to be located 1063 C.R. 2076 Newton, TX 75966;
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9. Discussion and possible action regarding GMA 14 and DFCs;
10. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
11. Manager's Report, to include: Region I WPC; B&L Water Well Service update, and drought conditions;
12. Establish date, time and place of next meeting; and;
13. Meeting adjourned.

John M. Martin Log Off

Open Meeting Submission

TRD:	20150006021
Date Posted:	09/03/2015
Status:	Accepted
Agency Id:	1416
Date of Submission:	09/03/2015
Agency Name:	Southeast Texas Groundwater Conservation District
Board:	Southeast Texas Groundwater Conservation District
Date of Meeting:	09/10/2015
Time of Meeting:	09:00 AM (##:## AM Local Time)
Street Location:	812 S. Margaret Avenue
City:	Kirbyville
State:	TX
Liaison Name:	John M. Martin
Liaison Id:	3
Additional Information Obtained From:	John Martin (409) 383-1577

Public Hearing

1. Open public hearing;
2. Receive public comment; and
3. Close public hearing.

Regular Board Meeting (to begin immediately after the close of the public hearing):

Agenda:

The items of business to be considered, discussed and acted on during the meeting are as follows:

1. Call to order;
2. Public comment (Comments are restricted to 3 minutes with a total of all comments limited to 30 minutes);
3. Discussion and possible action to approve the minutes of the July 9, 2015 Board meeting;

4. Review, discussion and possible action on the August and September Treasurer's Reports and approval of payables presented;
5. Discussion and possible action regarding annual financial audirors;
6 At the discretion of the President, the Board may adjourn into closed session pursuant to Texas Open Meeting Act, Texas Government Code, Chapter 551.071;
7. Discussion and possible action regarding GMA 14 and DFCs;
8. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX;
9. Manager's Report, to include: Jasper County Courthouse Annex update, TAGD Groundwater Summit, website update, B&J. Water Well Service update, and drought conditions;
10. Establish date, time and place of next meeting; and;
11. Meeting adjourned.

Southeast Texas Groundwater Conservation District
Meeting Minutes
September 10, 2015
Jasper-Newton Electric Meeting Room
Kirbyville, Texas

Directors Present:
Walter R. Glenn, President
Roger Fussell, Vice President
Bobby Rogers
Sam Ashworth
Mitch McMillon
Wendy Turner
Olen Bean
Jim Meek
Greg Wobbe
M. Charles Zimmerman
Robyn Summerlin

Directors Absent:
Jim Boono
Linda Powell

John Martin, General Manager
John D. Stover, Esq., General Counsel

Public Hearing:

1. Open public hearing: At 9:00 a.m. President Glenn brought to order the Public Hearing regarding GMA 14's proposed Desired Future Conditions ("DFC"). President Glenn asked Manager Martin to conduct a roll call, and a quorum was confirmed with ten Directors present and three absent.

2. Receive public comment: President Glenn asked if anyone present wanted to make or provide comments regarding the proposed DFCs. Mr. Marvin Jones, Esq. was present and provided comments on the proposed DFCs. In addition to Mr. Jones' August 25, 2015 letter submitted as written comment of the proposed DFCs (included in meeting materials), he provided two additional documents to the board for consideration: (1) a March 10, 2010 Texas Water Development Board ("TWDB") memo regarding (a) the status of joint planning, and (b) the use of geographic areas in establishing DFC; and (2) a map of the outcrop areas of the Jasper Aquifer across GMA 14.

Additionally, Mr. Jones provided a report on behalf of Mr. Bob Harden titled *Evaluation of Desired Future Conditions for the Gulf Coast Aquifer Within GMA 14* (prepared for the City of Conroe).

3. Close public hearing: President Glenn adjourned the Public Hearing on the proposed DFCs at 9:29 a.m.

Regular Board Meeting:

1. Call to order: At 9:29 a.m. President Glenn called to order the regular meeting of the Southeast Texas Groundwater Conservation District. President Glenn asked Treasurer Rogers if he would provide an invocation. President Glenn then asked Manager Martin to conduct roll call for the regular meeting. A quorum was confirmed with 10 Directors present and 3 Directors absent (at 9:45 a.m. Director McMillon arrived bringing the total number of Director present to 11).

2. Public comment (Comments are restricted to 3 minutes with a total of all comments limited to 30 minutes): President Glenn asked if anyone present wished to make a public comment. Mr. Jones had stepped out of the meeting room and no other members of the public were present. No comments were made.

3. Discussion and possible action to approve the minutes of the July 9, 2015 Board meeting: President Glenn asked if anyone had any questions or comments regarding the July 9, 2015 meeting minutes. No comments were made. Director Bean made motion to approve the minutes of the July 9, 2015 meeting as presented. Director Zimmerman seconded the motion. The motion passed unanimously.

4. Review, discussion and possible action on the August and September Treasurer's Reports and approval of payables presented: Treasurer Rogers first gave a thorough review of the District's August Treasurer's Report due to the fact that there was not an August meeting. He also reviewed September's Treasurer's Report and payables presented. He reviewed each of the District's account balances, the monthly payables, and expected FNB operating account balance after the payables have been paid for both the August and September Treasurer's Report. He also commented on the P&L Budget vs. Actual Report, indicating everything looked good, that the District's income is above what has been projected and that the expenses are below expected through August.

Vice President Fussell made motion to approve the Treasurer's Report and payables as presented. Director Bean seconded the motion. The motion passed unanimously.

5. Discussion and possible action regarding annual financial auditors: Manager Martin recalled that late last fall Direct Boone had inquired into the cost effectiveness of our current annual financial auditor. Manager Martin explained that he polled the TAGD group asking what thier annual financial audits were costing and had received 19 responses. He pointed out Item 5 of their monthly meeting materials which showed the annual cost of each of the 19 respondents and the overall average.

Manager Martin stated that several of the responses on the lower end of the scale utilized a firm out of Knippa, TX which is located west of Austin, TX. He stated that after speaking with Gary Ashmore (GM of Lower Trinity GCD) who utilizes this firm, he learned the firm did not provide the annual audit report in an open meeting allowing for questions and interaction between the board and the auditor.

Manager Martin recommend continued use of Axley & Rode but stated that if the Board was interested in finding another auditor a Request for Qualifications would have to be sent out and that any decision to hire another auditor could not be based solely on cost.

Vice President Fussell commented that he appreciated the personal interaction Mr. Carver of Axley & Rode provides. Manager Martin recommended that if the Board was comfortable with utilizing Axley & Rode again that a motion be considered allowing him to engage them for the 2015 annual audit. President Glenn asked if anyone had any further thoughts or comments.

Director Zimmerman inquired as to the location of Axley & Rode and Manager Martin stated that they had several offices that he knew of, including Lufkin, Jasper, and Livingston. Director Zimmerman commented that he like the local presence.

After a short discussion Director Turner made motion to allow Manager Martin to engage Axley & Rode for the 2015 annual financial audit. Treasurer Rogers seconded the motion. The motion passed unanimously.

6. At the discretion of the President, the Board may adjourn into closed session pursuant to Texas Open Meeting Act, Texas Government Code, Chapter 551.071: At 9:42, in accordance with Texas Open Meeting Act, Chapter 551.071, President Glenn adjourned the regular meeting of the Southeast Texas Groundwater Conservation District and convened a closed session.

At 10:19 a.m. President Glenn announced the end of the closed session. At 10:20 he again called to order the regular meeting of the Southeast Texas Groundwater Conservation District.

7. Discussion and possible action regarding GMA 14 and DFCs: Manager Martin reviewed two items he wanted the Board to take into consideration regarding DFCs and regional water planning. The first document, Item 7(b) of the monthly meeting materials, was an email from the TWDB by way of Kathy Turner Jones of the Lone Star GCD, with an amended table for the TERS report.

Manager Martin explained that at the request of a concerned citizen who attends Lone Star GCD board meetings, the TWDB revised TERS Table 1. The revised table includes two addition columns that split out the total TERS volumes by confined and unconfined volumes. Manager Martin stated that, as he understands it, the total volume of the confined portion of the Gulf Coast Aquifer would have to be pumped to meet the recommendations that the City of Conroe et al., are suggesting who want more water made available. Manager Martin pointed out that until Marvin Jones spoke this morning the amount being suggested was 5% of the TERS, and that Mr. Jones' recommendation of 2% was new. Nonetheless, according to the email from Larry French of the TWDB the confined portion of the aquifer averages only 0.4% of the total volume. Manager Martin explained that he spoke with GMA 14 consultant Bill Mullican who stated that what this meant was that by pumping all of the confined portion of the aquifer, 100% of the head pressures would be removed. He continued to explain that if that were to occur, existing wells would be reduced in capability/capacity, pumps would have to be lowered, larger pumps would need to be utilized, and additional wells may have to be drilled to make up for lost capacities.

The second document, Item 7(c), is a report that had been brought to his attention while attending the TAGD groundwater conference in August. The report, dated October 12, 2011, includes information on the estimated recharge and estimated maximum sustainable pumping volumes. Manager Martin stated that currently GMA 14 is using/planning for the use of over 1 million acre feet of water per year and the report shows that the annual recharge is estimated to be just under 675,000 acre feet per year. The report also indicates that estimated maximum sustainable pumping volume was only 402,000 acre feet per year.

Manager Martin recommended taking Attorney Stover's advice that the Board wait on taking any further action on the DFCs until after the 90 day comment period ended on October 4, 2015, which is several days before the next regularly scheduled Board meeting. He stated that he would be sure the Board would have all submitted comments included in next month's meeting materials and that it would be prudent to have any/all the documents available to review before any action is taken.

8. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX: Manager Martin reviewed the situation regarding the abandoned well. He recommend that the Board act on Attorney Stover's recommendation to have a title search completed on the tract of land where the well is located to see if the owner of the property could be located.

After a short discussion, Director McMillon made motion to allow Manager Martin to engage Hooks Title to perform the title search. Vice President Fussell seconded the motion. The motion passed unanimously.

9. Manager's Report, to include: Jasper County Courthouse Annex update, TAGD Groundwater Summit, website update, B&L Water Well Service update, and drought conditions: Manager Martin briefly reviewed the information in his Manager's Report including recent events related to the inspection of a well remediated by B&L Water Well Service.

10. Establish date, time and place of next meeting: President Glenn stated that the next regularly scheduled meeting is October 8, 2015. Manager Martin stated that a public hearing may be required for a non-exempt well application and, if so, would begin the October meeting at 9:00 a.m.

11. Meeting adjourned: At 10:50 a.m. President Glenn adjourned the regular meeting of the Southeast Texas Groundwater Conservation District.

Walter R. Glenn – President

~~Bobby Rogers – Secretary/Treasurer~~
Roger Fussell, Vice President

Date: October 8, 2015

Southeast Texas Groundwater Conservation District
Meeting Minutes
October 8, 2015
Jasper-Newton Electric Meeting Room
Kirbyville, Texas

Directors Present:
Walter R. Glenn, President
Roger Fussell, Vice President
Sam Ashworth
Mitch McMillon
Jim Boone
Glen Benn
Jon Mock
Greg Wobbe
M. Charles Zimmerman
Robyn Summerlin

Directors Absent:
Bobby Rogers
Linda Powell
Wendy Turner

John Martin, General Manager
John D. Stover, Esq., General Counsel

Public Hearing:
(For a detailed record of the proceeding please refer to the audio recording of this hearing.)

1. Open public hearing: At 9:04 a.m. President Glenn brought to order the Public Hearing regarding the Non-Exempt Permit Application of Daniel Ayres. President Glenn asked Manager Martin to conduct a roll call, and a quorum was confirmed with 9 Directors present and four absent. At approximately 9:07 Director Meek arrived bringing the total number of Directors present to 10.

2. Receive public comment: President Glenn greeted all in attendance and introduced the Board of Directors. He then asked Manger Martin if proper notice had been provided for the public hearing regarding the Ayres application. Manager Martin provided exhibits (1 – 4) documenting the noticing of the hearing. He stated that there was a minor issue however, and that four of the property owners who were required to receive the notice by mail, as required by District Rule, were inadvertently missed. He stated that this meant that the hearing could only focus on the Drilling and Operating Permits as those requirements were met. The Transfer Permit requirements were not met and would have to be taken up at a future date.

President Glenn then asked who in attendance was opposed the Ayres permit request. Manager Martin provided three additional exhibits (5 – 7), which are written notices in opposition to the permit. After discussion the follow parties were accepted as have standing in the Ayres permit request:

Daniel Ayres	Conley Todd	Rebecca Hudson
Paul Hitt, Jr.	Sandra Taraba	William Mouhot
Doy Lee Grace	Jeff Walker	Frances Malone

Manager Martin gave a brief description of the proposed well and its proposed capacities. The applicant, Mr. Ayres, provided some background information regarding the project then asked his hydrologist, William Turner, to provide additional technical information regarding the project. Mr. Turner provided information regarding the expected impact of the proposed well on the surrounding area and nearby water wells.

At 9:45 a.m. Attorney Stover requested a short recess, which was granted by President Glenn. At 10:00 the hearing resumed.

After discussion, an evidentiary hearing was set for November 12, 2015 to begin at 9:00 a.m.

3. Close public hearing: President Glenn adjourned the Public Hearing on the Non-Exempt Permit Application of Daniel Ayres at 10:25 a.m.

Regular Board Meeting:

1. Call to order: At 10:33 a.m. President Glenn called to order the regular meeting of the Southeast Texas Groundwater Conservation District. President Glenn then asked Manager Martin to conduct roll call for the regular meeting. A quorum was confirmed with 10 Directors present and 3 Directors absent.

2. Public comment (Comments are restricted to 3 minutes with a total of all comments limited to 30 minutes): President Glenn asked if anyone present wished to make a public comment. President Glenn noted that only one member of public remained in attendance after the adjournment of the public hearing. Mr. Steven Black identified himself as a representative of the Evadale paper mill and stated that he was only in attendance to take notes in Director Turner's absence.

3. Discussion and possible action to approve the minutes of the September 10, 2015 Board meeting: President Glenn asked if anyone had any questions or comments regarding the September 10, 2015 meeting minutes. No comments were made. Director Zimmerman made motion to approve the minutes of the September 10, 2015 meeting as presented. Director Bean seconded the motion. The motion passed unanimously.

4. Discussion and possible action on the October Treasurer's Reports and approval of payables presented: In Treasurer Rogers' absence, Manager Martin gave a thorough review of the District's October Treasurer's Report. He reviewed each of the District's account balances, the monthly payables, and expected FNB operating account balance after the October payables have been paid. He also commented on the P&L Budget vs. Actual Report, indicating everything looked good, that the District's income is above what has been projected, and that the expenses are below expected through September.

Director Bean made motion to approve the Treasurer's Report and payables as presented. Director Boone seconded the motion. The motion passed unanimously.

5. Presentation of the District's 3rd Quarter, 2015 Investment Report: Manager Martin reviewed the 3rd Quarter Investment Report including all beginning balances, ending balances, interest earned, interest rates, and combined total of all the funds. Manager Martin pointed out a minor typographic error just above the account totals portion of the report which wrongly indicated that the totals were for the 2nd quarter, 2015. He also noted that $225,000 of the investment funds have been designated the "building fund" and $10,000 has been designated for GMA 14 planning.

6. Discussion and possible action regarding Daniel Ayres' request for drilling, operating, and transfer permits for a proposed new well to be located 1063 C.R. 2076 Newton, TX 75966: No action was taken on this item at this time due to the pending evidentiary hearing set for November 12, 2015.

7. At the discretion of the President, the Board may adjourn into closed session pursuant to Texas Open Meeting Act, Texas Government Code, Chapter 551.071 and 551.074: This topic was moved to after Item 8 of the agenda due to Attorney Stover's schedule and need to leave in order to attend an emergency meeting elsewhere.

At 11:14 a.m., in accordance with Texas Open Meeting Act, Chapter 551.074, President Glenn adjourned the regular meeting of the Southeast Texas Groundwater Conservation District and convened a closed session to discuss the annual performance review of Manager Martin.

At 11:30 a.m. President Glenn announced the end of the closed session and again called to order the regular meeting of the Southeast Texas Groundwater Conservation District.

8. Discussion and possible action to adopt the District's 2016 budget, as presented or with any amendments made at the time of the meeting: After a brief discussion, Director Zimmerman made motion to approve the budget as presented and to provide a $2,500 bonus to Manager Martin, to be included in an amended 2015 budget. Manager Martin stated that he had recently discussed amending the 2015 budget with Treasurer Rogers and that he would include the bonus in an amended 2015 budget to be considered at the next meeting. Director Bean seconded the motion. The motion passed unanimously.

9. Discussion and possible action regarding GMA 14 and DFCs: Manager Martin began reviewing the documents associated with GMA 14's proposed DFCs starting with the documents that had been previously provided to the Board at the previous meeting, including all the documents associated with Marvin Jones' comments and the R.W. Harden report. He then discussed his response to the R.W. Harden report stating that two items were of particular interest: first, the comment that subsidence in the Jasper Layer is not a concern according to the USGS/HAGM, and secondly, calculations of the proposed 1% for the Chicot and Evangeline and 2% of the Jasper based on the TERS.

Manager Martin then explained that the District has received some additional comments from Mr. Wade Oliver and Mr. Van Kelley from Intera Geoscience. He explained that Items 9h and 9i were presentations that had been given in person on September 17, 2015 at the Lone Star GCD DFC public hearing and was provided to our district in written format.

Then Manager Martin explained that the District received an additional written comment from Thornhill Group, but that it had been received on October 5, 2015, one day after the end of the 90 day comment period. Manager Martin reviewed and explained that in many ways Mr. Thornhill's comments were similar to Mr. Jones' and Mr. Harden's, but that he also emphasized several other issues, including but not limited to: reverse engineering, rebuttal to comments provided by Intera Geoscience, and the subsidence DFCs included for the Bluebonnet GCD.

Manager Martin pointed out Items 9 and 9(2) and stated that these were a Summary of Public Comments Received that are required to be produced to GMA 14. He stated that Item 9 did not include the comments received from Thornhill Group due to having been received after the 90 day period. He then stated that Item 9(2), a Summary of Public Comments Received, included the Thornhill Group comments.

Manager Martin asked Attorney Stover to provide his recommendation as to whether or not the comments received after the 90 day deadline should be included. Attorney Stover recommended to the Board that there would be no harm including them and recommended that they be included.

President Glenn asked if action and a motion is required. Attorney Stover stated the he thought it appropriate for the Board to consider approving the Summary of Public Comments Received, including the Thornhill Group written comments, and that the Board empower Manager Martin to move forward with adopting GMA 14's proposed DFCs at the GMA level and to allow for flexibility, at Manager Martin's discretion, if something else arises. Vice President Fussell made motion to approve the recommendation made by Attorney Stover. Director McMillon seconded the motion. The motion passed unanimously.

10. Discussion and possible action regarding the abandoned well located on Meadow Wood Rd in Silsbee, TX: Manager Martin stated that although the title search was run, very little new information was provided. He pointed out that there is an easement on the site with the Grantor and Grantee being the same person. Manager Martin recommended no action on this item at this time to allow for further research.

11. Manager's Report, to include: Region I WPG; B&L Water Well Service update, and drought conditions: Manger Martin explained that B&L was nearing the end of it's one year period to plug and/or repair the wells that had been improperly completed. He stated that he hoped to have in the next month or two a thorough review of all of the wells that have been plugged and/or repaired by B&L. He asked if anyone had any problem with allowing B&L additional time. No one objected.

Manager Martin stated that a "walk through" was scheduled for the remodeled office on Friday. He also stated that it was still not known when the District would be able to move back into the remodeled office.

12. Establish date, time and place of next meeting: The next scheduled meeting will be on November 12, 2015 beginning with the previously discussed evidentiary hearing regarding the Ayres permit request.

13. Meeting adjourned: At 11:36 a.m. President Glenn adjourned the regular meeting of the Southeast Texas Groundwater Conservation District.

Roger Fussell – Vice President

Bobby Rogers – Secretary/Treasurer

Date: November 12, 2015

Appendix C

Correspondence from Kevin Patteson, Texas Water Development Board, to Mike Turco, Harris-Galveston Subsidence District, approving the updated Houston Area Groundwater Model as the Official Groundwater Availability Model for the Northern Segments of the Gulf Coast Aquifer System.

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Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

February 18, 2014

Mr. Mike Turco
General Manager
Harris Galveston Subsidence District
1660 West Bay Area Blvd.
Friendswood, TX 77546

Re: Approval of Houston Area Groundwater Model as the Official Groundwater Availability Model for the Northern Segment of the Gulf Coast Aquifer System

Dear Mr. Turco,

I am approving the request, transmitted in a letter dated April 15, 2013, from Mr. Ron Neighbors of the Harris-Galveston Subsidence District to Mr. Larry French of the Texas Water Development Board (Attachment 1), to designate the Houston Area Groundwater Model as the official groundwater availability model of the Northern Segment of the Gulf Coast Aquifer System. This action is pursuant to the provisions of Texas Water Code Section 16.012 (l) and is based on our technical evaluation of the Houston Area Groundwater Model compared to the existing groundwater availability model (Northern Gulf Coast Groundwater Availability Model). My staff has conducted this evaluation considering the technical requirements of joint planning and establishment of desired future conditions for the aquifers of Groundwater Management Area 14. I am also including documentation of the technical analysis (Attachment 2), as well as the comments of various groundwater stakeholders (Attachment 3) and TWDB responses to the comments (Attachment 4).

I appreciate the thoughtful and rigorous reviews that commenters have performed with respect to the Houston Area Groundwater Model. My staff agrees with a number of the technical issues that have been raised but note that most of these issues are also valid with respect to the existing groundwater availability model for the northern segment of the Gulf Coast Aquifer System. My staff will retain these technical comments and consider them when the TWDB performs future upgrades or improvements on the model.

By copy of this letter I am also informing the groundwater conservation districts in Groundwater Management Area 14 and the regional water planning groups of this action.

Our Mission

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

Board Members

Carlos Rubinstein, Chairman | Bech Bruun, Member | Mary Ann Williamson, Member

Kevin Patteson, Executive Administrator

Please contact Mr. Larry French (512-463-5067) of my staff if you have any questions.

Sincerely,

Kevin Patteson
Executive Administrator

Attachments

C w/att: Robert Mace, Ph.D., P.G.
Larry French, P.G.
Cindy Ridgeway, P.G.
Kathy Turner Jones, Lone Star Groundwater Conservation District
Zach Holland, Bluebonnet Groundwater Conservation District
John Pyburn, Brazoria County Groundwater Conservation District
Bill Jacobs, Lower Trinity Groundwater Conservation District
John Martin, Southeast Texas Groundwater Conservation District
Mark Evans, North Harris County Regional Water Authority (Region H)
Kelley Holcomb, Angelina & Neches River Authority (Region I)
Wayne Wilson, Wilson Cattle Company (Region G)
John E. Burke, John Burke & Associates (Region K)

Appendix D

Groundwater Management Area 14 Significant Activity Review, Status Update, and Remaining Milestones Timeline as of April 3, 2016

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Groundwater Management Area 14

Significant Activity Review, Status Update, and Remaining Milestones

As of April 3, 2016

April 24, 2013

- Briefed on results from the recently concluded Houston Area Groundwater Model project.
- Briefed on changes made to the joint-planning process as a result of passage of Senate Bill 660 in 2011.

May 22, 2013

- Texas Water Development Board (TWDB) briefed Groundwater Water Management Area 14 (GMA 14) regarding ongoing technical review of recently completed Houston Area Groundwater Model (HAGM) for possible consideration as the official TWDB Groundwater Availability Model.
- Approval for execution of professional services contracts with consultants for execution of the joint-planning process.

June 26, 2013

- TWDB briefed GMA 14 on status of technical review of recently completed Houston Area Groundwater Model (HAGM).
- Briefed on a comparison between GAM Run 10-023 utilizing the TWDB adopted Northern Gulf Coast Groundwater Availability Model (2003) during the first round of joint planning and the recently completed Houston Area Groundwater Model (HAGM).

September 18, 2013

- Discussion of draft results from the Houston Area Groundwater Model (HAGM) under review by TWDB.
- Briefing and consideration of aquifer uses or conditions, including conditions that differ substantially from one geographic area to another in GMA 14, as required by Texas Water Code 36.108 (d)(1).
- Briefing and consideration of water supply needs and water management strategies included in the 2012 Texas State Water Plan, as required by Texas Water Code 36.108 (d)(2).

January 29, 2014

- Posted meeting canceled due to hazardous travel conditions (ice storm).

March 4, 2014

- Posted meeting canceled due to hazardous travel conditions (ice storm).

April 30, 2014

- U.S. Geological Survey briefed GMA 14 on the approach, conceptual model development, model calibration, and review process for the Houston Area Groundwater Model (HAGM).
- TWDB briefed GMA 14 on TWDB approval of the HAGM as the official Groundwater Availability Model for the Northern Gulf Coast Aquifer System.
- Briefed on results from HAGM GAM Run #1 and discussion on approach and process for HAGM GAM Run #2.
- Discussion of draft statements of desired future conditions (DFCs) resulting from HAGM GAM Run #1.

June 24, 2014

- Discussion and approval of aquifers to be designated as non-relevant for the purpose of joint planning.
- TWDB briefed GMA 14 on completion of reports regarding total estimated recoverable storage (TERS).
- Briefed on results from HAGM GAM Run #2.
- Discussion of draft statements of desired future conditions (DFCs) resulting from HAGM GAM Run #2.
- Briefing and consideration of hydrological conditions, including for each aquifer in the management area, total estimated recoverable storage, average annual recharge, inflows, and discharge, as required by Texas Water Code 36.108(d)(3).
- Briefing and consideration of environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water, as required by Texas Water Code 36.108(d)(4).
- Briefing and discussion of the impacts of draft proposed DFCs on subsidence, as required by Texas Water Code Chapter 36.108(d) (5).

September 23, 2014

- Briefing and consideration of the socioeconomic impacts of draft proposed DFCs, as required by Texas Water Code 36.108(d) (6).
- Briefing and consideration of the impact on the interests and rights in private property, as required by Texas Water Code 36.108(d) (7).

- Briefing and discussion of administrative procedures under consideration by GMA 14.
- TWDB Board Member Beck Bruun provided overview of current activities at the TWDB.

November 18, 2014

- Consideration and approval of administrative procedures, with recognition of progress by GMA 14 to date.
- Briefing and consideration of the feasibility of achieving draft proposed DFCs, as required by Texas Water Code 36.108(d) (7).
- Consideration and approval of DFC option resulting from HAGM GAM Run #2 as a potential candidate for proposal and adoption by the Member Districts in accordance with Section 3.03 of the adopted administrative procedures.

May 27, 2015

- Consideration and approval of DFC option resulting from HAGM Run #2 as a candidate for adoption as a proposed DFC to be further reviewed in consideration of the nine statutory factors listed in Texas Water Code Section 36.108(1-9) and in accordance with Section 3.04 of the administrative procedures adopted by GMA 14.

June 24, 2015

- Consideration and approval of DFC option resulting from HAGM Run #2 for the Gulf Coast Aquifer System in GMA 14 as the proposed DFCs in accordance with Texas Water Code Section 36.108 (d) and (d-2) and in accordance with Section 3.05 of the administrative procedures adopted by GMA 14.

July 2 – 6, 2015

- Information considered by GMA 14 throughout current round of joint planning was distributed and made available to GCDs in GMA 14 and on the Lone Star GCD webpage for public review.

July 6 – October 3, 2015

- The 90-day public comment period for proposed DFCs occurred. Each GCD held a public hearing on the proposed DFCs relevant to the individual GCD in accordance with requirements included in Texas Water Code Section 36.108 (d-2). During the public comment period, each GCD made available in the GCD office a copy of the proposed DFCs and all supporting materials such as documentation of factors considered under Texas Water Code Section 36.108 (d) and the groundwater availability model results.

October 4 – 28, 2015

- After the individual public hearings, each GCD compiled for consideration at the next joint planning meeting a summary of relevant comments received along with suggested revisions to the proposed DFCs, and the basis for the revisions.

October 28, 2015

- GMA 14 meeting for District Representatives to consider summary reports submitted by each of the GCDs in GMA 14 and consider any proposals for alternative DFCs. After agreement to a few editorial and non-substantive revisions, GMA 14 District Representatives directed contracted consultants to prepare a draft Explanatory Report for review and comment by the GMA 14 District Representatives. Ultimately, the DFCs must be adopted as a resolution by a two-thirds vote of all the District Representatives. The District Representatives shall produce a final desired future conditions explanatory report for the management area and submit to the TWWDB and each GCD in the management area, including proof that notice was posted for the joint planning meeting, a copy of the resolution, and a copy of the explanatory report.

January 2, 2016

- Draft Explanatory Report provided to GMA 14 District Representatives for review and comment. This review and revision process, as of April 3, 2016, is ongoing.

Remaining efforts

- In an upcoming (to be scheduled) meeting of GMA 14 District Representatives, posted in accordance with the requirements of Chapter 551, Government Code, desired future conditions shall be adopt by resolution by 2/3 vote of all GCDs in GMA 14.
- After submission of the adopted DFCs including the explanatory report to the TWDB, then the TWDB will review for administrative completeness and then conduct execution of the Northern Gulf Coast GAM to calculate estimates of modeled available groundwater for GMA 14. This process at the TWDB may take from 6 – 8 months.
- In accordance with Texas Water Code Section 36.108 (d-4), as soon as possible after a GCD receives the adopted final DFC resolution and explanatory report, the GCD shall adopt the DFCs in the resolution and explanatory report that apply to the GCD.

Appendix E

Resolution 2016-01-01, dated April 29, 2016, adopting Desired Future Conditions for GMA 14

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RESOLUTION FOR THE APPROVAL OF DESIRED FUTURE CONDITIONS FOR ALL AQUIFERS IN GROUNDWATER MANAGEMENT AREA 14

Whereas, pursuant to Section 35.004 of the Texas Water Code, the Texas Water Development Board ("TWDB") has designated groundwater management areas that, together, cover all major and minor aquifers in the state; and

Whereas, each groundwater management area was designated with the objective of providing the most suitable area for the management of groundwater resources; and

Whereas, through Title 31, Section 356.21 of the Texas Administrative Code, the TWDB has designated the area encompassing all of Austin, Brazoria, Chambers, Fort Bend, Galveston, Grimes, Hardin, Harris, Jasper, Jefferson, Liberty, Montgomery, Newton, Orange, Polk, San Jacinto, Tyler, Walker, Waller, and Washington counties as Groundwater Management Area No. 14 ("GMA 14"); and

Whereas, GMA 14 includes all or portions of areas subject to groundwater regulation by Bluebonnet Groundwater Conservation District (Austin, Grimes, Walker, and Waller counties), Brazoria County Groundwater Conservation District (Brazoria County), Lone Star Groundwater Conservation District (Montgomery County), Lower Trinity Groundwater Conservation District (Polk and San Jacinto counties), and Southeast Texas Groundwater Conservation District (Hardin, Jasper, Newton, and Tyler counties) (the "Member Districts"); and

Whereas, the Member Districts are authorized by Chapter 36, Texas Water Code, to engage in joint planning activities for the coordinated management of the aquifers located in GMA 14, and in that regard, shall establish desired future conditions ("DFCs") for the relevant aquifers within GMA 14; and

Whereas Fort Bend Subsidence District (Fort Bend County), Harris-Galveston Subsidence District (Galveston and Harris counties), and other stakeholders within GMA 14 from Chambers County, and Washington County also contributed to the development of DFCs for GMA 14; and

Whereas, Section 36.108 of the Texas Water Code requires the Member Districts in GMA 14 to consider groundwater availability models and other data or information for the management area and vote on a proposal for the adoption of DFCs for each relevant aquifer within GMA 14 by May 1, 2016; and

Whereas, the Member Districts within GMA 14 secured hydrogeologic and engineering consulting services to provide technical support in their efforts to establish requisite DFCs; and

Whereas, in developing the proposed DFCs for the relevant aquifers within GMA 14, the Member Districts in GMA 14 considered the nine statutory factors set forth in Section 36.108(d) of the Texas Water Code:

- aquifer uses or conditions within the management area, including conditions that differ substantially from one geographic area to another,
- the water supply needs and water management strategies included in the state water plan,
- hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge,
- other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water,
- the impact on subsidence,
- socioeconomic impacts reasonably expected to occur,
- the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater as recognized under Section 36.002,
- the feasibility of achieving the desired future condition, and
- any other information relevant to the specific desired future conditions; and

Whereas, pursuant to Section 36.108(d-2), the Member Districts also considered in their development of proposed DFCs the balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in the management area; and

Whereas, the Member Districts used this information to developed proposed DFCs for the portions of the northern segment of the Gulf Coast Aquifer that occurs within the bounds of GMA 14; and

Whereas, TWDB conducted an evaluation of the Houston Area Groundwater Model ("HAGM") and adopted it as the updated Northern Gulf Coast Groundwater Availability Model ("GAM"); and

Whereas, the Members Districts conducted a model run of the updated Northern Gulf Coast GAM specifically identified as GAM Run 2 for the purpose of evaluating drawdown in the Northern Gulf Coast Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-052 MAG for the Carrizo-Wilcox Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-053 MAG for the Queen City Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-054 MAG for the Sparta Aquifer; and

Whereas, the TWDB has prepared a report for GAM Task 10-055 MAG for the Yegua-Jackson Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-30 MAG for the Brazos River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-31 MAG for the Navasota River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-32 MAG for the San Bernard River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-33 MAG for the San Jacinto River Alluvium Aquifer; and

Whereas, the TWDB has prepared a report for Aquifer Assessment Task 10-34 MAG for the Trinity River Alluvium Aquifer; and

Whereas, during joint meetings noticed and conducted pursuant to Section 36.108(e) of the Texas Water Code, the Member Districts considered GAMs and other data and information relevant to the development of DFCs for GMA 14, including input and comments from stakeholders within GMA 14; and

Whereas, the Member Districts find that all notice requirements for a meeting, held this day, to take up and consider the approval of the proposed DFCs as described herein for GMA 14 have been, and are, satisfied; and

Whereas, Texas Water Code Section 36.0015(b), as amended by House Bill 200 during the 84th Texas Legislature states that "(b) In order to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater, and of groundwater reservoirs or their subdivisions, and to control subsidence caused by withdrawal of water from those groundwater reservoirs or their subdivisions, consistent with the objectives of Section 59, Article XVI, Texas Constitution, groundwater conservation districts may be created as provided by this chapter. Groundwater conservation districts created as provided by this chapter are the state's preferred method of groundwater management in order to protect property rights, balance the conservation and development of groundwater to meet the needs of this state, and use the best available science in the conservation and development of groundwater through rules developed, adopted, and promulgated by a district in accordance with the provisions of this chapter"; and

Whereas, the Member Districts find that the proposed DFCs provided herein for establishment are each merited and necessary for the effective and prudent management of groundwater resources within GMA 14, and have otherwise been developed in accordance with, and do satisfy the obligations imposed by, Chapter 36 of the Texas Water Code and all other applicable laws of the State of Texas.

Now, therefore, be it resolved by the Member Districts of GMA 14 that the following DFCs are each hereby established:

Formations of the Gulf Coast Aquifer

DFCs for the Gulf Coast Aquifer are hereby adopted, as documented by and incorporating herein GAM Run 2, at two scales, which do not differ substantively in their application; the first being for GMA 14 in its entirety, and also, to better facilitate the management and conservation of groundwater resources at the individual groundwater conservation district level after considering the statutory criteria set forth under Section 36.108(d), Water Code, on a county-by-county basis. DFCs for GMA 14 for the Gulf Coast Aquifer are as follows:

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 28.3 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 23.6 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 18.5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 66.2 feet after 61 years.

Austin County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 76 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Austin County should not exceed approximately 2.83 feet by the year 2070.

Brazoria County (BCGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 27 feet after 61 years.

Chambers County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 32 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 30 feet after 61 years.

Grimes County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 5 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 6 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 52 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Grimes County should not exceed approximately 0.12 feet by the year 2070.

Hardin County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 21 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 27 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 29 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 89 feet after 61 years.

Jasper County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 23 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 41 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 46 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 40 feet after 61 years.

Jefferson County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 15 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 17 feet after 61 years.

Liberty County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 27 feet after 61 years.

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 29 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 25 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 120 feet after 61 years.

Montgomery County (LSGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 26 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately -4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 34 feet after 61 years.

Newton County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 35 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 45 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 44 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 37 feet after 61 years.

Orange County

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 14 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 16 feet after 61 years.

Polk County (LTGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 26 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 10 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 15 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 73 feet after 61 years.

San Jacinto County (LTGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 22 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 19 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 19 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 108 feet after 61 years.

Tyler County (STGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 35 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 30 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 62 feet after 61 years.

Walker County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 9 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 4 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 42 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Walker County should not exceed approximately 0.04 feet by the year 2070.

Waller County (BGCD)

- From estimated year 2009 conditions, the average draw down of the Chicot Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 39 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 40 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 101 feet after 61 years.
- From estimated year 1890 conditions, the maximum subsidence in Waller County should not exceed approximately 4.73 feet by the year 2070.

Washington County

- From estimated year 2009 conditions, the average draw down of the Evangeline Aquifer should not exceed approximately 1 foot after 61 years.
- From estimated year 2009 conditions, the average draw down of the Burkeville confining unit should not exceed approximately 16 feet after 61 years.
- From estimated year 2009 conditions, the average draw down of the Jasper Aquifer should not exceed approximately 48 feet after 61 years.

Formations in Fort Bend, Galveston, and Harris counties

Groundwater Management Area 14 (GMA 14) efforts to determine DFCs is primarily an aquifer water-level based approach to describe the regional and local desires for the aquifer beneath them. The GMA process requires Groundwater Conservation Districts (GCDs) to determine the DFCs for the entire GMA, regardless of whether each county is included within a GCD. The Fort Bend Subsidence District (FBSD) and the Harris-Galveston Subsidence District (HGSD), operating in Fort Bend County and Harris and Galveston counties, respectively, regulate groundwater for the purpose of ending land surface subsidence within their jurisdiction. They are not GCDs and operate considerably different from the typical GCD. Therefore, in an official context these three counties are "unrepresented" but the GCDs within GMA-14 must still determine the DFC for these counties.

Both FBSD and HGSD have participated in an unofficial role to aid the GCDs within GMA-14 with their evaluation of Fort Bend, Galveston and Harris County information. The groundwater pumpage within these three counties even though regulated is still greater than the sum of all other counties within GMA-14. FBSD and HGSD recognize that the projected groundwater pumpage from these three counties will impact the decisions of GMA-14 throughout a large portion of the area. FBSD and HGSD have provided considerable historical and projected groundwater pumpage data and details of regulations to assist GMA-14 in incorporating these counties in the overall GMA-14 DFCs. FBSD and HGSD cannot however, present DFCs for these three counties in terms of aquifer water-level changes over time. The FBSD and HGSD regulations do not specifically address water-levels nor do they designate a specific pumping limit, rather the regulations are based on limitations of groundwater as a percentage of total water demand. The percentage of groundwater to total water demand is decreased over time, as total water demand increases.

The goal of both FBSD and HGSD is to end land surface subsidence that is caused by man's pumpage of groundwater. There is a clearly established link between the over-pumpage of groundwater and land surface subsidence. The DFCs within the aquifer beneath Fort Bend, Galveston, and Harris counties has no easily defined relationship to water-levels. The DFC for FBSD and HGSD is the reduction and halting of the compaction of clay layers within the aquifer caused by the over-pumpage of groundwater. Stated more simply, the DFC for these three counties is that future land surface subsidence be avoided. That stated, HGSD and FBSD have adopted regulations, most recently in 2013, that require the reduction of

groundwater pumpage and the conversion to alternate water sources, while balancing with the realistic ability of the permittees to achieve compliance with these regulations. This effort was accomplished with the aid of computer models and information specific to the missions of FBSD and HGSD and outside of the revised Northern Gulf Coast GAM (NGCGAM) adopted by the TWDB.

Within HGSD, from central to southeastern Harris County and all of Galveston County (Regulatory Areas 1 and 2), virtually all permittees have achieved compliance with previous and current HGSD regulations. Subsidence has been halted and water-levels within the aquifer have risen dramatically in these areas. However, in northern and western areas of Harris County (Regulatory Area 3), the HGSD regulations have allowed groundwater pumpage to continue until the required reductions in 2010, 2025, and 2035. With these scheduled reductions in groundwater pumpage, subsidence will slow dramatically and even be halted with water-levels stabilizing and in later years rising.

Within FBSD, from central to northern and eastern Fort Bend County (Regulatory Area A), the regulations call for reductions of groundwater pumpage in 2014/2016, and 2025. Similar to HGSD's Regulatory Area 3, subsidence within FBSD Regulatory Area A will slow dramatically and even be halted with water-levels stabilizing and in later years rising.

In both HGSD and FBSD, because of the percentage based approach to regulations, groundwater pumpage will increase until scheduled reductions in milestone years (ex: 2010, 2014/2016, 2025, and 2035). In between milestone years, groundwater pumpage will increase with the assumed increase in total water demand from an assumed increase in population. In order to demonstrate the DFC of these three counties using water-level changes, the area of previous groundwater-to-alternative water conversions must be separated from future conversions AND each annual time step must be depicted.

The HGSD and FBSD have submitted to GMA-14 their current regulations and projected groundwater pumpage projections through the year 2070. This data has been divided into the grid cells/layers relative to the NGCGAM and utilized by the GCDs in development of their DFCs.

Groundwater pumpage within GMA-14 from Fort Bend, Galveston, and Harris counties is regulated by FBSD and HGSD, non GCD governmental agencies (the only GMA in Texas with this occurrence) and the missions of HGSD and FBSD are vastly different from GCDs and do not fit well with a water-level designed DFC process). The groundwater pumpage projections developed in recognition of the HGSD and FBSD regulatory plans have been utilized without adjustment by GMA14 in the DFC process. Therefore, the DFCs adopted by GMA-14 are consistent with the HGSD and FBSD regulatory plans.

Carrizo Sand Aquifer

Grimes County (BGCD)

- The portion of the Carrizo Sand Aquifer occurring in Grimes County is declared non-relevant.

Walker County (BGCD)

- The portion of the Carrizo Sand Aquifer occurring in Walker County is declared non-relevant.

Queen City Aquifer

Grimes County (BGCD)

- The portion of the Queen City Aquifer occurring in Grimes County is declared non-relevant..

Walker County (BGCD)

- The portion of the Queen City Aquifer occurring in Walker County is declared non-relevant..

Sparta Aquifer

Grimes County (BGCD)

- The portion of the Sparta Aquifer occurring in Grimes County is declared non-relevant..

Walker County (BGCD)

- The portion of the Sparta Aquifer occurring in Walker County is declared non-relevant.

Yegua-Jackson Aquifer

Grimes County (BGCD)

- The portion of the Yegua Jackson Aquifer occurring in Grimes County is declared non-relevant..
-

Jasper County (STGCD)

- The portion of the Yegua-Jackson occurring in Jasper County is declared non-relevant.

-

Newton County (STGCD)

- The portion of the Yegua-Jackson occurring in Newton County is declared non-relevant.

Polk County (LTGCD)

- The portion of the Yegua-Jackson occurring in Polk County is declared non-relevant.

Tyler County (STGCD)

- The portion of the Yegua-Jackson occurring in Tyler County is declared non-relevant.

Walker County (BGCD)

- The portion of the Yegua Jackson Aquifer occurring in Walker County is declared non-relevant..

Washington County

- The portion of the Yegua Jackson Aquifer occurring in Washington County is declared non-relevant..

River Alluvium Aquifers

Austin County (BGCD)

- The portion of the Brazos River Alluvium occurring in Austin County is declared non-relevant.
- The portion of the San Bernard River Alluvium occurring in Austin County is declared non-relevant.

Grimes County (BGCD)

- The portion of the Brazos River Alluvium occurring in Grimes County is declared non-relevant.
- The portion of the Navasota River Alluvium occurring in Grimes County is declared non-relevant.

Walker County (BGCD)

- The portion of the San Jacinto River Alluvium occurring in Walker County is declared non-relevant.
- The portion of the Trinity River Alluvium occurring in Walker County is declared non-relevant.

Waller County (BGCD)

- The portion of the Brazos River Alluvium occurring in Walker County is declared non-relevant.

Washington County

- The portion of the Brazos River Alluvium occurring in Washington County is declared non-relevant.

And it is so ordered and passed this 29th day of April, 2016.

Signed _____

Mr. Zach Holland Bluebonnet Groundwater Conservation District

Signed _____

Mr. Kent Burkett Brazoria County Groundwater Conservation District

Signed _____

Ms. Kathy Turner Jones Lone Star Groundwater Conservation District

Signed _____

Mr. Gary Ashmore Lower Trinity Groundwater Conservation District

Signed _____

Mr. John Martin Southeast Texas Groundwater Conservation District

Appendix F

Groundwater Availability Model Run Summary for Groundwater Management Area 14, Northern Gulf Coast Aquifer

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MEMORANDUM

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TO: Mr. Larry French, TWDB

CC: Ms. Kathy Jones, LSGCD

FROM: Jason Afinowicz, P.E.

SUBJECT: Groundwater Availability Model Run Summary for Groundwater Management Area 14, Northern Gulf Coast Aquifer

DATE: 2015/12/11

PROJECT: LSD13339

Groundwater Management Area 14 (GMA 14) is completing the development of Desired Future Conditions (DFCs) for the aquifers within its region. GMA 14 is comprised of five groundwater conservation districts: Bluebonnet Groundwater Conservation District (BGCD), Brazoria County Groundwater Conservation District (BCGCD), Lone Star Groundwater Conservation District (LSGCD), Lower Trinity Groundwater Conservation District (LTGCD), and Southeast Texas Groundwater Conservation District (STGCD). Each district, along with other interlocal planning partners, participated in the DFC development and model review processes described in this document.

Description of Desired Future Conditions

GMA 14 has prepared a summary of DFCs for two aquifers comprising the Gulf Coast Aquifer and the Yegua-Jackson Aquifer. This model submittal comprises the GMA's evaluation of the Northern Gulf Coast Aquifer pursuant to that goal. DFCs by layer, county, and the entirety of GMA 14 are contained below in *Table 1*.

Table 1 – Desired Future Conditions for the Gulf Coast Aquifer in GMA 14

County	GCD	Feet of Drawdown (2009-2070)				Feet of Subsidence (1890-2070)
		Chicot	Evangeline	Burkeville	Jasper	
Austin	BGCD	39	23	23	76	2.83
Brazoria	BCGCD	23	27	-	-	-
Chambers	-	32	30	-	-	-
Grimes	BGCD	5	5	6	52	0.12
Hardin	STGCD	21	27	29	89	-
Jasper	STGCD	23	41	46	40	-
Jefferson	-	15	17	-	-	-
Liberty	-	27	29	25	120	-
Montgomery	LSGCD	26	-4	-4	34	-
Newton	STGCD	35	45	44	37	-

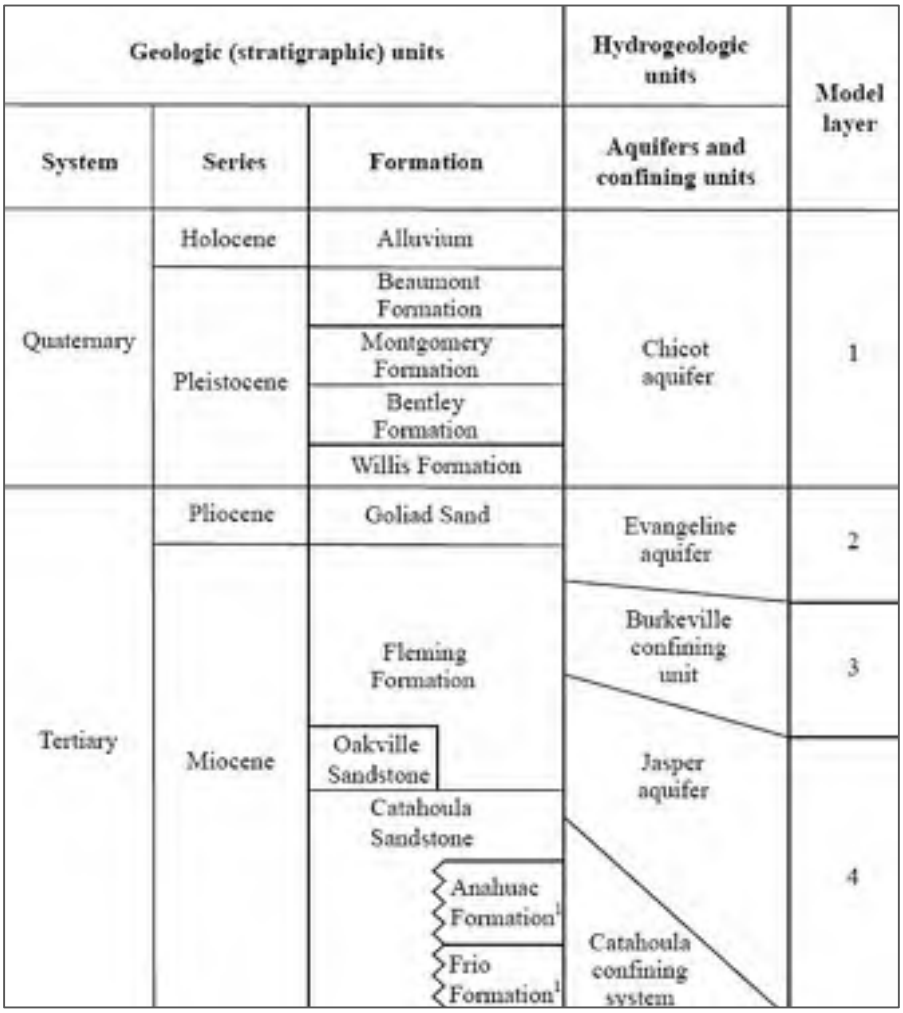
County	GCD	Feet of Drawdown (2009-2070)				Feet of Subsidence (1890-2070)
		Chicot	Evangeline	Burkeville	Jasper	
Orange	-	14	16	-	-	-
Polk	LTGCD	26	10	15	73	-
San Jacinto	LTGCD	22	19	19	108	-
Tyler	STGCD	42	35	30	62	-
Walker	BGCD	-	9	4	42	0.04
Waller	BGCD	39	39	40	101	4.73
Washington	-	-	1	16	48	-

Modeling Approach

The proposed pumping scenario was evaluated in MODFLOW-2000 using the Northern Gulf Coast Groundwater Availability Model (GAM) approved by TWDB on February 18, 2014 and formally referred to as the Houston Area Groundwater Model (HAGM). This model was reviewed by TWDB and approved as the Northern Gulf Coast GAM on February 18, 2014.

The updated Northern Gulf Coast GAM covers an area spanning 38 counties in southeast Texas. Flow is simulated in four layers of the model, generally comprising the Chicot Aquifer, the Evangeline Aquifer, the Burkeville Confining Unit, and the Jasper Aquifer. These layers are shown below in *Figure 1*. The model simulates hydrogeologic conditions in these four layers over a period from a predevelopment condition in 1891 through 2009. The northwestern boundaries for each layer are the northwestern extent of the up dip outcrop segments. The downdip limit of freshwater in each aquifer was chosen as the southeastern boundary of each layer. A no-flow boundary was selected for this line. The southwestern and northeastern boundaries we drawn to generally coincide with the occurrence of the Lavaca and Sabine Rivers, respectively, and were simulated with the use of a no-flow boundary due to the location of groundwater divides in these areas. Finally, a no-flow boundary was also set at the base of the Jasper, as the brackish water located in the underlying Catahoula Aquifer impedes communication between this layer and the Jasper. The MODFLOW General-Head Boundary (GHB) package was used for simulating recharge and discharge in all model layers.

Figure 1 – Correlation of Stratigraphic and Hydrogeologic Units in the Northern Gulf Coast GAM



Pumpage in the base model was derived from a number of sources, including the Harris-Galveston Subsidence District (HGSD), Fort Bend Subsidence District (FBSD), LSGCD, TWDB, and the San Jacinto River Authority (SJRA). The model was simulated under transient conditions from 10,000 years prior to 1891. A total of 78 stress periods of various lengths were used to simulate the years from 1891 through 2009. These stress periods are illustrated below in *Figure 2* and *Table 2*.

Figure 2 – Total Groundwater Withdrawals by Stress Period, 1891-2009

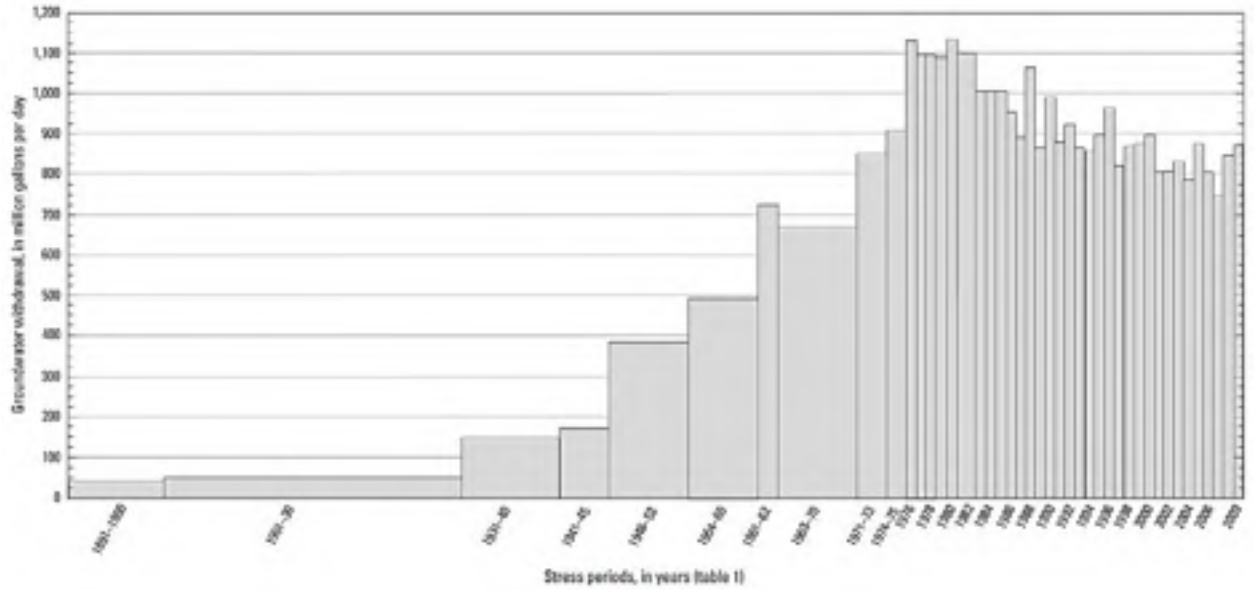


Table 2 – Model Historic Stress Periods

Stress Period	Length of Time (years)	Time Interval	Stress Period	Length of Time (years)	Time Interval	Stress Period	Length of Time (years)	Time Interval
1	Transient[1]	10,000 years	27	0.085	Dec. 1980	53	0.085	Aug. 1988
2	10	1891–1900	28	1	1981	54	0.082	Sept. 1988
3	30	1901–30	29	0.085	Jan. 1982	55	0.085	Oct. 1988
4	10	1931–40	30	0.077	Feb. 1982	56	0.082	Nov. 1988
5	5	1941–45	31	0.085	Mar. 1982	57	0.085	Dec. 1988
6	8	1946–53	32	0.082	Apr. 1982	58	1	1989
7	7	1954–60	33	0.085	May 1982	59	1	1990
8	2	1961–62	34	0.082	June 1982	60	1	1991
9	8	1963–70	35	0.085	July 1982	61	1	1992
10	3	1971–73	36	0.085	Aug. 1982	62	1	1993
11	2	1974–75	37	0.082	Sept. 1982	63	1	1994
12	1	1976	38	0.085	Oct. 1982	64	1	1995
13	1	1977	39	0.082	Nov. 1982	65	1	1996
14	1	1978	40	0.085	Dec. 1982	66	1	1997
15	1	1979	41	1	1983	67	1	1998
16	0.085	Jan. 1980	42	1	1984	68	1	1999
17	0.077	Feb. 1980	43	1	1985	69	1	2000
18	0.085	Mar. 1980	44	1	1986	70	1	2001
19	0.082	Apr. 1980	45	1	1987	71	1	2002
20	0.085	May 1980	46	0.085	Jan. 1988	72	1	2003
21	0.082	June 1980	47	0.077	Feb. 1988	73	1	2004

Stress Period	Length of Time (years)	Time Interval	Stress Period	Length of Time (years)	Time Interval	Stress Period	Length of Time (years)	Time Interval
22	0.085	July 1980	48	0.085	Mar. 1988	74	1	2005
23	0.085	Aug. 1980	49	0.082	Apr. 1988	75	1	2006
24	0.082	Sept. 1980	50	0.085	May 1988	76	1	2007
25	0.085	Oct. 1980	51	0.082	June 1988	77	1	2008
26	0.082	Nov. 1980	52	0.085	July 1988	78	1	2009

[1]A 10,000-year transient period was used without withdrawals for model stability.

Calibration of the model was conducted through iterative trial-and-error adjustment of selected model input data until measured and estimated field conditions could be replicated to a reasonable degree. Additional details of the model configuration and approach are shown in *Hydrogeology and Simulation of Groundwater Flow and Land-Surface Subsidence in the Northern Part of the Gulf Coast Aquifer System, Texas, 1891-2009* (USGS, 2012).

Pumping during the predictive period of the model (following 2009) was incorporated into the model from various sources using information provided by individual districts throughout GMA 14. These sources include:

- TWDB GAM Run 10-023 during the first phase of DFC development conducted in 2010,
- Pumpage incorporated into the HAGM as part of the Regional Groundwater Update Project (RGUP),
- Regulatory limits imposed by the LSGCD regulatory plan,

In addition, data from the HAGM and GAM Run 10-023 were used as the bases for the horizontal and vertical distribution of pumpage in the model. *Attachment A* summarizes the target pumpage for predictive period stress periods simulated in the Northern Gulf Coast GAM.

Model Output Analysis

Model output was analyzed based on cell county assignments from the TWDB model grid for the Northern Gulf Coast Aquifer dated February 3, 2014 (GLFC_N_GRID_POLY020314).

Cell-by-cell drawdown results for each formation were geographically assigned to counties based on the TWDB model grid county assignments. The cell-by-cell drawdowns in each county were averaged to produce the overall county drawdowns; cells that went dry during the simulated period were not included in this calculation.

Results of the analysis are shown below in *Table 3*, including target pumpage and drawdown over the predictive period by county and layer.

Table 3 – Simulated Pumpage and Resulting Drawdown

County	Formation	Model Pumpage (Ac-Ft/Yr)							Average Drawdown 2009-2070
		2010	2020	2030	2040	2050	2060	2070	
Austin	Chicot	1,300	1,300	1,300	1,300	1,300	1,300	1,300	39
	Evangeline	20,000	20,000	20,000	20,000	20,000	20,000	20,000	23
	Burkeville	0	0	0	0	0	0	0	23

County	Formation	Model Pumpage (Ac-Ft/Yr)							Average Drawdown 2009-2070
		2010	2020	2030	2040	2050	2060	2070	
	Jasper	1,000	1,000	1,000	1,000	1,000	1,000	1,000	76
Grimes	Chicot	0	0	0	0	0	0	0	5
	Evangeline	3,000	3,000	3,000	3,000	3,000	3,000	3,000	5
	Burkeville	0	0	0	0	0	0	0	6
	Jasper	11,000	11,000	11,000	11,000	11,000	11,000	11,000	52
Walker	Evangeline	2,000	2,000	2,000	2,000	2,000	2,000	2,000	9
	Burkeville	0	0	0	0	0	0	0	4
	Jasper	16,000	16,000	16,000	16,000	16,000	16,000	16,000	42
Waller	Chicot	300	300	300	300	300	300	300	39
	Evangeline	41,000	41,000	41,000	41,000	41,000	41,000	41,000	39
	Burkeville	0	0	0	0	0	0	0	40
	Jasper	300	300	300	300	300	300	300	101
Brazoria	Chicot	39,023	39,023	39,023	39,023	39,023	39,023	39,023	23
	Evangeline	11,377	11,377	11,377	11,377	11,377	11,377	11,377	27
Montgomery	Chicot	11,921	12,599	13,869	13,943	15,025	14,716	13,445	26
	Evangeline	37,731	27,523	27,551	27,771	26,573	26,613	26,522	-4
	Burkeville	0	0	0	0	0	0	0	-4
	Jasper	41,488	23,878	22,580	22,286	22,402	22,671	24,033	34
Polk	Chicot	0	0	0	0	0	0	0	26
	Evangeline	8,306	8,306	8,306	8,306	8,306	8,306	8,306	10
	Burkeville	744	744	744	744	744	744	744	15
	Jasper	27,668	27,668	27,668	27,668	27,668	27,668	27,668	73
San Jacinto	Chicot	0	0	0	0	0	0	0	22
	Evangeline	8,172	8,172	8,172	8,172	8,172	8,172	8,172	19
	Burkeville[1]	2,697	2,697	2,697	2,697	2,697	2,697	2,697	19
	Jasper	10,096	10,096	10,096	10,096	10,096	10,096	10,096	108
Hardin	Chicot	1,263	1,263	1,263	1,263	1,263	1,263	1,263	21
	Evangeline	33,674	33,674	33,674	33,674	33,674	33,674	33,674	27
	Burkeville	0	0	0	0	0	0	0	29
	Jasper	0	0	0	0	0	0	0	89
Jasper	Chicot	10,828	10,828	10,828	10,828	10,828	10,828	10,828	23
	Evangeline	40,728	40,728	40,728	40,728	40,728	40,728	40,728	41
	Burkeville	1	1	1	1	1	1	1	46
	Jasper	16,010	16,010	16,010	16,010	16,010	16,010	16,010	40
Newton	Chicot	500	500	500	500	500	500	500	35
	Evangeline	21,274	21,274	21,274	21,274	21,274	21,274	21,274	45
	Burkeville	0	0	0	0	0	0	0	44
	Jasper	12,380	12,380	12,380	12,380	12,380	12,380	12,380	37

County	Formation	Model Pumpage (Ac-Ft/Yr)							Average Drawdown 2009-2070
		2010	2020	2030	2040	2050	2060	2070	
Tyler	Chicot	0	0	0	0	0	0	0	42
	Evangeline	20,578	20,578	20,578	20,578	20,578	20,578	20,578	35
	Burkeville	1	1	1	1	1	1	1	30
	Jasper	17,638	17,638	17,638	17,638	17,638	17,638	17,638	62
Harris	Chicot	92,683	137,104	109,198	81,058	87,425	90,875	94,397	29
	Evangeline	224,516	264,656	176,501	114,900	121,232	126,316	131,438	4
	Burkeville	0	0	0	0	0	0	0	-16
	Jasper	6,068	8,212	5,432	3,164	3,369	3,519	3,658	62
Galveston	Chicot	4,851	5,827	6,556	7,181	7,786	8,353	8,869	34
	Evangeline	167	215	254	284	314	346	374	31
Fort Bend	Chicot	46,800	58,277	52,874	62,902	73,281	84,386	97,159	53
	Evangeline	75,254	71,577	51,077	56,663	61,886	66,958	72,198	55
	Burkeville	0	0	0	0	0	0	0	60
	Jasper	0	0	0	0	0	0	0	108
Chambers	Chicot	22,622	22,622	22,622	22,622	22,622	22,622	22,622	32
	Evangeline	379	379	379	379	379	379	379	30
Jefferson	Chicot	2,400	2,400	2,400	2,400	2,400	2,400	2,400	15
	Evangeline	100	100	100	100	100	100	100	17
Liberty	Chicot	14,567	14,567	14,567	14,567	14,567	14,567	14,567	27
	Evangeline	27,652	27,652	27,652	27,652	27,652	27,652	27,652	29
	Burkeville	215	215	215	215	215	215	215	25
	Jasper	787	787	787	787	787	787	787	120
Orange	Chicot	18,797	18,797	18,797	18,797	18,797	18,797	18,797	14
	Evangeline	1,202	1,202	1,202	1,202	1,202	1,202	1,202	16
Washington	Evangeline	3,237	3,237	3,237	3,237	3,237	3,237	3,237	1
	Burkeville	367	367	367	367	367	367	367	16
	Jasper	9,431	9,431	9,431	9,431	9,431	9,431	9,431	48

MODFLOW Package

A complete MODFLOW package for the model simulation is included as an attachment to this memorandum. This includes the following items:

- 00BaseFiles
  - Input
    - HAGM.2013.bas – Basic Package for NGC GAM
    - HAGM.2013.bcf – Block-Centered Flow Package for NGC GAM
    - HAGM.2013.sip – Strongly Implicit Package for NGC GAM
    - HAGM.2013.sub – Subsidence and Aquifer-System Compaction Package for NGC GAM
    - HAGM.2013_139.dis – Discretization File for NGC GAM

        - HAGM.2013_139.ghb – General-Head Boundary Package for NGC GAM
    - Well
        - Rev20140610_SP1_thru_SP139.wel – Modified Well Package used for simulation described in this memorandum
- Runs
    - HAGM_rev20140610.nam – Input and output file names for simulation described in this memorandum
    - HAGM_rev20140610.oc – Output Control Option used for simulation described in this memorandum

Attachment A
Pumpage for Predictive Stress Periods

Attachment A: Pumpage for Predictive Stress Periods

County	Layer	Target Pumpage (Ac-Ft/Yr)																													
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Austin	Chicot	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Austin	Evangeline	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Austin	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austin	Jasper	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Brazoria	Chicot	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023
Brazoria	Evangeline	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377
Chambers	Chicot	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622
Chambers	Evangeline	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379
Fort Bend	Chicot	46,786	49,746	52,706	55,665	47,228	49,467	49,627	51,775	53,919	56,059	58,196	59,788	61,378	62,968	64,556	46,777	47,954	49,130	50,307	51,483	52,659	53,657	54,654	55,651	56,648	57,645	58,642	59,639	60,637	61,634	62,631
Fort Bend	Evangeline	75,244	78,028	80,811	83,595	62,427	64,334	64,244	66,075	67,906	69,737	71,567	72,791	74,015	75,238	76,462	47,143	47,927	48,712	49,498	50,283	51,068	51,626	52,185	52,743	53,302	53,860	54,418	54,977	55,535	56,094	56,652
Fort Bend	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fort Bend	Jasper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galveston	Chicot	4,849	4,946	5,043	5,140	5,236	5,333	5,430	5,527	5,623	5,720	5,817	5,889	5,961	6,033	6,105	6,177	6,249	6,321	6,393	6,465	6,537	6,598	6,660	6,722	6,783	6,845	6,906	6,968	7,030	7,091	7,153
Galveston	Evangeline	167	171	176	181	186	191	196	201	205	210	215	219	223	227	231	234	238	242	246	250	254	257	260	263	266	269	272	275	278	281	284
Grimes	Chicot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grimes	Evangeline	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Grimes	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grimes	Jasper	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000
Hardin	Chicot	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263
Hardin	Evangeline	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674
Hardin	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hardin	Jasper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harris	Chicot	92,342	96,806	101,259	105,702	110,130	114,554	118,970	123,392	127,809	132,222	136,630	138,414	140,197	141,980	143,762	102,638	103,848	105,058	106,268	107,477	108,687	109,786	110,885	111,983	113,082	76,966	77,675	78,383	79,091	79,799	80,507
Harris	Evangeline	224,450	228,437	232,430	236,429	240,434	244,445	248,461	252,482	256,507	260,537	264,570	266,514	268,457	270,400	272,344	170,599	171,761	172,924	174,087	175,251	176,415	177,488	178,561	179,634	180,708	111,428	112,105	112,782	113,459	114,136	114,813
Harris	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harris	Jasper	6,067	6,281	6,495	6,709	6,923	7,138	7,352	7,567	7,781	7,996	8,211	8,283	8,355	8,427	8,499	5,235	5,274	5,313	5,353	5,392	5,431	5,468	5,504	5,540	5,576	3,052	3,075	3,097	3,119	3,141	3,164
Jasper	Chicot	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828
Jasper	Evangeline	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728
Jasper	Burkeville	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Jasper	Jasper	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010
Jefferson	Chicot	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Jefferson	Evangeline	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Liberty	Chicot	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567
Liberty	Evangeline	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652
Liberty	Burkeville	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
Liberty	Jasper	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787
Montgomery	Chicot	11,921	11,921	11,921	11,921	11,921	11,921	12,599	12,599	12,599	12,599	12,599	12,695	12,785	12,872	12,953	13,700	13,737	13,773	13,807	13,838	13,869	13,928	13,983	14,036	14,071	14,058	14,038	14,016	13,993	13,969	13,943
Montgomery	Evangeline	37,731	37,731	37,731	37,731	37,731	37,731	27,523	27,523	27,523	27,523	27,523	27,542	27,560	27,577	27,595	27,462	27,481	27,500	27,518	27,535	27,551	27,566	27,581	27,595	27,615	27,629	27,660	27,689	27,718	27,745	27,771
Montgomery	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Montgomery	Jasper	41,488	41,488	41,488	41,488	41,488	41,488	23,878	23,878	23,878	23,878	23,878	23,763	23,655	23,551	23,452	22,838	22,782	22,727	22,675	22,627	22,580	22,506	22,436	22,369	22,314	22,313	22,302	22,295	22,289	22,286	22,286
Newton	Chicot	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
Newton	Evangeline	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274
Newton	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Newton	Jasper	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380
Orange	Chicot	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797
Orange	Evangeline	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202
Polk	Chicot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polk	Evangeline	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306
Polk	Burkeville	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744
Polk	Jasper	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668
San Jacinto	Chicot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Jacinto	Evangeline	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172
San Jacinto	Burkeville	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697
San Jacinto	Jasper	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096
Tyler	Chicot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyler	Evangeline	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578
Tyler	Burkeville	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tyler	Jasper	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638
Walker	Evangeline	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Walker	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walker	Jasper	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Waller	Chicot	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Waller	Evangeline	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000
Waller	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waller	Jasper	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Washington	Evangeline	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237
Washington	Burkeville	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367
Washington	Jasper	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431

Attachment A: Pumpage for Predictive Stress Periods

County	Layer	Target Pumpage (Ac-Ft/Yr)																												
		2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070
Austin	Chicot	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Austin	Evangeline	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Austin	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austin	Jasper	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Brazoria	Chicot	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023	39,023
Brazoria	Evangeline	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377	11,377
Chambers	Chicot	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622
Chambers	Evangeline	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379	379
Fort Bend	Chicot	63,663	64,695	65,727	66,759	67,792	68,824	69,856	70,888	71,920	72,952	74,057	75,161	76,266	77,370	78,475	79,579	80,683	81,788	82,892	83,996	85,266	86,536	87,805	89,075	90,345	91,614	92,884	94,154	95,423	96,693
Fort Bend	Evangeline	57,174	57,696	58,217	58,739	59,261	59,783	60,305	60,827	61,349	61,871	62,377	62,884	63,390	63,897	64,404	64,910	65,417	65,924	66,430	66,937	67,460	67,983	68,507	69,030	69,553	70,076	70,600	71,123	71,646	72,170
Fort Bend	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fort Bend	Jasper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Galveston	Chicot	7,212	7,272	7,331	7,391	7,450	7,510	7,569	7,629	7,688	7,748	7,803	7,859	7,914	7,970	8,025	8,081	8,136	8,192	8,247	8,303	8,353	8,404	8,455	8,506	8,556	8,607	8,657	8,708	8,759	8,809
Galveston	Evangeline	287	290	293	296	299	302	305	308	311	314	317	320	324	327	330	333	336	339	343	346	348	351	354	357	360	362	365	368	371	373
Grimes	Chicot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grimes	Evangeline	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Grimes	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grimes	Jasper	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000
Hardin	Chicot	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263	1,263
Hardin	Evangeline	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674	33,674
Hardin	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hardin	Jasper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harris	Chicot	81,141	81,774	82,408	83,040	83,673	84,306	84,939	85,571	86,203	86,836	87,180	87,525	87,870	88,215	88,559	88,904	89,249	89,594	89,939	90,284	90,635	90,987	91,339	91,691	92,043	92,395	92,747	93,098	93,450	93,802
Harris	Evangeline	115,446	116,079	116,711	117,344	117,976	118,609	119,242	119,874	120,507	121,140	121,648	122,156	122,664	123,172	123,680	124,188	124,697	125,205	125,714	126,222	126,734	127,246	127,758	128,270	128,782	129,294	129,806	130,319	130,831	131,343
Harris	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Harris	Jasper	3,184	3,205	3,225	3,246	3,266	3,287	3,307	3,327	3,348	3,368	3,383	3,398	3,413	3,428	3,443	3,458	3,473	3,488	3,503	3,518	3,532	3,546	3,560	3,574	3,588	3,602	3,616	3,630	3,644	3,658
Jasper	Chicot	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828	10,828
Jasper	Evangeline	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728	40,728
Jasper	Burkeville	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Jasper	Jasper	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010	16,010
Jefferson	Chicot	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Jefferson	Evangeline	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Liberty	Chicot	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567	14,567
Liberty	Evangeline	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652	27,652
Liberty	Burkeville	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215
Liberty	Jasper	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787	787
Montgomery	Chicot	14,000	14,054	14,106	14,155	14,087	14,856	14,901	14,944	14,985	15,025	14,965	14,904	14,843	14,857	14,874	14,658	14,673	14,688	14,702	14,716	14,716	14,717	14,160	14,163	14,165	14,168	14,170	14,172	14,174	13,445
Montgomery	Evangeline	27,766	27,761	27,756	27,752	27,970	26,583	26,580	26,578	26,575	26,573	26,582	26,589	26,595	26,598	26,601	26,607	26,608	26,610	26,612	26,613	26,601	26,590	26,578	26,568	26,559	26,550	26,542	26,534	26,527	26,522
Montgomery	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Montgomery	Jasper	22,234	22,185	22,138	22,093	21,943	22,561	22,519	22,478	22,440	22,402	22,453	22,507	22,562	22,545	22,525	22,735	22,719	22,702	22,686	22,671	22,683	22,693	23,262	23,269	23,276	23,282	23,288	23,294	23,299	24,033
Newton	Chicot	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
Newton	Evangeline	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274	21,274
Newton	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Newton	Jasper	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380	12,380
Orange	Chicot	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797	18,797
Orange	Evangeline	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202	1,202
Polk	Chicot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Polk	Evangeline	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306	8,306
Polk	Burkeville	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744	744
Polk	Jasper	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668	27,668
San Jacinto	Chicot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
San Jacinto	Evangeline	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172	8,172
San Jacinto	Burkeville	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697	2,697
San Jacinto	Jasper	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096	10,096
Tyler	Chicot	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tyler	Evangeline	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578	20,578
Tyler	Burkeville	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tyler	Jasper	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638	17,638
Walker	Evangeline	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Walker	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walker	Jasper	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Waller	Chicot	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Waller	Evangeline	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000	41,000
Waller	Burkeville	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Waller	Jasper	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Washington	Evangeline	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237	3,237
Washington	Burkeville	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367	367
Washington	Jasper	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431	9,431

Appendix G

Descriptions of historic groundwater use in GMA 14

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Consideration of Aquifer Uses or Conditions within the Management Area

County	Aquifer	Groundwater Pumpage by County and Formation (ac-ft)												2007-2011 Summary (ac-ft)		
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Median	Maximum
Austin	Brazos River Alluvium Aquifer	971	872	455	620	878	709	368	395	407	357	465	684	462	407	684
	Gulf Coast Aquifer	12,770	11,597	7,721	9,290	9,589	8,962	6,696	6,514	6,935	7,210	5,825	6,611	6,619	6,611	7,210
	Other Aquifer	193	173	90	123	175	137	74	78	84	76	99	112	90	84	112
	Unknown	-	-	-	-	-	-	-	-	-	4	8	6	4	4	8
	Subtotal Austin	*13,934*	*12,643*	*8,266*	*10,032*	*10,642*	*9,808*	*7,138*	*6,987*	*7,426*	*7,647*	*6,398*	*7,413*	*7,174*	*7,413*	*7,647*
Brazoria	Gulf Coast Aquifer	35,807	31,125	31,166	31,462	26,573	26,332	36,061	38,202	54,980	48,202	43,763	27,687	42,567	43,763	54,980
	Other Aquifer	-	-	-	-	40	-	-	-	-	66	6,779	11,944	3,758	66	11,944
	Unknown	-	-	-	-	-	-	-	-	143	167	190	147	129	147	190
	Subtotal Brazoria	*35,807*	*31,125*	*31,166*	*31,462*	*26,612*	*26,332*	*36,061*	*38,202*	*55,123*	*48,435*	*50,732*	*39,778*	*46,454*	*48,435*	*55,123*
Brazos	Gulf Coast Aquifer	12	12	12	15	-	-	7	6	7	12	16	-	8	7	16
	Subtotal Brazos	*12*	*12*	*12*	*15*	*-*	*-*	*7*	*6*	*7*	*12*	*16*	*-*	*8*	*7*	*16*
Chambers	Gulf Coast Aquifer	5,253	4,155	4,245	4,594	3,774	2,714	2,657	3,447	3,595	1,782	3,042	1,490	2,671	3,042	3,595
	Other Aquifer	-	-	-	-	-	-	-	-	-	-	895	913	362	-	913
	Unknown	-	-	-	-	-	-	-	-	-	-	9	4	3	-	9
	Subtotal Chambers	*5,253*	*4,155*	*4,245*	*4,594*	*3,774*	*2,714*	*2,657*	*3,447*	*3,595*	*1,782*	*3,946*	*2,407*	*3,036*	*3,447*	*3,946*
Fort Bend	Brazos River Alluvium Aquifer	5,043	3,208	2,932	3,110	-	-	-	-	-	-	-	-	-	-	-
	Gulf Coast Aquifer	94,619	79,702	78,921	82,152	70,461	79,944	95,207	82,870	92,369	107,244	74,283	73,165	85,986	82,870	107,244
	Other Aquifer	-	-	-	-	-	-	-	42	-	-	10,463	25,904	7,282	42	25,904
	Unknown	-	-	-	-	-	-	-	-	24	33	43	31	26	31	43
	Subtotal Fort Bend	*99,662*	*82,910*	*81,853*	*85,262*	*70,461*	*79,944*	*95,207*	*82,913*	*92,393*	*107,277*	*84,789*	*99,101*	*93,295*	*92,393*	*107,277*
Galveston	Gulf Coast Aquifer	8,231	7,612	7,243	6,780	2,850	2,886	2,032	1,552	1,944	2,913	3,400	7,715	3,505	2,913	7,715
	Other Aquifer	-	-	-	-	-	-	-	-	-	-	101	228	66	-	228
	Unknown	-	-	-	-	-	-	-	-	70	78	86	71	61	71	86
	Subtotal Galveston	*8,231*	*7,612*	*7,243*	*6,780*	*2,850*	*2,886*	*2,032*	*1,552*	*2,014*	*2,991*	*3,587*	*8,014*	*3,632*	*2,991*	*8,014*
Grimes	Brazos River Alluvium Aquifer	96	91	73	40	40	71	200	139	126	61	72	67	93	72	139
	Gulf Coast Aquifer	3,605	3,510	3,537	3,451	2,914	3,460	3,926	3,523	3,822	3,687	2,449	969	2,890	3,523	3,822
	Other Aquifer	486	412	410	379	29	51	228	166	124	67	205	134	139	134	205
	Sparta Aquifer	5	5	4	4	-	-	-	-	-	-	-	-	-	-	-
	Unknown	-	-	-	-	-	-	-	-	-	-	17	106	25	-	106
	Yegua-Jackson Aquifer	134	75	78	71	66	130	280	277	297	300	382	1,779	607	300	1,779
	Subtotal Grimes	*4,327*	*4,092*	*4,102*	*3,945*	*3,049*	*3,712*	*4,635*	*4,105*	*4,369*	*4,114*	*3,125*	*3,054*	*3,754*	*4,105*	*4,369*
Hardin	Gulf Coast Aquifer	19,074	18,576	18,715	17,283	15,451	17,046	17,512	7,499	7,811	6,645	4,490	1,783	5,646	6,645	7,811
	Other Aquifer	-	-	-	-	-	-	7	6	6	8	9	-	6	6	9
	Unknown	-	-	-	-	-	-	-	-	35	23	12	5	15	12	35
	Subtotal Hardin	*19,074*	*18,576*	*18,715*	*17,283*	*15,451*	*17,046*	*17,519*	*7,505*	*7,853*	*6,676*	*4,512*	*1,788*	*5,667*	*6,676*	*7,853*
Harris	Gulf Coast Aquifer	385,584	332,616	302,190	313,866	260,515	317,231	267,003	243,928	287,891	308,138	138,199	157,277	227,087	243,928	308,138
	Other Aquifer	-	-	-	-	2,858	10,627	12,535	11,301	708	2,696	116,900	123,620	51,045	11,301	123,620
	Unknown	-	-	-	-	-	-	-	-	693	762	832	697	597	697	832
	Subtotal Harris	*385,584*	*332,616*	*302,190*	*313,866*	*263,373*	*327,859*	*279,538*	*255,229*	*289,293*	*311,596*	*255,930*	*281,593*	*278,728*	*281,593*	*311,596*
Jasper	Gulf Coast Aquifer	52,381	52,024	52,505	51,110	38,678	54,671	50,897	49,485	47,327	44,642	39,796	34,766	43,203	44,642	49,485
	Other Aquifer	-	-	-	-	-	-	19	3	4	56	1,131	2,914	822	56	2,914
	Unknown	-	-	-	-	-	-	-	-	-	-	13	80	19	-	80
	Subtotal Jasper	*52,381*	*52,024*	*52,505*	*51,110*	*38,678*	*54,671*	*50,915*	*49,489*	*47,332*	*44,698*	*40,940*	*37,760*	*44,044*	*44,698*	*49,489*
Jefferson	Gulf Coast Aquifer	2,051	3,270	3,242	3,276	1,177	1,037	1,957	1,685	1,769	12,608	12,691	14,299	8,610	12,608	14,299
	Other Aquifer	-	-	-	-	-	-	-	-	-	-	360	411	154	-	411
	Unknown	-	-	-	-	-	-	-	-	58	60	63	51	46	58	63
	Subtotal Jefferson	*2,051*	*3,270*	*3,242*	*3,276*	*1,177*	*1,037*	*1,957*	*1,685*	*1,827*	*12,668*	*13,113*	*14,761*	*8,811*	*12,668*	*14,761*
Liberty	Gulf Coast Aquifer	13,388	14,165	13,749	13,087	9,128	7,374	11,321	10,342	10,807	10,865	4,509	3,480	8,001	10,342	10,865
	Other Aquifer	2	-	-	-	-	-	-	-	-	-	4,345	2,437	1,356	-	4,345
	Unknown	-	-	-	-	-	-	-	-	117	121	125	114	95	117	125
	Subtotal Liberty	*13,389*	*14,165*	*13,749*	*13,087*	*9,128*	*7,374*	*11,321*	*10,342*	*10,924*	*10,986*	*8,979*	*6,031*	*9,452*	*10,342*	*10,986*
Montgomery	Gulf Coast Aquifer	55,699	52,494	55,514	54,925	46,006	57,259	65,626	63,211	70,002	72,629	41,307	40,364	57,503	63,211	72,629
	Other Aquifer	-	-	-	-	-	-	1,635	204	-	505	39,944	49,495	18,030	505	49,495
	Unknown	-	-	-	-	-	-	-	-	380	386	392	388	309	386	392
	Subtotal Montgomery	*55,699*	*52,494*	*55,514*	*54,925*	*46,006*	*57,259*	*67,260*	*63,414*	*70,382*	*73,520*	*81,643*	*90,247*	*75,841*	*73,520*	*90,247*
Newton	Gulf Coast Aquifer	2,814	2,573	2,576	2,612	1,678	3,717	2,727	2,379	2,231	2,199	2,075	818	1,940	2,199	2,379
	Other Aquifer	-	-	-	-	-	-	140	-	-	-	478	655	227	-	655
	Unknown	-	-	-	-	-	-	-	-	69	73	77	125	69	73	125
	Subtotal Newton	*2,814*	*2,573*	*2,576*	*2,612*	*1,678*	*3,717*	*2,867*	*2,379*	*2,300*	*2,272*	*2,630*	*1,598*	*2,236*	*2,300*	*2,630*

Consideration of Aquifer Uses or Conditions within the Management Area

County	Aquifer	Groundwater Pumpage by County and Formation (ac-ft)												2007-2011 Summary (ac-ft)		
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Median	Maximum
Orange	Gulf Coast Aquifer	17,530	17,658	17,818	16,300	12,675	13,033	16,900	15,552	15,461	15,225	8,466	7,500	12,441	15,225	15,552
	Other Aquifer	-	-	-	-	-	-	-	-	-	-	4,321	4,467	1,758	-	4,467
	Unknown	-	-	-	-	-	-	-	-	68	74	79	70	58	70	79
	Subtotal Orange	*17,530*	*17,658*	*17,818*	*16,300*	*12,675*	*13,033*	*16,900*	*15,552*	*15,529*	*15,299*	*12,865*	*12,037*	*14,256*	*15,299*	*15,552*
Polk	Gulf Coast Aquifer	4,006	4,081	4,233	4,257	3,077	3,421	4,734	4,347	4,232	4,372	3,153	2,708	3,762	4,232	4,372
	Other Aquifer	1,115	1,117	1,089	1,332	623	791	871	774	726	612	808	706	725	726	808
	Unknown	-	-	-	-	-	-	-	-	23	20	16	132	38	20	132
	Yegua-Jackson Aquifer	9	5	4	4	4	3	411	339	374	380	558	212	373	374	558
	Subtotal Polk	*5,130*	*5,202*	*5,326*	*5,593*	*3,704*	*4,215*	*6,016*	*5,460*	*5,355*	*5,384*	*4,536*	*3,758*	*4,899*	*5,355*	*5,460*
San Jacinto	Gulf Coast Aquifer	3,294	2,922	2,981	2,938	3,433	2,186	3,257	2,913	3,020	2,912	1,521	943	2,262	2,912	3,020
	Other Aquifer	-	-	-	-	-	-	6	5	6	6	6	-	5	6	6
	Unknown	-	-	-	-	-	-	-	-	-	-	4	1	1	-	4
	Subtotal San Jacinto	*3,294*	*2,922*	*2,981*	*2,938*	*3,433*	*2,186*	*3,263*	*2,918*	*3,025*	*2,918*	*1,531*	*944*	*2,267*	*2,918*	*3,025*
Tyler	Gulf Coast Aquifer	3,704	3,793	3,848	3,805	3,011	3,223	4,440	3,975	3,839	4,110	3,372	2,062	3,472	3,839	4,110
	Other Aquifer	-	-	-	-	-	-	6	252	-	-	1,713	1,509	695	252	1,713
	Unknown	-	-	-	-	-	-	-	-	22	18	14	78	26	18	78
	Yegua-Jackson Aquifer	-	-	-	-	-	-	10	8	9	11	13	-	8	9	13
	Subtotal Tyler	*3,704*	*3,793*	*3,848*	*3,805*	*3,011*	*3,223*	*4,456*	*4,235*	*3,870*	*4,139*	*5,113*	*3,649*	*4,201*	*4,139*	*5,113*
Walker	Carrizo-Wilcox Aquifer	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-
	Gulf Coast Aquifer	4,726	4,171	4,156	4,448	4,652	3,664	4,247	3,854	3,387	4,041	2,273	1,685	3,048	3,387	4,041
	Other Aquifer	989	727	1,036	1,027	924	1,081	960	970	1,087	1,073	2,533	2,457	1,624	1,087	2,533
	Queen City Aquifer	26	13	13	13	13	19	23	21	37	36	26	26	29	26	37
	Unknown	-	-	-	-	-	-	-	-	-	-	7	3	2	-	7
	Yegua-Jackson Aquifer	26	13	13	13	13	19	218	108	105	479	1,873	497	612	479	1,873
	Subtotal Walker	*5,766*	*4,925*	*5,219*	*5,501*	*5,602*	*4,784*	*5,448*	*4,952*	*4,616*	*5,628*	*6,712*	*4,668*	*5,315*	*4,952*	*6,712*
Waller	Brazos River Alluvium Aquifer	808	915	936	827	871	780	692	501	699	716	825	865	721	716	865
	Gulf Coast Aquifer	28,298	31,542	31,736	28,077	26,888	24,392	22,113	16,130	23,679	24,378	26,289	27,705	23,636	24,378	27,705
	Other Aquifer	208	215	218	204	212	213	238	185	193	204	270	227	216	204	270
	Unknown	-	-	-	-	-	-	-	-	-	2	4	2	2	2	4
	Subtotal Waller	*29,314*	*32,673*	*32,890*	*29,108*	*27,970*	*25,385*	*23,043*	*16,815*	*24,571*	*25,299*	*27,388*	*28,799*	*24,574*	*25,299*	*28,799*
Washinton	Brazos River Alluvium Aquifer	250	182	183	112	114	96	78	58	57	48	66	104	67	58	104
	Gulf Coast Aquifer	3,337	2,896	3,099	2,721	1,747	1,742	2,376	2,032	2,073	2,112	1,698	1,301	1,843	2,032	2,112
	Other Aquifer	97	106	119	72	-	-	-	-	-	-	-	-	-	-	-
	Unknown	-	-	-	-	-	-	-	-	4	7	10	14	7	7	14
	Yegua-Jackson Aquifer	12	12	12	15	14	14	163	137	151	168	870	52	276	151	870
	Subtotal Washington	*3,696*	*3,197*	*3,413*	*2,920*	*1,876*	*1,852*	*2,617*	*2,227*	*2,285*	*2,335*	*2,644*	*1,471*	*2,192*	*2,285*	*2,644*
GMA 14	Gulf Coast Aquifer	756,184	680,494	649,208	656,448	544,276	634,295	621,695	563,446	647,183	685,926	422,618	414,328	546,700	563,446	685,926
	Yegua-Jackson Aquifer	181	105	107	104	98	166	1,082	870	935	1,338	3,696	2,540	1,876	1,338	3,696
	Brazos River Alluvium Aquifer	7,169	5,269	4,579	4,708	1,903	1,655	1,338	1,093	1,289	1,181	1,429	1,720	1,342	1,289	1,720
	Carrizo-Wilcox Aquifer	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-
	Queen City Aquifer	26	13	13	13	13	19	23	21	37	36	26	26	29	26	37
	Sparta Aquifer	5	5	4	4	-	-	-	-	-	-	-	-	-	-	-
	Other Aquifer	3,091	2,751	2,961	3,138	4,860	12,901	16,719	13,986	2,940	5,369	191,360	228,132	88,357	13,986	228,132
	Unknown	-	-	-	-	-	-	-	-	1,706	1,828	2,001	2,125	1,532	1,828	2,125
	Total	**766,655**	**688,636**	**656,874**	**664,415**	**551,150**	**649,036**	**640,857**	**579,415**	**654,090**	**695,678**	**621,130**	**648,870**	**639,837**	**648,870**	**695,678**

Consideration of Aquifer Uses or Conditions within the Management Area

County	Use	Groundwater Pumpage by County and Use (ac-ft)												2007-2011 Summary (ac-ft)		
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Median	Maximum
Austin	Irrigation	10,228	9,232	4,796	6,546	8,251	6,479	3,101	3,364	3,634	3,083	3,986	5,303	3,874	3,634	5,303
	Livestock	167	101	103	101	96	461	485	521	379	438	346	339	405	379	521
	Municipal	3,480	3,241	3,308	3,331	2,232	2,769	3,479	3,031	3,329	4,013	1,952	1,714	2,808	3,031	4,013
	Manufacturing	60	69	60	55	63	99	72	71	84	110	106	51	84	84	110
	Mining	-	-	-	-	-	-	-	-	-	4	8	6	4	4	8
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Austin	*13,934*	*12,643*	*8,266*	*10,032*	*10,642*	*9,808*	*7,138*	*6,987*	*7,426*	*7,647*	*6,398*	*7,413*	*7,174*	*7,413*	*7,647*
Brazoria	Irrigation	7,022	3,915	3,625	2,706	3,676	2,504	2,820	8,994	20,827	14,508	14,889	3,108	12,465	14,508	20,827
	Livestock	968	429	388	444	446	1,340	1,165	1,241	1,210	1,231	1,126	1,190	1,200	1,210	1,241
	Municipal	26,523	25,734	25,828	27,095	20,189	20,102	29,525	26,731	31,468	30,985	33,143	32,517	30,969	31,468	33,143
	Manufacturing	1,291	983	1,324	1,217	2,301	2,385	2,551	1,235	1,475	1,543	1,384	2,816	1,691	1,475	2,816
	Mining	3	64	1	1	1	1	1	1	144	168	190	147	130	147	190
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Brazoria	*35,807*	*31,125*	*31,166*	*31,462*	*26,612*	*26,332*	*36,061*	*38,202*	*55,123*	*48,435*	*50,732*	*39,778*	*46,454*	*48,435*	*55,123*
Brazos	Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Livestock	12	12	12	15	-	-	-	-	-	-	-	-	-	-	-
	Municipal	-	-	-	-	-	-	7	6	7	12	16	-	8	7	16
	Manufacturing	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mining	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Brazos	*12*	*12*	*12*	*15*	*-*	*-*	*7*	*6*	*7*	*12*	*16*	*-*	*8*	*7*	*16*
Chambers	Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Livestock	277	161	162	224	212	271	224	217	219	178	212	208	207	212	219
	Municipal	4,028	3,015	3,173	3,100	2,542	1,836	1,703	2,332	2,437	1,483	3,534	2,072	2,372	2,332	3,534
	Manufacturing	2	2	1	2	2	1	122	156	137	90	71	107	112	107	156
	Mining	895	900	880	1,245	938	572	562	705	729	-	9	4	289	9	729
	Power	51	77	28	24	80	35	45	37	74	31	120	16	56	37	120
	Subtotal Chambers	*5,253*	*4,155*	*4,245*	*4,594*	*3,774*	*2,714*	*2,657*	*3,447*	*3,595*	*1,782*	*3,946*	*2,407*	*3,036*	*3,447*	*3,946*
Fort Bend	Irrigation	29,311	18,485	16,894	17,787	9,521	12,436	9,891	10,228	9,097	16,775	14,940	18,600	13,928	14,940	18,600
	Livestock	703	284	266	240	240	882	869	924	770	766	829	832	824	829	924
	Municipal	61,136	56,141	58,008	61,020	54,582	60,657	78,194	66,096	76,941	84,407	63,691	73,523	72,932	73,523	84,407
	Manufacturing	5,243	4,477	4,321	3,702	2,929	3,250	3,333	2,934	3,010	2,693	2,716	3,286	2,928	2,934	3,286
	Mining	527	1,192	236	281	281	277	277	83	113	49	50	38	66	50	113
	Power	2,743	2,331	2,127	2,232	2,909	2,442	2,643	2,648	2,462	2,587	2,563	2,821	2,616	2,587	2,821
	Subtotal Fort Bend	*99,662*	*82,910*	*81,853*	*85,262*	*70,461*	*79,944*	*95,207*	*82,913*	*92,393*	*107,277*	*84,789*	*99,101*	*93,295*	*92,393*	*107,277*
Galveston	Irrigation	-	-	-	6	-	-	-	-	-	-	208	27	47	-	208
	Livestock	195	176	159	168	159	122	115	122	108	103	150	150	127	122	150
	Municipal	7,888	6,449	6,195	6,157	2,445	2,462	1,599	1,303	1,648	2,549	2,896	7,711	3,221	2,549	7,711
	Manufacturing	145	301	220	238	42	97	163	112	42	102	91	56	81	91	112
	Mining	-	684	669	204	204	204	150	11	214	235	241	71	154	214	241
	Power	4	2	0	6	0	0	4	4	2	2	1	-	2	2	4
	Subtotal Galveston	*8,231*	*7,612*	*7,243*	*6,780*	*2,850*	*2,886*	*2,032*	*1,552*	*2,014*	*2,991*	*3,587*	*8,014*	*3,632*	*2,991*	*8,014*

Consideration of Aquifer Uses or Conditions within the Management Area

County	Use	Groundwater Pumpage by County and Use (ac-ft)												2007-2011 Summary (ac-ft)		
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Median	Maximum
Grimes	Irrigation	267	364	254	77	60	89	612	333	275	-	75	49	146	75	333
	Livestock	807	359	372	341	227	445	421	502	436	453	674	698	553	502	698
	Municipal	3,125	3,193	3,330	3,370	2,543	2,926	3,336	3,087	3,461	3,544	2,239	1,992	2,865	3,087	3,544
	Manufacturing	126	173	145	156	218	248	262	182	197	117	119	207	164	182	207
	Mining	-	-	-	-	-	-	-	-	-	-	17	106	25	-	106
	Power	2	2	2	2	2	4	3	2	1	1	1	2	1	1	2
	Subtotal Grimes	*4,327*	*4,092*	*4,102*	*3,945*	*3,049*	*3,712*	*4,635*	*4,105*	*4,369*	*4,114*	*3,125*	*3,054*	*3,754*	*4,105*	*4,369*
Hardin	Irrigation	3,502	1,223	1,210	148	136	166	789	1,769	2,245	866	1,436	1,284	1,520	1,436	2,245
	Livestock	15	16	14	15	16	40	40	40	44	41	53	52	46	44	53
	Municipal	15,468	17,260	17,396	16,931	15,121	16,706	16,572	5,621	5,487	5,712	2,976	417	4,042	5,487	5,712
	Manufacturing	89	76	95	189	177	133	118	75	42	34	35	30	43	35	75
	Mining	-	-	-	-	-	-	-	-	35	23	12	5	15	12	35
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Hardin	*19,074*	*18,576*	*18,715*	*17,283*	*15,451*	*17,046*	*17,519*	*7,505*	*7,853*	*6,676*	*4,512*	*1,788*	*5,667*	*6,676*	*7,853*
Harris	Irrigation	6,343	6,227	6,360	4,080	2,633	3,753	3,094	1,824	1,411	1,011	1,385	2,511	1,628	1,411	2,511
	Livestock	905	647	636	577	542	854	873	862	955	789	797	804	841	804	955
	Municipal	356,982	309,415	280,051	294,163	244,202	310,373	262,509	238,528	272,383	297,272	241,283	264,181	262,729	264,181	297,272
	Manufacturing	13,890	11,069	10,953	11,005	11,687	9,021	9,971	11,341	11,855	9,739	9,881	10,245	10,612	10,245	11,855
	Mining	1,297	1,061	1,028	1,055	1,048	1,163	102	639	835	892	832	1,760	992	835	1,760
	Power	6,167	4,197	3,162	2,987	3,261	2,695	2,988	2,034	1,854	1,893	1,753	2,092	1,925	1,893	2,092
	Subtotal Harris	*385,584*	*332,616*	*302,190*	*313,866*	*263,373*	*327,859*	*279,538*	*255,229*	*289,293*	*311,596*	*255,930*	*281,593*	*278,728*	*281,593*	*311,596*
Jasper	Irrigation	-	-	-	-	-	-	36	30	30	-	-	-	12	-	30
	Livestock	129	66	80	73	73	162	192	197	123	417	437	143	264	197	437
	Municipal	5,222	4,768	4,601	5,075	4,212	4,091	4,968	4,815	4,509	4,892	4,368	3,728	4,462	4,509	4,892
	Manufacturing	47,030	47,191	47,825	45,961	34,394	50,417	45,719	44,446	42,670	39,389	36,122	33,809	39,287	39,389	44,446
	Mining	-	-	-	-	-	-	-	-	-	-	13	80	19	-	80
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Jasper	*52,381*	*52,024*	*52,505*	*51,110*	*38,678*	*54,671*	*50,915*	*49,489*	*47,332*	*44,698*	*40,940*	*37,760*	*44,044*	*44,698*	*49,489*
Jefferson	Irrigation	-	-	-	-	26	-	-	-	-	-	125	650	155	-	650
	Livestock	484	364	341	458	449	213	209	203	162	159	190	200	183	190	203
	Municipal	1,365	1,485	1,447	1,401	549	569	1,501	1,292	1,430	12,261	12,702	13,840	8,305	12,261	13,840
	Manufacturing	70	47	87	16	13	110	80	55	37	33	-	-	25	33	55
	Mining	132	134	126	162	139	145	167	136	199	215	97	70	143	136	215
	Power	-	1,240	1,240	1,240	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Jefferson	*2,051*	*3,270*	*3,242*	*3,276*	*1,177*	*1,037*	*1,957*	*1,685*	*1,827*	*12,668*	*13,113*	*14,761*	*8,811*	*12,668*	*14,761*
Liberty	Irrigation	3,306	4,407	3,408	2,690	1,587	2	-	-	-	-	-	-	-	-	-
	Livestock	454	179	179	199	200	-	-	-	-	-	-	-	-	-	-
	Municipal	9,332	9,330	9,951	9,902	7,039	6,712	10,996	10,087	10,570	10,653	8,727	5,856	9,179	10,087	10,653
	Manufacturing	297	249	211	295	301	660	326	255	237	212	127	60	178	212	255
	Mining	-	-	-	-	-	-	-	-	117	121	125	114	95	117	125
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Liberty	*13,389*	*14,165*	*13,749*	*13,087*	*9,128*	*7,374*	*11,321*	*10,342*	*10,924*	*10,986*	*8,979*	*6,031*	*9,452*	*10,342*	*10,986*

Consideration of Aquifer Uses or Conditions within the Management Area

County	Use	Groundwater Pumpage by County and Use (ac-ft)												2007-2011 Summary (ac-ft)		
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Median	Maximum
Montgomery	Irrigation	66	66	66	50	50	65	-	244	187	129	467	5,753	1,356	244	5,753
	Livestock	204	197	198	212	212	498	434	546	499	499	603	614	552	546	614
	Municipal	53,857	50,565	53,646	53,445	44,596	55,521	65,301	61,259	67,967	71,816	79,496	82,805	72,668	71,816	82,805
	Manufacturing	599	695	765	730	725	802	795	706	726	687	683	91	579	687	726
	Mining	161	161	29	4	5	4	3	3	383	387	392	388	311	387	392
	Power	812	810	810	484	418	369	727	657	620	2	3	597	376	597	657
	Subtotal Montgomery	*55,699*	*52,494*	*55,514*	*54,925*	*46,006*	*57,259*	*67,260*	*63,414*	*70,382*	*73,520*	*81,643*	*90,247*	*75,841*	*73,520*	*90,247*
Newton	Irrigation	275	275	275	310	292	248	264	50	-	-	137	50	47	50	137
	Livestock	44	44	38	51	51	43	49	49	37	37	84	83	58	49	84
	Municipal	2,180	2,117	2,126	2,114	1,274	3,419	2,521	2,228	2,142	2,110	2,280	1,340	2,020	2,142	2,280
	Manufacturing	315	137	137	137	61	7	32	52	52	52	52	-	42	52	52
	Mining	-	-	-	-	-	-	-	-	69	73	77	125	69	73	125
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Newton	*2,814*	*2,573*	*2,576*	*2,612*	*1,678*	*3,717*	*2,867*	*2,379*	*2,300*	*2,272*	*2,630*	*1,598*	*2,236*	*2,300*	*2,630*
Orange	Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Livestock	84	39	37	37	37	144	133	101	144	156	177	182	152	156	182
	Municipal	12,682	12,428	11,914	11,536	7,782	8,109	12,230	10,323	10,992	10,877	8,849	7,581	9,724	10,323	10,992
	Manufacturing	3,479	3,906	4,670	3,547	3,539	3,609	3,456	4,055	3,339	3,051	2,698	3,157	3,260	3,157	4,055
	Mining	-	-	-	-	-	-	-	-	68	74	79	70	58	70	79
	Power	1,286	1,286	1,196	1,179	1,317	1,170	1,080	1,072	986	1,142	1,062	1,048	1,062	1,062	1,142
	Subtotal Orange	*17,530*	*17,658*	*17,818*	*16,300*	*12,675*	*13,033*	*16,900*	*15,552*	*15,529*	*15,299*	*12,865*	*12,037*	*14,256*	*15,299*	*15,552*
Polk	Irrigation	120	115	115	96	100	100	100	342	25	154	595	503	324	342	595
	Livestock	144	79	74	71	66	43	41	30	35	32	44	44	37	35	44
	Municipal	4,479	4,578	4,705	4,795	3,267	3,639	5,466	4,767	4,990	4,995	3,650	2,652	4,211	4,767	4,995
	Manufacturing	387	431	431	631	271	433	410	321	282	183	231	426	289	282	426
	Mining	-	-	-	-	-	-	-	-	23	20	16	132	38	20	132
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Polk	*5,130*	*5,202*	*5,326*	*5,593*	*3,704*	*4,215*	*6,016*	*5,460*	*5,355*	*5,384*	*4,536*	*3,758*	*4,899*	*5,355*	*5,460*
San Jacinto	Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Livestock	114	61	57	71	71	83	87	83	68	67	114	116	90	83	116
	Municipal	3,153	2,834	2,896	2,840	3,353	2,093	3,165	2,825	2,948	2,842	1,409	822	2,169	2,825	2,948
	Manufacturing	28	28	28	28	9	9	11	10	9	9	5	5	8	9	10
	Mining	-	-	-	-	-	-	-	-	-	-	4	1	1	-	4
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal San Jacinto	*3,294*	*2,922*	*2,981*	*2,938*	*3,433*	*2,186*	*3,263*	*2,918*	*3,025*	*2,918*	*1,531*	*944*	*2,267*	*2,918*	*3,025*
Tyler	Irrigation	-	-	-	-	434	500	500	175	19	-	393	437	205	175	437
	Livestock	110	110	100	94	87	46	56	60	46	80	59	60	61	60	80
	Municipal	3,562	3,651	3,735	3,697	2,485	2,673	3,898	3,999	3,780	4,039	4,644	3,062	3,905	3,999	4,644
	Manufacturing	32	32	14	14	5	4	1	1	2	2	3	11	4	2	11
	Mining	-	-	-	-	-	-	-	-	22	18	14	78	26	18	78
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Tyler	*3,704*	*3,793*	*3,848*	*3,805*	*3,011*	*3,223*	*4,456*	*4,235*	*3,870*	*4,139*	*5,113*	*3,649*	*4,201*	*4,139*	*5,113*

Consideration of Aquifer Uses or Conditions within the Management Area

County	Use	Groundwater Pumpage by County and Use (ac-ft)												2007-2011 Summary (ac-ft)		
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Median	Maximum
Walker	Irrigation	-	-	-	-	1	-	153	34	-	377	570	117	220	117	570
	Livestock	304	156	151	147	122	187	222	199	190	181	221	221	202	199	221
	Municipal	4,995	4,505	4,811	5,150	5,270	4,583	5,062	4,652	4,414	5,050	5,882	4,292	4,858	4,652	5,882
	Manufacturing	467	264	257	204	209	15	12	67	12	20	32	34	33	32	67
	Mining	-	-	-	-	-	-	-	-	-	-	7	3	2	-	7
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Walker	*5,766*	*4,925*	*5,219*	*5,501*	*5,602*	*4,784*	*5,448*	*4,952*	*4,616*	*5,628*	*6,712*	*4,668*	*5,315*	*4,952*	*6,712*
Waller	Irrigation	23,104	26,948	27,630	24,048	24,384	20,990	17,785	12,518	19,639	20,070	21,937	23,599	19,553	20,070	23,599
	Livestock	679	398	380	475	372	567	627	538	482	459	732	753	593	538	753
	Municipal	4,555	4,394	4,417	4,398	3,156	3,367	4,528	3,615	4,429	4,748	4,692	4,418	4,381	4,429	4,748
	Manufacturing	14	13	11	13	13	18	17	34	21	20	22	26	25	22	34
	Mining	961	921	452	175	44	442	86	110	0	2	4	2	24	2	110
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Waller	*29,314*	*32,673*	*32,890*	*29,108*	*27,970*	*25,385*	*23,043*	*16,815*	*24,571*	*25,299*	*27,388*	*28,799*	*24,574*	*25,299*	*28,799*
Washington	Irrigation	1,549	1,107	1,110	625	550	450	350	250	245	200	300	509	301	250	509
	Livestock	179	182	181	231	188	182	184	160	157	149	152	151	154	152	160
	Municipal	1,561	1,493	1,661	1,666	772	882	1,818	1,563	1,742	1,841	1,888	428	1,493	1,742	1,888
	Manufacturing	407	414	461	398	366	338	265	254	137	138	293	369	238	254	369
	Mining	-	-	-	-	-	-	-	-	4	7	10	14	7	7	14
	Power	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Subtotal Washington	*3,696*	*3,197*	*3,413*	*2,920*	*1,876*	*1,852*	*2,617*	*2,227*	*2,285*	*2,335*	*2,644*	*1,471*	*2,192*	*2,285*	*2,644*
GMA 14	Irrigation	85,094	72,365	65,742	59,168	51,701	47,782	39,495	40,155	57,634	57,173	61,443	62,500	55,781	57,634	62,500
	Livestock	6,978	4,059	3,928	4,243	3,866	6,583	6,426	6,595	6,064	6,235	7,000	6,840	6,547	6,595	7,000
	Municipal	585,573	526,595	503,200	521,187	427,610	513,490	518,378	458,160	517,074	566,099	490,316	514,953	509,321	514,953	566,099
	Manufacturing	73,969	70,556	72,016	68,536	57,326	71,657	67,716	66,363	64,366	58,224	54,671	54,787	59,682	58,224	66,363
	Mining	3,977	5,116	3,421	3,127	2,661	2,808	1,350	1,688	2,954	2,289	2,196	3,214	2,468	2,289	3,214
	Power	11,064	9,946	8,566	8,153	7,986	6,715	7,491	6,454	5,998	5,657	5,503	6,576	6,038	5,998	6,576
	Total	**766,655**	**688,636**	**656,874**	**664,415**	**551,150**	**649,036**	**640,857**	**579,415**	**654,090**	**695,678**	**621,130**	**648,870**	**639,837**	**648,870**	**695,678**

Consideration of Aquifer Uses or Conditions within the Management Area

County	Use	2007 - 2011 Average Groundwater Pumpage by Formation and Use (ac-ft)					
		Irrigation	Livestock	Municipal	Manufacturing	Mining	Power
Bluebonnet GCD	Gulf Coast Aquifer	22,305	1,294	12,265	306	22	1
	Yegua-Jackson Aquifer	134	179	906	-	-	-
	Brazos River Alluvium Aquifer	1,107	118	51	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	29	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	247	132	1,690	-	32	-
	Subtotal Bluebonnet GCD	*23,793*	*1,752*	*14,911*	*306*	*54*	*1*
Brazoria County GCD	Gulf Coast Aquifer	12,465	1,200	27,215	1,687	0	-
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	3,754	4	129	-
	Subtotal Brazoria County GCD	*12,465*	*1,200*	*30,969*	*1,691*	*130*	*-*
Brazos Valley GCD	Gulf Coast Aquifer	-	-	8	-	-	-
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	-	-	-	-
	Subtotal Brazos Valley GCD	*-*	*-*	*8*	*-*	*-*	*-*
Lone Star GCD	Gulf Coast Aquifer	1,356	552	54,641	576	2	376
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	18,027	3	309	-
	Subtotal Lone Star GCD	*1,356*	*552*	*72,668*	*579*	*311*	*376*
Lower Trinity GCD	Gulf Coast Aquifer	324	124	5,569	8	-	-
	Yegua-Jackson Aquifer	-	2	371	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	1	440	289	39	-
	Subtotal Lower Trinity GCD	*324*	*127*	*6,380*	*296*	*39*	*-*
Southeast Texas GCD	Gulf Coast Aquifer	1,784	429	12,672	39,376	-	-
	Yegua-Jackson Aquifer	-	-	8	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	1,749	-	129	-
	Subtotal Southeast Texas GCD	*1,784*	*429*	*14,430*	*39,376*	*129*	*-*
Harris-Galveston Subsidence District	Gulf Coast Aquifer	1,675	968	216,147	9,386	488	1,927
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	49,803	1,307	658	-
	Subtotal Harris-Galveston Subsidence District	*1,675*	*968*	*265,951*	*10,693*	*1,146*	*1,927*
Fort Bend Subsidence District	Gulf Coast Aquifer	13,928	824	65,650	2,928	40	2,616
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	7,282	-	26	-
	Subtotal Fort Bend Subsidence District	*13,928*	*824*	*72,932*	*2,928*	*66*	*2,616*

Consideration of Aquifer Uses or Conditions within the Management Area

County	Use	2007 - 2011 Average Groundwater Pumpage by Formation and Use (ac-ft)					
		Irrigation	Livestock	Municipal	Manufacturing	Mining	Power
Chambers County	Gulf Coast Aquifer	-	207	2,010	112	287	56
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	362	-	3	-
	Subtotal Chambers County	*-*	*207*	*2,372*	*112*	*289*	*56*
Jefferson County	Gulf Coast Aquifer	155	183	8,151	25	97	-
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	154	-	46	-
	Subtotal Jefferson County	*155*	*183*	*8,305*	*25*	*143*	*-*
Liberty County	Gulf Coast Aquifer	-	-	7,822	178	-	-
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	1,356	-	95	-
	Subtotal Liberty County	*-*	*-*	*9,179*	*178*	*95*	*-*
Orange County	Gulf Coast Aquifer	-	152	7,971	3,256	-	1,062
	Yegua-Jackson Aquifer	-	-	-	-	-	-
	Brazos River Alluvium Aquifer	-	-	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	1,753	4	58	-
	Subtotal Orange County	*-*	*152*	*9,724*	*3,260*	*58*	*1,062*
Washington County	Gulf Coast Aquifer	246	130	1,229	238	-	-
	Yegua-Jackson Aquifer	-	12	264	-	-	-
	Brazos River Alluvium Aquifer	55	12	-	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	-	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	-	-	-	-	7	-
	Subtotal Washington County	*301*	*154*	*1,493*	*238*	*7*	*-*
GMA 14	Gulf Coast Aquifer	54,239	6,062	421,350	58,076	936	6,038
	Yegua-Jackson Aquifer	134	193	1,548	-	-	-
	Brazos River Alluvium Aquifer	1,161	130	51	-	-	-
	Carrizo-Wilcox Aquifer	-	-	-	-	-	-
	Queen City Aquifer	-	29	-	-	-	-
	Sparta Aquifer	-	-	-	-	-	-
	Other/Unknown Aquifer	247	133	86,371	1,607	1,532	-
	TOTAL	**55,781**	**6,547**	**509,321**	**59,682**	**2,468**	**6,038**

Appendix H

Presentation materials related to consideration of aquifer uses or conditions

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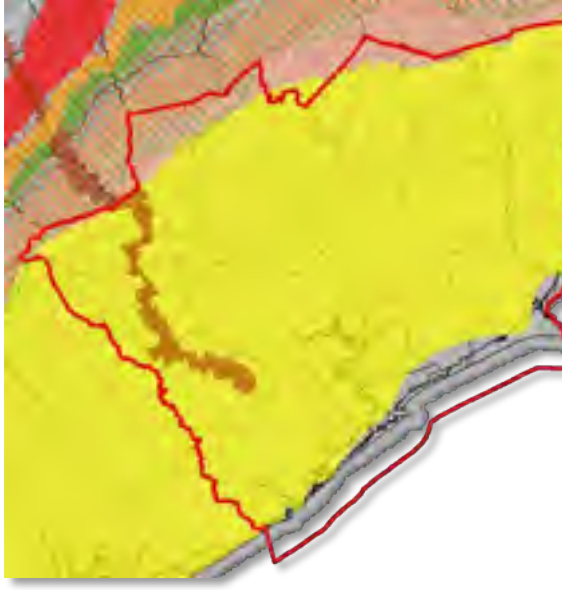


Explanatory Report

Aquifer Uses and Conditions

September 18, 2013

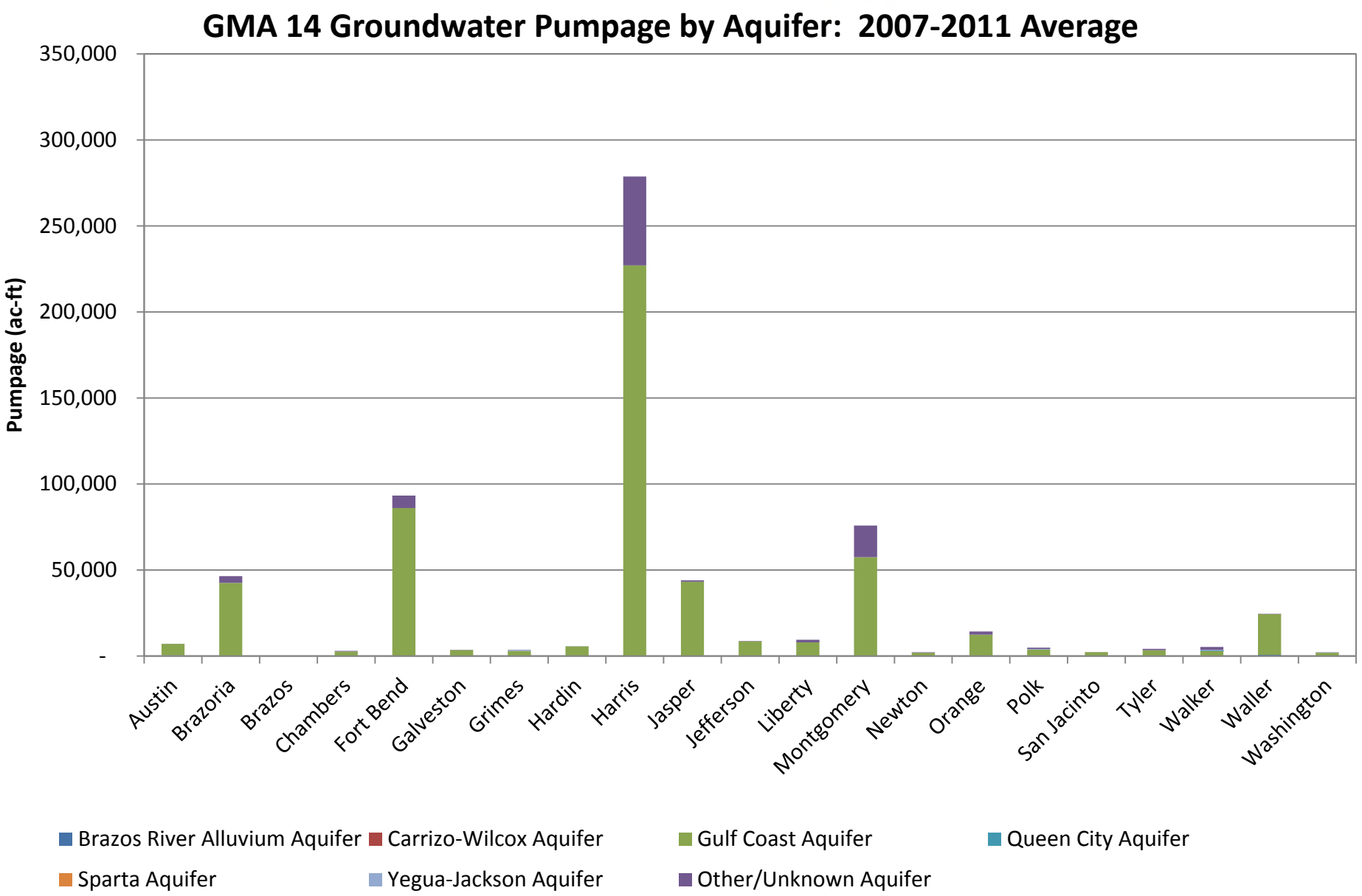
Phase 3: Explanatory Report

Aquifer Uses and Conditions

- Aquifer Uses and Conditions
  - Water Use Data from TWDB – Water Use Survey
  - Year 2000 to 2011
  - Summarized by County, Aquifer, and Use

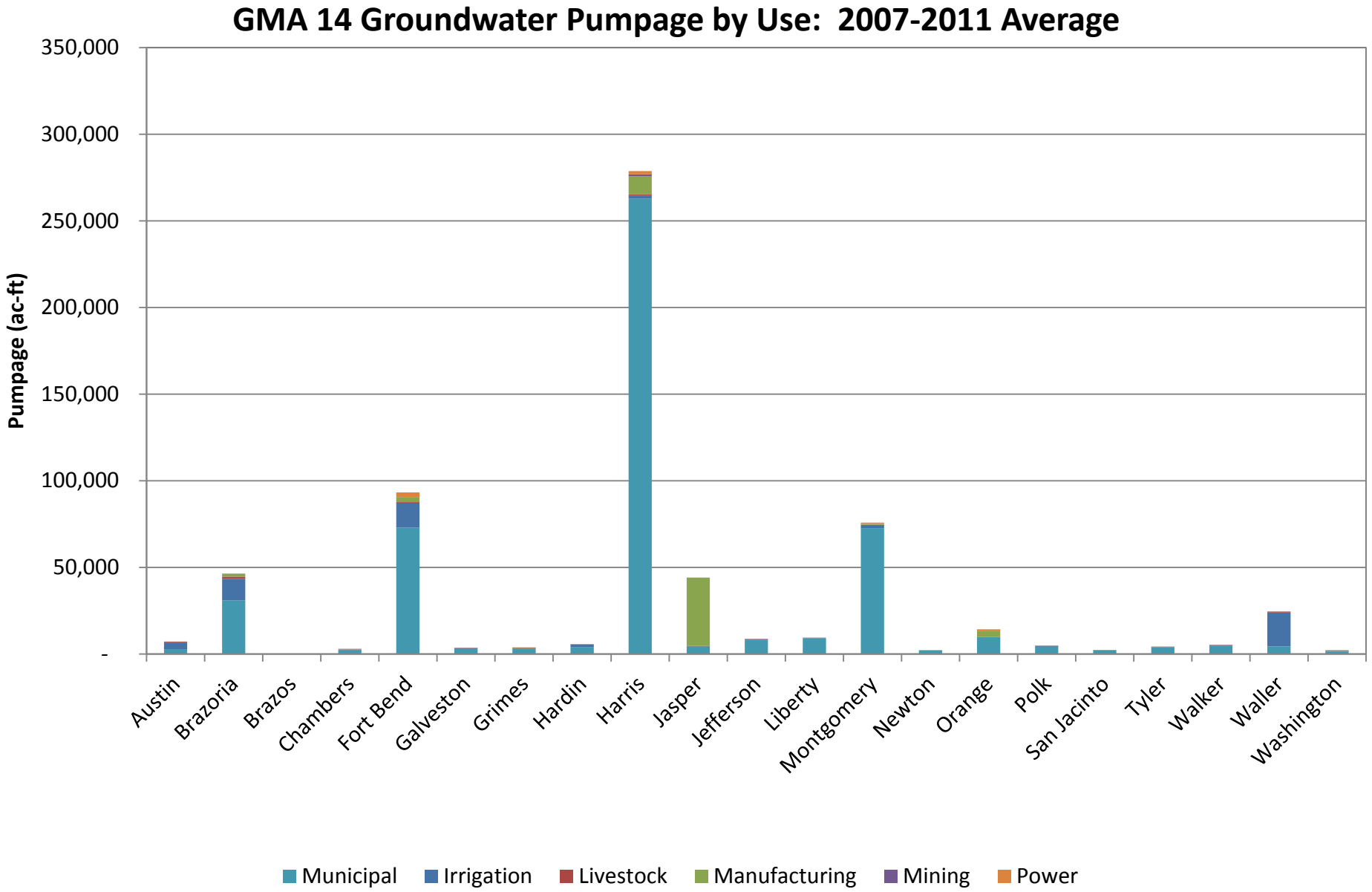
Phase 3: Explanatory Report

Aquifer Uses and Conditions



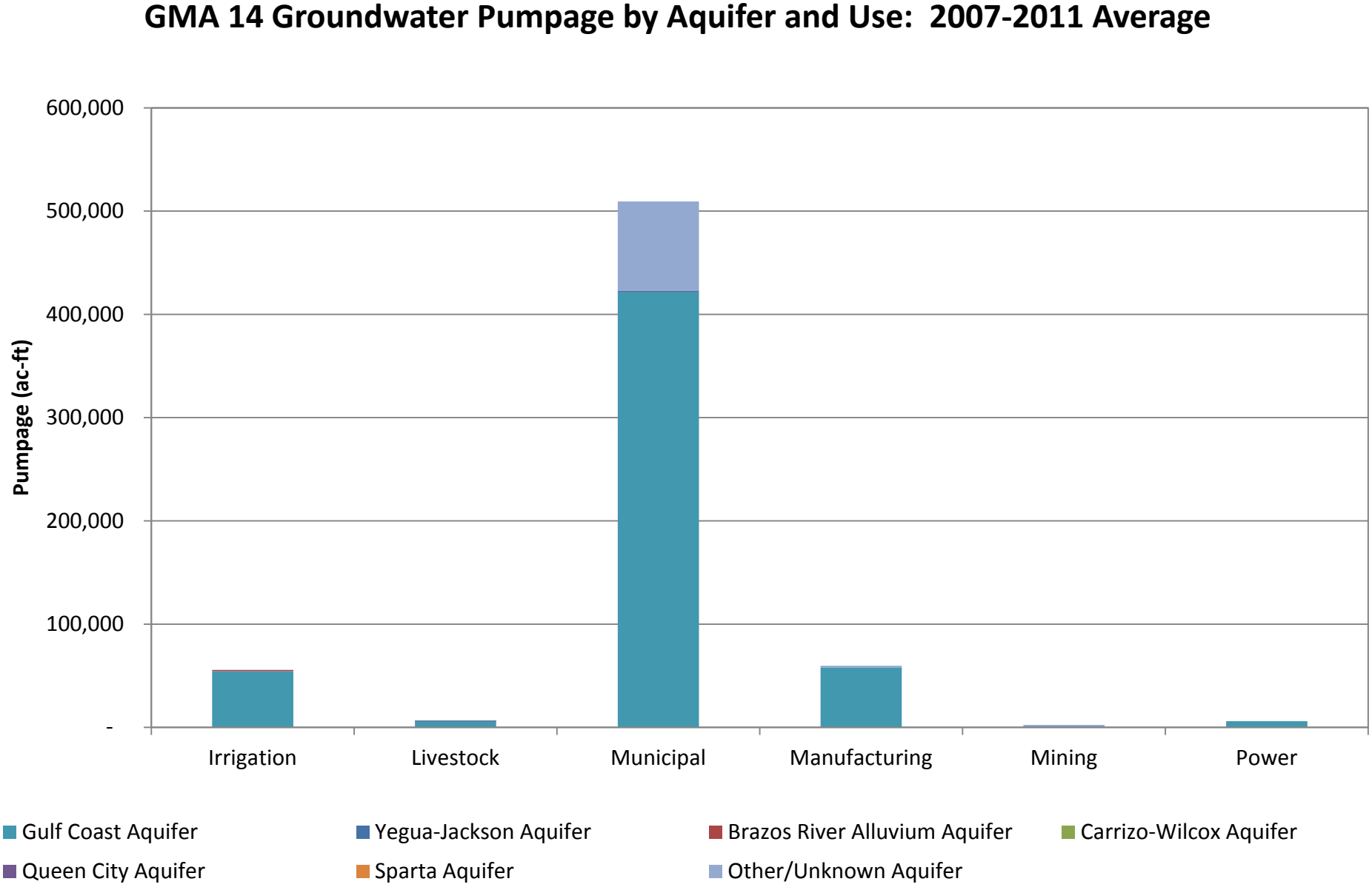
Phase 3: Explanatory Report

Aquifer Uses and Conditions



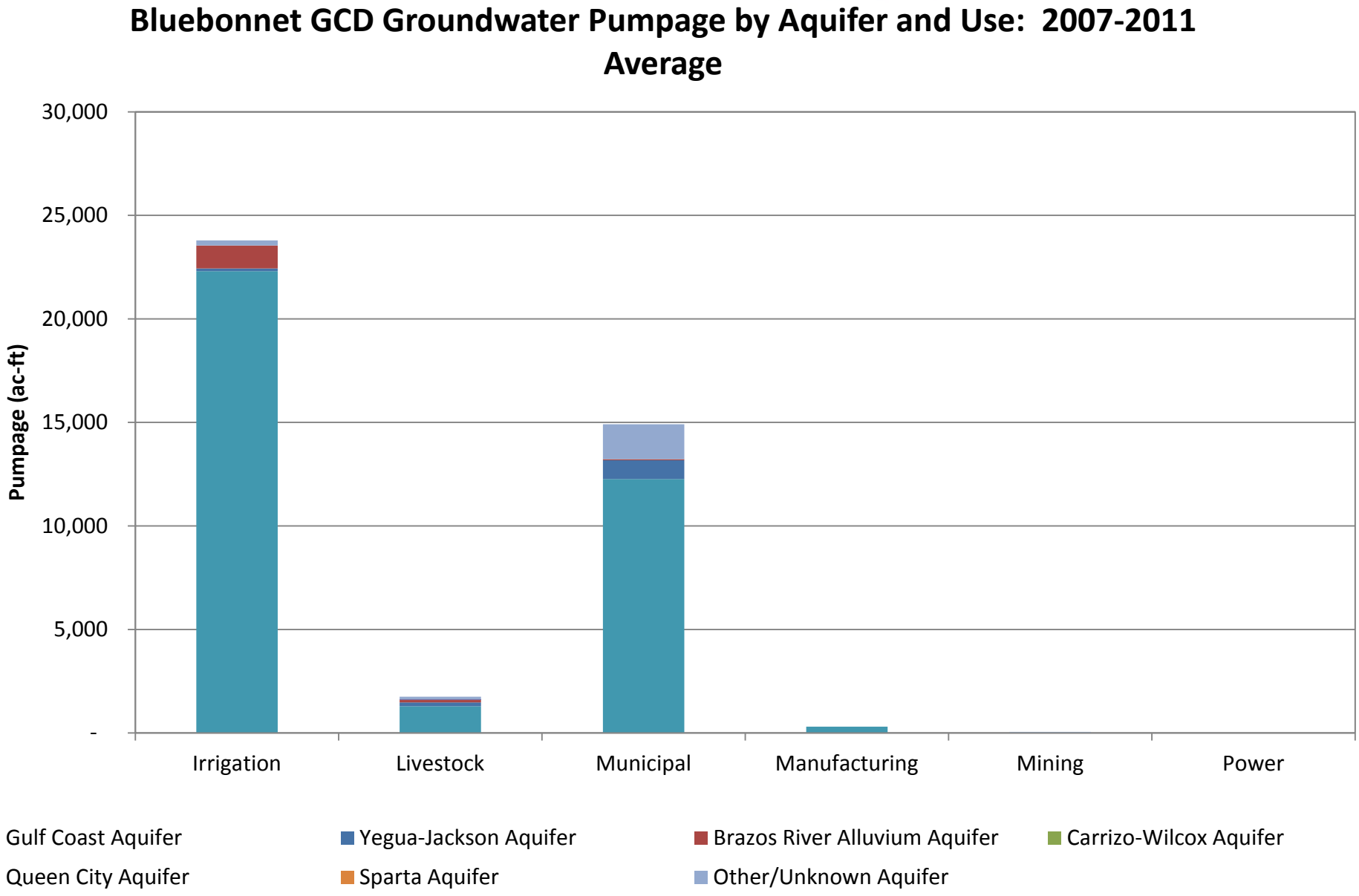
Phase 3: Explanatory Report

Aquifer Uses and Conditions



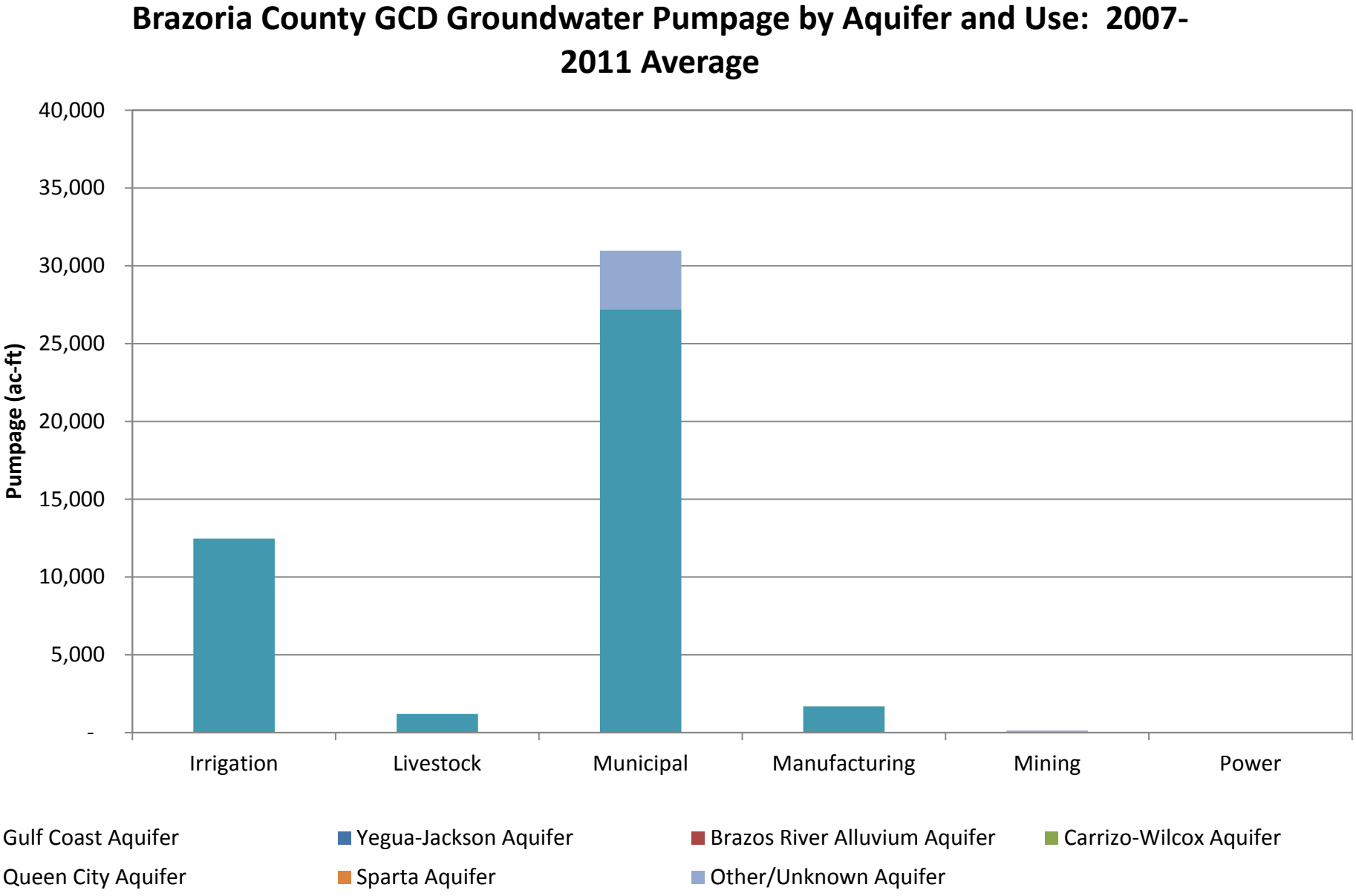
Phase 3: Explanatory Report

Aquifer Uses and Conditions



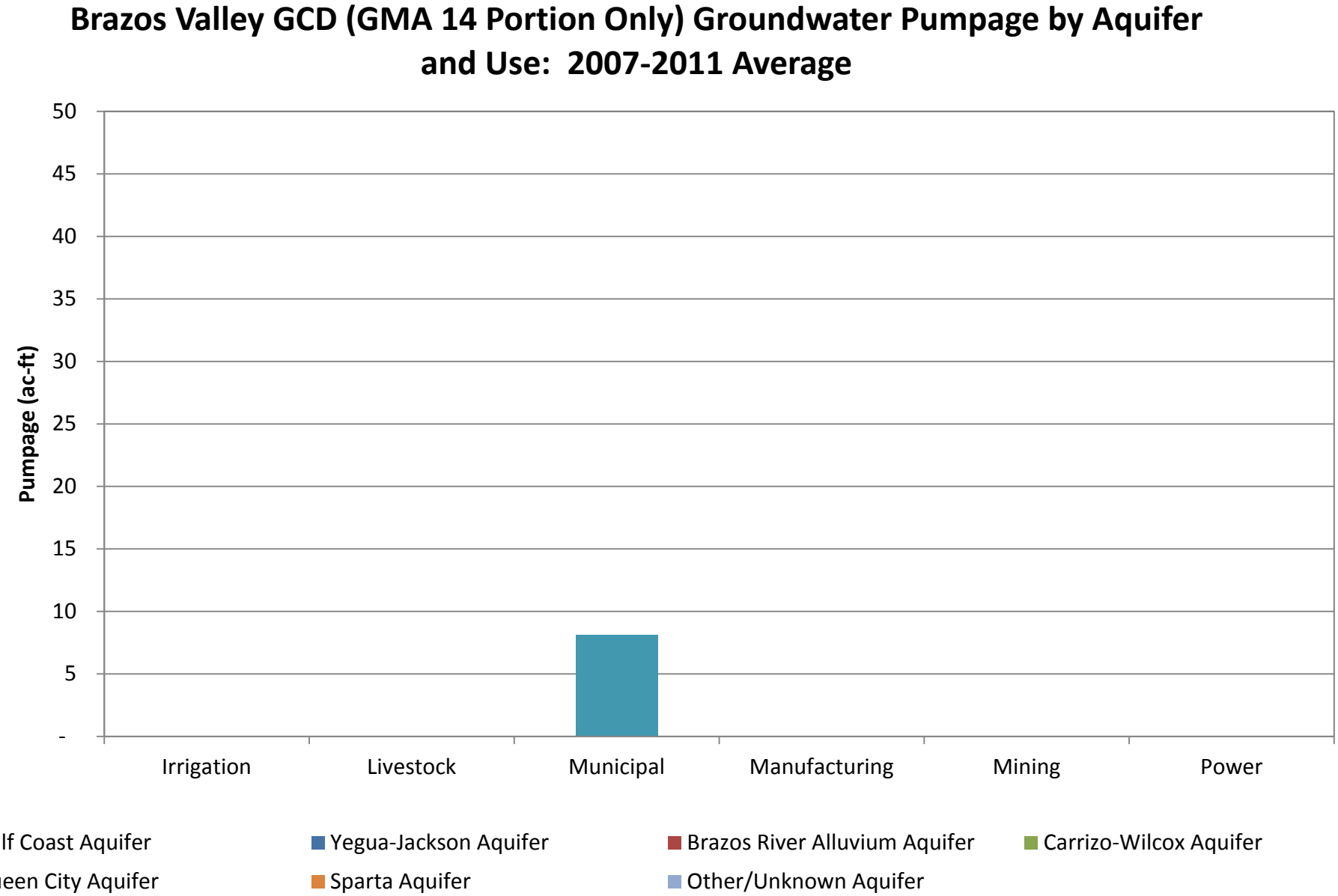
Phase 3: Explanatory Report

Aquifer Uses and Conditions



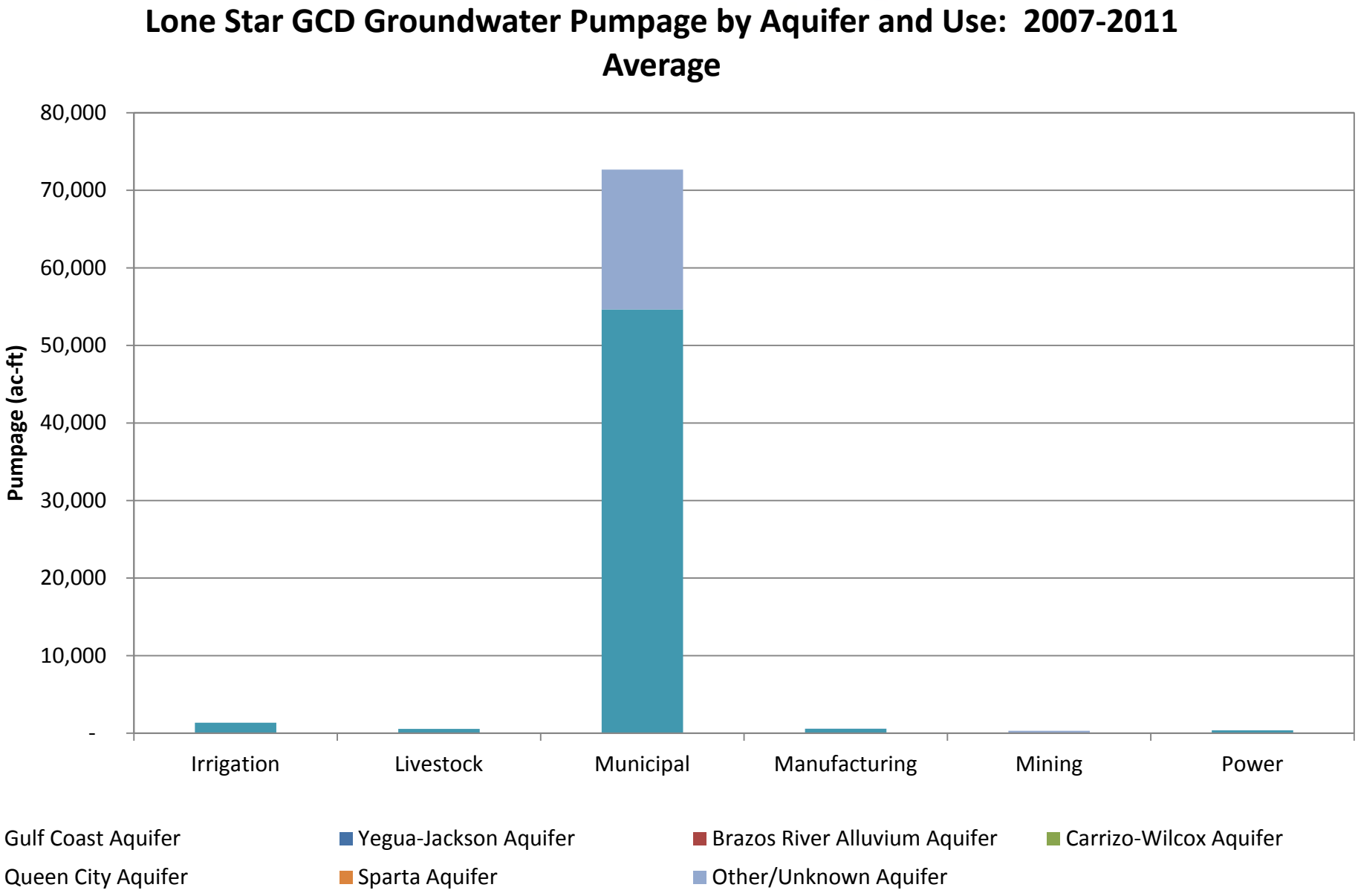
Phase 3: Explanatory Report

Aquifer Uses and Conditions



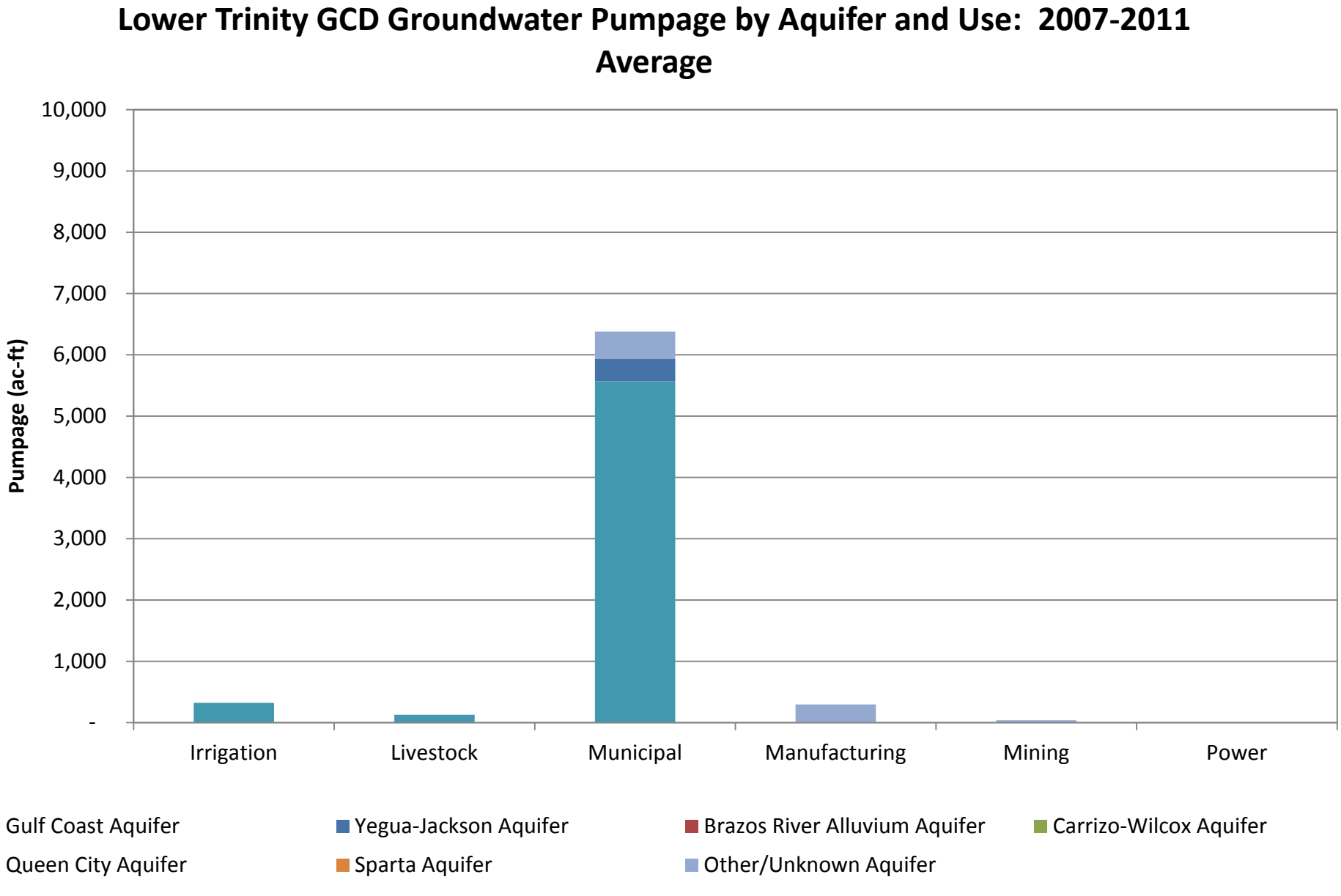
Phase 3: Explanatory Report

Aquifer Uses and Conditions



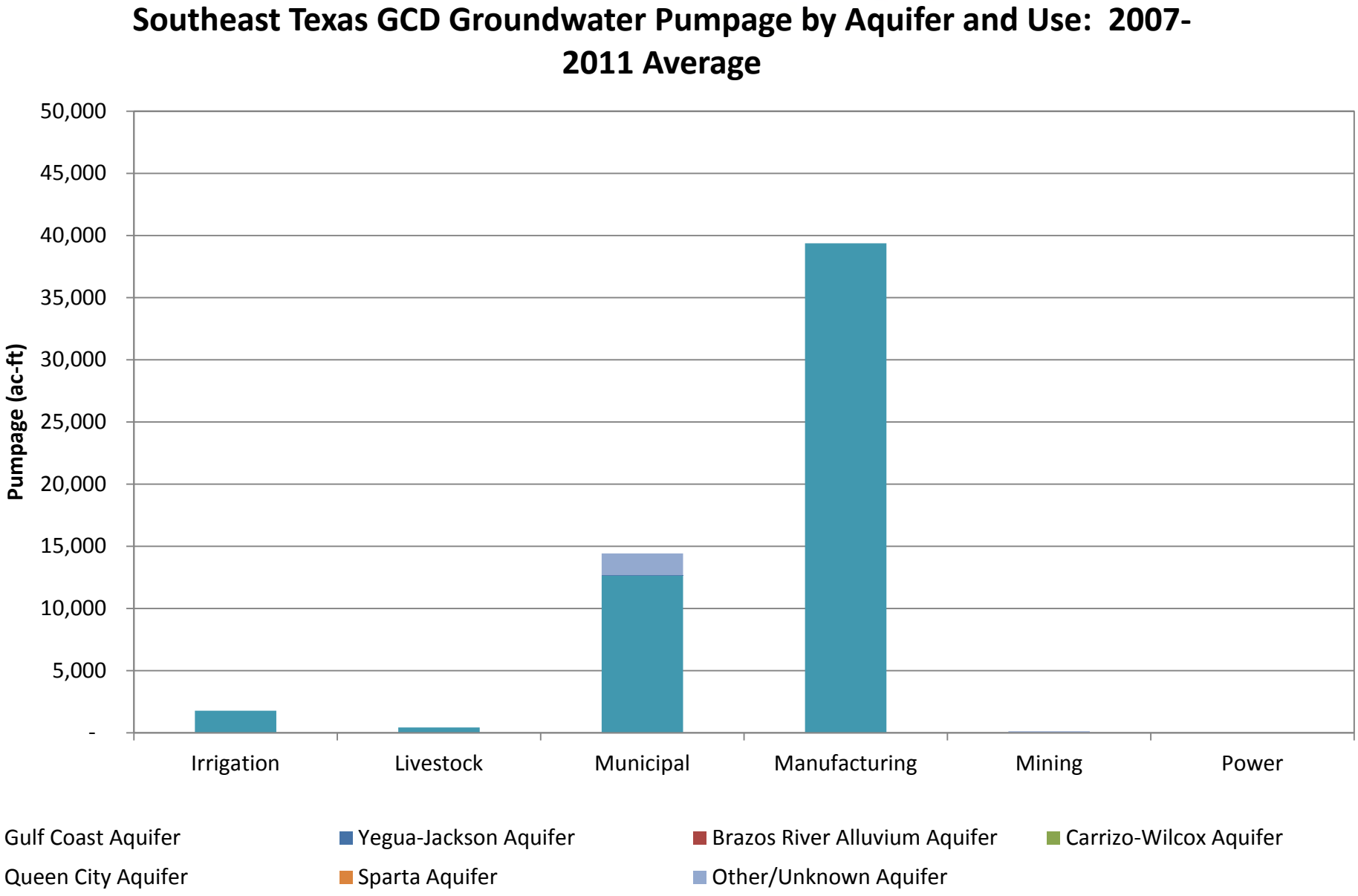
Phase 3: Explanatory Report

Aquifer Uses and Conditions



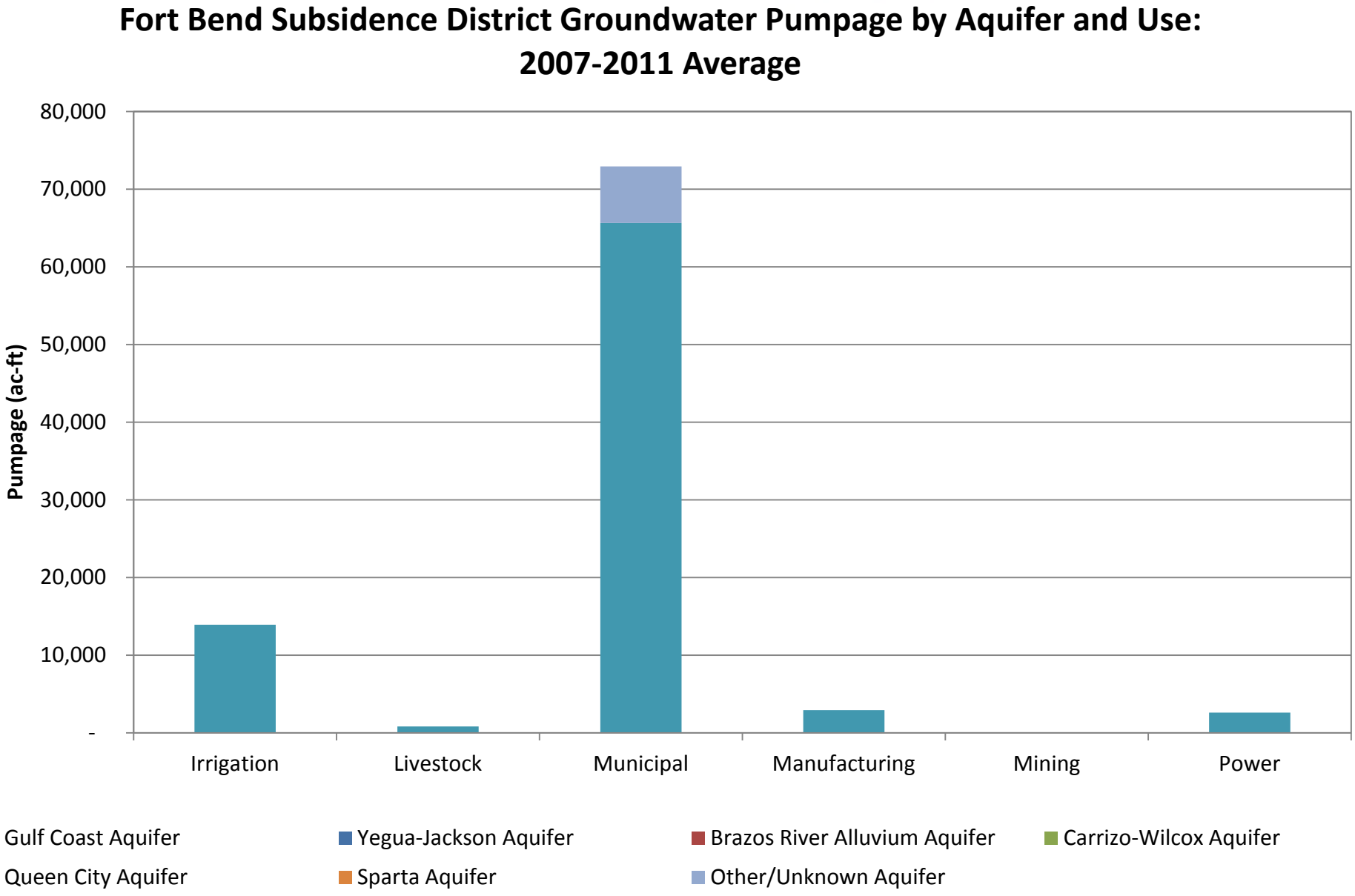
Phase 3: Explanatory Report

Aquifer Uses and Conditions



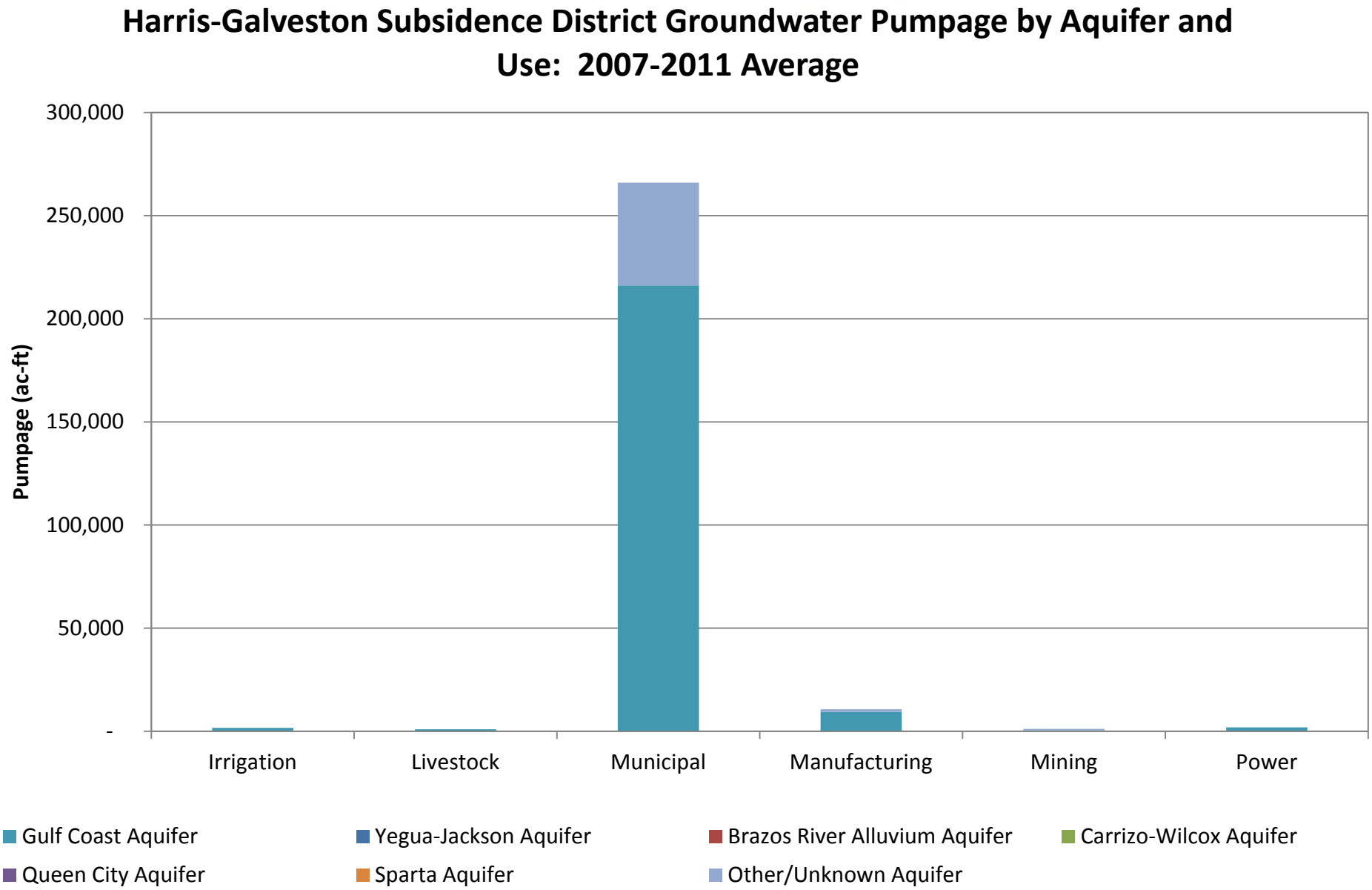
Phase 3: Explanatory Report

Aquifer Uses and Conditions



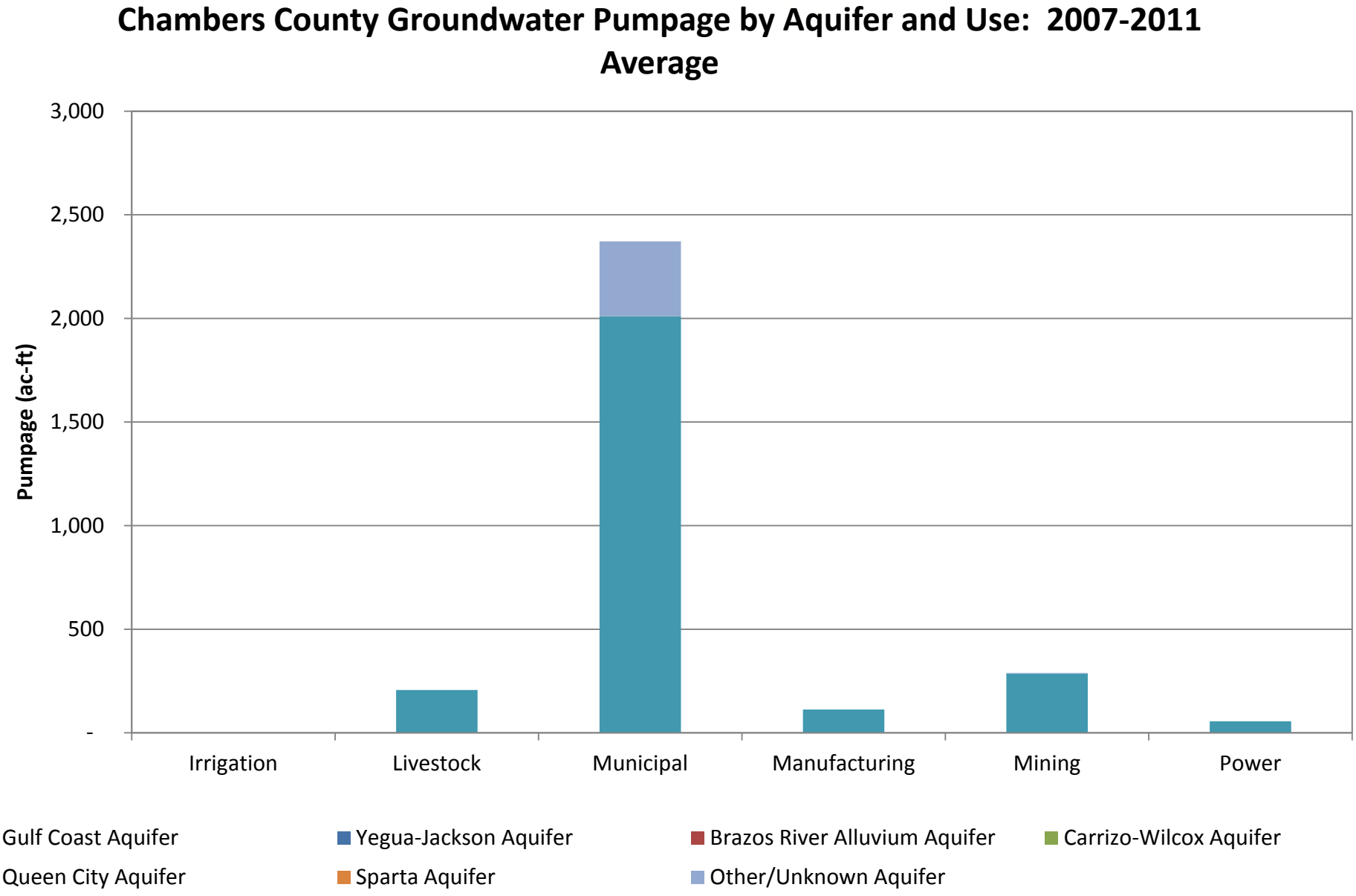
Phase 3: Explanatory Report

Aquifer Uses and Conditions



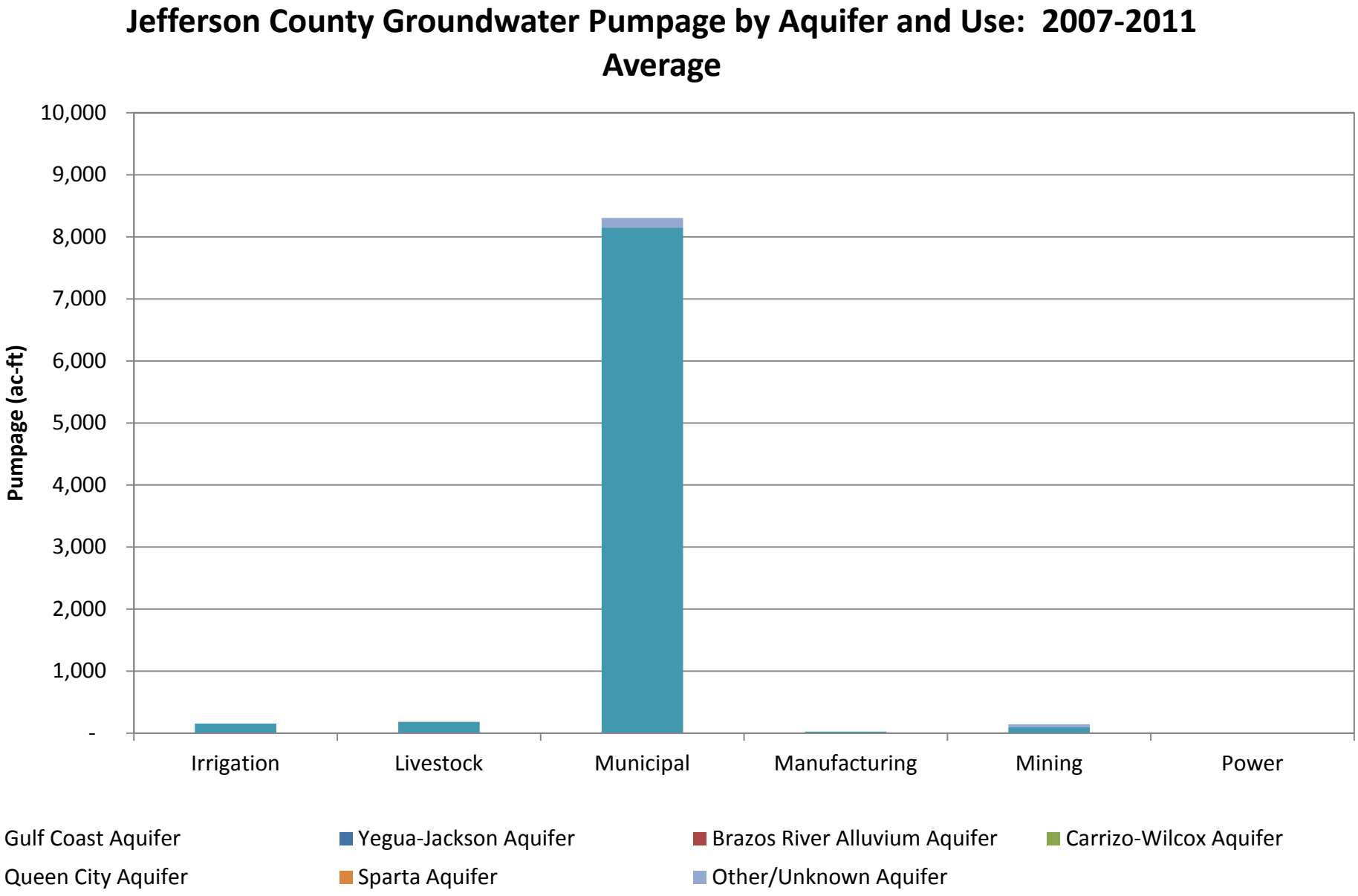
Phase 3: Explanatory Report

Aquifer Uses and Conditions



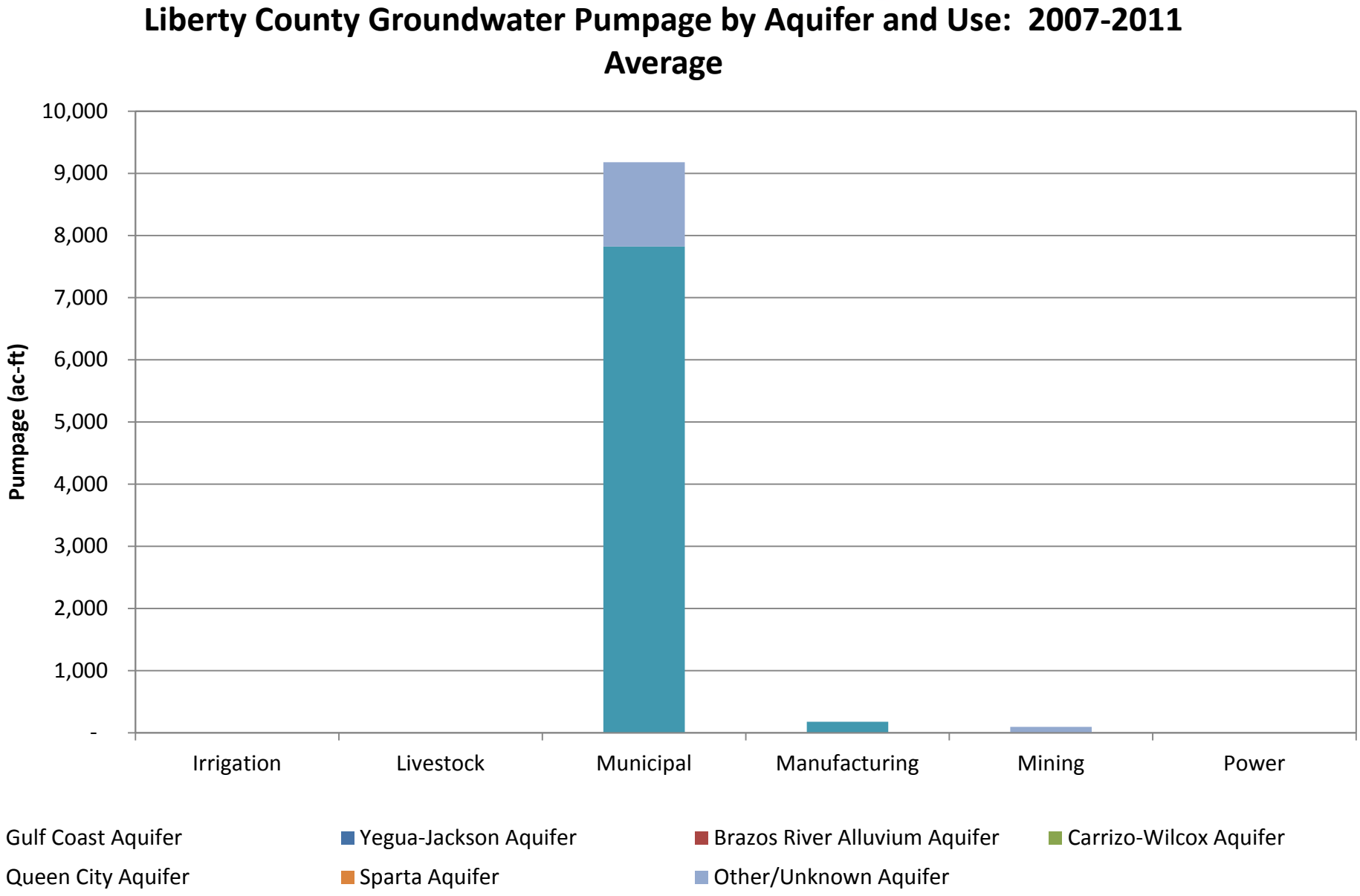
Phase 3: Explanatory Report

Aquifer Uses and Conditions



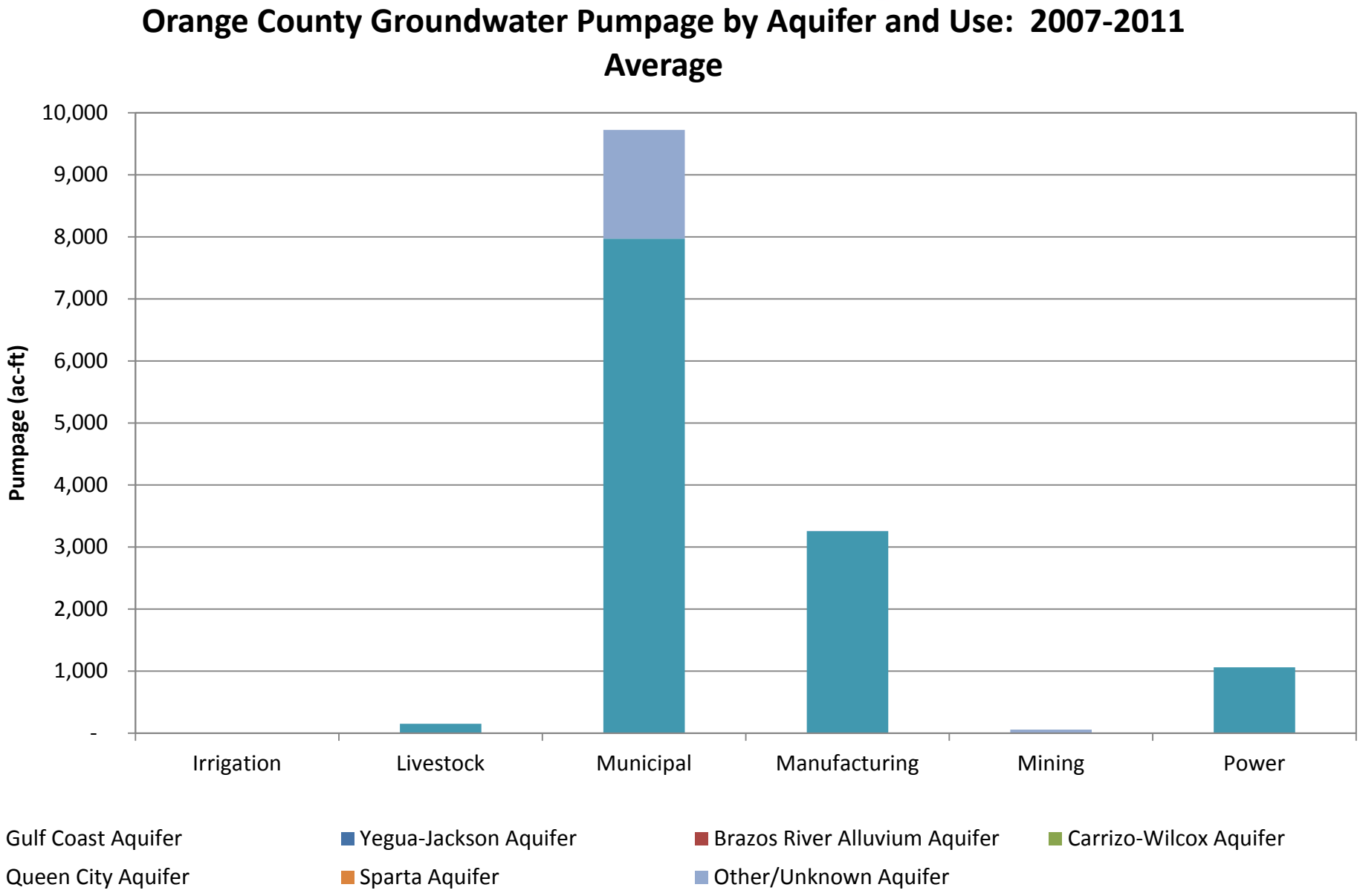
Phase 3: Explanatory Report

Aquifer Uses and Conditions



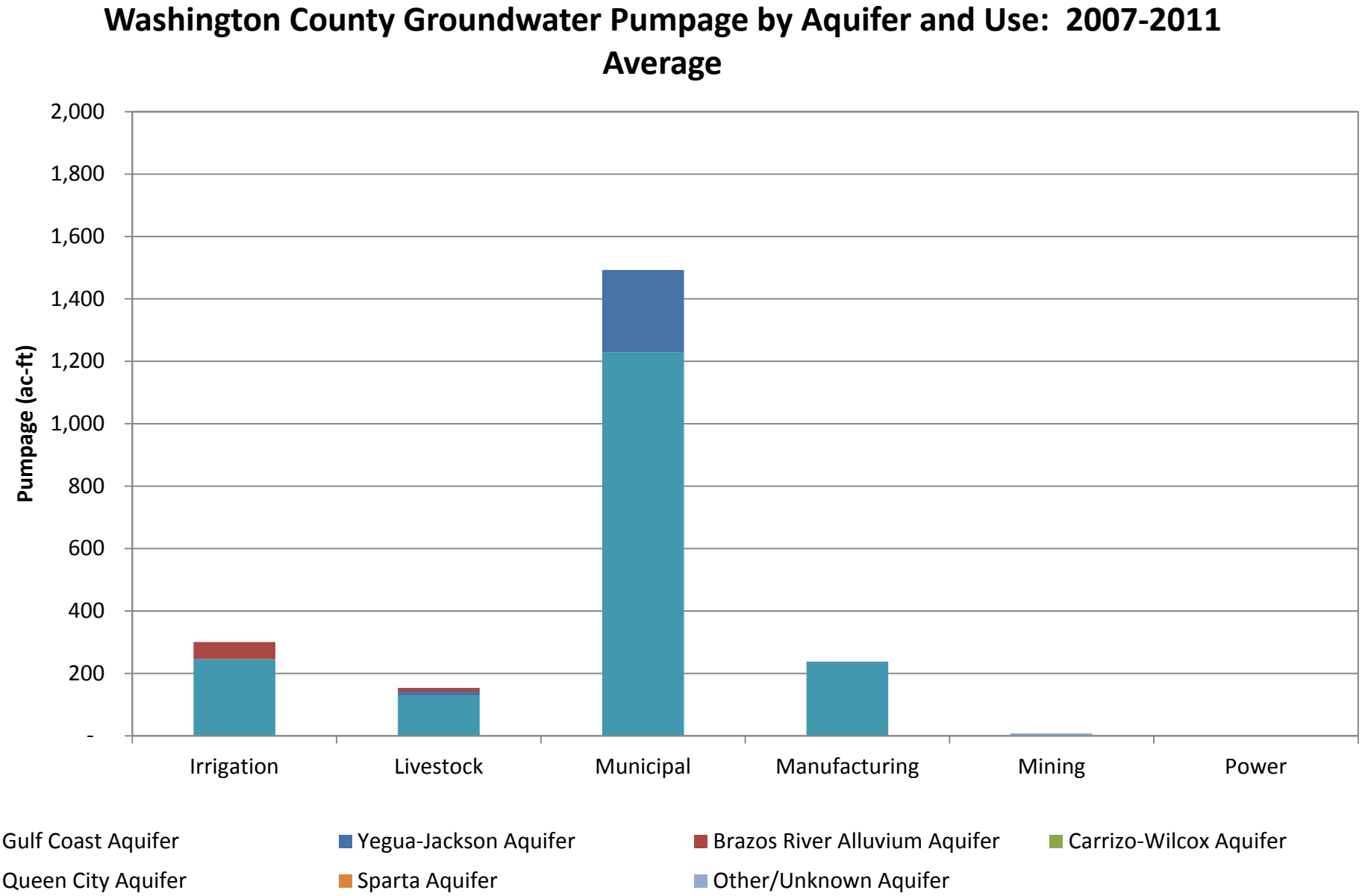
Phase 3: Explanatory Report

Aquifer Uses and Conditions



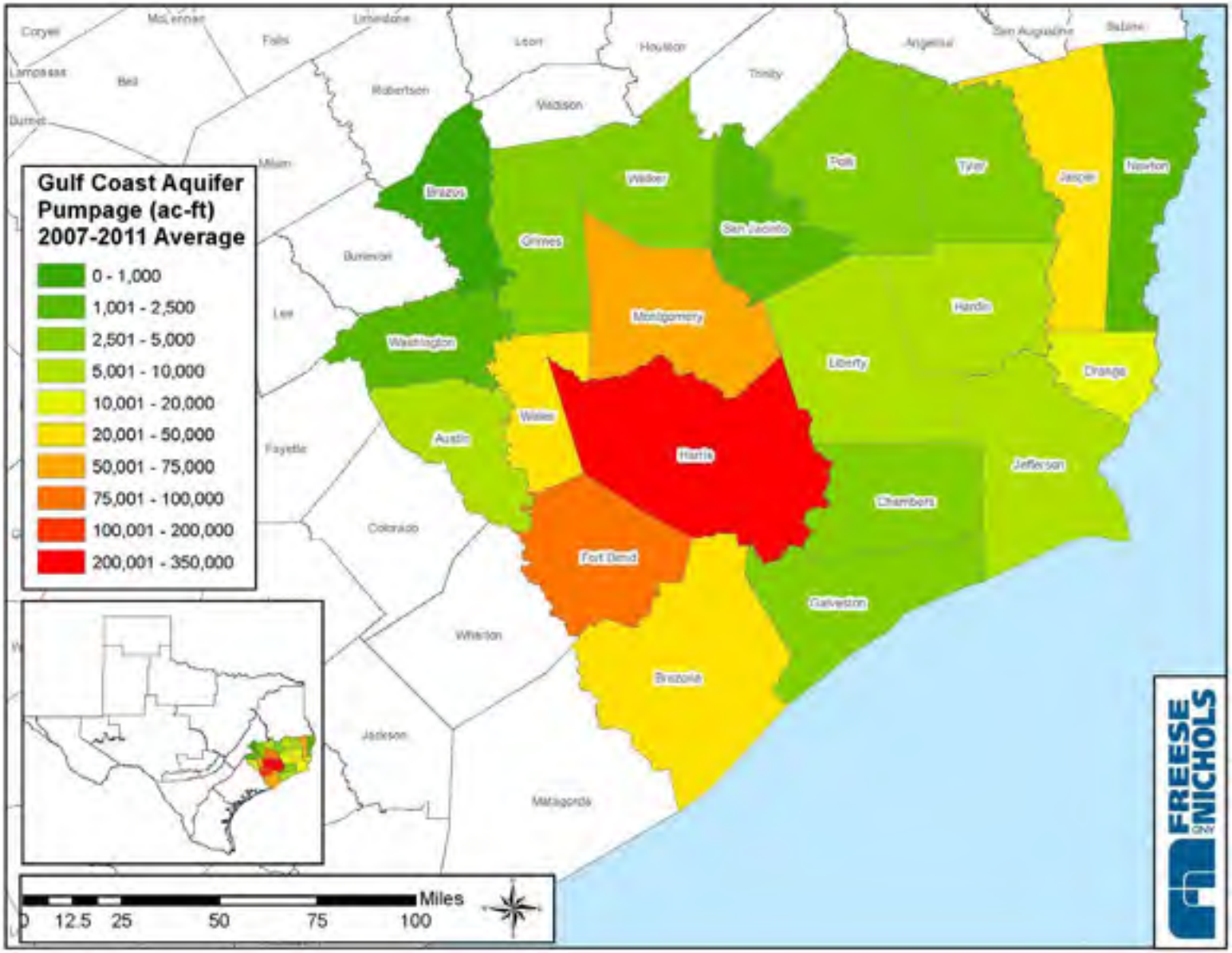
Phase 3: Explanatory Report

Aquifer Uses and Conditions



Phase 3: Explanatory Report

Aquifer Uses and Conditions



Phase 3: Explanatory Report

Aquifer Uses and Conditions

- Aquifer Conditions
  - Developed from existing reports
  - Additional study in future meetings

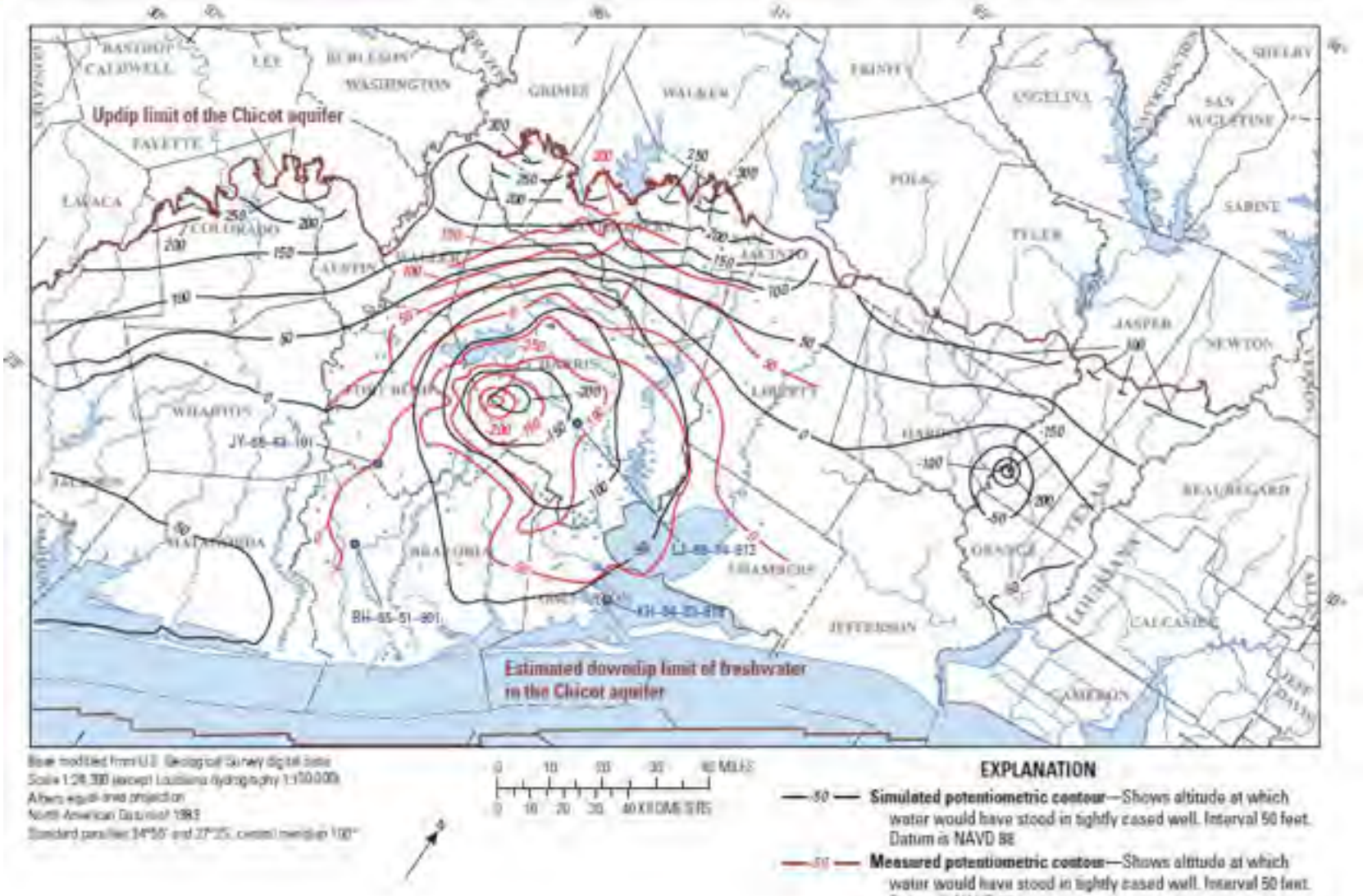
Phase 3: Explanatory Report

Aquifer Uses and Conditions

- Gulf Coast Aquifer
  - *Hydrogeology and Simulation of Groundwater Flow and Land-Surface Subsidence in the Northern Part of the Gulf Coast Aquifer* (USGS, Rev. 2012)
  - Water-level elevation
  - Subsidence

Phase 3: Explanatory Report

Aquifer Uses and Conditions

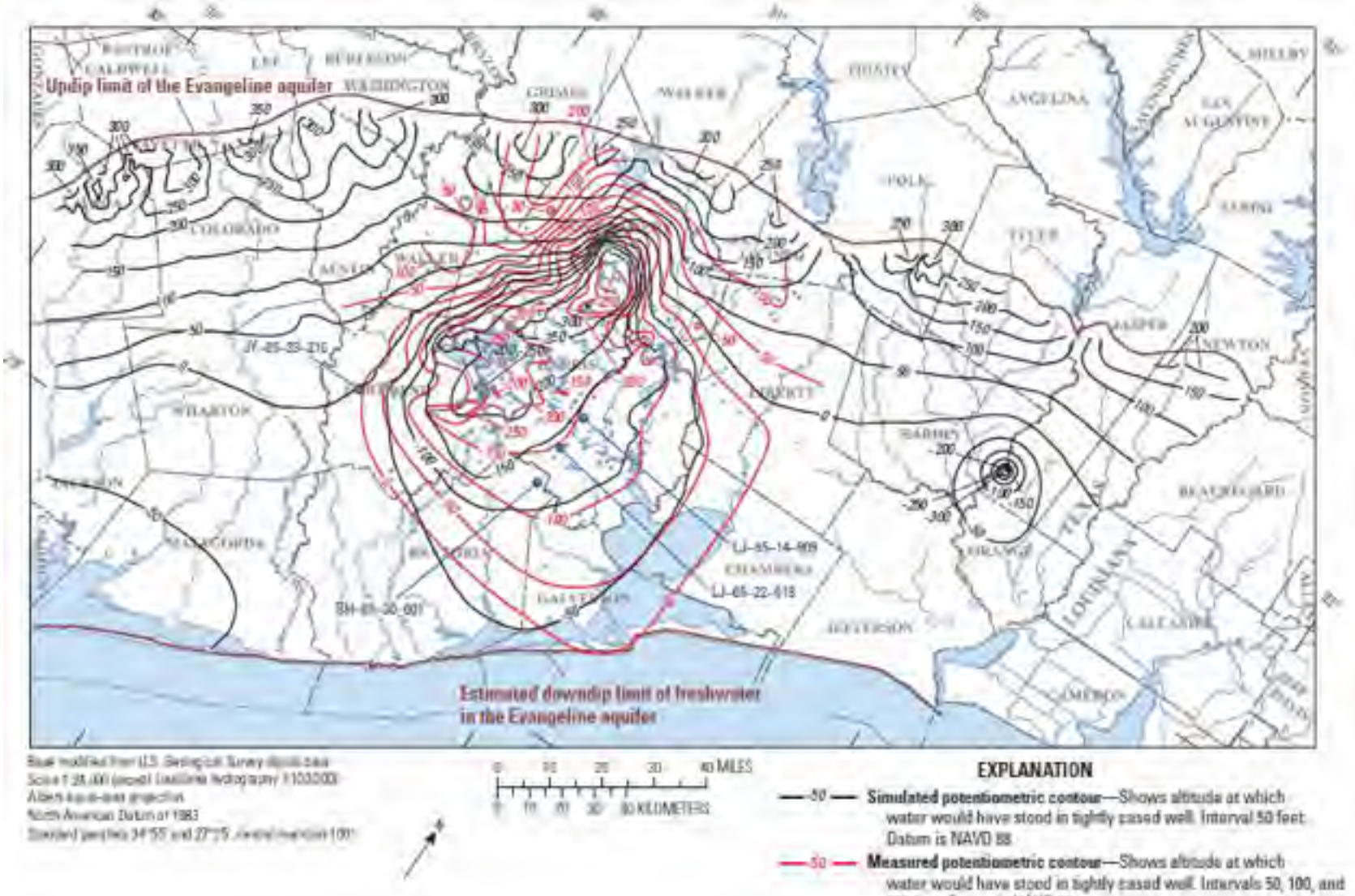


Chicot Formation

Simulated and Measured Contours

Phase 3: Explanatory Report

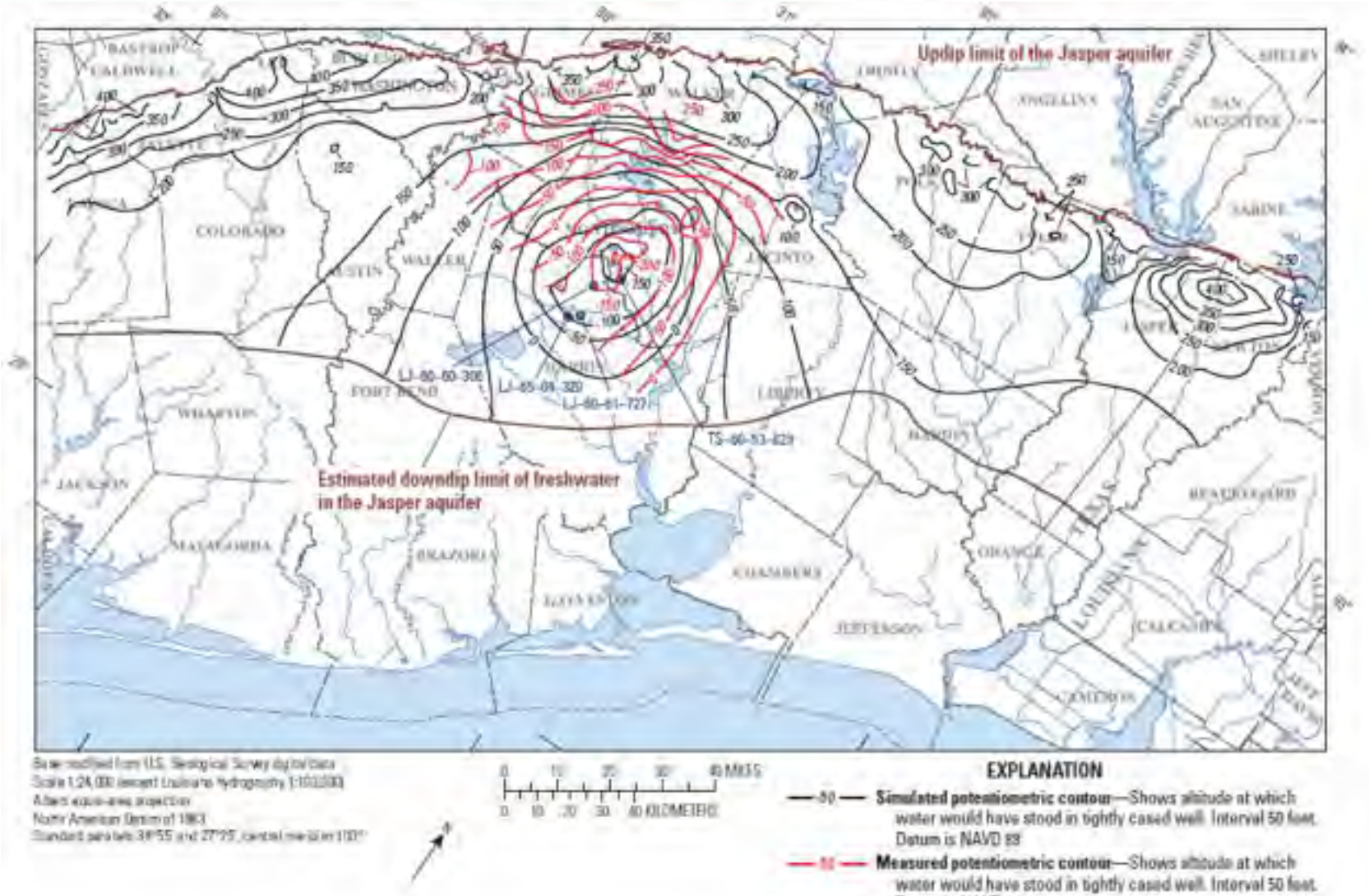
Aquifer Uses and Conditions



Evangeline Formation
Simulated and Measured Contours

Phase 3: Explanatory Report

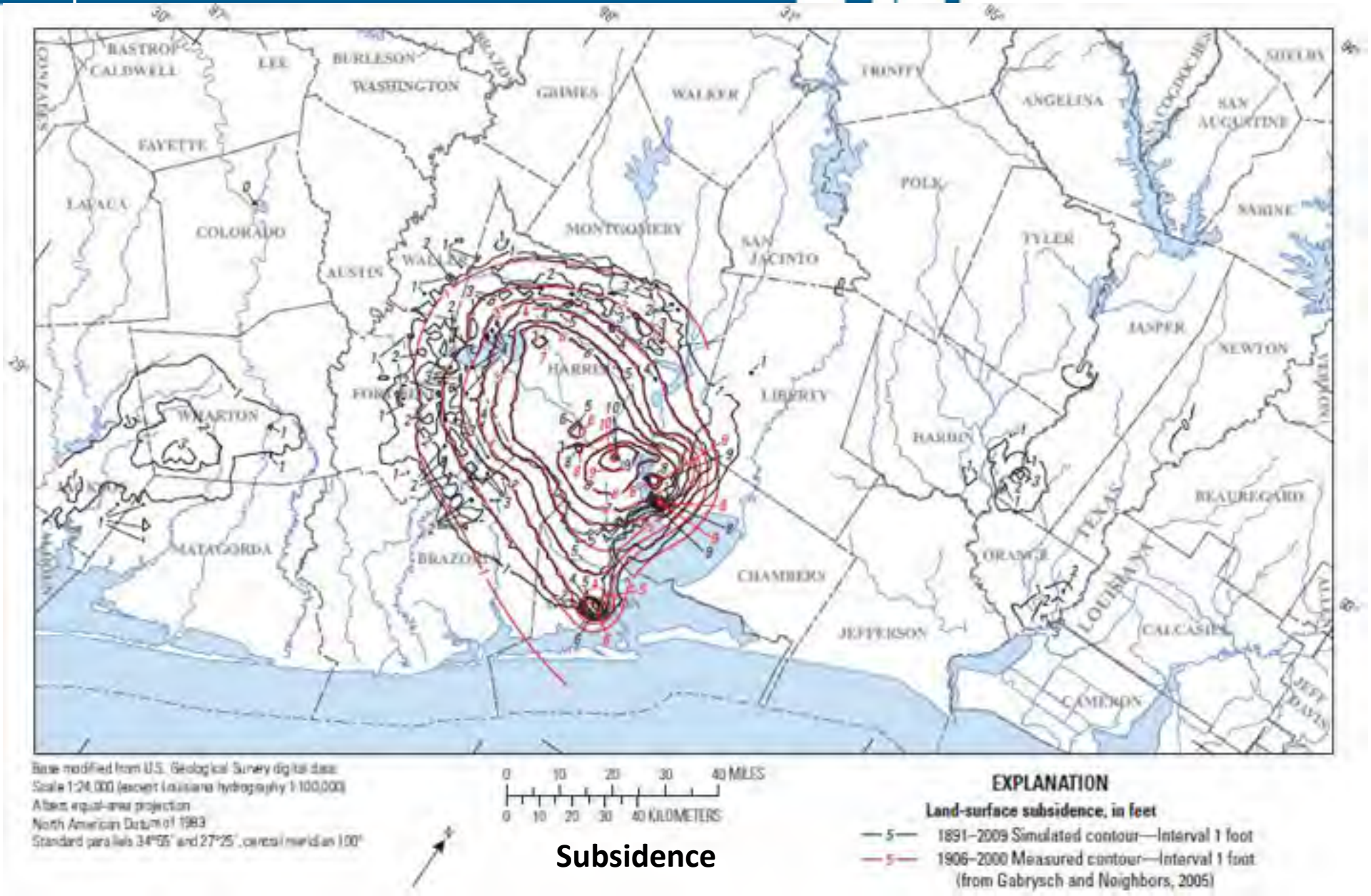
Aquifer Uses and Conditions



Jasper Formation
Simulated and Measured Contours

Phase 3: Explanatory Report

Aquifer Uses and Conditions



Subsidence

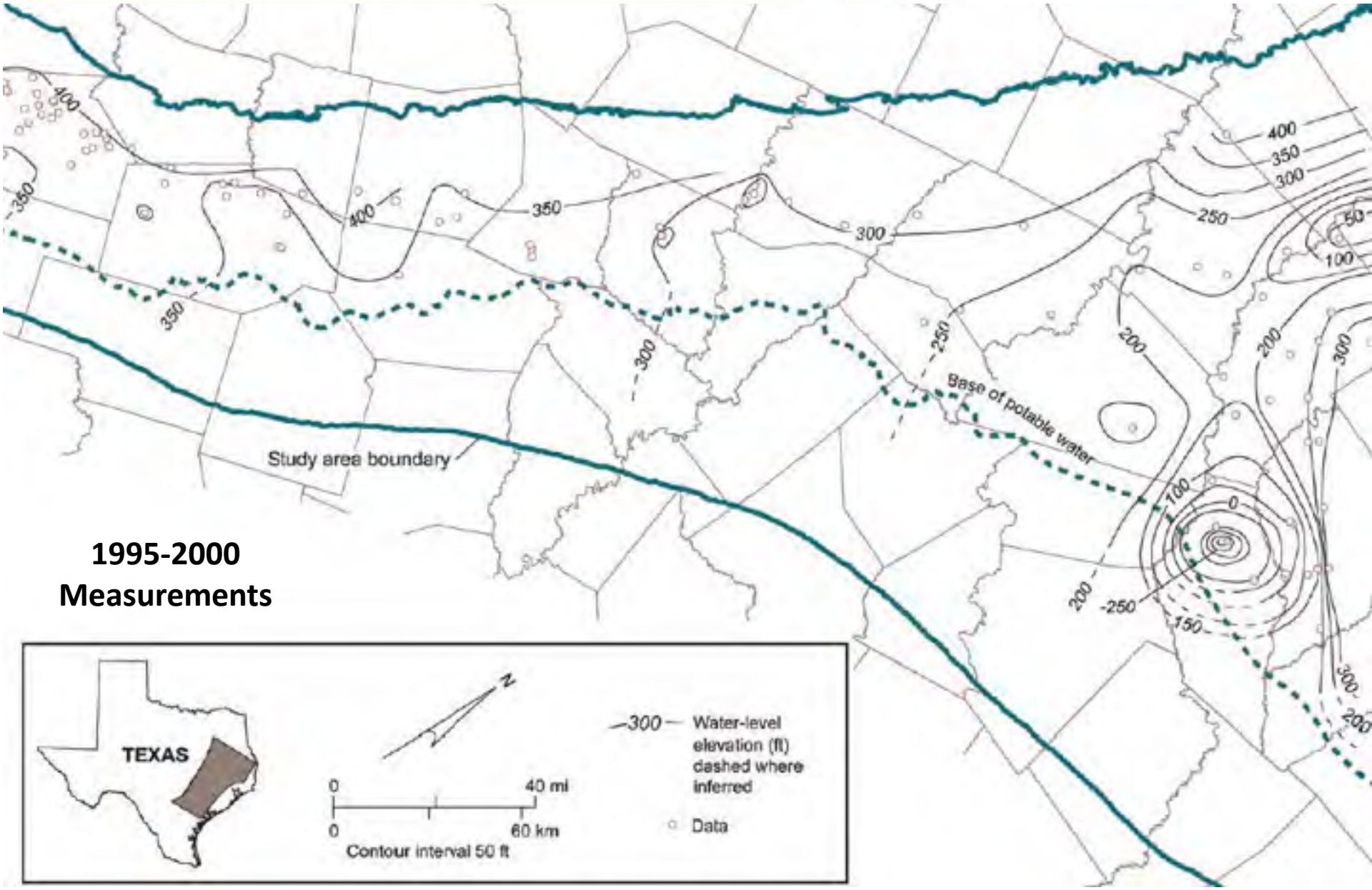
Phase 3: Explanatory Report

Aquifer Uses and Conditions

- Carrizo Sand Aquifer
  - *Groundwater Availability Model for the Central Part of the Carrizo-Wilcox Aquifer in Texas* (BEG, 2003)
  - Water-level elevation

Phase 3: Explanatory Report

Aquifer Uses and Conditions



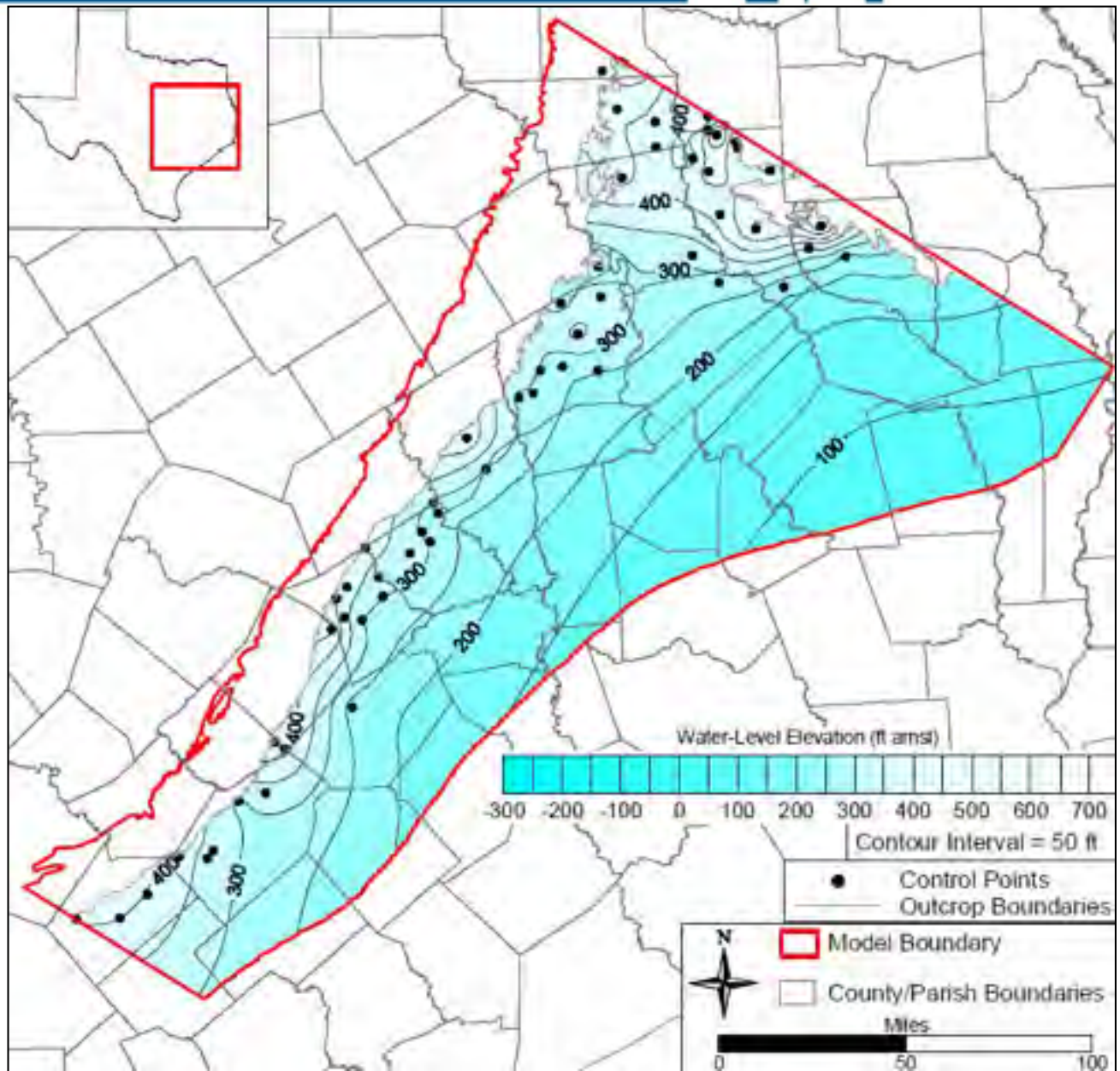
Phase 3: Explanatory Report

Aquifer Uses and Conditions

- Queen City Aquifer
  - *Groundwater Availability Models for the Queen City and Sparta Aquifers* (INTERA, 2004)
  - Water-level elevation

Phase 3: Explanatory Report

Aquifer Uses and Conditions



1999 Estimated

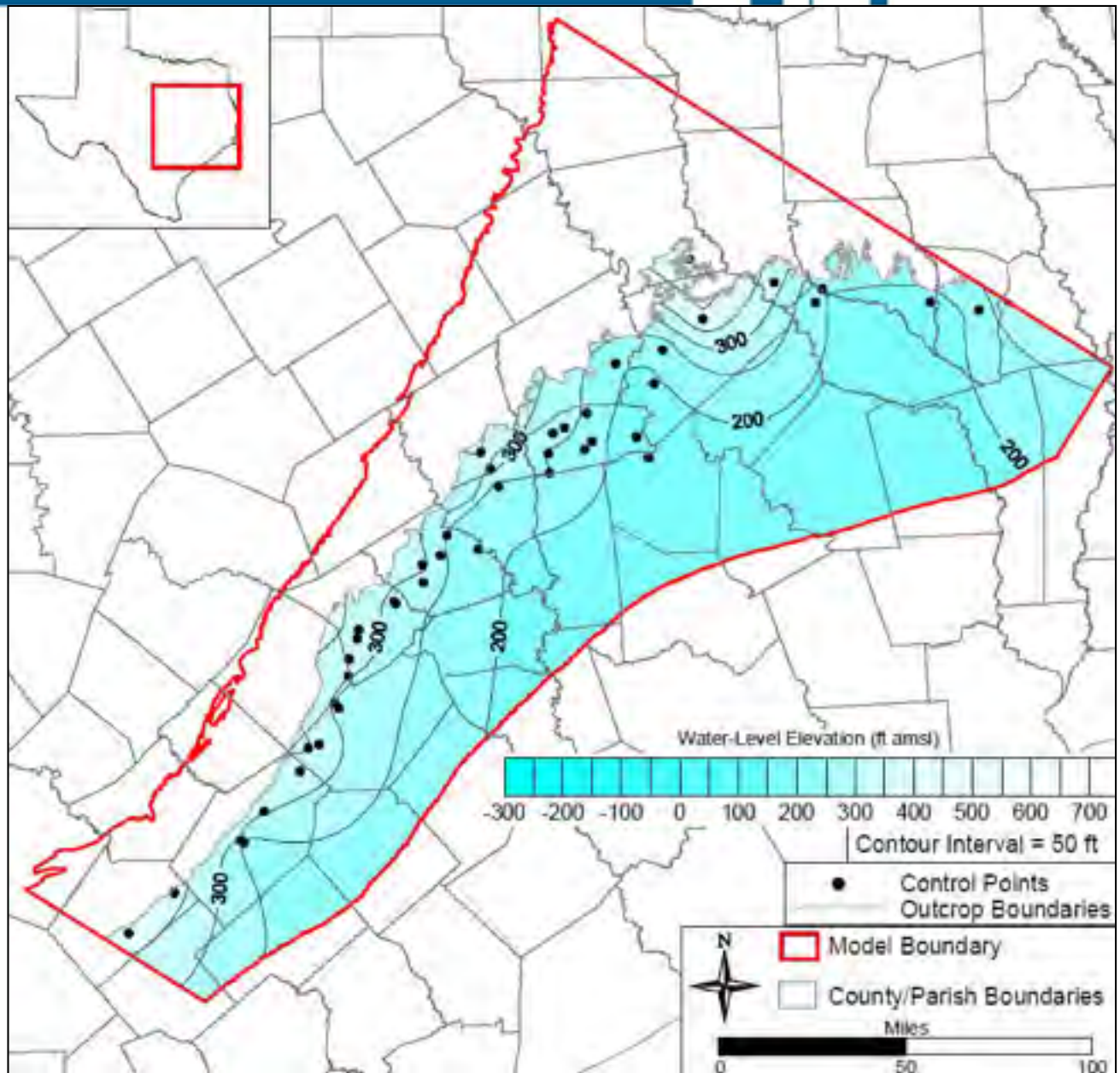
Phase 3: Explanatory Report

Aquifer Uses and Conditions

- Sparta Aquifer
  - *Groundwater Availability Models for the Queen City and Sparta Aquifers* (INTERA, 2004)
  - Water-level elevation

Phase 3: Explanatory Report

Aquifer Uses and Conditions



1999 Estimated

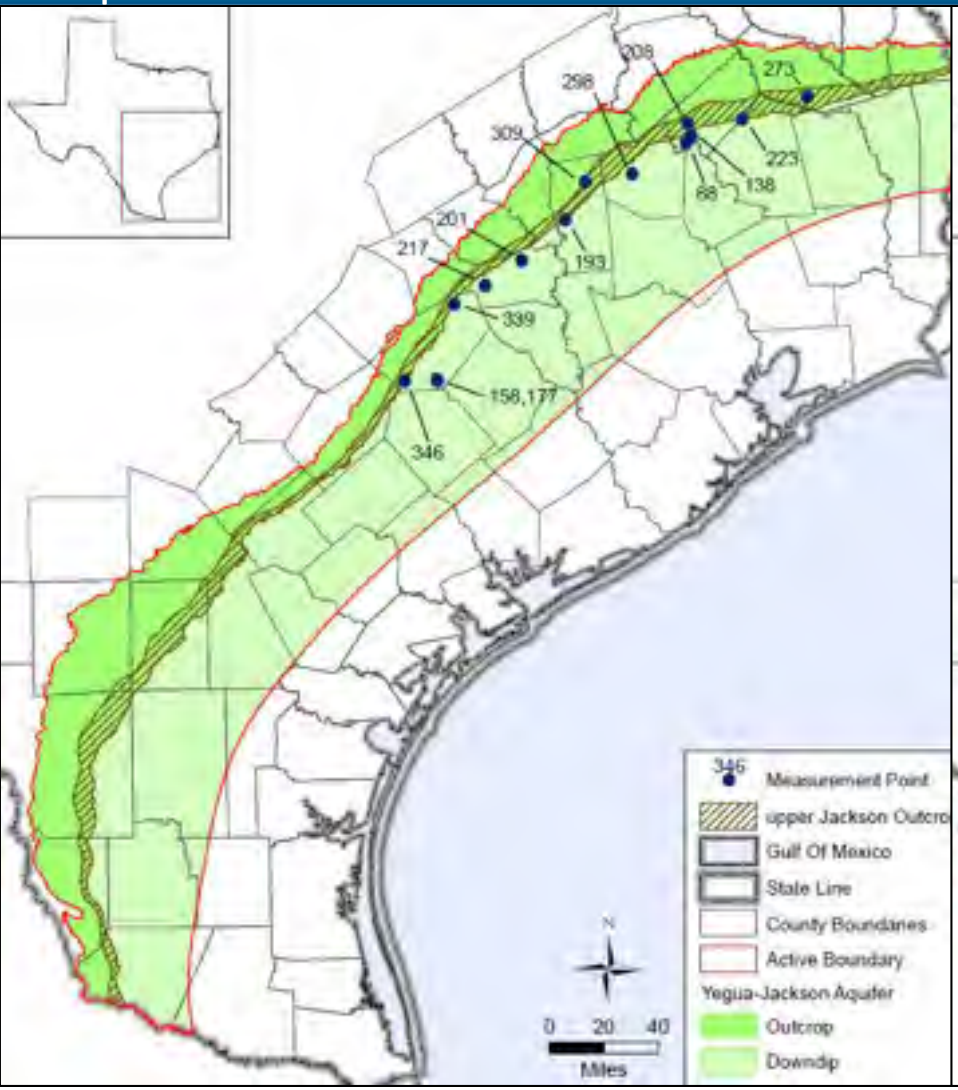
Phase 3: Explanatory Report

Aquifer Uses and Conditions

- Yegua-Jackson Aquifer
  - *Final Report: Groundwater Availability Model for the Yegua-Jackson Aquifer* (INTERA, Rev. 2010)
  - Water-level elevation

Phase 3: Explanatory Report

Aquifer Uses and Conditions



Upper Jackson | **1997 Estimated** | **Lower Jackson**

Phase 3: Explanatory Report

Aquifer Uses and Conditions

Upper Yegua | **1997 Estimated** | **Lower Yegua**

Appendix I

Presentation materials related to consideration of water supply needs and water management strategies

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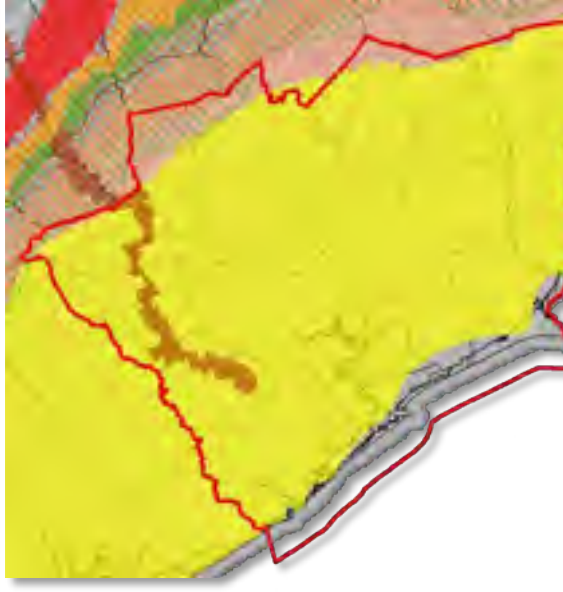
FREESE AND NICHOLS



Explanatory Report

Water Supply Needs and Strategies

September 18, 2013

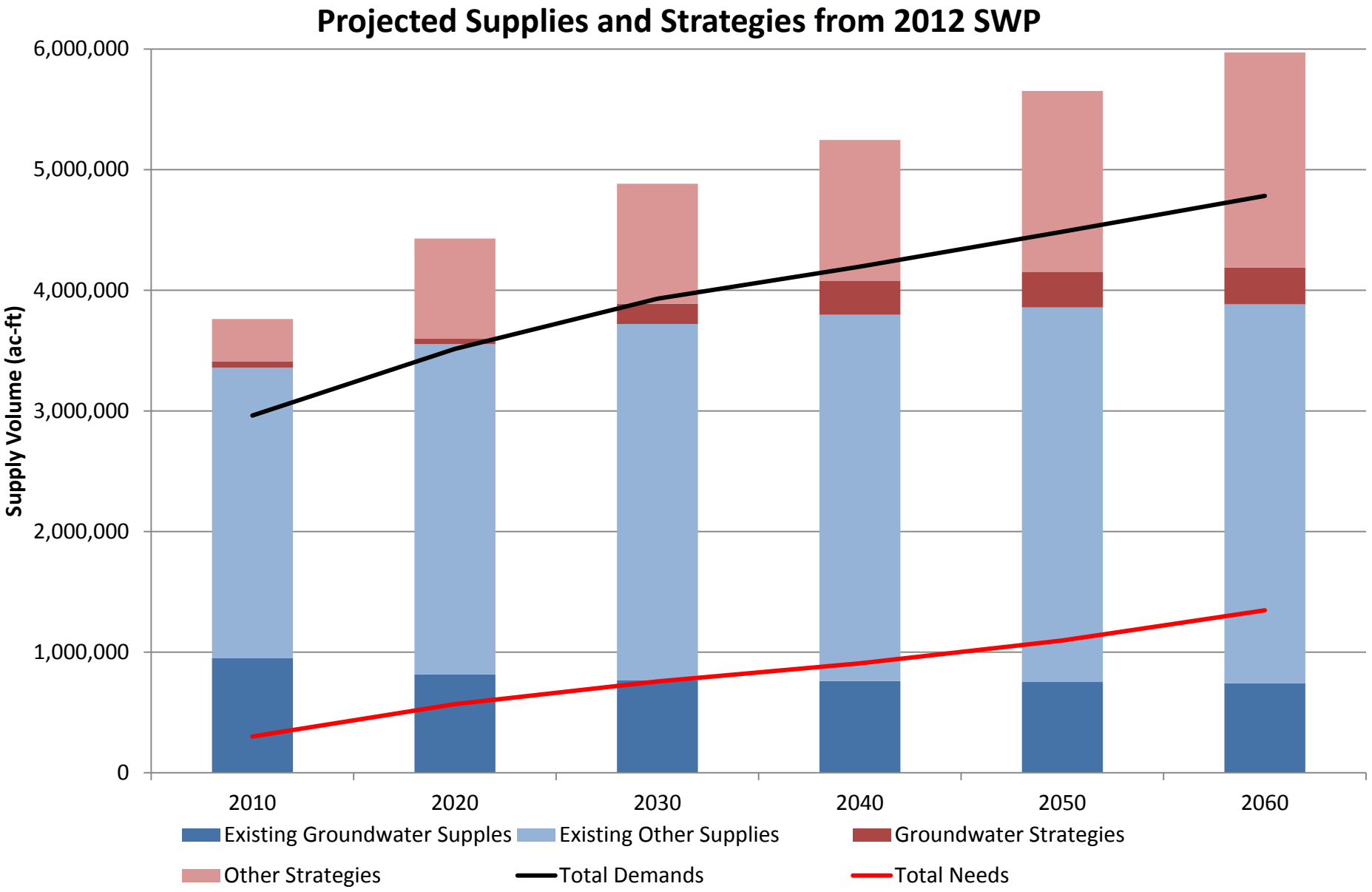
Phase 3: Explanatory Report

Water Supply Needs and Strategies

- Water Supply Needs and Strategies
  - 2012 State Water Plan
  - Year 2010 to 2060
  - Summarized by counties

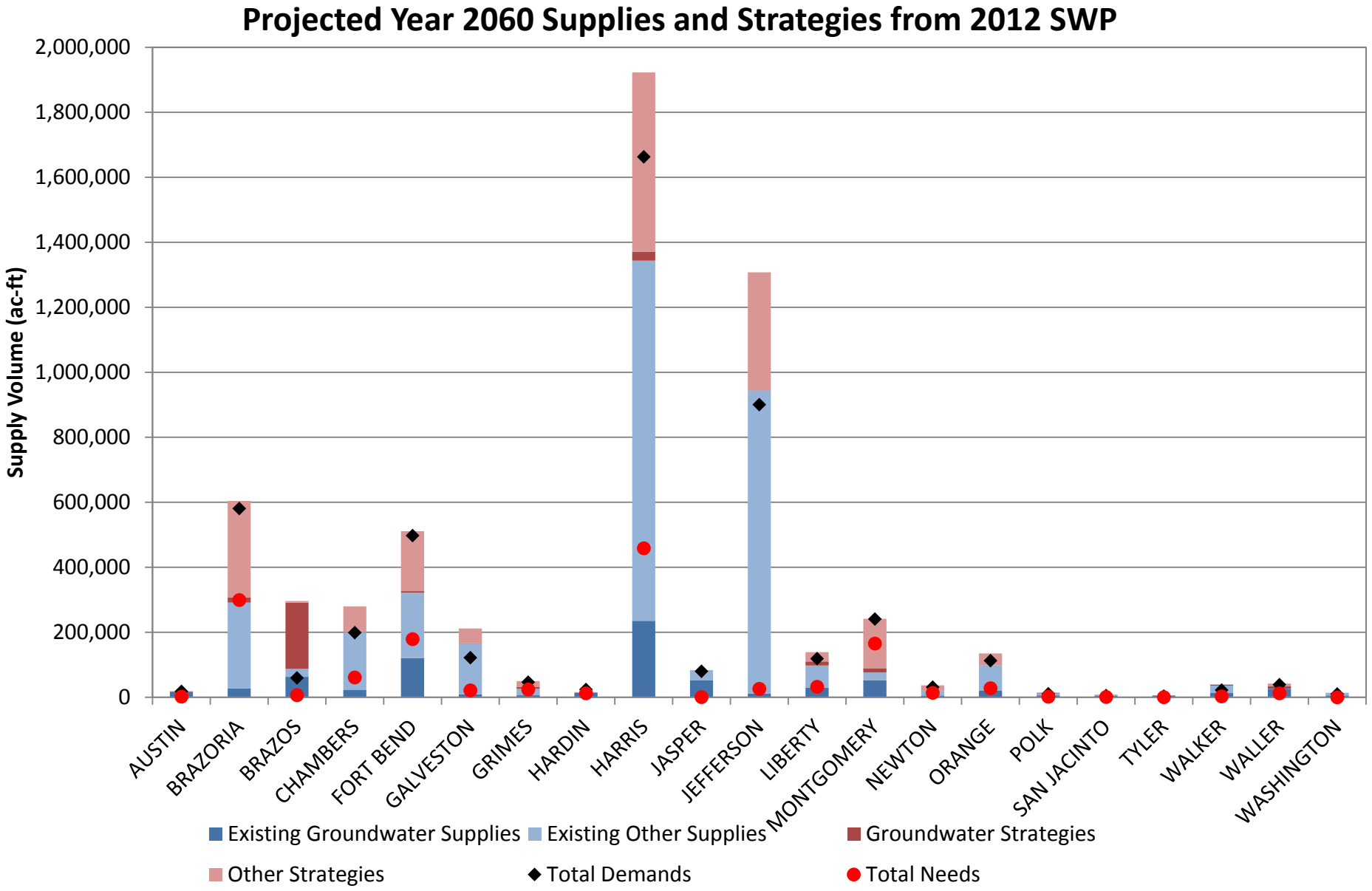
Phase 3: Explanatory Report

Water Supply Needs and Strategies



Phase 3: Explanatory Report

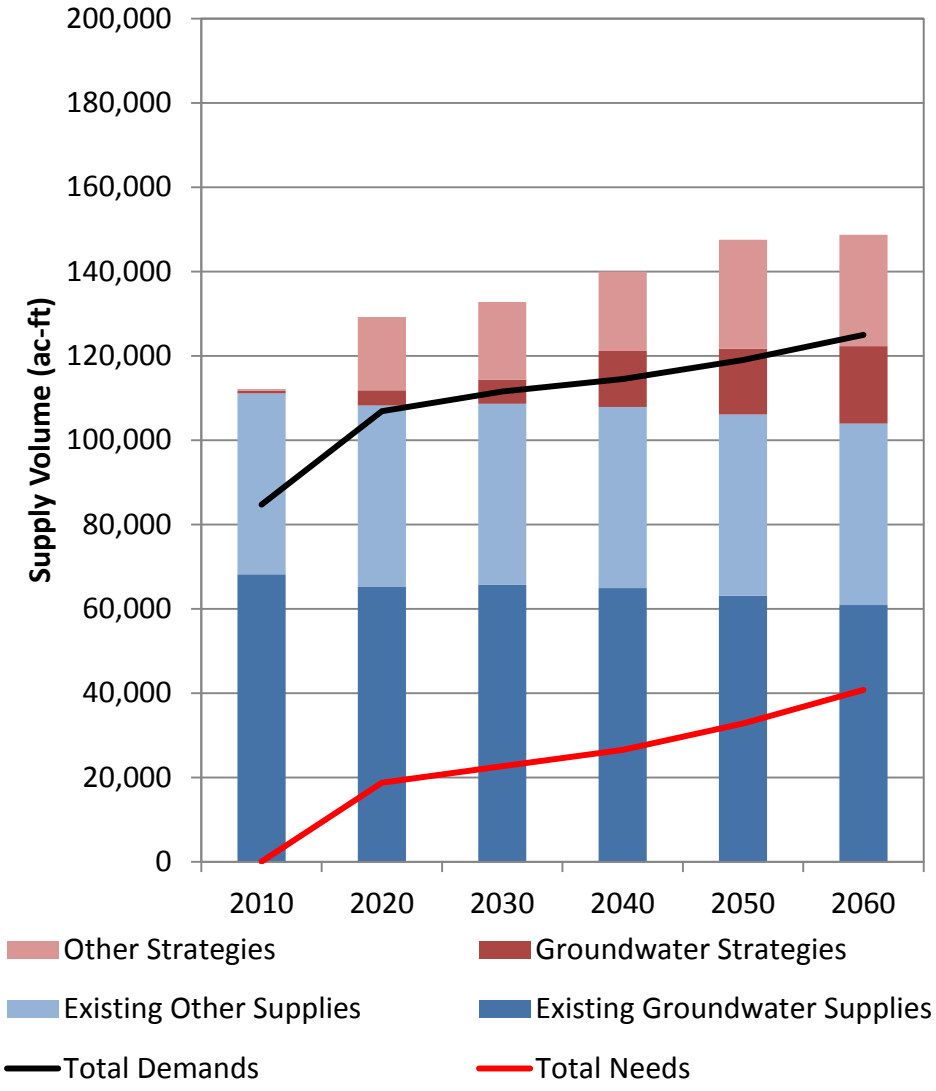
Water Supply Needs and Strategies



Phase 3: Explanatory Report

Water Supply Needs and Strategies

Bluebonnet GCD Projected Supplies and Strategies from 2012 SWP

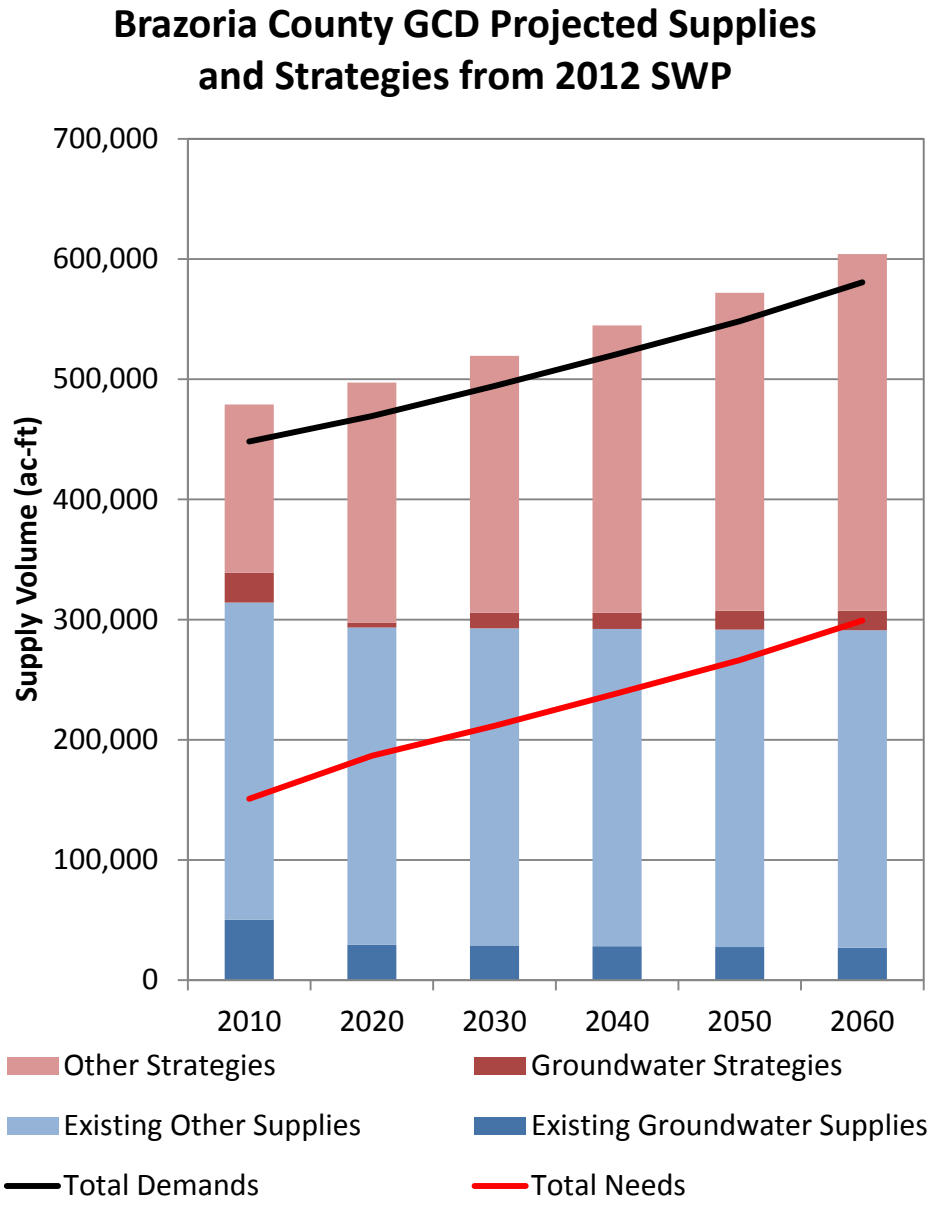


Major Strategies

- Expanded use of groundwater
- Purchase water from City of Bryan
- Conservation
- Raise level of Gibbons Creek Reservoir
- Wastewater Reuse

Phase 3: Explanatory Report

Water Supply Needs and Strategies

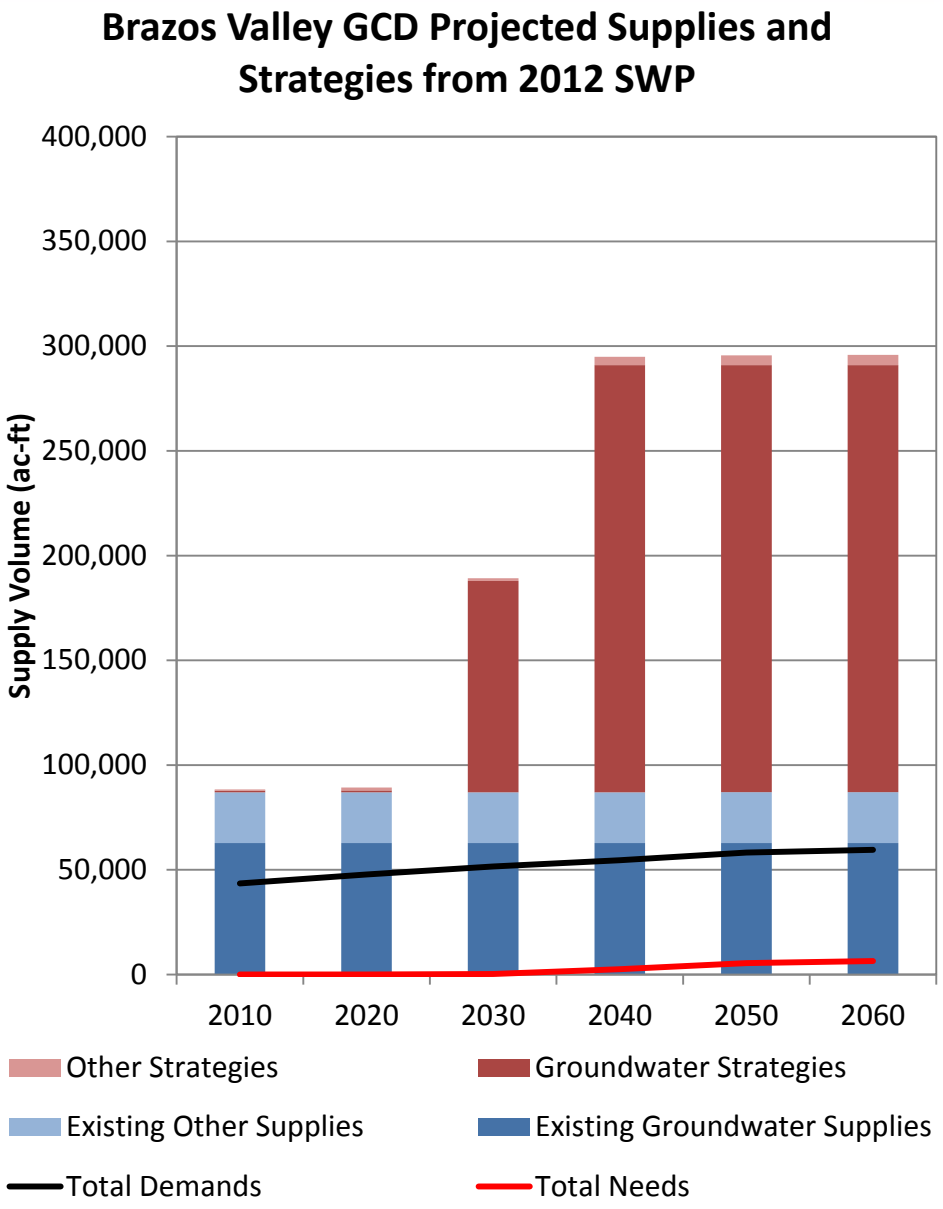


Major Strategies

- Expanded use of groundwater
- Allens Creek Reservoir
- Brazoria, DOW, and GCWA OCRs
- Conservation
- Freeport Desal
- Interruptible Irr. Supplies
- Supply reallocation
- Wastewater reclamation for municipal irrigation

Phase 3: Explanatory Report

Water Supply Needs and Strategies

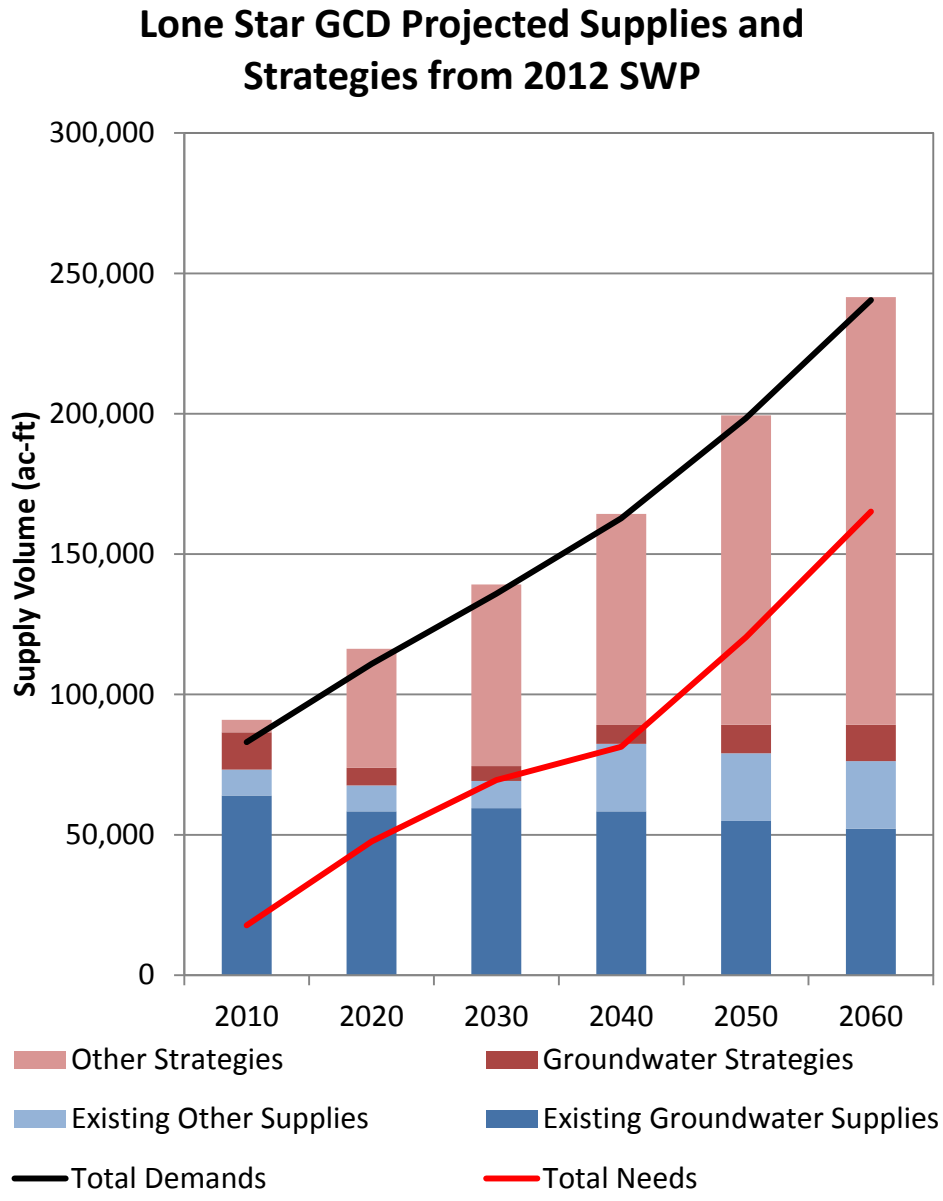


Major Strategies

- Brazos GW project to DWU and NTMWD
- Expanded use of groundwater
- Purchase water from City of Bryan
- BRA System Operation permit
- Municipal conservation
- Wastewater reuse

Phase 3: Explanatory Report

Water Supply Needs and Strategies



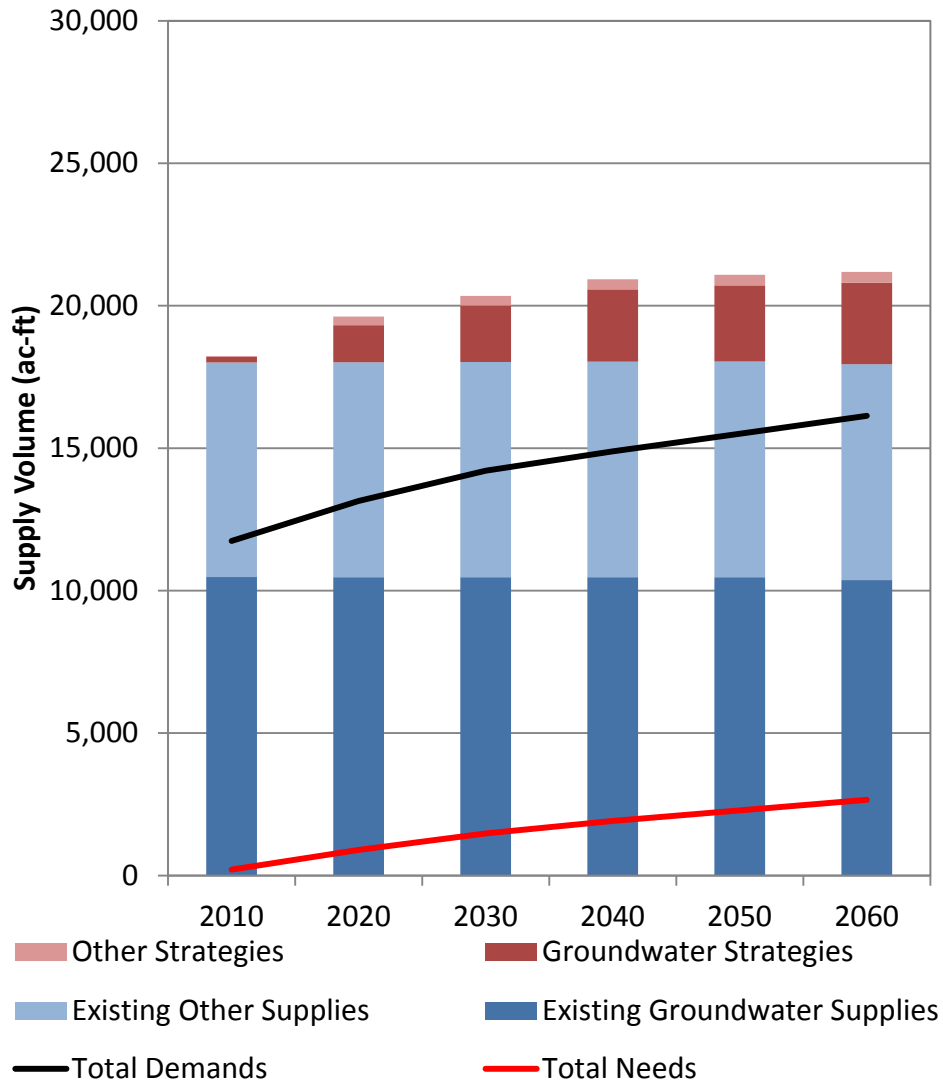
Major Strategies

- Expanded use of groundwater
- Interim groundwater use
- MC MUD 8 and 9 reuse
- Municipal conservation
- SJRA WRAP
- TRA to SJRA Contract
- Wastewater reclamation for municipal irrigation

Phase 3: Explanatory Report

Water Supply Needs and Strategies

Lower Trinity GCD Projected Supplies and Strategies from 2012 SWP

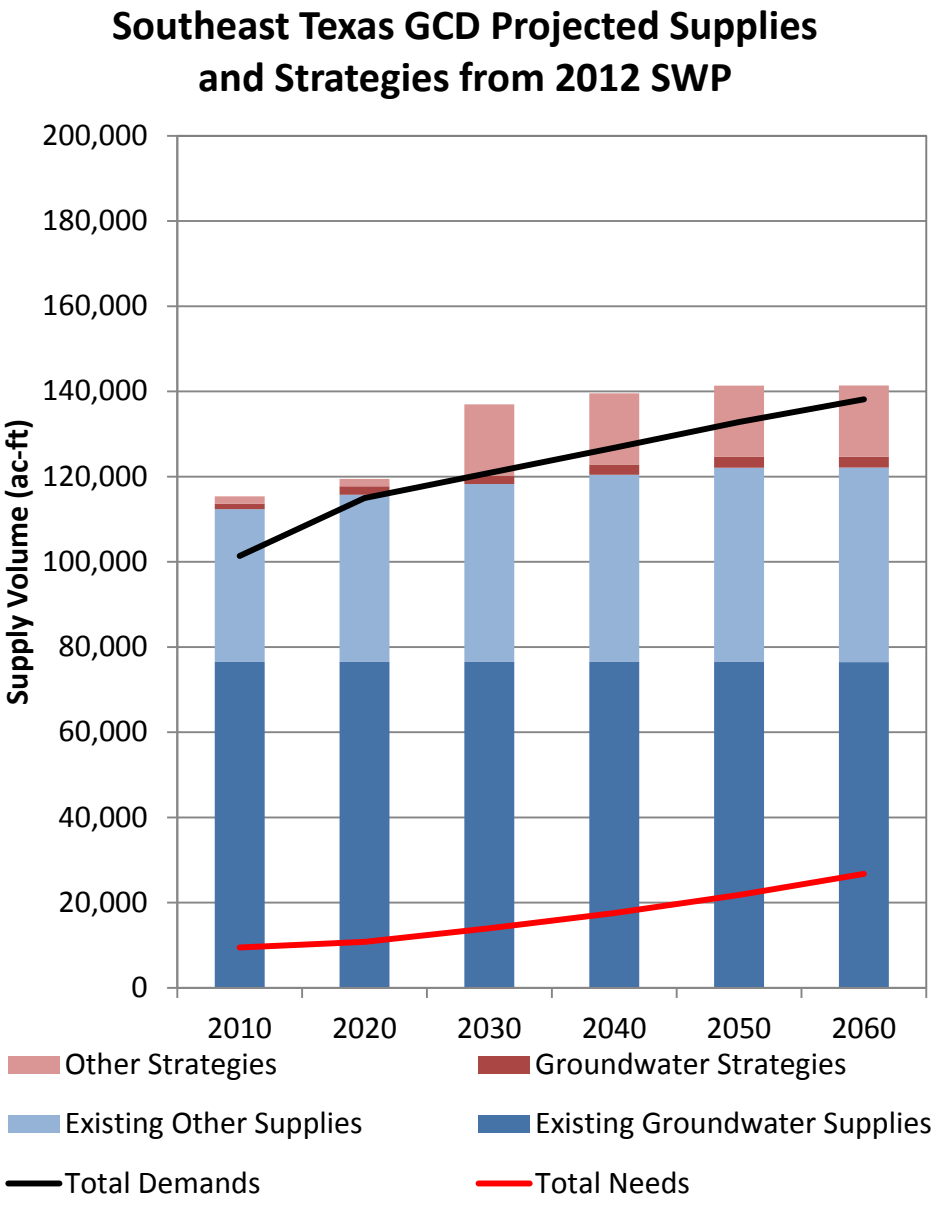


Major Strategies

- Expanded use of groundwater
- Municipal conservation

Phase 3: Explanatory Report

Water Supply Needs and Strategies



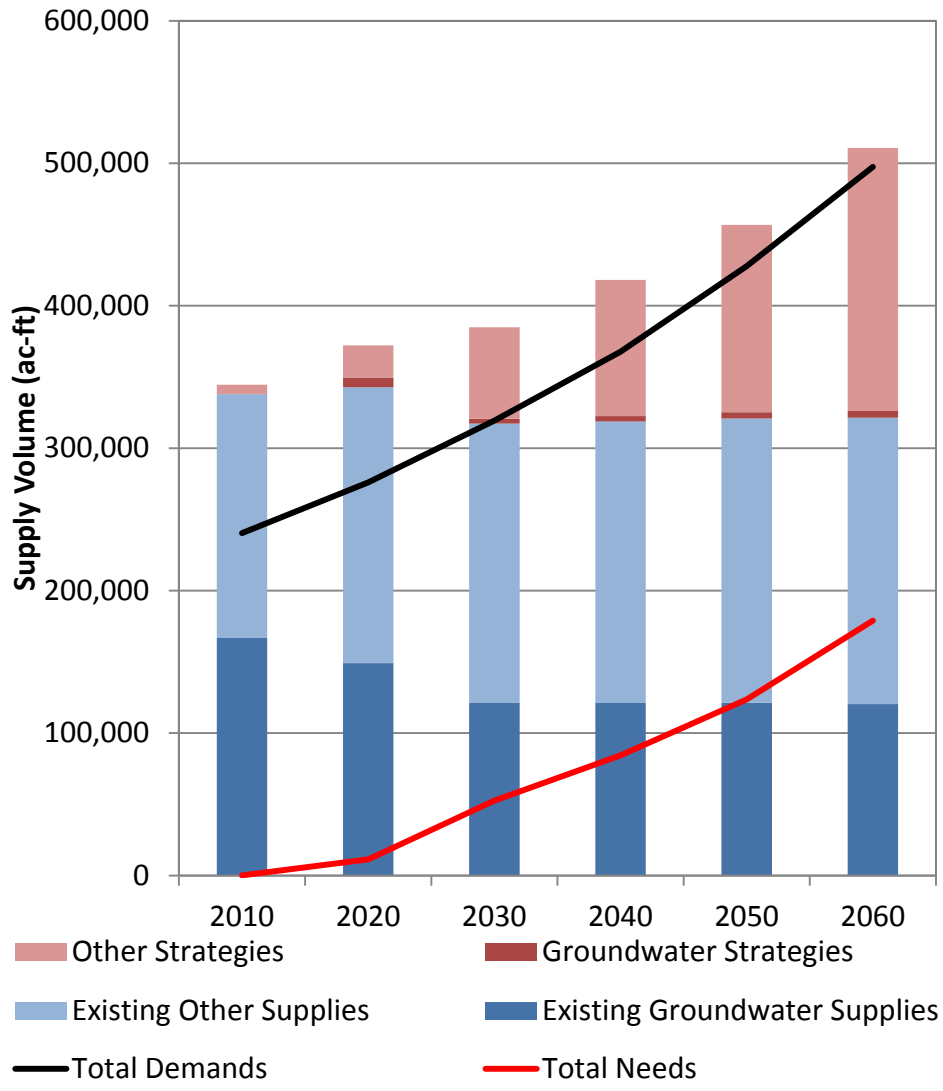
Major Strategies

- Expanded use of groundwater
- Overdrafting
- Purchase water from provider

Phase 3: Explanatory Report

Water Supply Needs and Strategies

Fort Bend Subsidence District Projected Supplies and Strategies from 2012 SWP

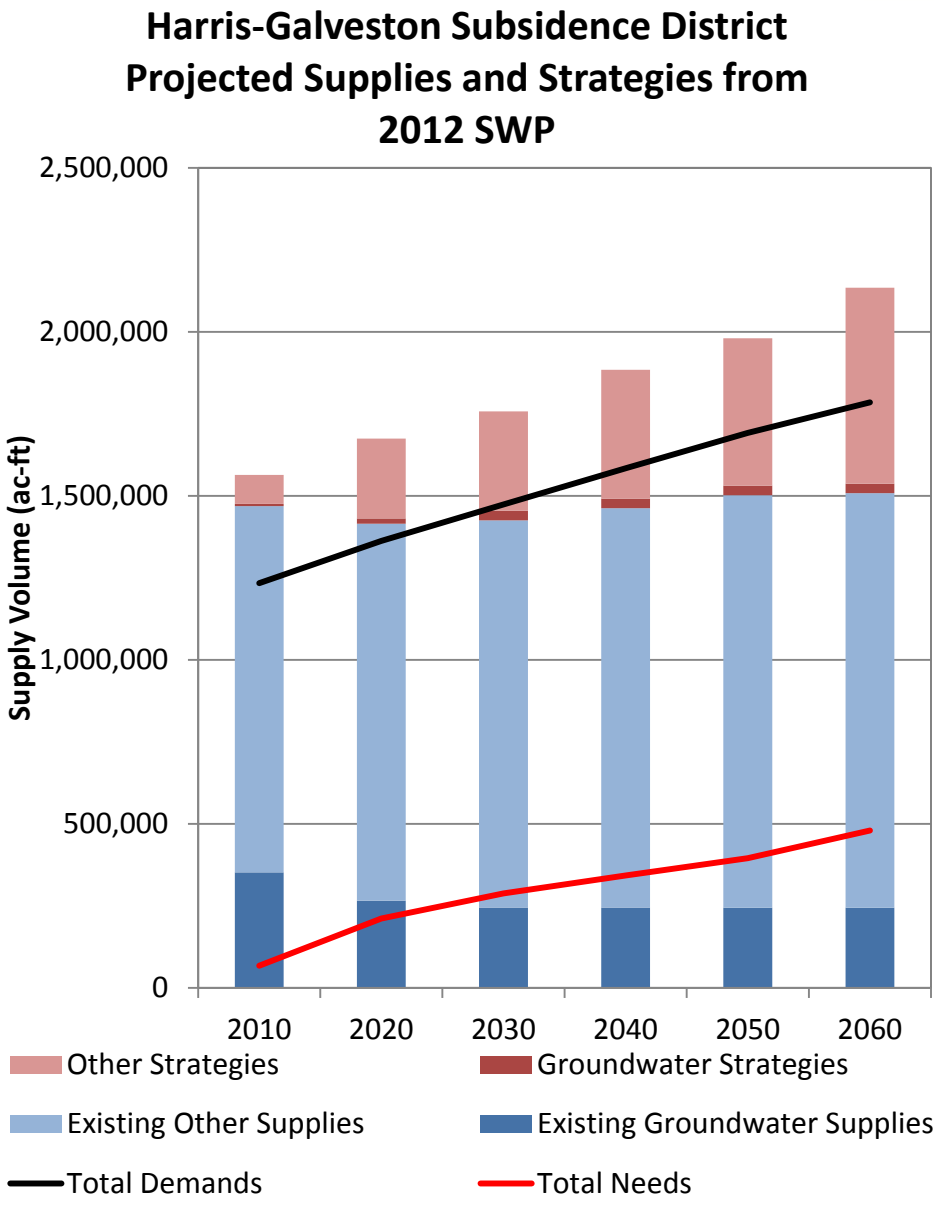


Major Strategies

- Expanded use of groundwater
- Allens Creek Reservoir
- BRA System Operations permit
- Fort Bend OCR
- Conservation
- Supply reallocation
- TRA to Houston contract
- Wastewater reclamation for municipal irrigation
- GRPs

Phase 3: Explanatory Report

Water Supply Needs and Strategies

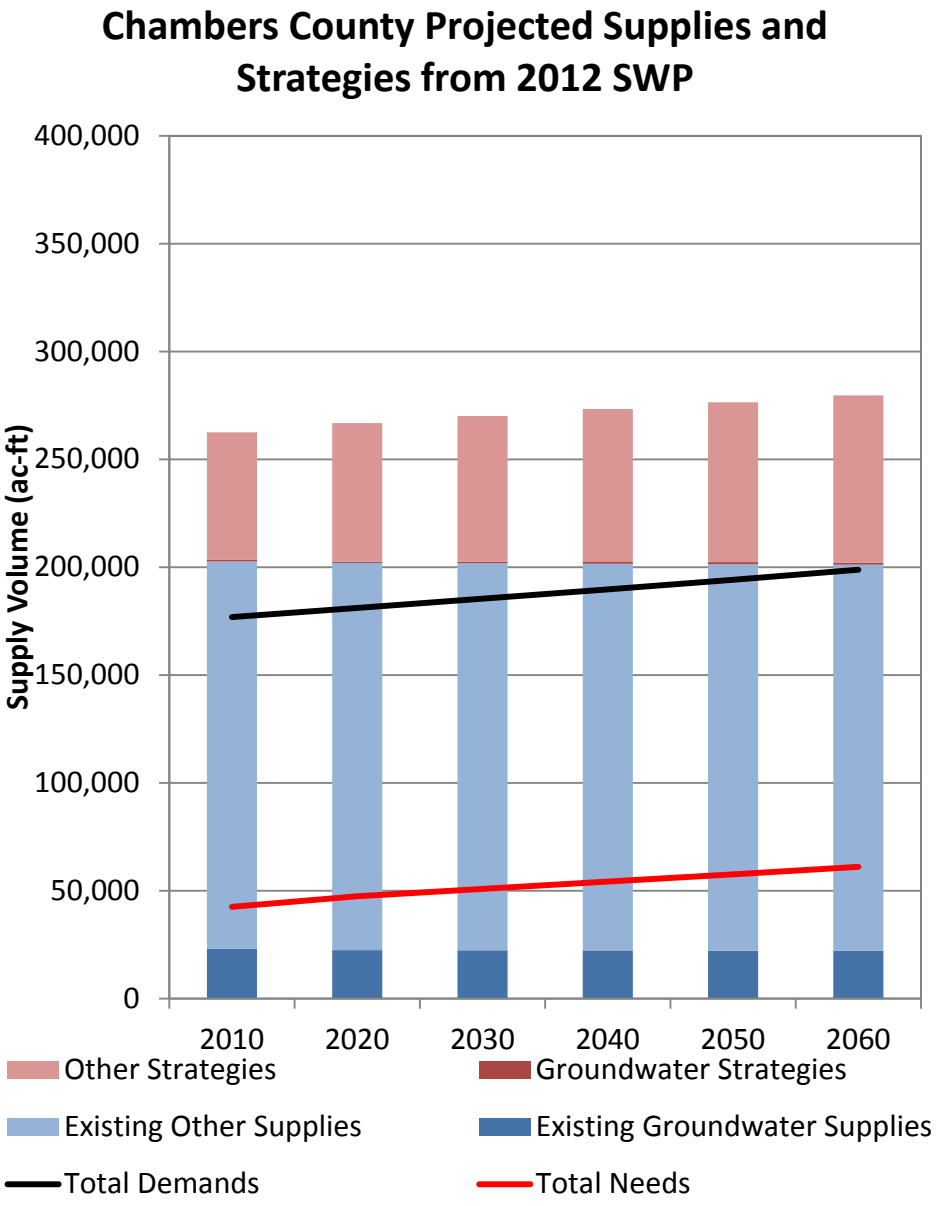


Major Strategies

- Expanded use of groundwater
- Allens Creek Reservoir
- Conservation
- Contract expansions
- Houston indirect reuse
- Supply reallocation
- TRA to Houston contract
- Wastewater reclamation for municipal irrigation
- Wastewater reuse for industry
- GRPs

Phase 3: Explanatory Report

Water Supply Needs and Strategies

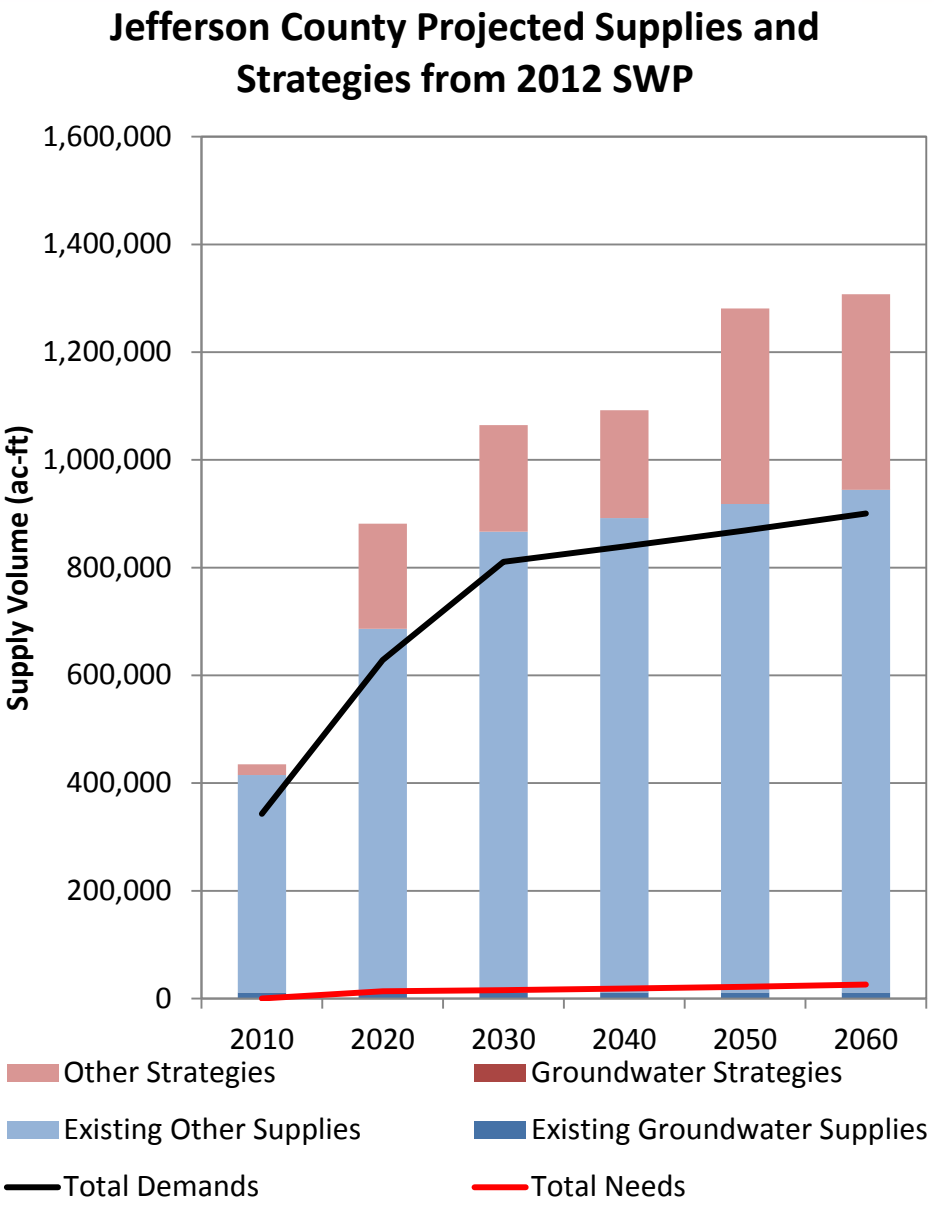


Major Strategies

- Expanded use of groundwater
- CLCND West Chambers system
- Conservation
- New contracts
- Supply reallocation

Phase 3: Explanatory Report

Water Supply Needs and Strategies

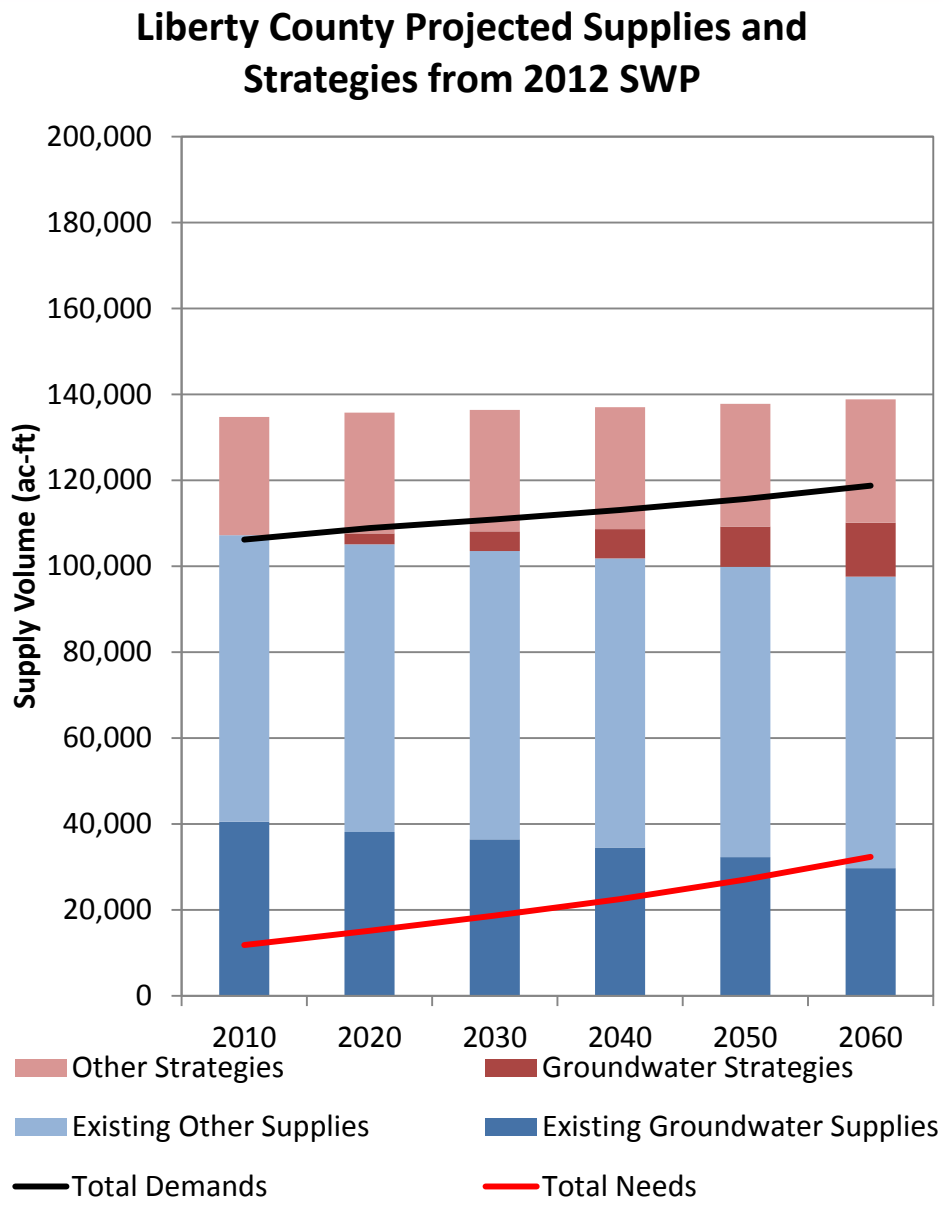


Major Strategies

- Expanded use of groundwater
- Permit amendment for Sam Rayburn
- Purchase water from provider
- Reallocation of flood storage
- Saltwater barrier conjunctive operation
- Wholesale customer conservation

Phase 3: Explanatory Report

Water Supply Needs and Strategies

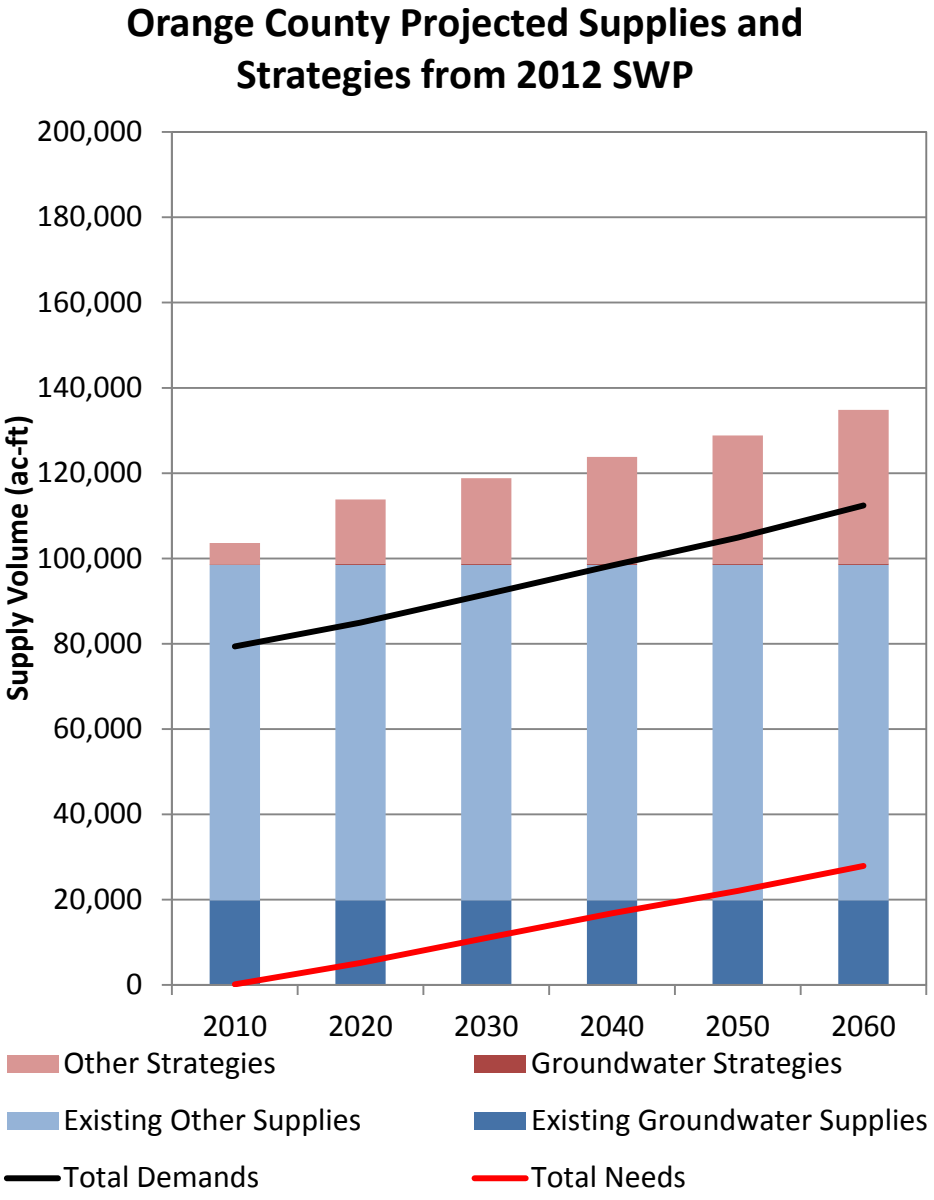


Major Strategies

- Expanded use of groundwater
- Conservation
- Supply reallocation

Phase 3: Explanatory Report

Water Supply Needs and Strategies

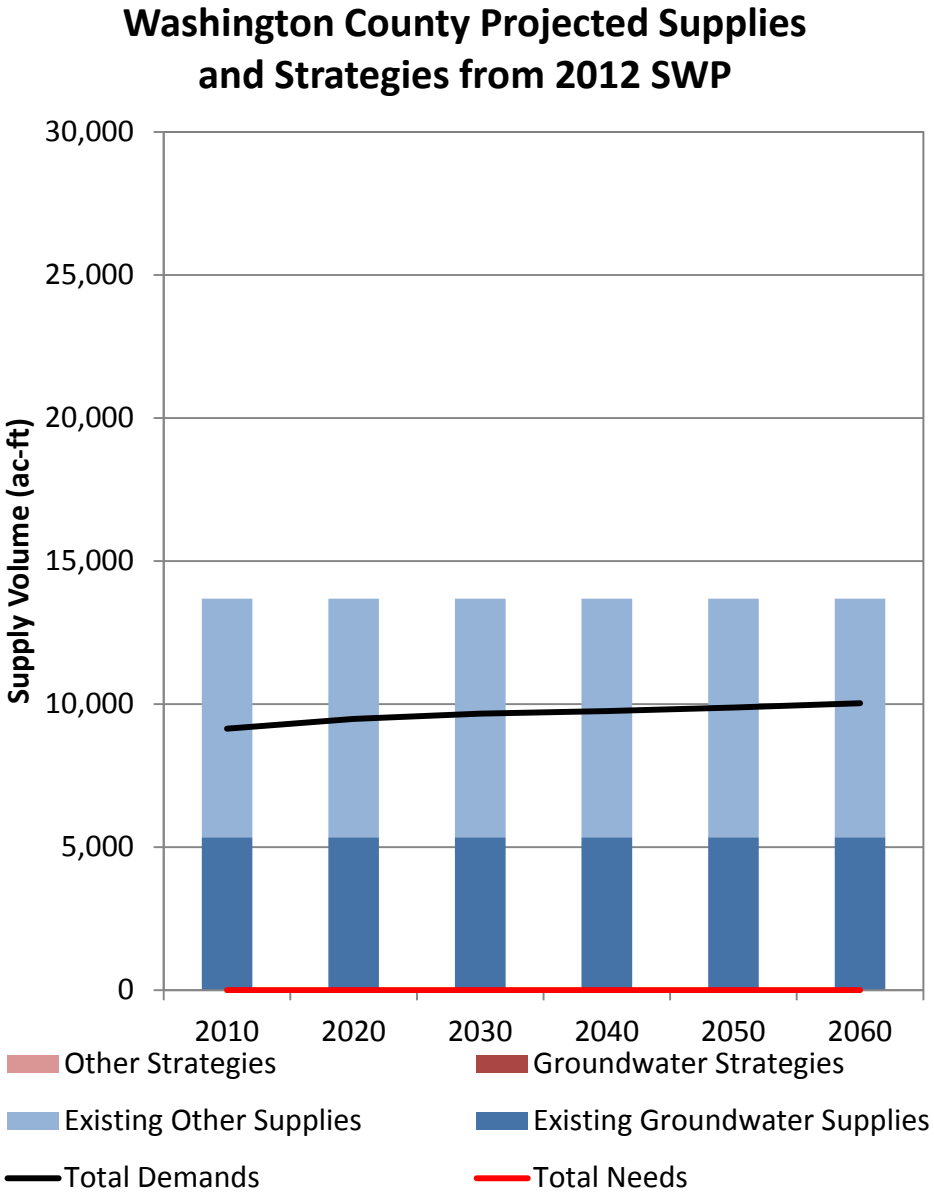


Major Strategies

- Expanded use of groundwater
- Overdrafting
- Purchase water from provider

Phase 3: Explanatory Report

Water Supply Needs and Strategies

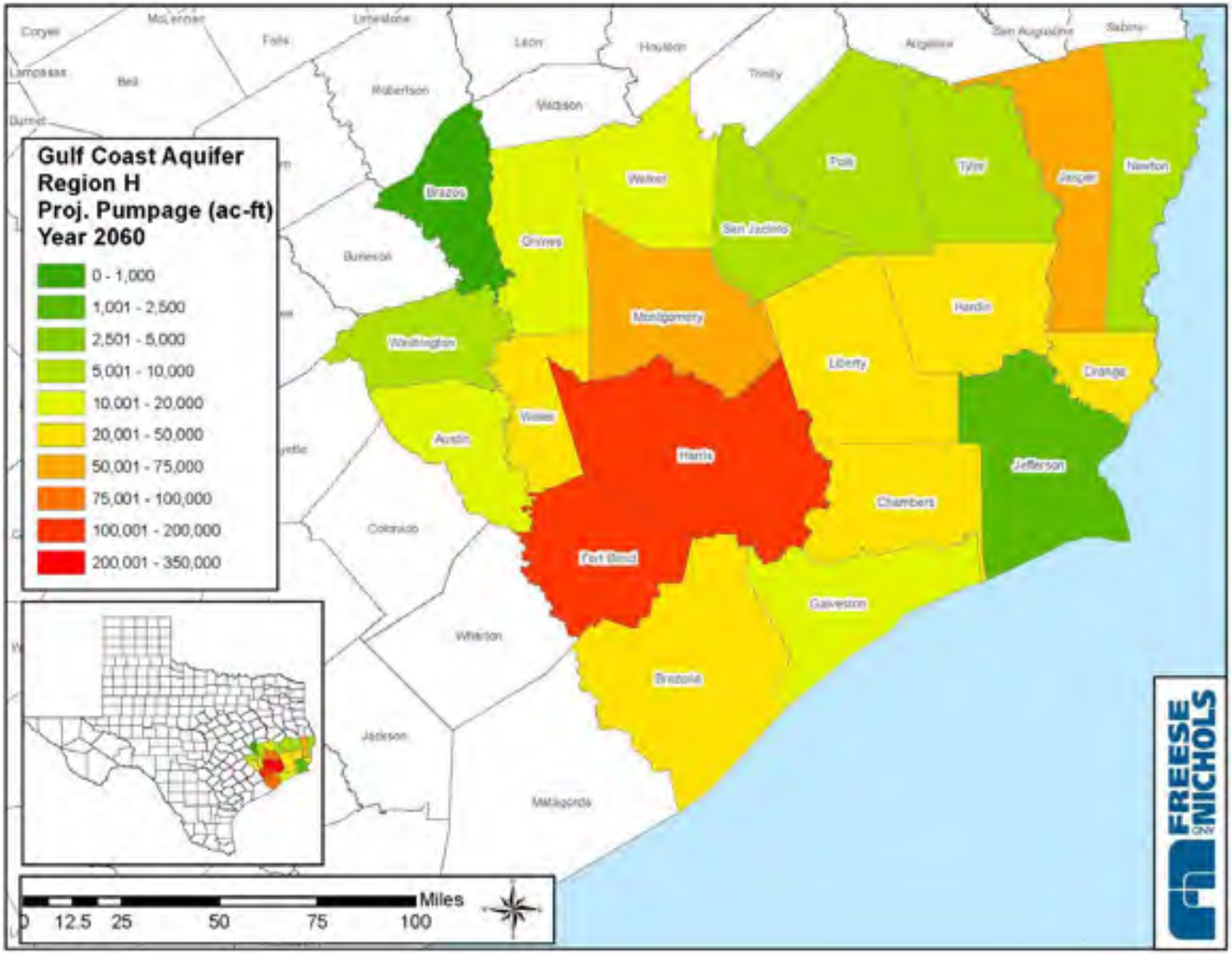


Major Strategies

- None

Phase 3: Explanatory Report

Water Supply Needs and Strategies



Consideration of Water Supply Needs and Water Management Strategies Included in the State Water Plan

County	2012 State Water Plan Needs and Strategies (ac-ft)																							
	2012 State Water Plan Projected Demands						Current Supplies						Needs						Water Management Strategies					
	2010	2020	2030	2040	2050	2060	2010	2020	2030	2040	2050	2060	2010	2020	2030	2040	2050	2060	2010	2020	2030	2040	2050	2060
AUSTIN	16,616	17,179	17,571	17,757	17,863	18,058	16,616	16,440	16,331	16,261	16,228	16,193	0	739	1,240	1,496	1,635	1,865	0	962	1,491	1,761	1,908	2,150
BRAZORIA	448,174	469,308	494,392	520,853	548,263	580,660	314,198	293,474	292,812	292,221	291,719	291,202	150,907	186,760	211,634	238,588	266,405	299,199	164,817	203,768	226,635	252,523	280,159	312,961
BRAZOS	*43,477*	*47,767*	*51,608*	*54,583*	*58,251*	*59,564*	*86,959*	*86,979*	*87,000*	*87,020*	*87,040*	*87,060*	*0*	*0*	*259*	*2,547*	*5,417*	*6,422*	*1,445*	*2,278*	*102,220*	*207,889*	*208,588*	*208,749*
CHAMBERS	176,883	181,120	185,435	189,737	194,119	198,800	202,657	201,973	201,850	201,646	201,412	201,130	42,520	47,412	50,831	54,251	57,612	61,065	59,891	64,828	68,257	71,685	75,056	78,520
FORT BEND	240,394	275,964	319,304	367,722	427,839	497,448	337,890	342,739	317,249	318,771	320,825	321,419	86	11,410	52,608	84,380	123,623	178,948	6,632	29,461	67,587	99,325	135,967	189,347
GALVESTON	103,061	106,679	110,509	113,658	116,855	121,863	164,440	164,596	164,629	164,595	164,559	164,541	16,307	16,466	17,787	18,738	19,884	21,276	16,374	41,817	43,534	44,486	45,634	47,026
GRIMES	17,538	37,650	39,317	40,986	43,168	46,377	25,763	25,755	25,752	25,750	25,753	25,755	0	15,300	16,862	18,497	20,608	23,718	960	17,058	17,791	23,496	23,636	23,846
HARDIN	19,376	20,713	21,416	22,126	22,941	23,705	14,296	14,296	14,296	14,296	14,296	14,271	8,955	9,931	10,540	11,148	11,790	12,317	1,270	1,422	1,422	1,423	1,576	1,577
HARRIS	1,130,740	1,255,987	1,363,515	1,470,305	1,575,123	1,663,105	1,304,458	1,250,335	1,260,704	1,297,813	1,337,286	1,343,683	51,413	194,925	270,301	323,711	375,414	458,509	78,503	217,852	288,712	377,301	433,135	579,144
JASPER	69,903	73,490	76,061	78,166	79,767	79,830	72,835	76,218	78,731	80,928	82,575	82,638	374	470	488	430	403	403	635	636	637	638	639	639
JEFFERSON	342,945	628,270	810,782	839,355	868,899	900,391	414,903	686,525	866,571	892,088	918,150	944,597	0	13,426	15,696	18,464	21,843	25,960	20,000	194,951	197,951	199,951	362,956	362,960
LIBERTY	106,213	108,875	110,898	113,089	115,651	118,751	107,218	105,109	103,549	101,851	99,848	97,594	11,846	15,142	18,687	22,539	27,061	32,363	27,533	30,649	32,839	35,196	37,948	41,248
MONTGOMERY	83,018	110,901	135,888	162,727	198,439	240,475	73,231	67,616	69,198	82,416	79,037	76,277	17,728	47,619	69,513	81,350	120,398	165,162	17,728	48,656	69,961	81,927	120,413	165,254
NEWTON	9,013	17,357	19,812	22,838	26,523	31,004	19,908	19,908	19,908	19,908	19,908	19,908	149	264	2,713	5,734	9,382	13,805	1,100	1,100	16,100	16,500	16,500	16,500
ORANGE	79,374	84,947	91,594	98,343	104,875	112,431	98,484	98,484	98,484	98,484	98,484	98,484	132	5,136	10,989	16,789	22,021	27,894	5,140	15,343	20,343	25,343	30,343	36,343
POLK	7,561	8,498	9,212	9,730	10,260	10,842	11,944	11,933	11,929	11,929	11,938	11,945	208	598	947	1,222	1,494	1,790	208	917	1,227	1,734	1,853	1,993
SAN JACINTO	4,182	4,648	4,999	5,158	5,247	5,296	6,064	6,083	6,099	6,109	6,107	6,003	0	300	533	695	793	869	19	690	1,091	1,158	1,188	1,244
TYLER	3,079	3,406	3,599	3,632	3,603	3,608	5,328	5,328	5,328	5,328	5,328	5,328	0	142	239	251	232	232	0	551	551	551	551	551
WALKER	20,784	20,981	22,088	21,562	21,781	21,959	39,021	36,864	36,944	36,249	36,091	35,780	0	815	1,655	1,973	2,384	2,853	0	884	1,725	2,052	2,464	2,935
WALLER	29,799	31,101	32,578	34,204	36,223	38,595	29,717	29,175	29,638	29,625	28,046	26,240	82	1,926	2,940	4,579	8,177	12,355	82	2,097	3,137	4,802	13,447	15,854
WASHINGTON	9,142	9,483	9,670	9,755	9,878	10,030	13,686	13,686	13,686	13,686	13,686	13,686	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	**2,961,272**	**3,514,324**	**3,930,248**	**4,196,286**	**4,485,568**	**4,782,792**	**3,359,616**	**3,553,516**	**3,720,688**	**3,796,974**	**3,858,316**	**3,883,734**	**300,707**	**568,781**	**756,462**	**907,382**	**1,096,576**	**1,347,005**	**402,337**	**875,920**	**1,163,211**	**1,449,741**	**1,793,961**	**2,088,841**

*Values for Brazos County include the portions of the county outside of GMA 14.

County	Water Management Strategy	Water Management Strategy Supply Volume (ac-ft)					
		2010	2020	2030	2040	2050	2060
Austin	Expanded Use of Groundwater	-	739	1,240	1,496	1,635	1,865
	Subtotal Groundwater	*-*	*739*	*1,240*	*1,496*	*1,635*	*1,865*
	Municipal Conservation	-	223	251	265	273	285
	Subtotal Other Supplies	*-*	*223*	*251*	*265*	*273*	*285*
	Total Austin County	***-***	***962***	***1,491***	***1,761***	***1,908***	***2,150***
Brazoria	Expanded Use of Groundwater	-	4,049	12,988	13,515	15,658	16,209
	Interim Strategies	24,916	-	-	-	-	-
	New Groundwater Wells For Livestock	-	27	27	27	27	27
	Subtotal Groundwater	*24,916*	*4,076*	*13,015*	*13,542*	*15,685*	*16,236*
	Allens Creek Lake/Reservoir	-	45,277	41,779	66,665	58,092	66,196
	BRA System Operations Permit	-	3,010	3,010	3,010	3,010	3,010
	Brazoria Co. Interruptible Supplies For Irr.	98,189	86,759	64,000	64,000	64,000	64,000
	Brazoria OCR	-	-	-	-	-	24,000
	Contract Expansions	7,750	7,750	7,750	7,750	7,750	7,750
	Dow Offchannel Reservoir	-	21,800	21,800	21,800	21,800	21,800
	Freeport Desalination Plant	-	-	-	-	33,600	33,600
	GCWA Offchannel Reservoir	-	-	39,500	39,500	39,500	39,500
	Irrigation Conservation	18,792	18,792	18,792	18,792	18,792	18,792
	Municipal Conservation	1,476	2,610	2,978	3,249	3,567	3,918
	Reallocate Existing Supply	13,694	13,694	13,895	13,988	14,019	13,694
	Wastewater Reclamation For Mun. Irrigation	-	-	116	227	344	465
	Subtotal Other Supplies	*139,901*	*199,692*	*213,620*	*238,981*	*264,474*	*296,725*
	Total Brazoria County	***164,817***	***203,768***	***226,635***	***252,523***	***280,159***	***312,961***
Brazos	Additional Carrizo Aquifer Development (Includes Overdrafting)	-	-	-	3,000	3,000	3,000
	Brazos Groundwater Project To DWU	-	-	-	100,000	100,000	100,000
	Brazos Groundwater Project To NTMWD	-	-	100,000	100,000	100,000	100,000
	Purchase Water From City Of Bryan	900	900	900	900	900	900
	Subtotal Groundwater	*900*	*900*	*100,900*	*203,900*	*203,900*	*203,900*
	BRA System Operations Permit	-	-	-	2,500	2,500	2,500
	Municipal Water Conservation	545	1,378	1,320	1,177	1,271	1,432
	Wastewater Reuse	-	-	-	312	917	917
	Subtotal Other Supplies	*545*	*1,378*	*1,320*	*3,989*	*4,688*	*4,849*
	Total Brazos County	***1,445***	***2,278***	***102,220***	***207,889***	***208,588***	***208,749***
Chambers	Expanded Use of Groundwater	-	577	681	796	905	1,010
	Interim Strategies	903	-	-	-	-	-
	Subtotal Groundwater	*903*	*577*	*681*	*796*	*905*	*1,010*
	CLCND West Chambers System	-	1,691	1,978	2,235	2,511	2,804
	Irrigation Conservation	24,018	24,018	24,018	24,018	24,018	24,018
	Municipal Conservation	137	195	219	239	263	291
	New Contract From Existing Supply	13,823	17,083	19,972	22,888	25,732	28,672
	Reallocate Existing Supply	21,010	21,264	21,389	21,509	21,627	21,725
	Subtotal Other Supplies	*58,988*	*64,251*	*67,576*	*70,889*	*74,151*	*77,510*
	Total Chambers County	***59,891***	***64,828***	***68,257***	***71,685***	***75,056***	***78,520***
Fort Bend	Expanded Use of Groundwater	-	6,886	3,423	3,813	4,378	5,052
	Subtotal Groundwater	*-*	*6,886*	*3,423*	*3,813*	*4,378*	*5,052*
	Allens Creek Lake/Reservoir	-	-	-	6,605	25,864	16,145
	BRA System Operations Permit	-	3,611	15,860	22,340	22,340	22,340
	Contract Expansions	-	367	1,295	1,226	1,225	1,016
	Fort Bend MUD 25 Groundwater Reduction Plan	-	589	589	589	589	589
	Fort Bend OCR	-	-	-	-	90	45,943
	Fulshear Reuse	-	287	430	430	430	430
	Industrial Conservation	-	558	558	558	558	558
	Irrigation Conservation	5,197	5,197	5,197	5,197	5,197	5,197
	Missouri City Groundwater Reduction Plan	-	4,401	4,401	4,401	4,401	4,401
	Municipal Conservation	1,435	7,077	10,277	12,253	14,678	17,497
	NFBWA Groundwater Reduction Plan	-	-	-	-	-	-
	Reallocate Existing Supply	-	-	4,687	4,510	3,720	13,762
	Sugar Land Groundwater Reduction Plan	-	488	4,921	4,835	4,915	4,961
	TRA To Houston Contract	-	-	13,813	27,824	39,179	39,179
	Wastewater Reclamation For Mun. Irrigation	-	-	2,136	4,744	8,403	12,277
	WHCRWA Groundwater Reduction Plan	-	-	-	-	-	-
	Subtotal Other Supplies	*6,632*	*22,575*	*64,164*	*95,512*	*131,589*	*184,295*
	Total Fort Bend County	***6,632***	***29,461***	***67,587***	***99,325***	***135,967***	***189,347***
Galveston	Expanded Use of Groundwater	-	811	1,352	1,350	1,352	1,352
	Interim Strategies	6,410	-	-	-	-	-
	New Groundwater Wells For Livestock	-	14	14	14	14	14
	Subtotal Groundwater	*6,410*	*825*	*1,366*	*1,364*	*1,366*	*1,366*
	Allens Creek Lake/Reservoir	-	12,101	13,234	14,175	15,310	16,687
	Contract Expansions	-	25,630	25,630	25,630	25,630	25,630
	Interruptible Supplies For Irr.	6,788	-	-	-	-	-
	Irrigation Conservation	2,392	2,392	2,392	2,392	2,392	2,392
	Municipal Conservation	768	846	886	896	903	914
	New Contract From Existing Supply	16	23	26	29	33	37
	Subtotal Other Supplies	*9,964*	*40,992*	*42,168*	*43,122*	*44,268*	*45,660*
	Total Galveston County	***16,374***	***41,817***	***43,534***	***44,486***	***45,634***	***47,026***
Grimes	Additional Gulf Coast Aquifer Development	-	-	-	5,600	5,600	5,600
	Purchase Water From City Of Bryan	600	600	600	600	600	600
	Subtotal Groundwater	*600*	*600*	*600*	*6,200*	*6,200*	*6,200*
	Raise Level Of Gibbons Creek Reservoir	-	3,870	3,870	3,870	3,870	3,870
	Steam-Electric Conservation	360	1,588	2,321	2,426	2,566	2,776
	Wastewater Reuse	-	11,000	11,000	11,000	11,000	11,000
	Subtotal Other Supplies	*360*	*16,458*	*17,191*	*17,296*	*17,436*	*17,646*
	Total Grimes County	***960***	***17,058***	***17,791***	***23,496***	***23,636***	***23,846***
Hardin	New Wells - Gulf Coast Aquifer	114	114	114	115	115	116
	Overdraft Gulf Coast Aquifer	154	306	306	306	459	459
	Subtotal Groundwater	*268*	*420*	*420*	*421*	*574*	*575*
	Purchase Water From Provider (2)	1,002	1,002	1,002	1,002	1,002	1,002
	Subtotal Other Supplies	*1,002*	*1,002*	*1,002*	*1,002*	*1,002*	*1,002*
	Total Hardin County	***1,270***	***1,422***	***1,422***	***1,423***	***1,576***	***1,577***

Consideration of Water Supply Needs and Water Management Strategies Included in the State Water Plan

County	Water Management Strategy	Water Management Strategy Supply Volume (ac-ft)					
		2010	2020	2030	2040	2050	2060
Harris	Expanded Use of Groundwater	-	15,481	27,659	27,693	27,727	27,560
	Interim Strategies	15	-	-	-	-	-
	Subtotal Groundwater	*15*	*15,481*	*27,659*	*27,693*	*27,727*	*27,560*
	Allens Creek Lake/Reservoir	-	15	83	336	384	622
	COH Groundwater Reduction Plan	-	-	-	-	-	-
	Contract Expansions	-	108,852	66,039	51,840	42,538	31,971
	Houston Indirect Reuse	-	-	-	66,420	114,679	128,801
	Missouri City Groundwater Reduction Plan	-	386	386	386	386	386
	Municipal Conservation	37,292	46,836	51,902	56,748	61,656	66,947
	New Contract From Existing Supply	23,008	31,264	38,732	54,777	54,805	54,849
	NHCRWA Groundwater Reduction Plan	-	-	-	-	-	-
	NHCRWA Indirect Reuse	-	-	-	7,300	16,300	16,300
	Reallocate Existing Supply	18,253	15,276	7,308	19,232	30,220	96,881
	TRA to Houston Contract	-	-	93,744	86,519	75,164	75,164
	Wastewater Reclamation For Mun. Irrigation	-	-	3,268	6,616	10,027	13,431
	Wastewater Reuse For Industry	-	-	-	-	-	67,200
	WHCRWA Groundwater Reduction Plan	(65)	(258)	(409)	(566)	(751)	(968)
	Subtotal Other Supplies	*78,488*	*202,371*	*261,053*	*349,608*	*405,408*	*551,584*
	Total Harris County	***78,503***	***217,852***	***288,712***	***377,301***	***433,135***	***579,144***
Jasper	New Wells - Gulf Coast Aquifer	82	82	82	82	82	82
	Overdraft Gulf Coast Aquifer	550	550	550	550	550	550
	Subtotal Groundwater	*632*	*632*	*632*	*632*	*632*	*632*
	Municipal Conservation	3	4	5	6	7	7
	Subtotal Other Supplies	*3*	*4*	*5*	*6*	*7*	*7*
	Total Jasper County	***635***	***636***	***637***	***638***	***639***	***639***
Jefferson	New Wells - Gulf Coast Aquifer	-	-	-	-	5	9
	Subtotal Groundwater	*-*	*-*	*-*	*-*	*5*	*9*
	Permit Ammendment For Sam Rayburn	-	28,000	28,000	28,000	28,000	28,000
	Purchase Water From Provider (1)	-	25,951	25,951	25,951	25,951	25,951
	Purchase Water From Provider (2)	-	-	-	-	36,000	36,000
	Reallocation Of Flood Storage (Rayburn)	-	-	-	-	122,000	122,000
	Saltwater Barrier Conjunctive Operation With Rayburn/Steinhagen	-	111,000	111,000	111,000	111,000	111,000
	Wholesale Customer Conservation	20,000	30,000	33,000	35,000	40,000	40,000
	Subtotal Other Supplies	*20,000*	*194,951*	*197,951*	*199,951*	*362,951*	*362,951*
	Total Jefferson County	***20,000***	***194,951***	***197,951***	***199,951***	***362,956***	***362,960***
Liberty	Expanded Use of Groundwater	-	2,537	4,590	6,809	9,399	12,544
	Subtotal Groundwater	*-*	*2,537*	*4,590*	*6,809*	*9,399*	*12,544*
	Irrigation Conservation	20,876	20,876	20,876	20,876	20,876	20,876
	Municipal Conservation	-	539	641	744	868	995
	Reallocate Existing Supply	6,657	6,697	6,732	6,767	6,805	6,833
	Subtotal Other Supplies	*27,533*	*28,112*	*28,249*	*28,387*	*28,549*	*28,704*
	Total Liberty County	***27,533***	***30,649***	***32,839***	***35,196***	***37,948***	***41,248***
Montgomery	Expanded Use of Groundwater	-	5,615	4,471	5,614	9,034	11,820
	Interim Strategies	13,268	-	-	-	-	-
	MUD 8 And 9 Reuse	-	657	816	1,120	1,120	1,120
	Subtotal Groundwater	*13,268*	*6,272*	*5,287*	*6,734*	*10,154*	*12,940*
	Municipal Conservation	4,460	6,007	7,384	8,838	10,795	13,089
	SJRA WRAP	-	36,377	55,538	54,582	53,581	52,534
	TRA to SJRA Contract	-	-	-	7,935	39,096	76,476
	Wastewater Reclamation For Mun. Irrigation	-	-	1,752	3,838	6,787	10,215
	Subtotal Other Supplies	*4,460*	*42,384*	*64,674*	*75,193*	*110,259*	*152,314*
	Total Montgomery County	***17,728***	***48,656***	***69,961***	***81,927***	***120,413***	***165,254***
Newton	New Wells - Gulf Coast Aquifer	400	400	400	800	800	800
	Subtotal Groundwater	*400*	*400*	*400*	*800*	*800*	*800*
	Purchase Water From Provider (2)	700	700	15,700	15,700	15,700	15,700
	Subtotal Other Supplies	*700*	*700*	*15,700*	*15,700*	*15,700*	*15,700*
	Total Newton County	***1,100***	***1,100***	***16,100***	***16,500***	***16,500***	***16,500***
Orange	New Wells - Gulf Coast Aquifer	-	203	203	203	203	203
	Overdraft Gulf Coast Aquifer	140	140	140	140	140	140
	Subtotal Groundwater	*140*	*343*	*343*	*343*	*343*	*343*
	Purchase Water From Provider (1)	5,000	15,000	20,000	25,000	25,000	28,000
	Purchase Water From Provider (2)	-	-	-	-	5,000	8,000
	Subtotal Other Supplies	*5,000*	*15,000*	*20,000*	*25,000*	*30,000*	*36,000*
	Total Orange County	***5,140***	***15,343***	***20,343***	***25,343***	***30,343***	***36,343***
Polk	Expanded Use of Groundwater	-	117	205	272	384	513
	New Wells - Gulf Coast Aquifer	208	642	849	1,282	1,282	1,282
	Subtotal Groundwater	*208*	*759*	*1,054*	*1,554*	*1,666*	*1,795*
	Municipal Conservation	-	158	173	180	187	198
	Subtotal Other Supplies	*-*	*158*	*173*	*180*	*187*	*198*
	Total Polk County	***208***	***917***	***1,227***	***1,734***	***1,853***	***1,993***
San Jacinto	Expanded Use of Groundwater	-	542	928	984	1,007	1,060
	Subtotal Groundwater	*-*	*542*	*928*	*984*	*1,007*	*1,060*
	Municipal Conservation	19	148	163	174	181	184
	Subtotal Other Supplies	*19*	*148*	*163*	*174*	*181*	*184*
	Total San Jacinto County	***19***	***690***	***1,091***	***1,158***	***1,188***	***1,244***
Tyler	New Wells - Gulf Coast Aquifer	-	551	551	551	551	551
	Subtotal Groundwater	*-*	*551*	*551*	*551*	*551*	*551*
	Subtotal Other Supplies	*-*	*-*	*-*	*-*	*-*	*-*
	Total Tyler County	***-***	***551***	***551***	***551***	***551***	***551***
Walker	Expanded Use of Groundwater	-	816	1,651	1,963	2,374	2,843
	Subtotal Groundwater	*-*	*816*	*1,651*	*1,963*	*2,374*	*2,843*
	Municipal Conservation	-	68	74	89	90	92
	Subtotal Other Supplies	*-*	*68*	*74*	*89*	*90*	*92*
	Total Walker County	***-***	***884***	***1,725***	***2,052***	***2,464***	***2,935***
Waller	Expanded Use of Groundwater	-	1,447	2,231	3,644	5,382	7,431
	Subtotal Groundwater	*-*	*1,447*	*2,231*	*3,644*	*5,382*	*7,431*
	Irrigation Conservation	-	-	-	-	6,606	6,606
	Municipal Conservation	17	392	497	592	708	849
	WHCRWA Groundwater Reduction Plan	65	258	409	566	751	968
	Subtotal Other Supplies	*82*	*650*	*906*	*1,158*	*8,065*	*8,423*
	Total Waller County	***82***	***2,097***	***3,137***	***4,802***	***13,447***	***15,854***
Washington	No Strategies	-	-	-	-	-	-
	Subtotal Groundwater	*-*	*-*	*-*	*-*	*-*	*-*
	Subtotal Other Supplies	*-*	*-*	*-*	*-*	*-*	*-*
	Total Washington County	***-***	***-***	***-***	***-***	***-***	***-***

Consideration of Water Supply Needs and Water Management Strategies Included in the State Water Plan

County	Water Management Strategy	Water Management Strategy Supply Volume (ac-ft)					
		2010	2020	2030	2040	2050	2060
GMA 14	Total Groundwater	48,660	44,803	166,971	283,239	294,683	304,712
	Total Other Supplies	353,677	831,117	996,240	1,166,502	1,499,278	1,784,129
	Total Strategies	402,337	875,920	1,163,211	1,449,741	1,793,961	2,088,841

Appendix J

Presentation materials related to consideration of hydrological conditions

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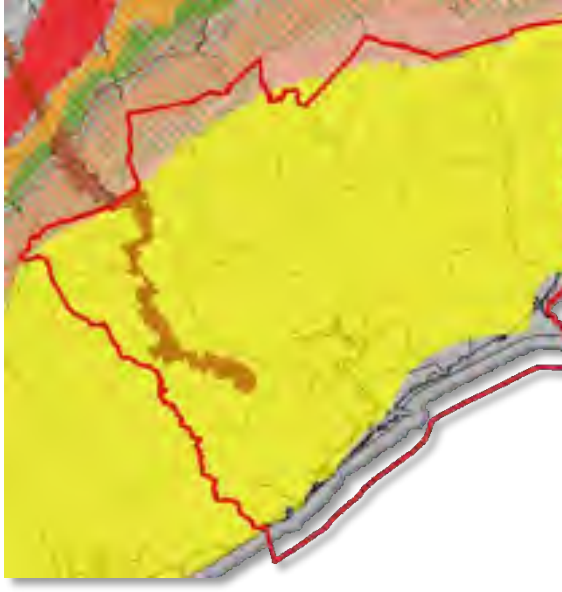


Explanatory Report

HYDROLOGICAL CONDITIONS

June 24, 2014

Phase 3: Explanatory Report

Hydrological Conditions

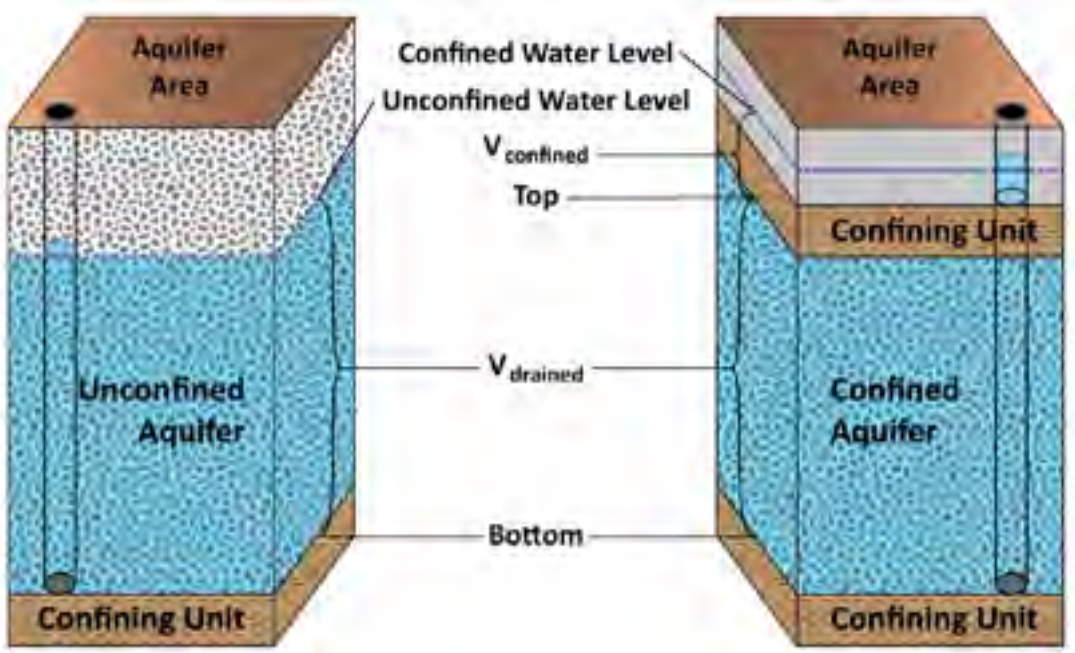
- Hydrological Conditions
  - *"hydrological conditions, including for each aquifer in the management area the total estimated recoverable storage as provided by the executive administrator, and the average annual recharge, inflows, and discharge;" TWC 36.108 (d) (3)*
  - Location
  - Water Surface
  - Long-Term Trends
  - Water Budget
    - Recharge
    - Discharge to Surface
    - Inflow/Outflow
  - Total Estimated Recoverable Storage (from TWDB)

Phase 3: Explanatory Report

Hydrological Conditions

- Total Estimated Recoverable Storage

  – TWDB assumed between 25 and 75 percent of total volume could be removed by pumping



Phase 3: Explanatory Report

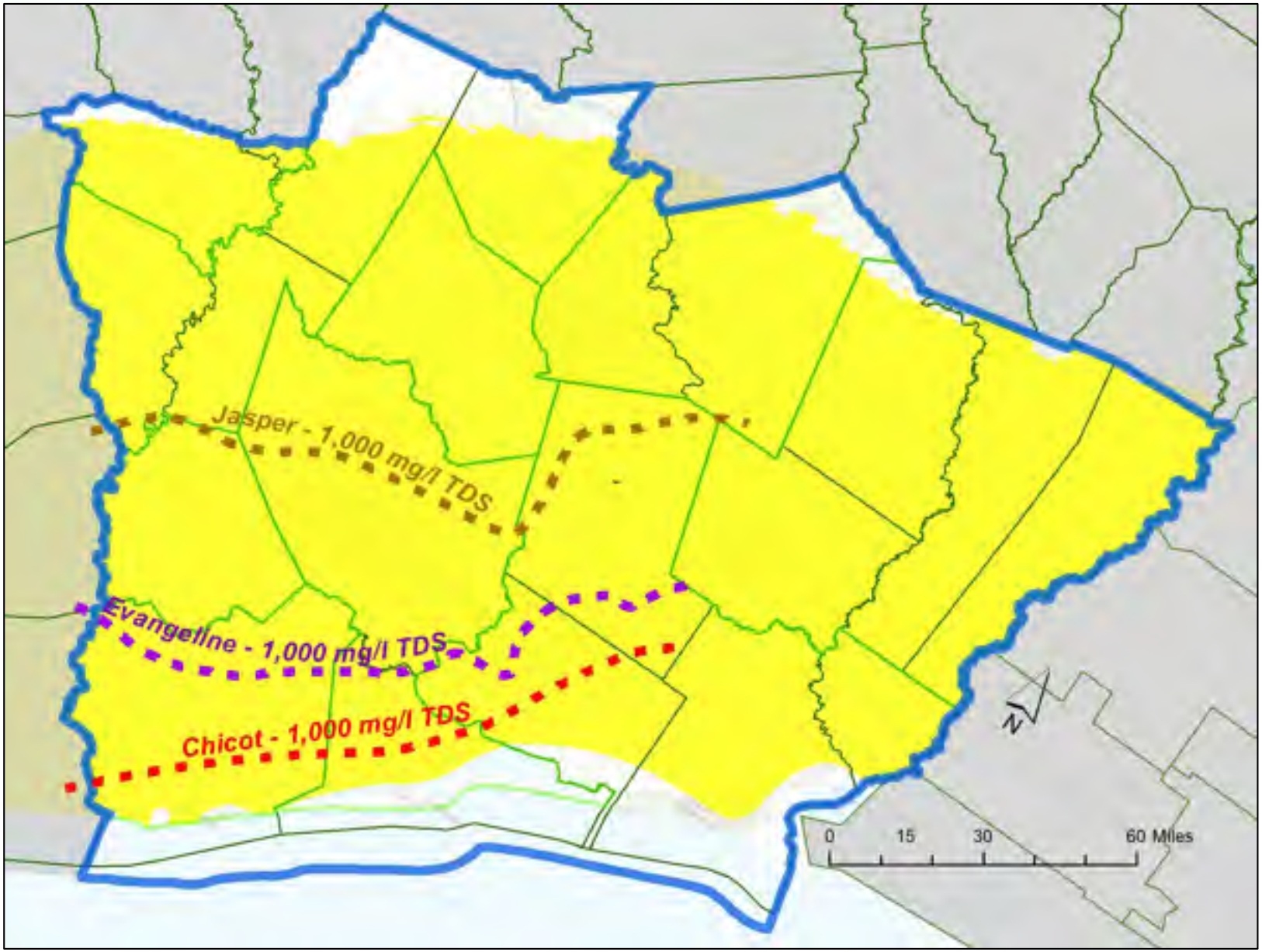
Hydrological Conditions

- Gulf Coast Aquifer
  - *Hydrogeology and Simulation of Groundwater Flow and Land-Surface Subsidence in the Northern Part of the Gulf Coast Aquifer* (USGS, Rev. 2012)
  - Northern Gulf Coast GAM Run
  - TWDB GAM Task 13-037

Phase 3: Explanatory Report

Hydrological Conditions

Gulf Coast Aquifer
Location Map



Phase 3: Explanatory Report

Hydrological Conditions

Gulf Coast Aquifer Stratigraphy

Geologic (stratigraphic) units			Hydrogeologic units	Model layer
System	Series	Formation	Aquifers and confining units	
Quaternary	Holocene	Alluvium	Chicot aquifer	1
	Pleistocene	Beaumont Formation		
		Montgomery Formation		
		Bentley Formation		
		Willis Formation		
Tertiary	Pliocene	Goliad Sand	Evangeline aquifer	2
	Miocene	Fleming Formation	Burkeville confining unit	3
		Oakville Sandstone	Jasper aquifer	4
		Catahoula Sandstone		
		Anahuac Formation[1]		
		Frio Formation[1]	Catahoula confining system	

Phase 3: Explanatory Report

Hydrological Conditions

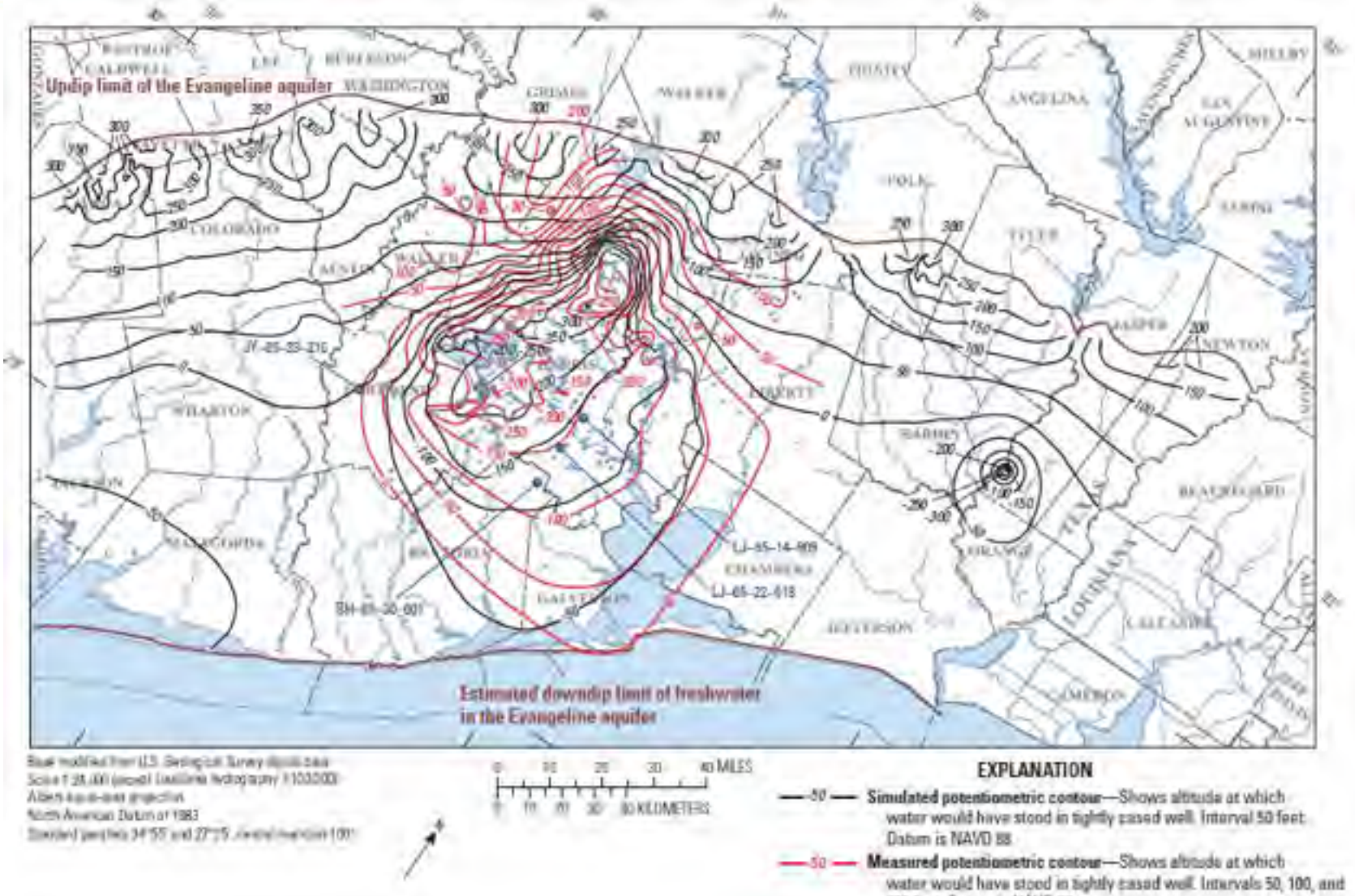
Gulf Coast Aquifer
Measured Water Surface

Chicot Aquifer
Simulated and Measured Contours

Phase 3: Explanatory Report

Hydrological Conditions

Gulf Coast Aquifer
Measured Water Surface

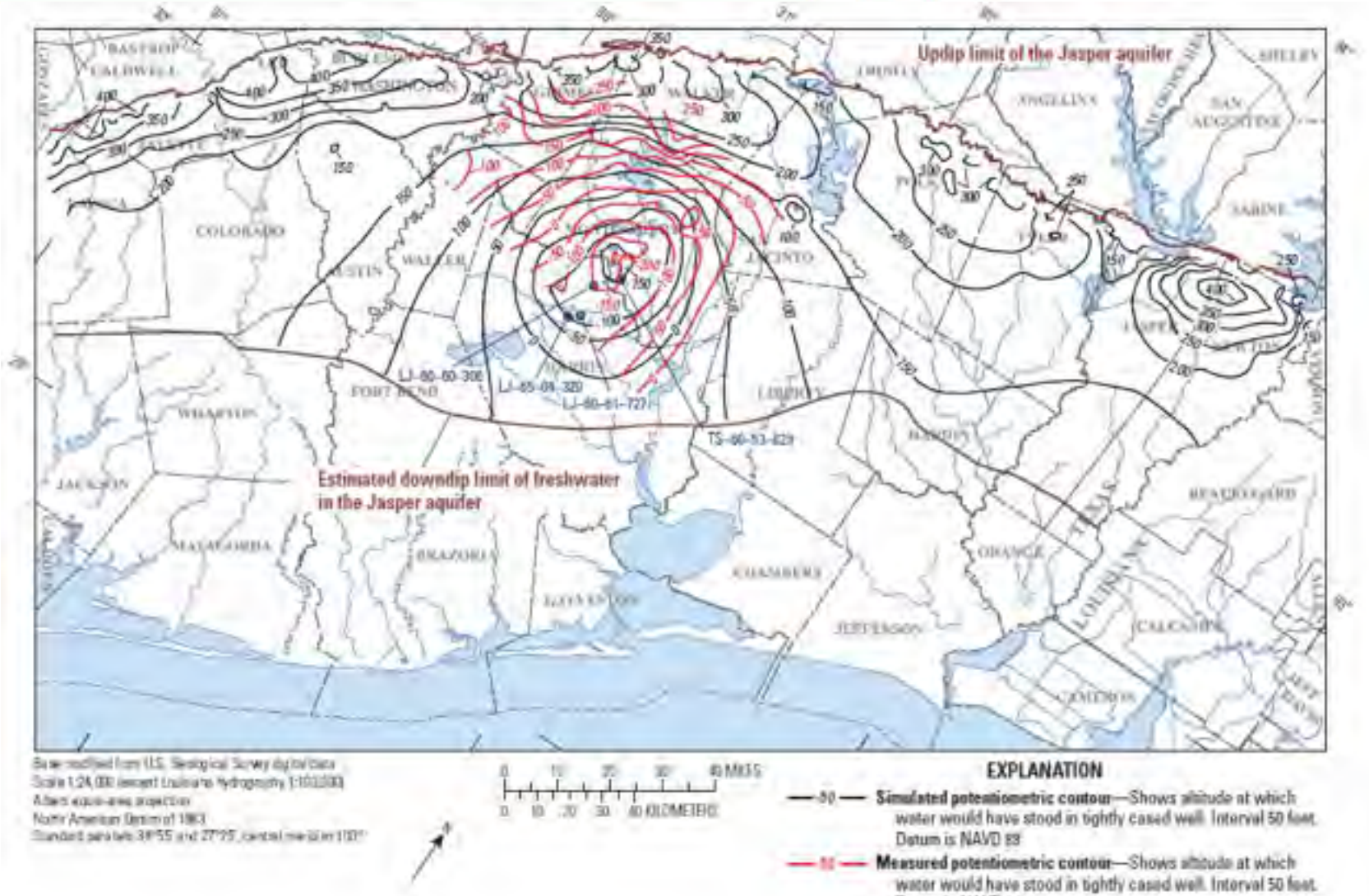


Evangeline Aquifer
Simulated and Measured Contours

Phase 3: Explanatory Report

Hydrological Conditions

Gulf Coast Aquifer
Measured Water Surface

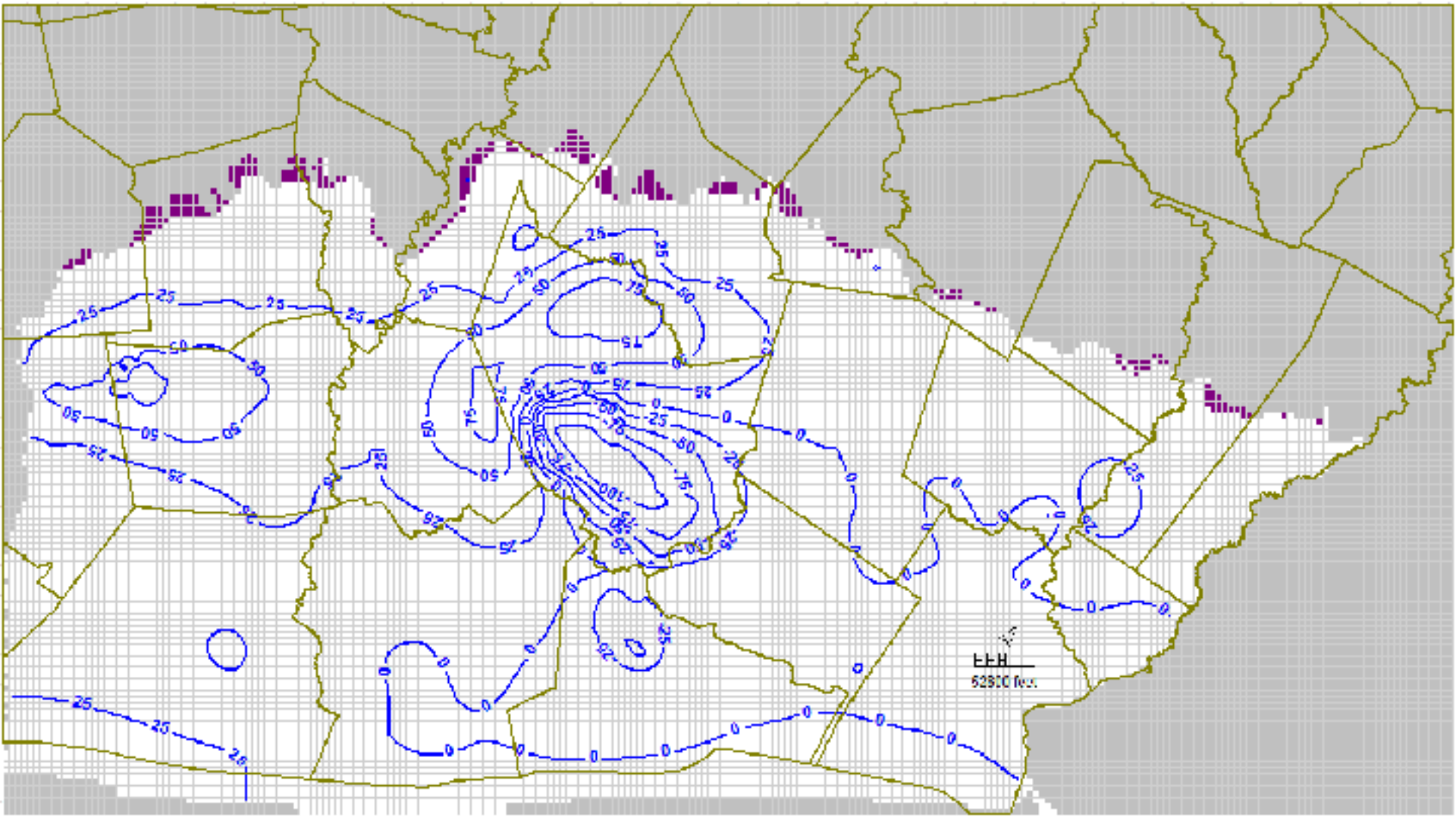


Jasper Aquifer
Simulated and Measured Contours

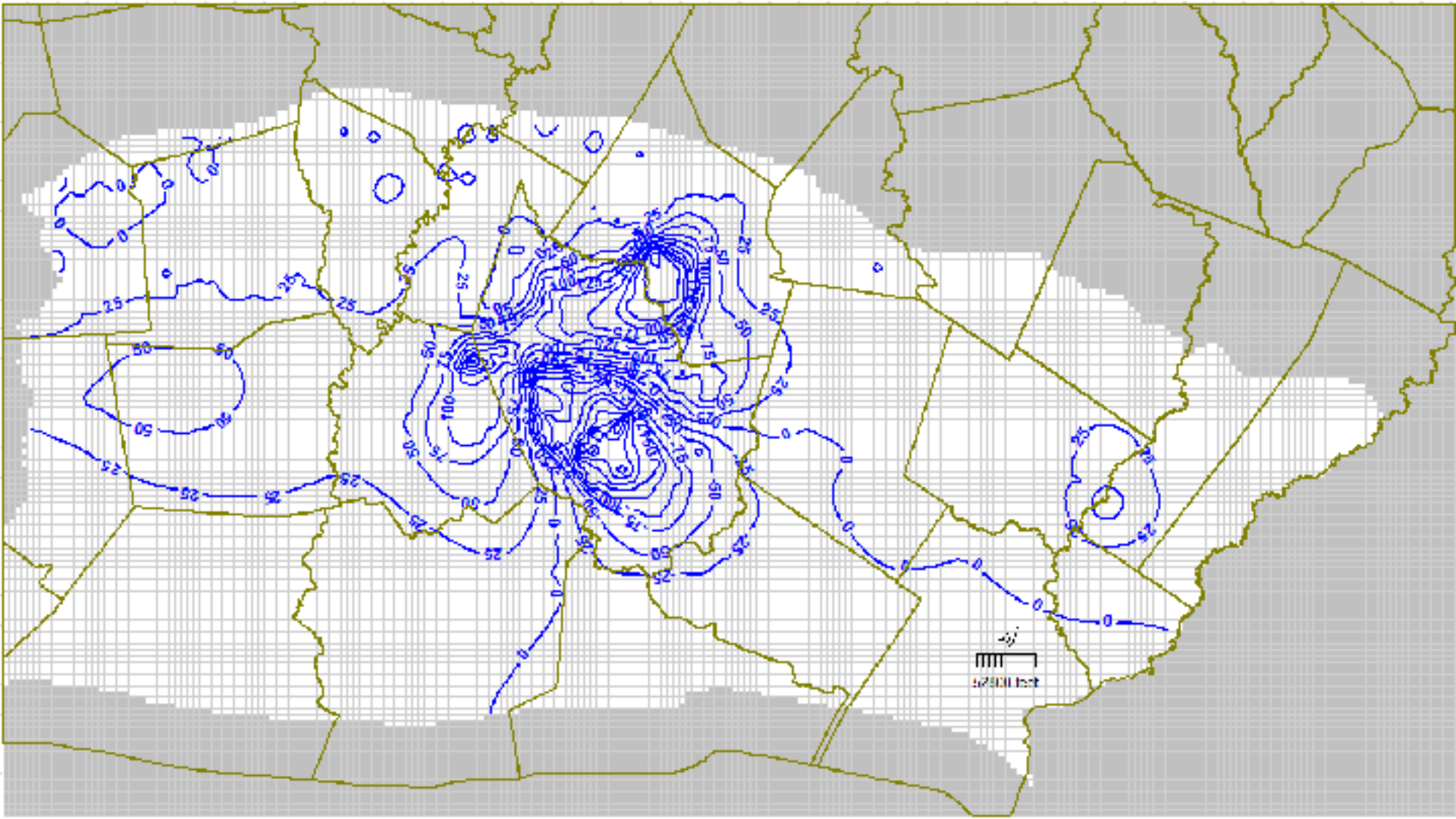
Phase 3: Explanatory Report

Hydrological Conditions

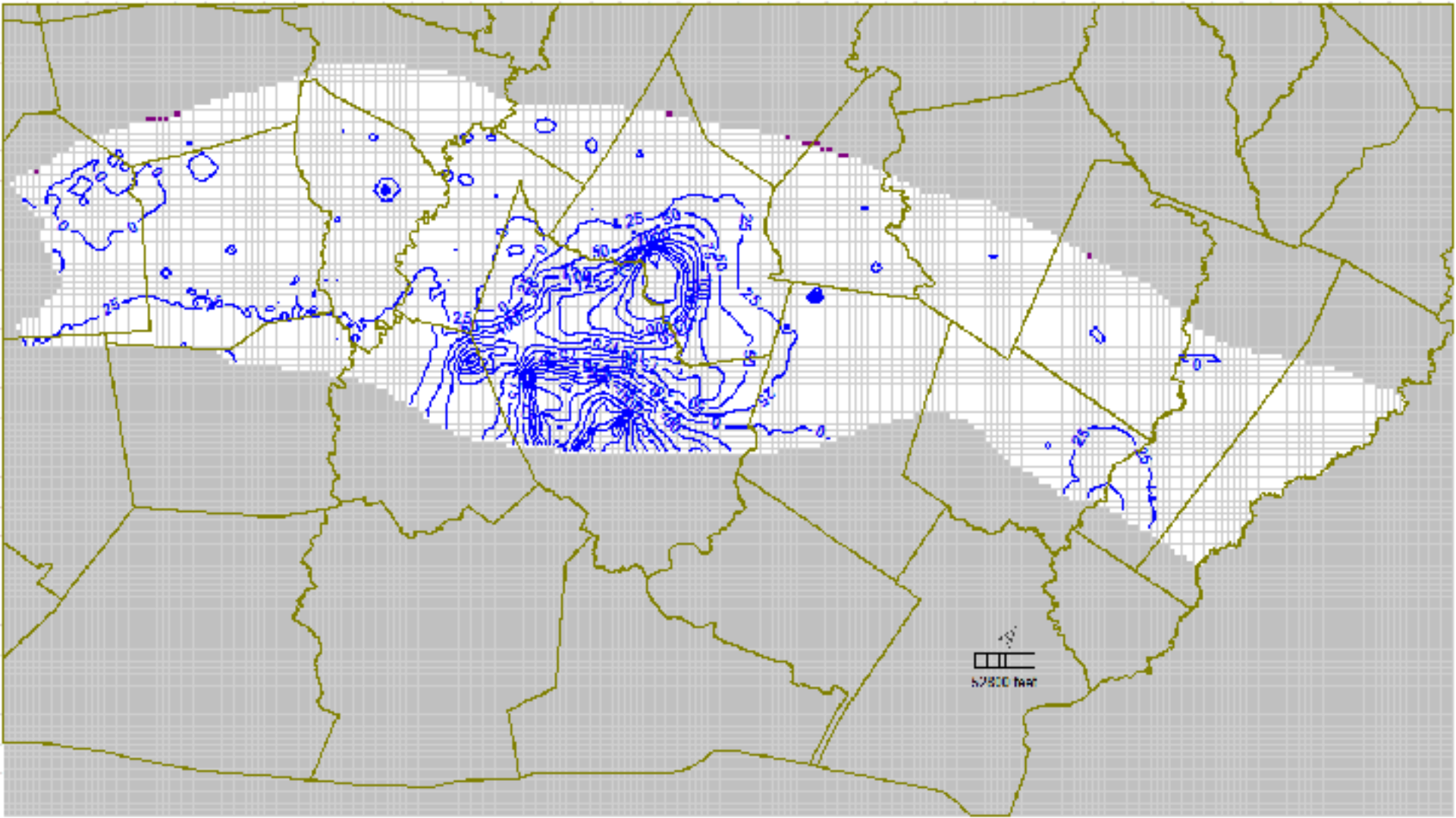
- 1980-2009 Drawdown – Chicot Aquifer



- 1980-2009 Drawdown – Evangeline Aquifer



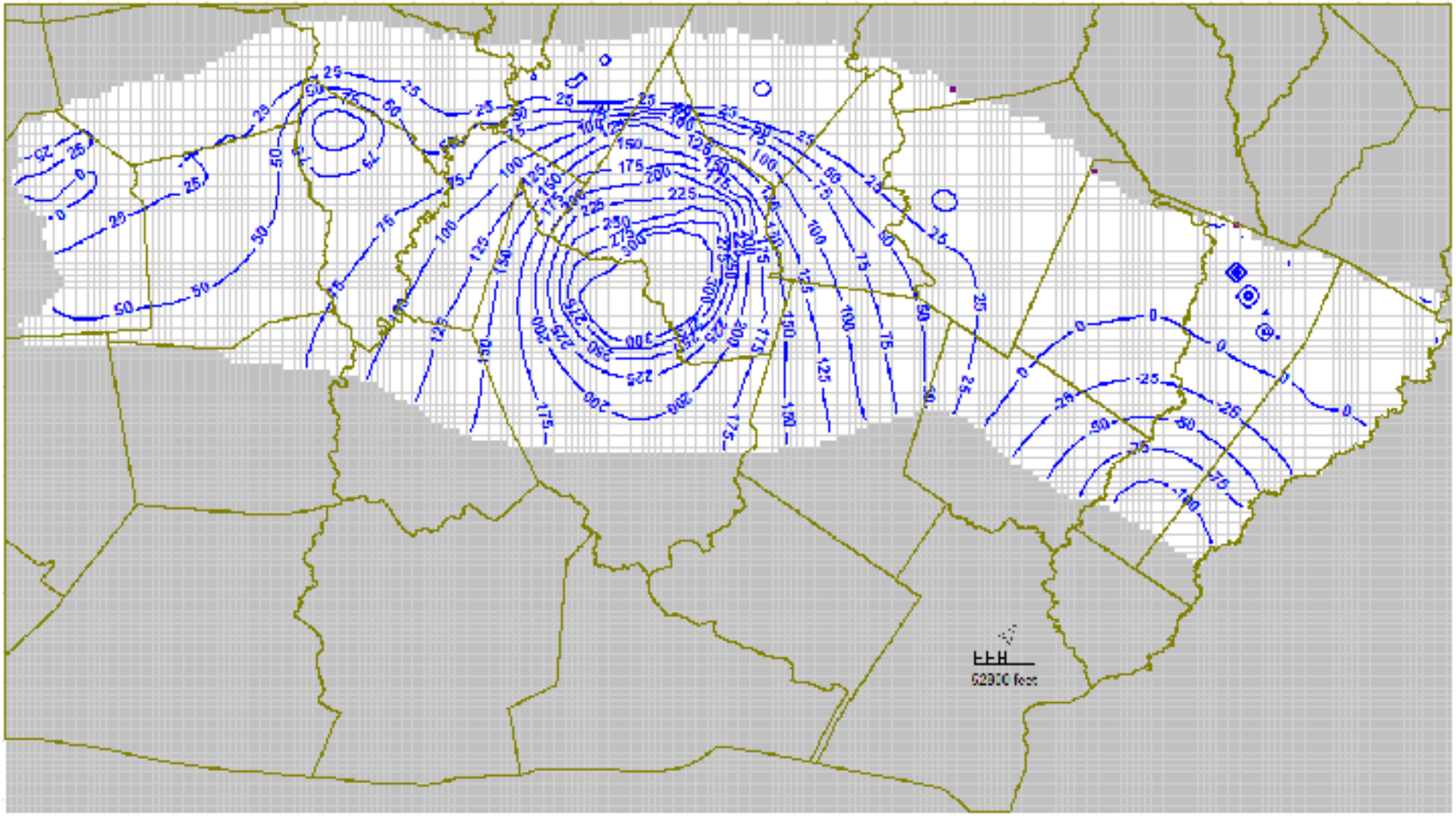
- 1980-2009 Drawdown – Burkeville Confining Unit



Phase 3: Explanatory Report

Hydrological Conditions

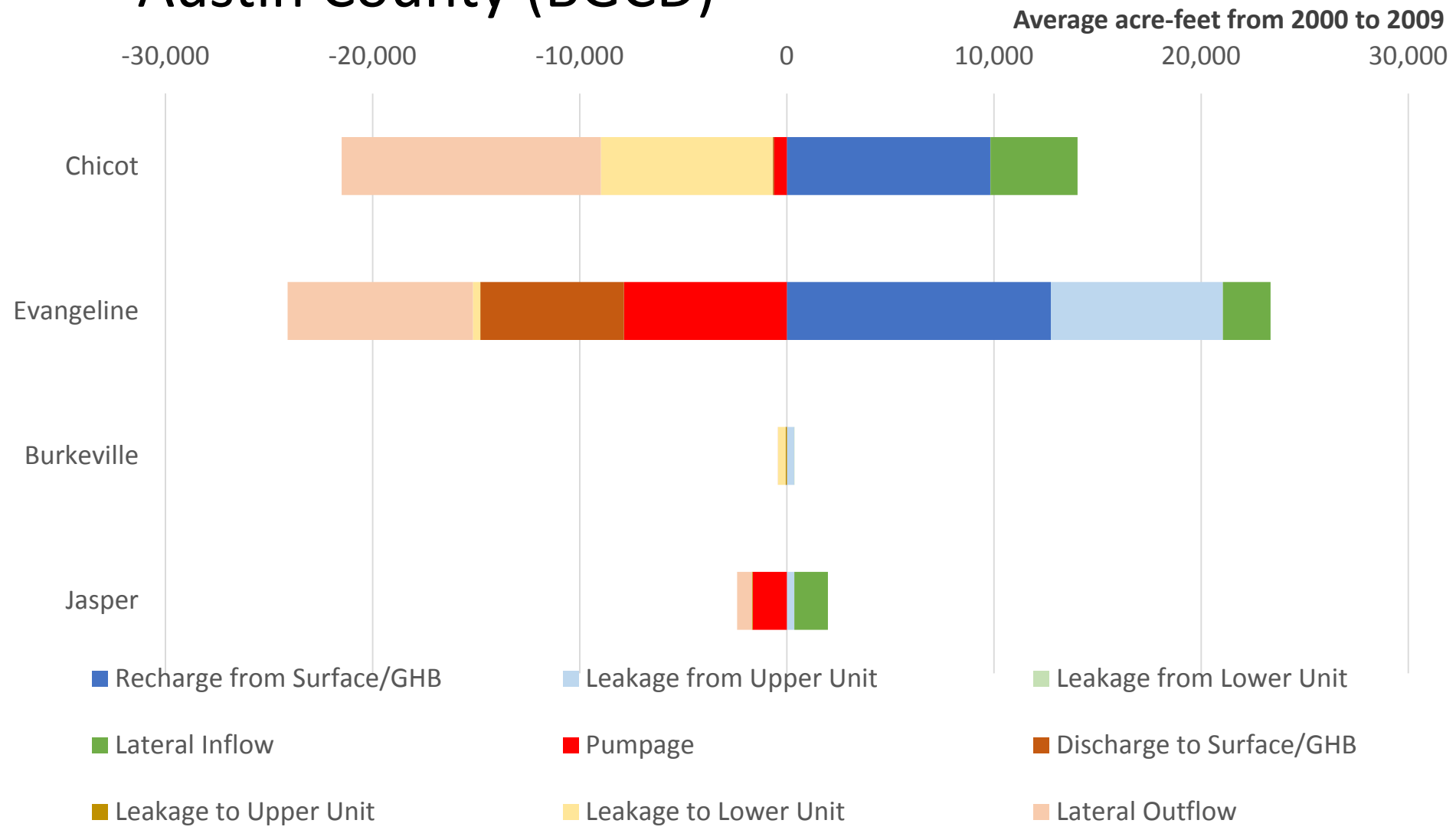
- 1980-2009 Drawdown – Jasper Aquifer



Phase 3: Explanatory Report

Hydrological Conditions

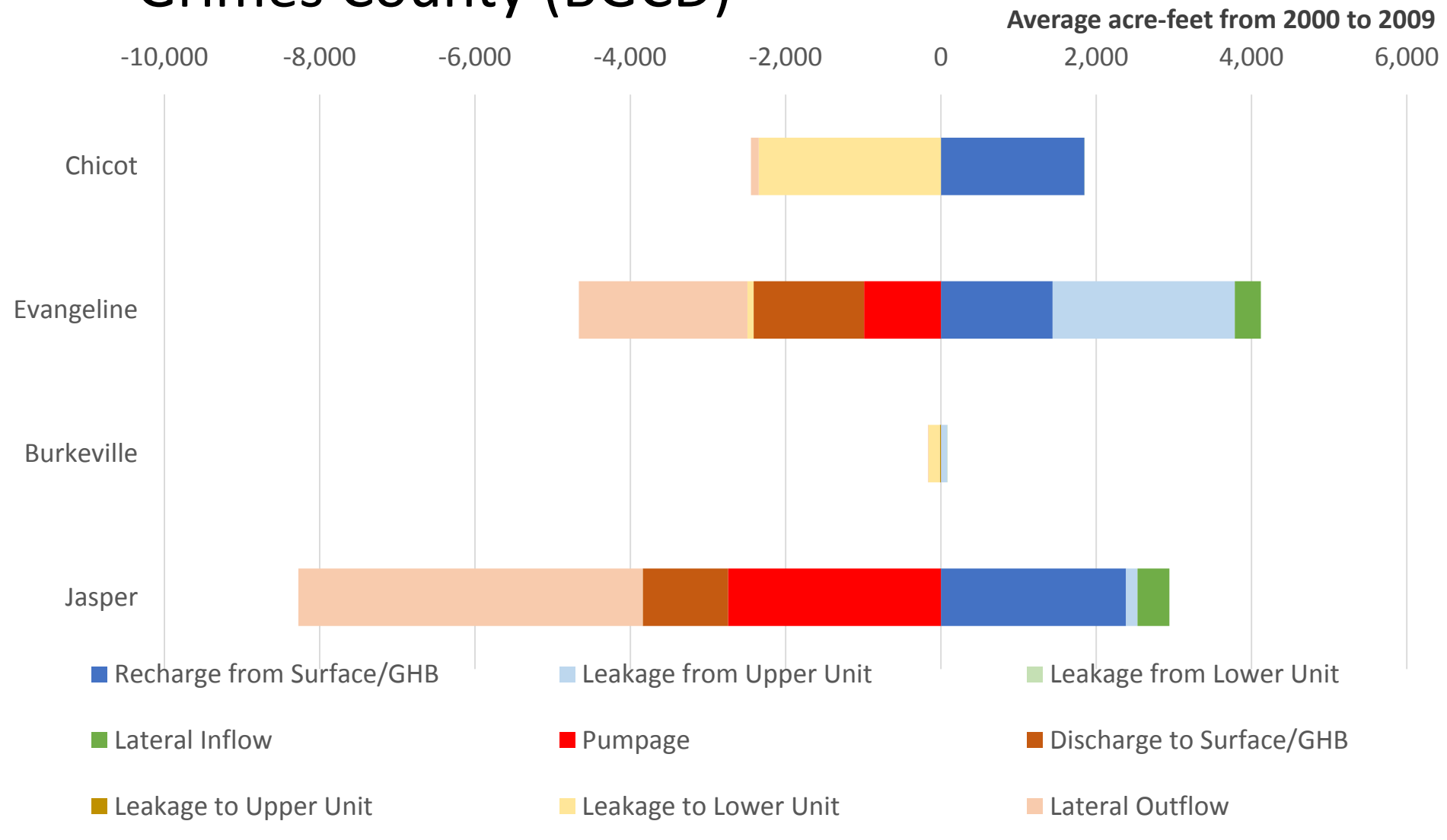
- Austin County (BGCD)



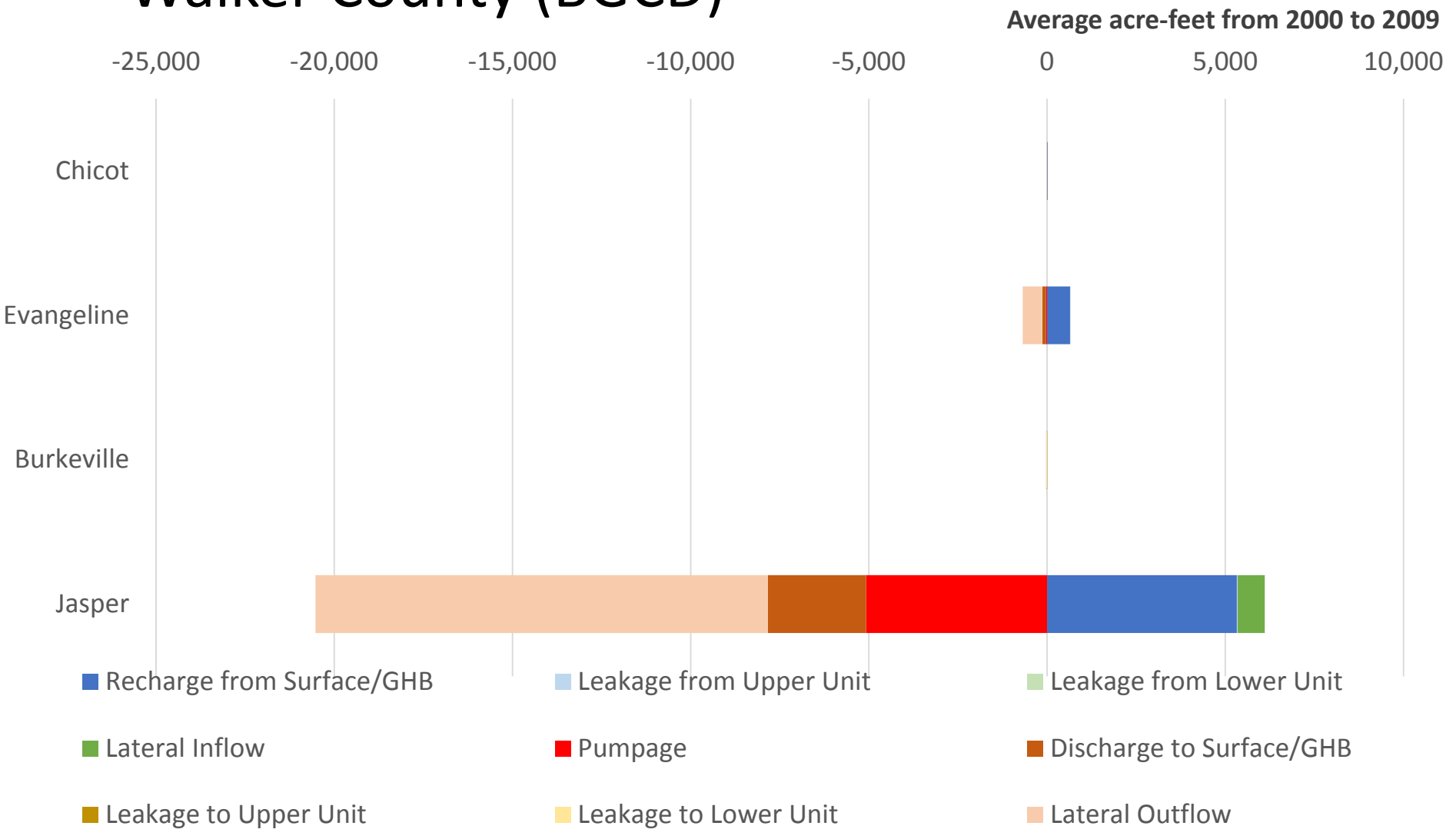
Phase 3: Explanatory Report

Hydrological Conditions

- Grimes County (BGCD)



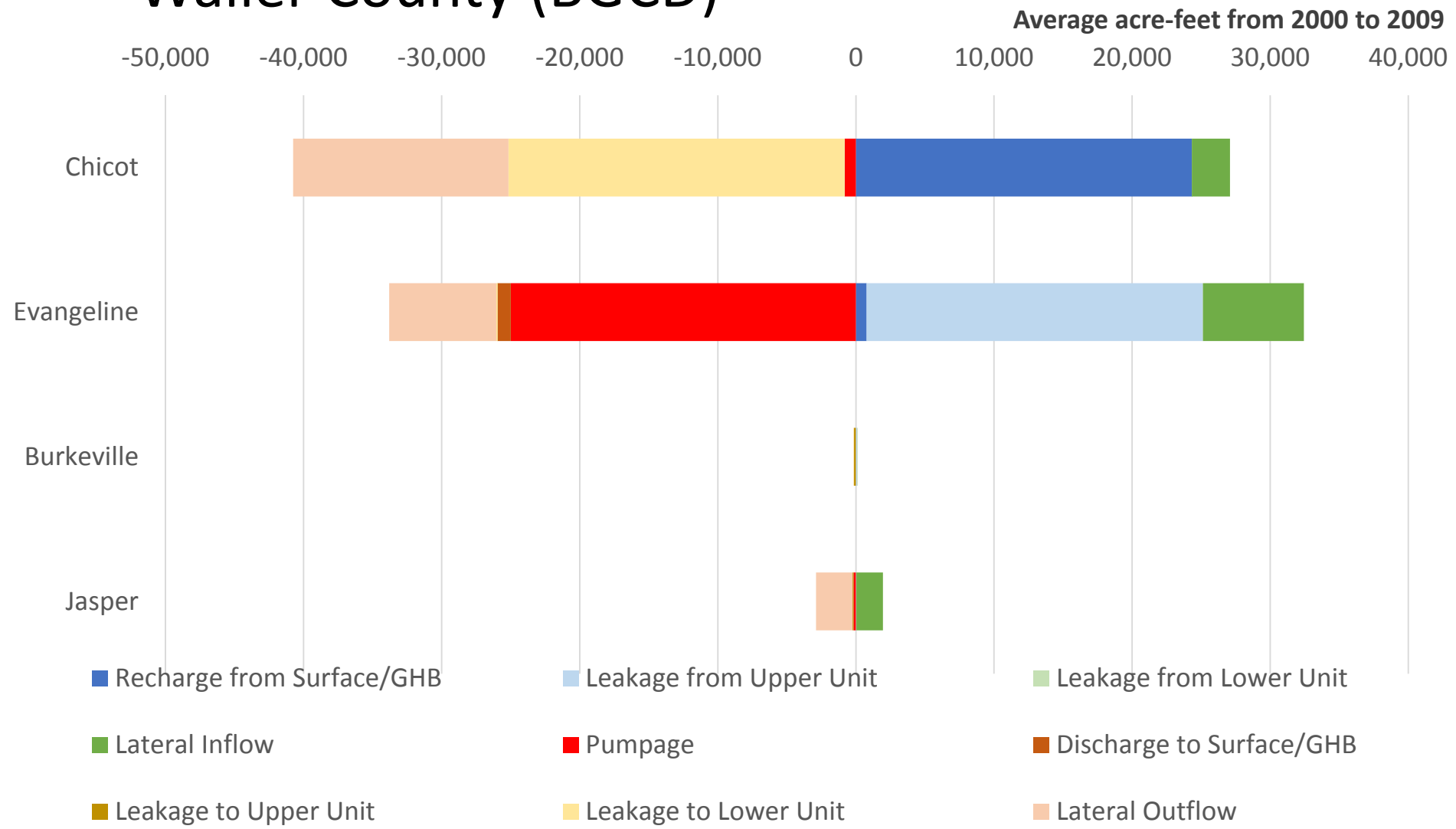
- Walker County (BGCD)



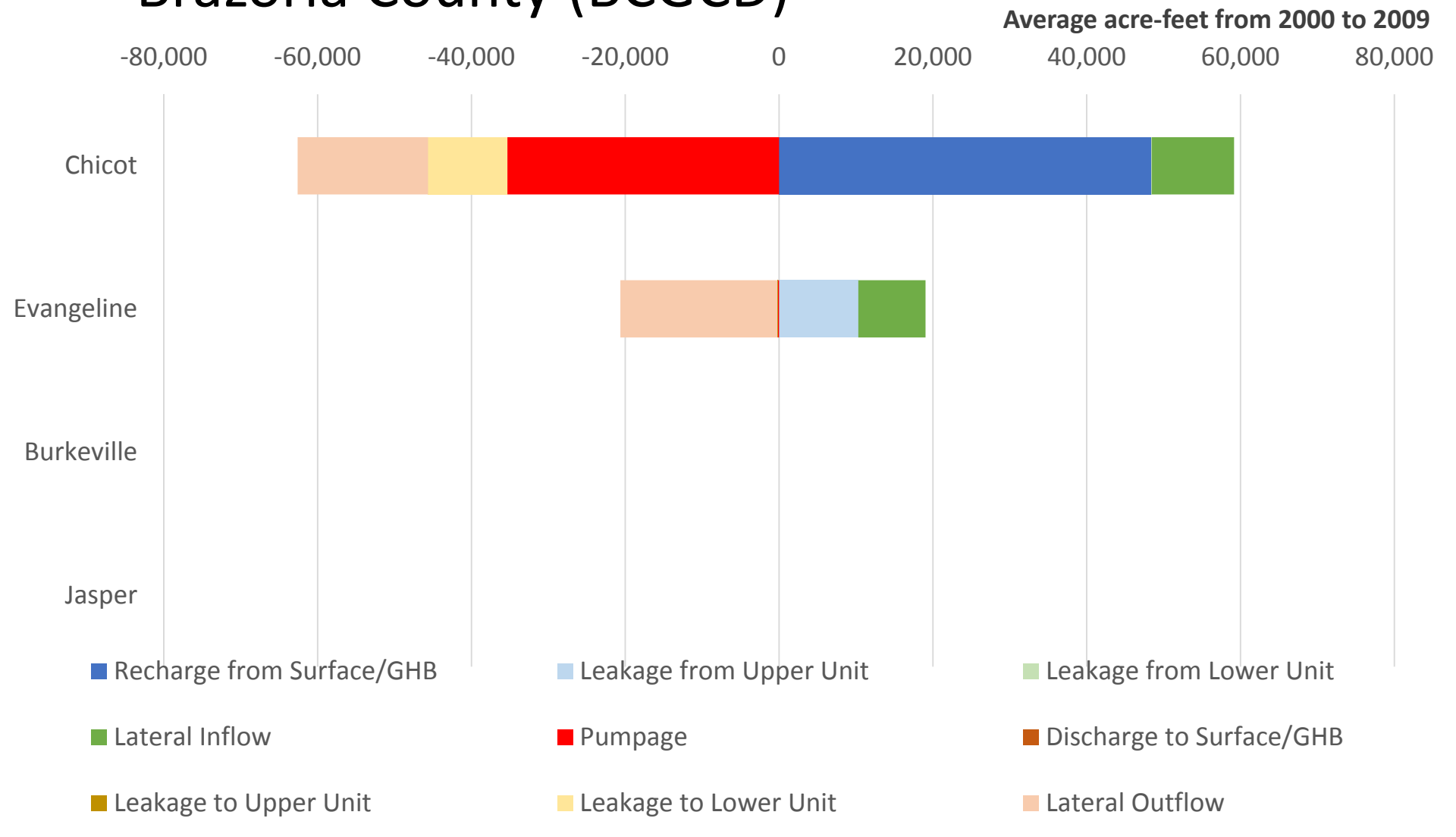
Phase 3: Explanatory Report

Hydrological Conditions

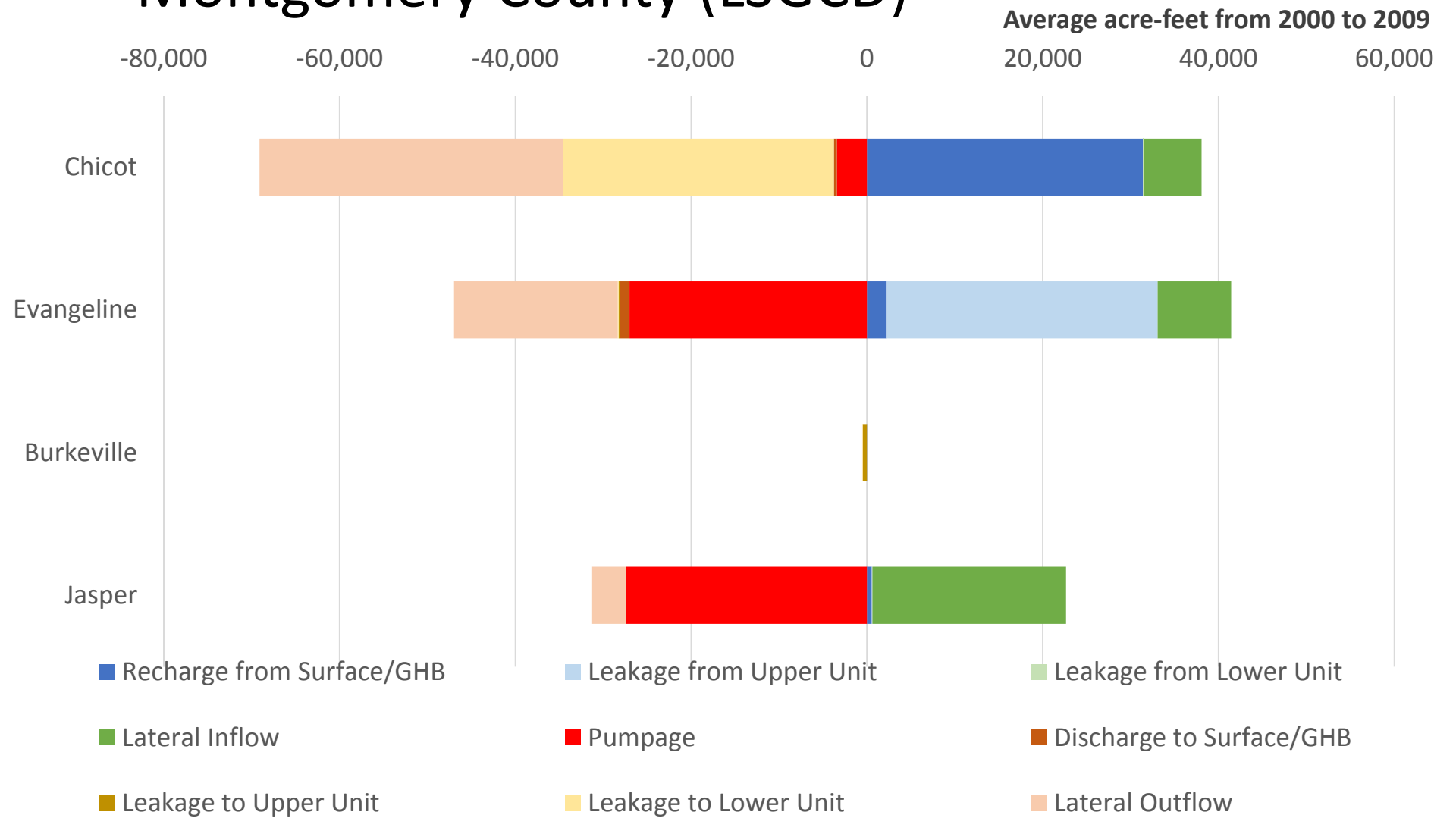
- Waller County (BGCD)



- Brazoria County (BCGCD)



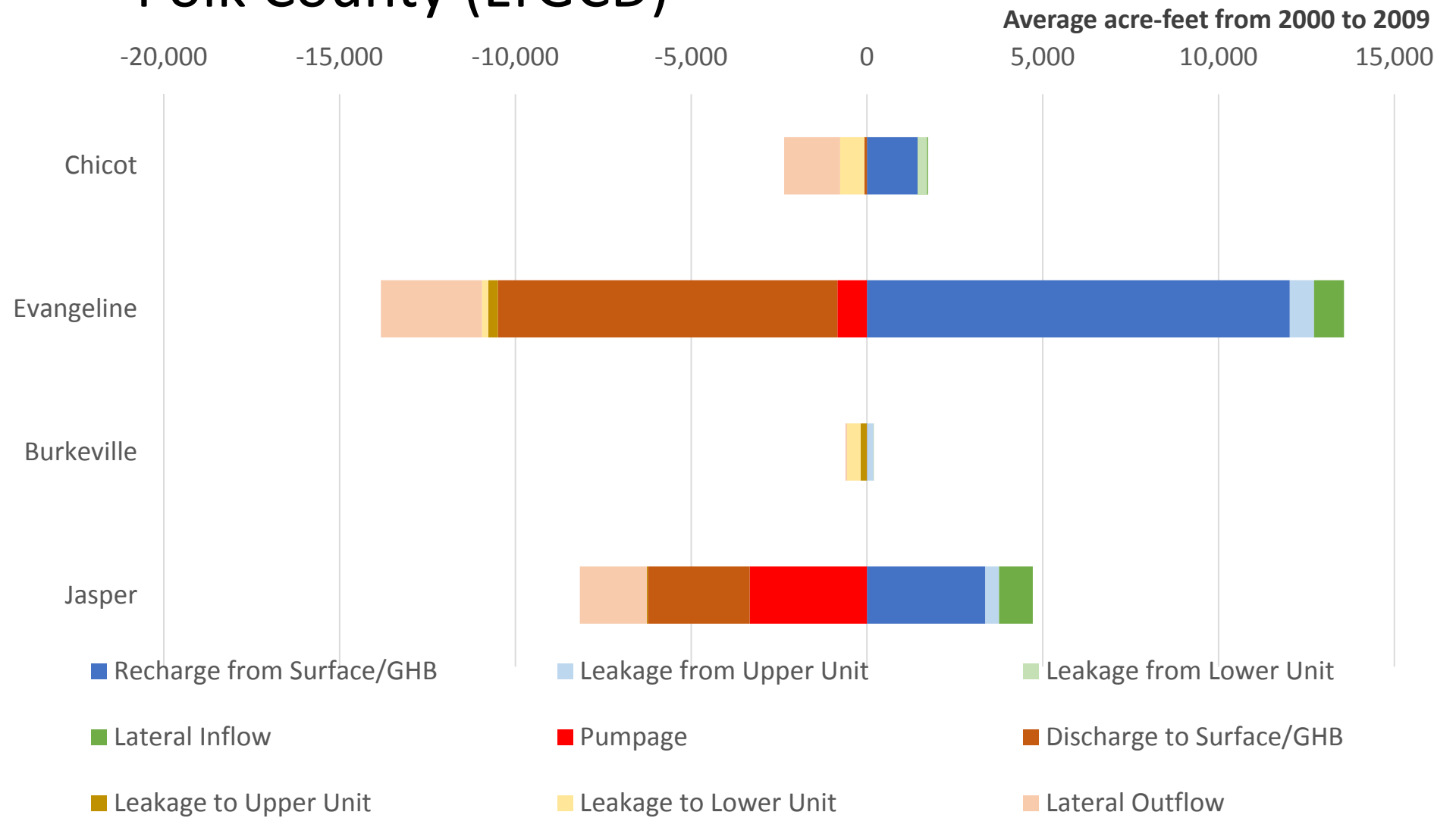
- Montgomery County (LSGCD)



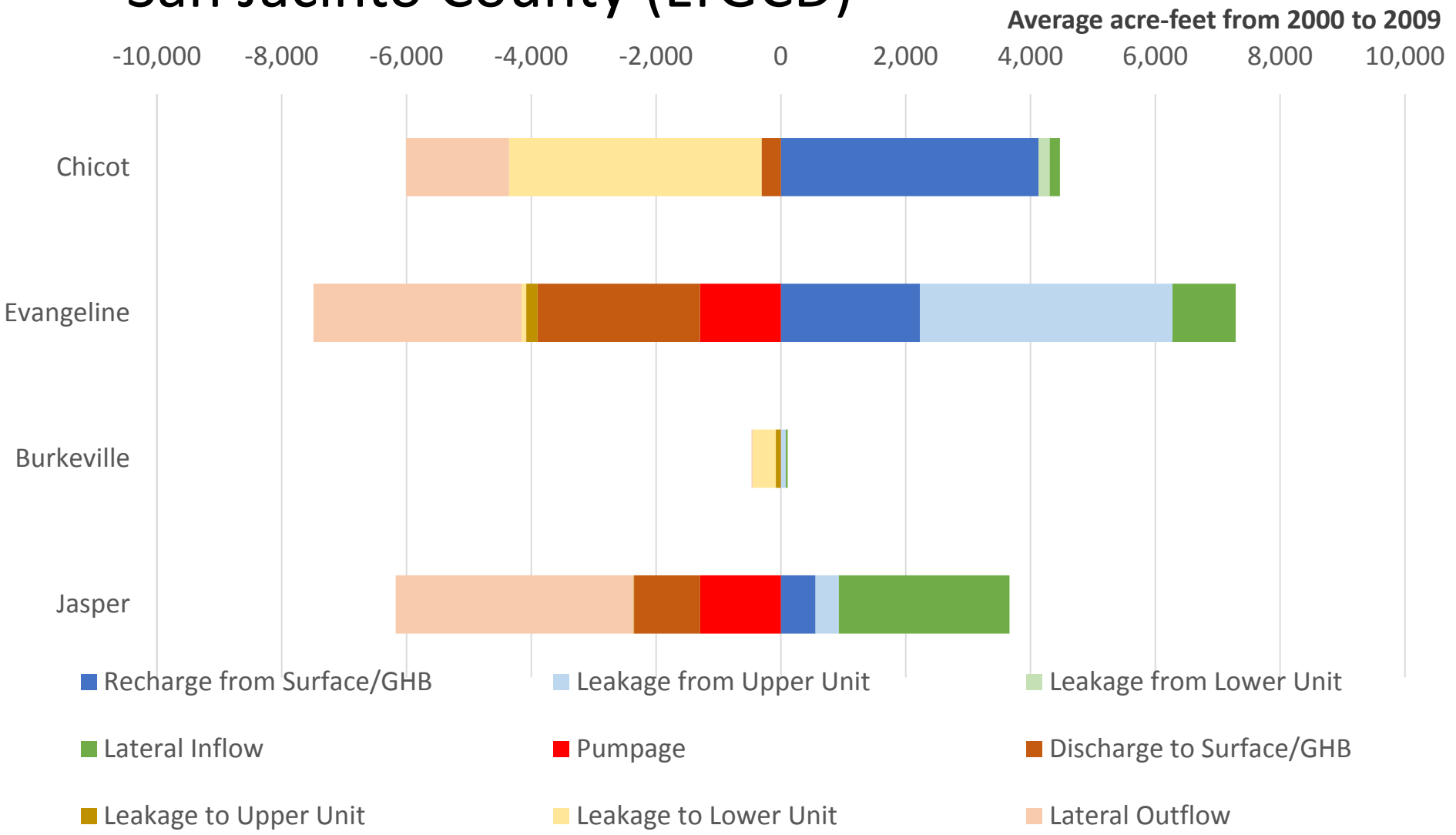
Phase 3: Explanatory Report

Hydrological Conditions

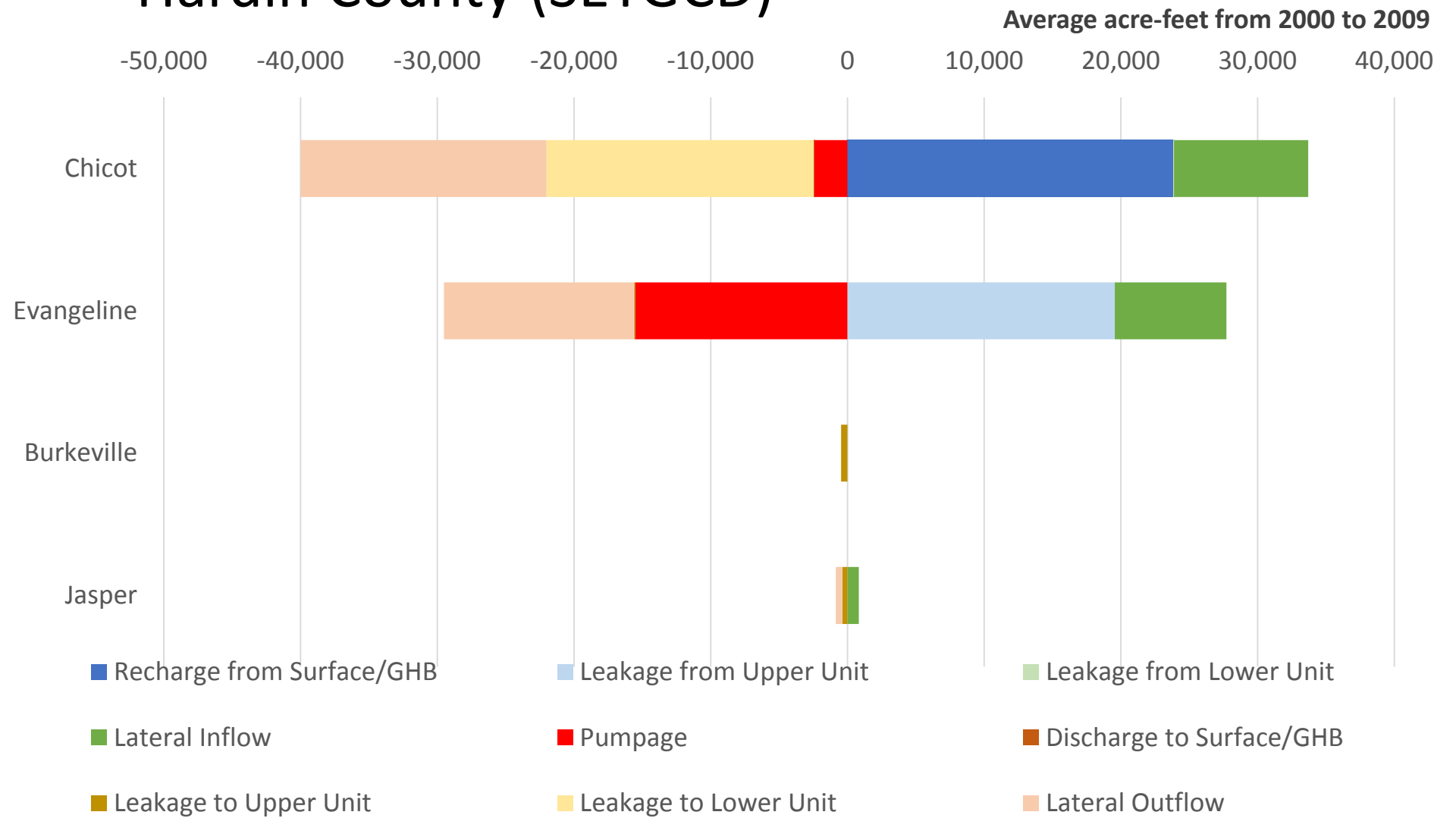
- Polk County (LTGCD)



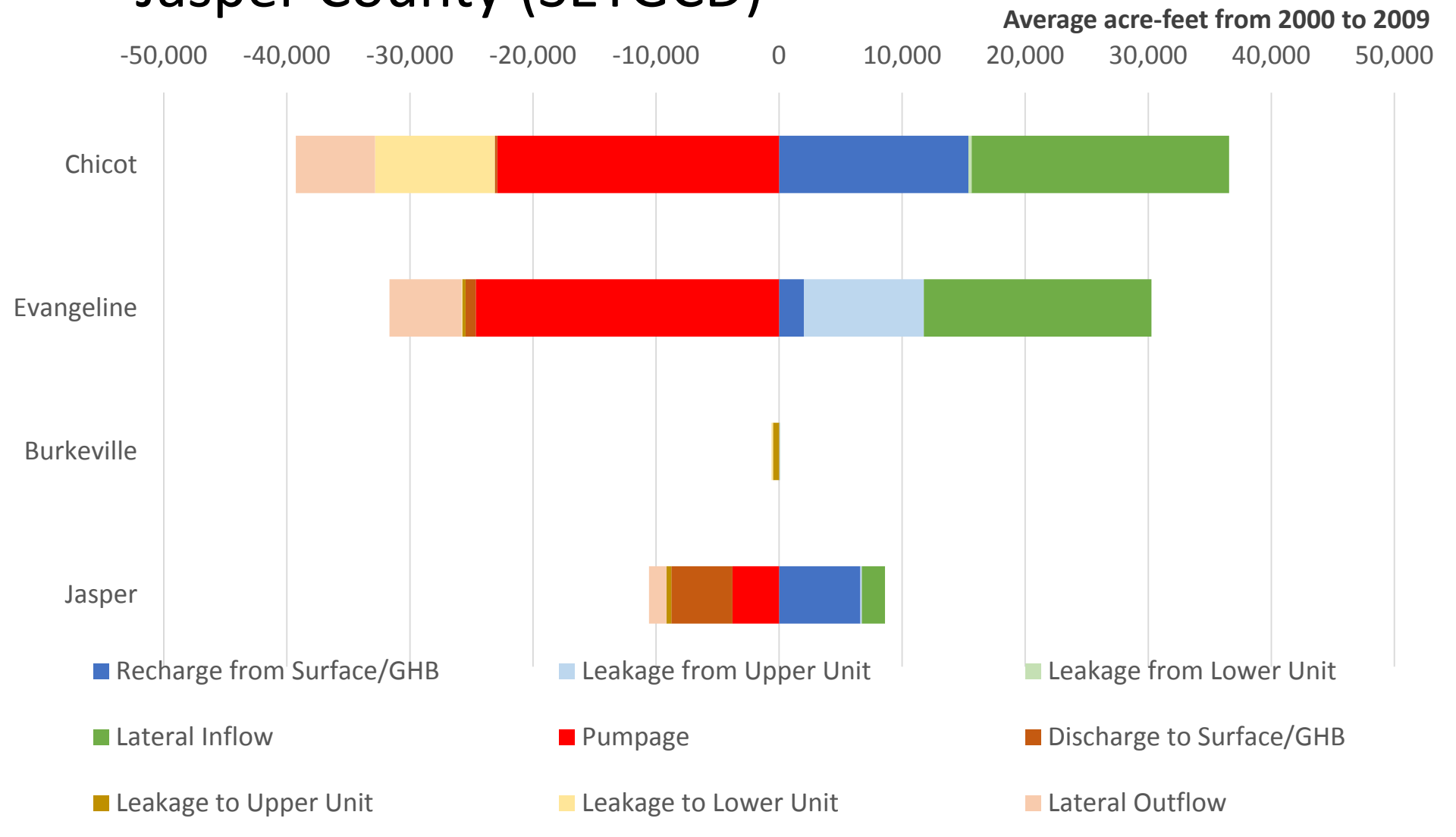
- San Jacinto County (LTGCD)



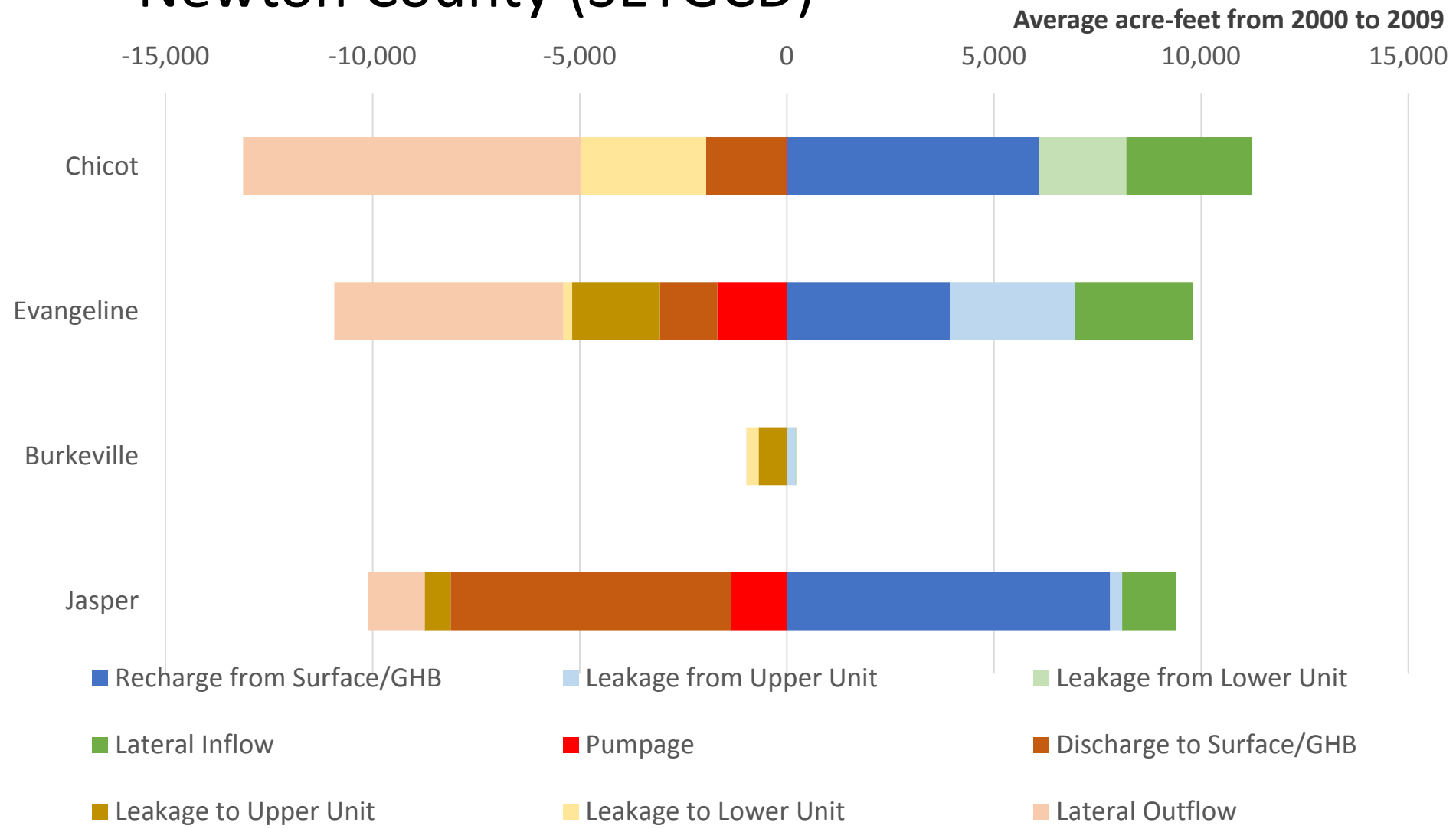
- Hardin County (SETGCD)



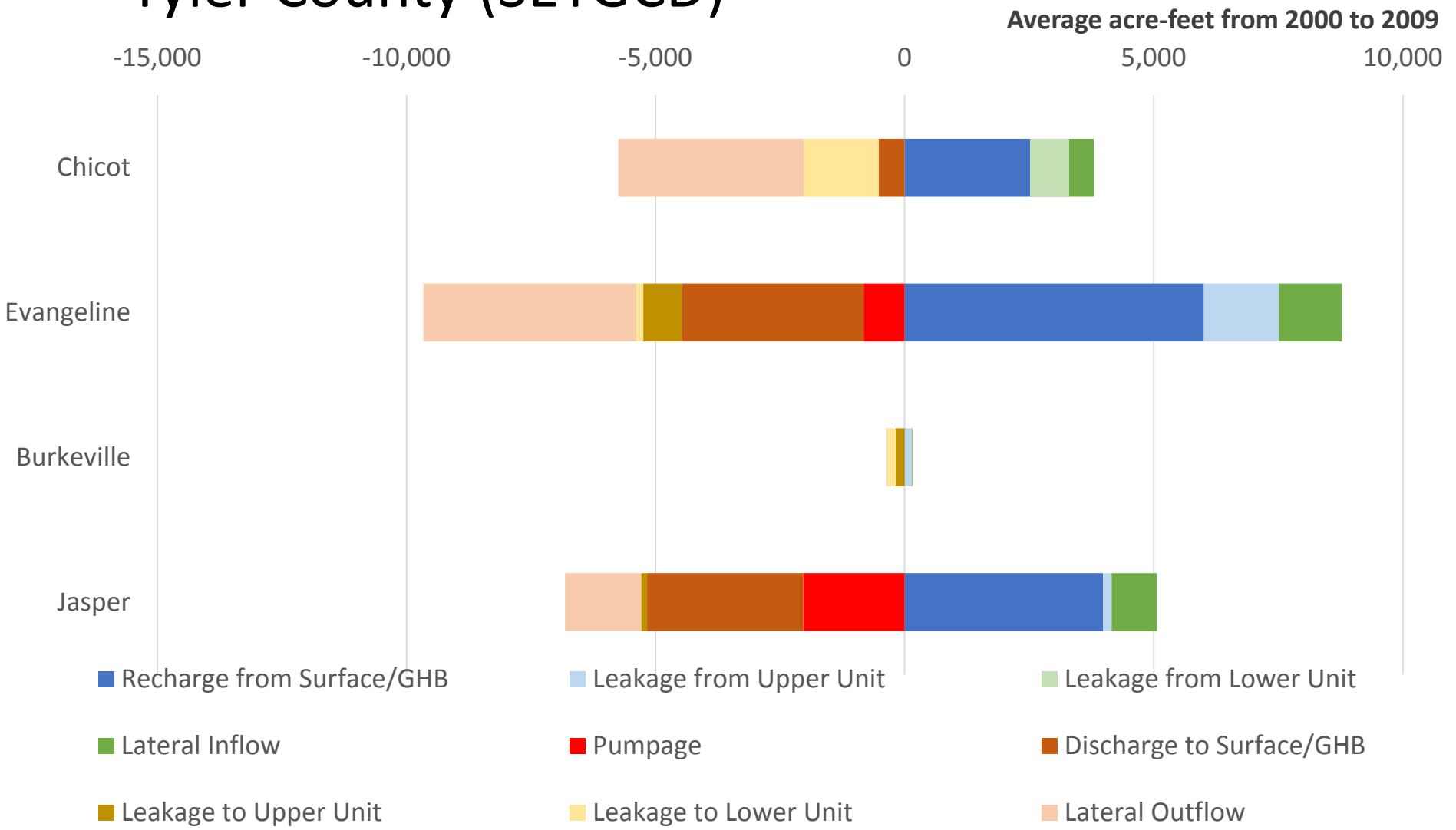
- Jasper County (SETGCD)



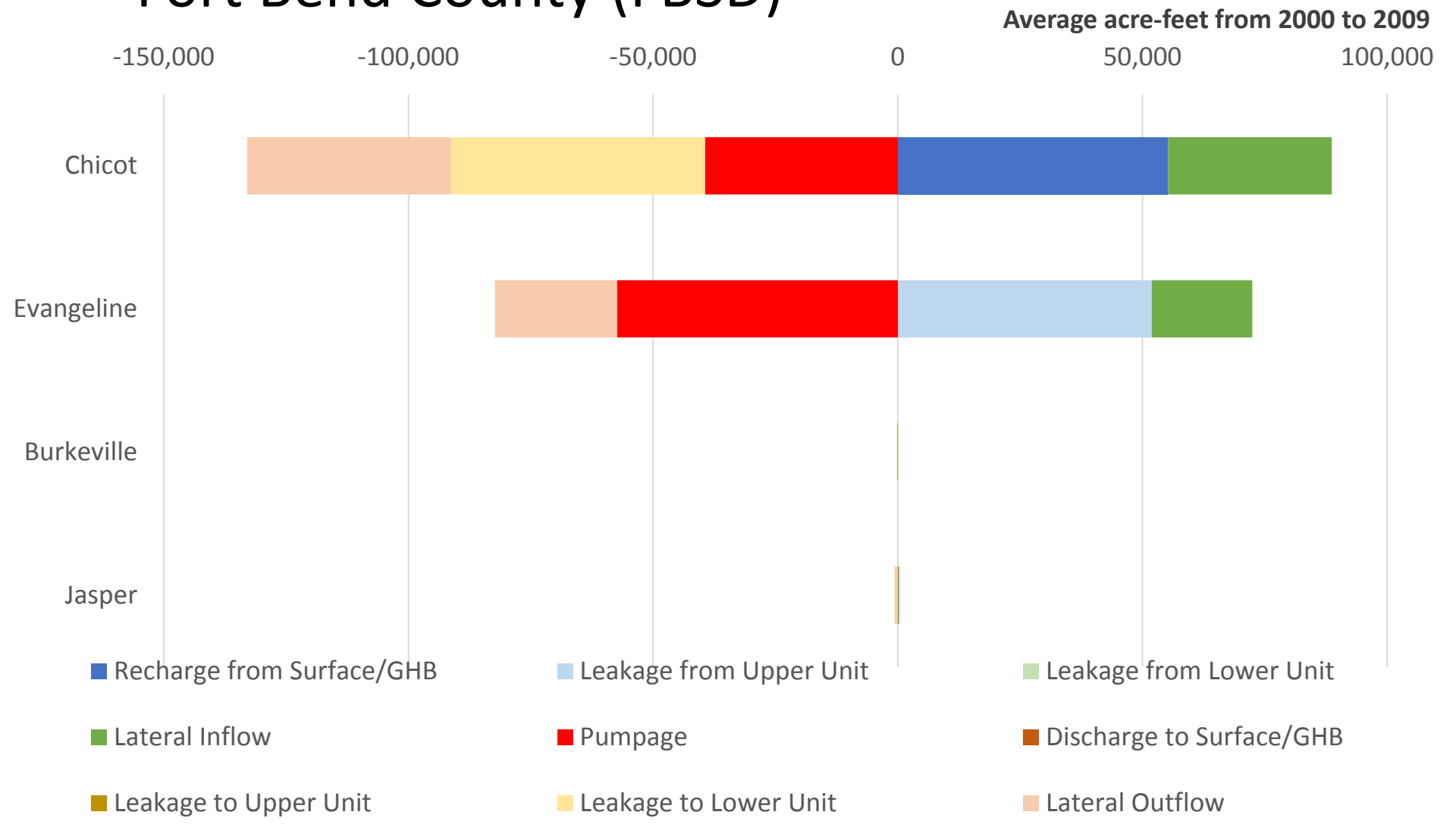
- Newton County (SETGCD)



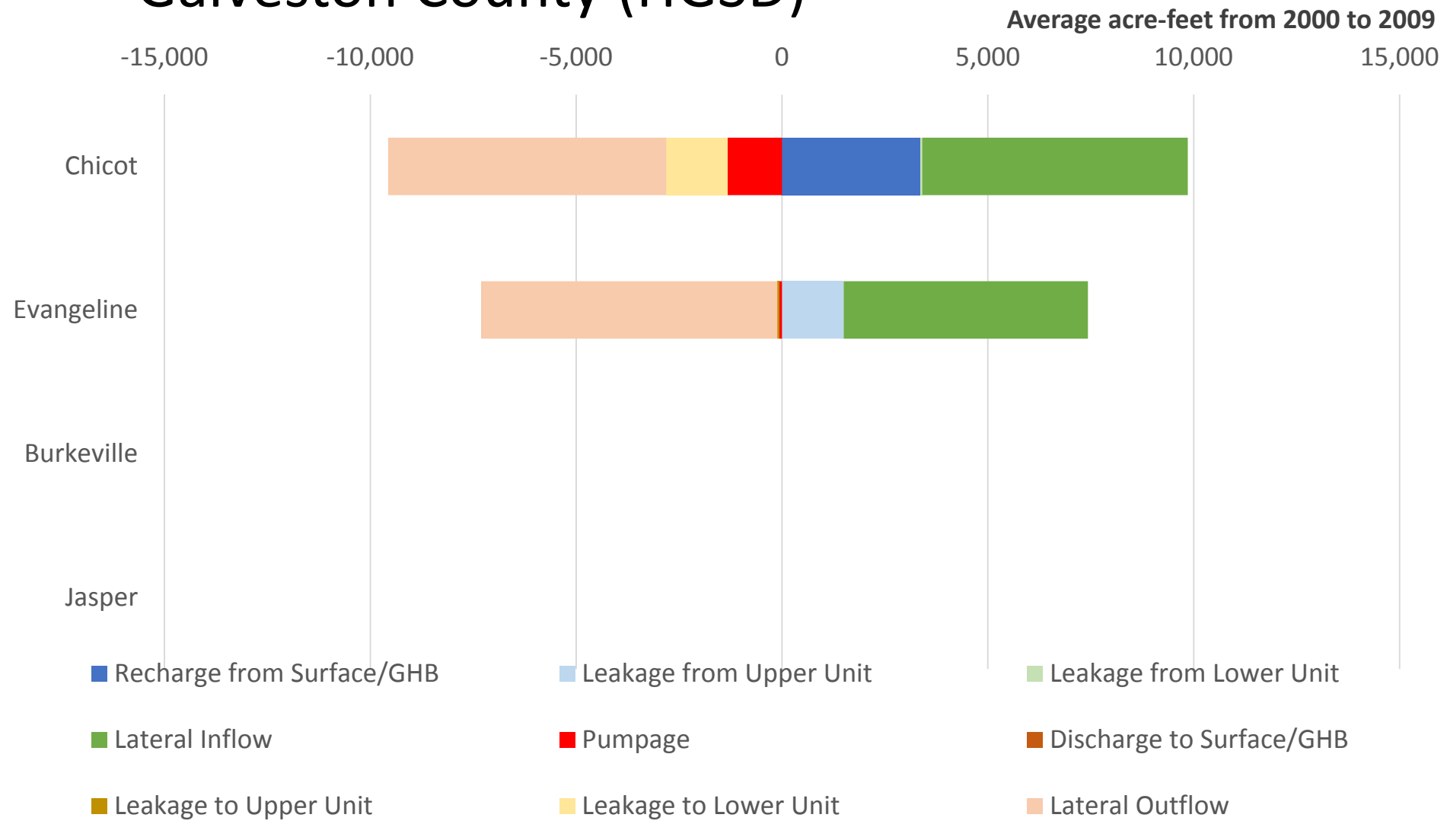
- Tyler County (SETGCD)



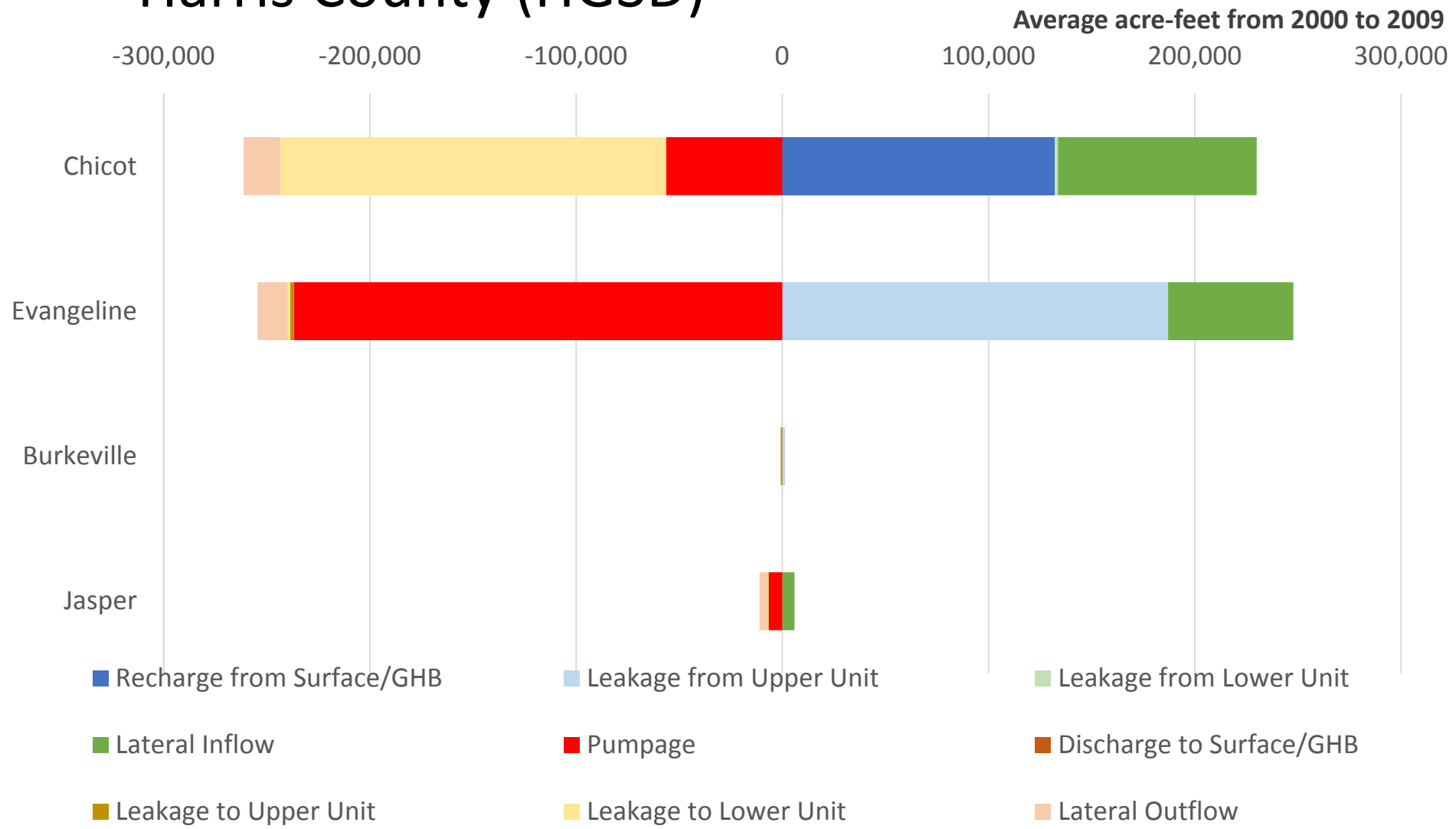
- Fort Bend County (FBSD)



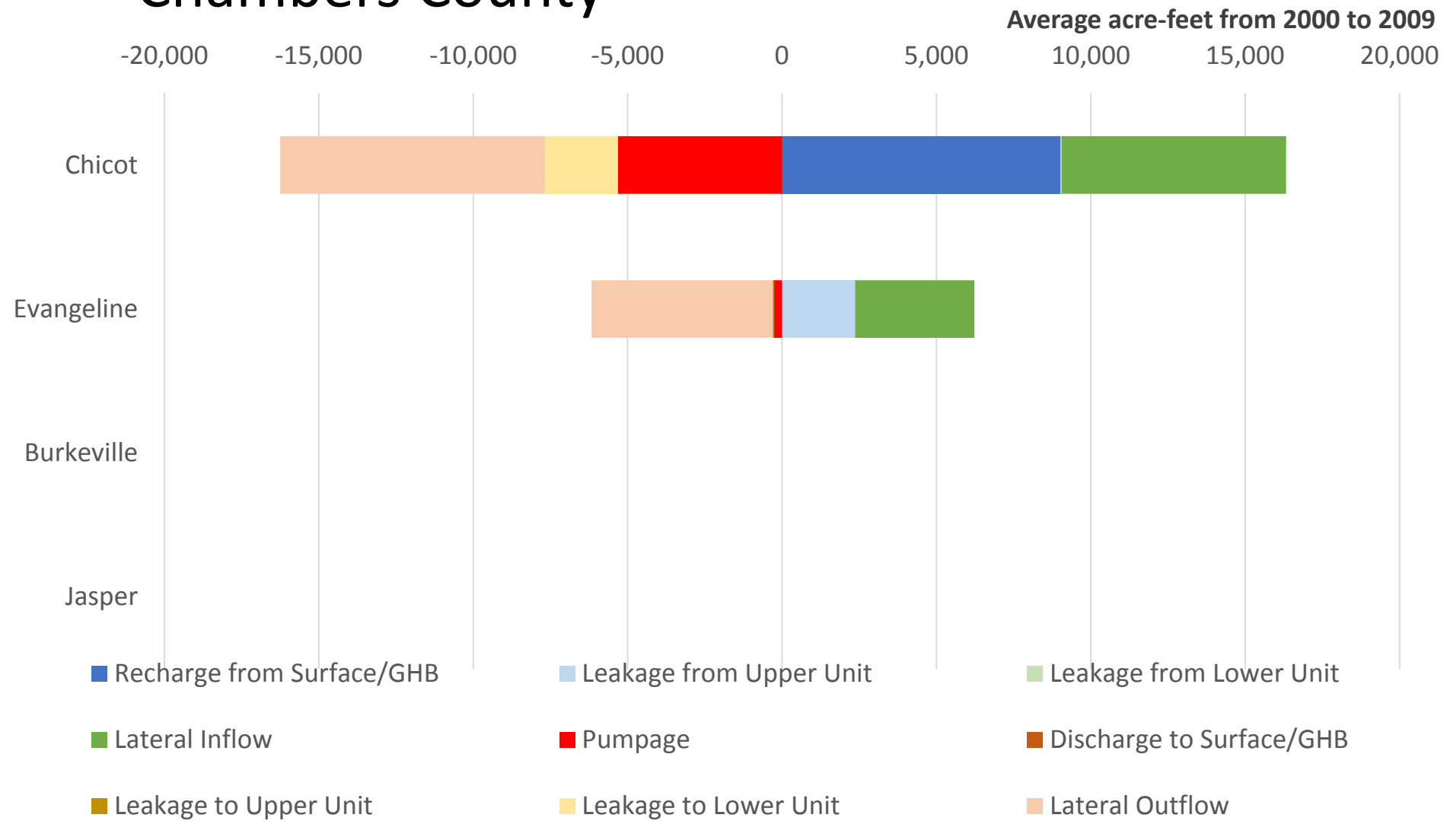
- Galveston County (HGSD)



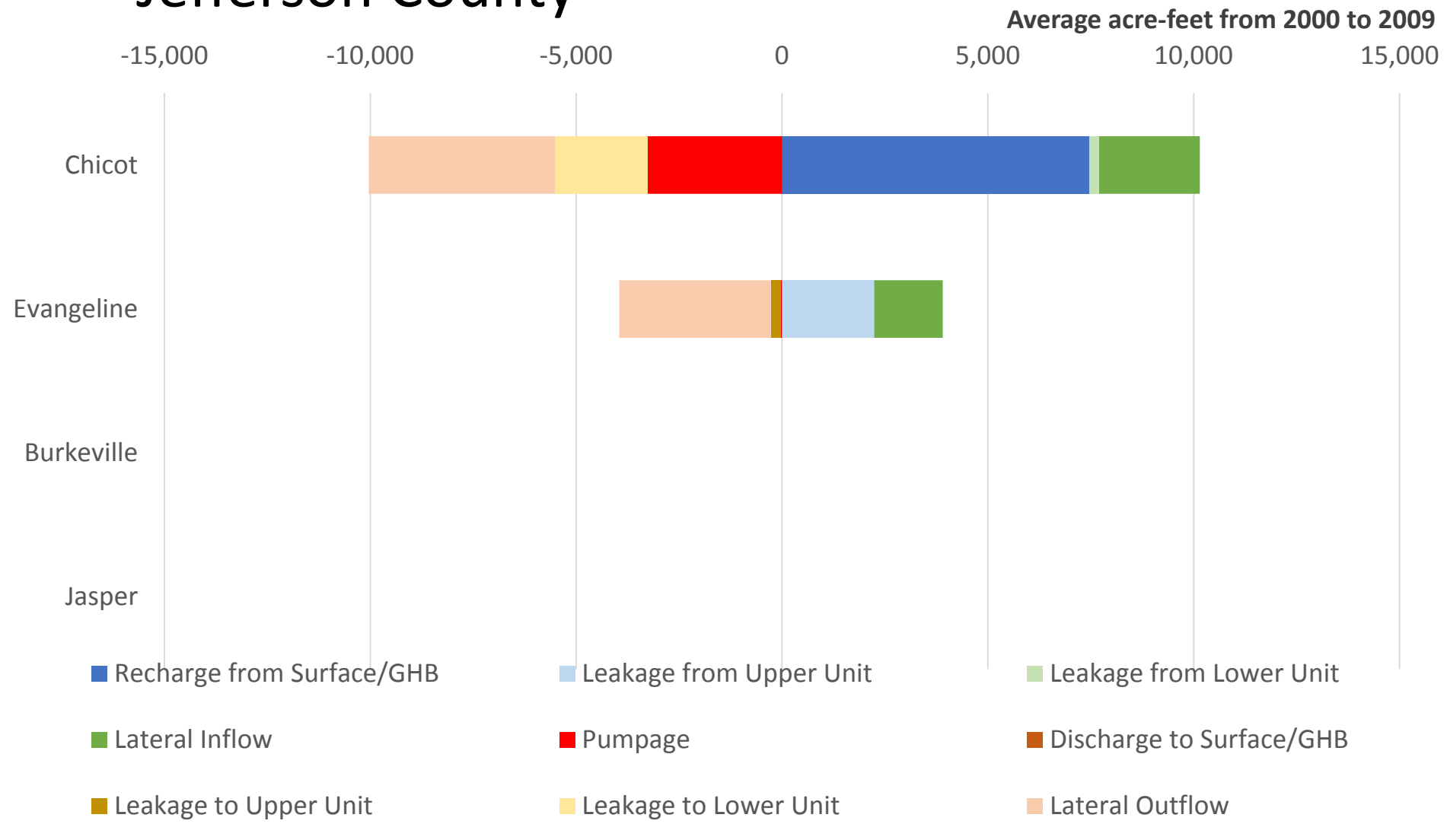
- Harris County (HGSD)



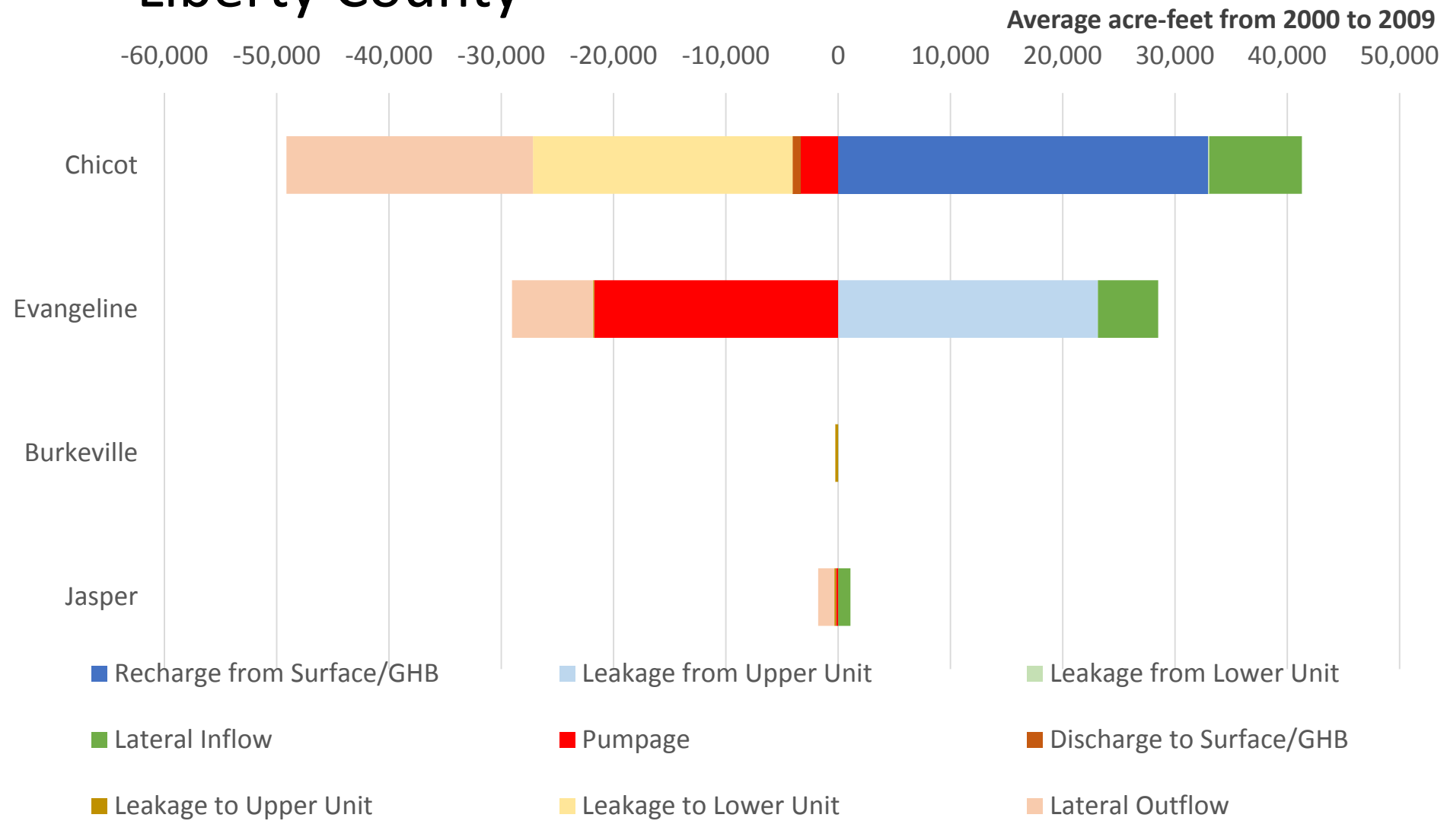
- Chambers County



- Jefferson County



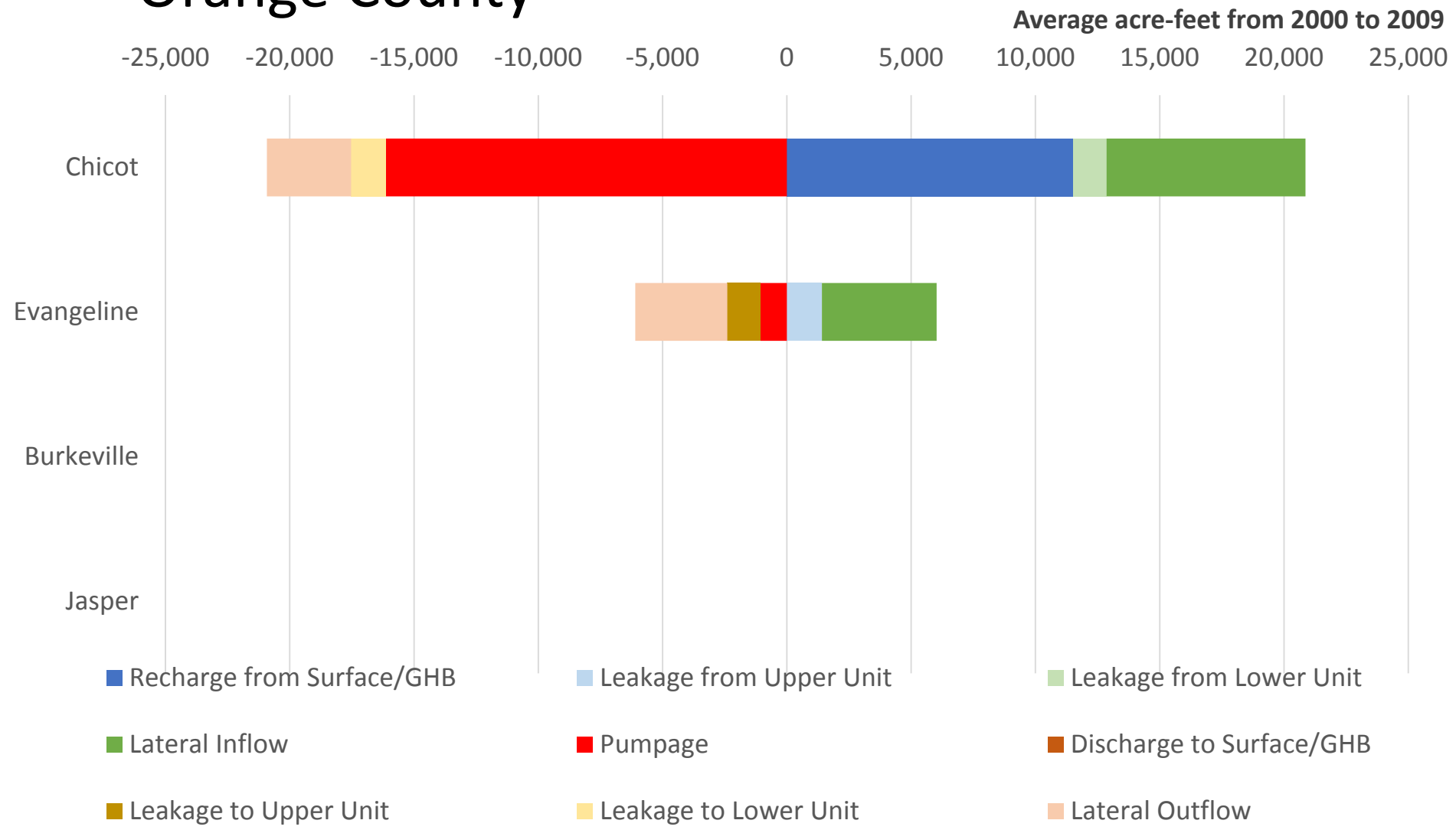
- Liberty County



Phase 3: Explanatory Report

Hydrological Conditions

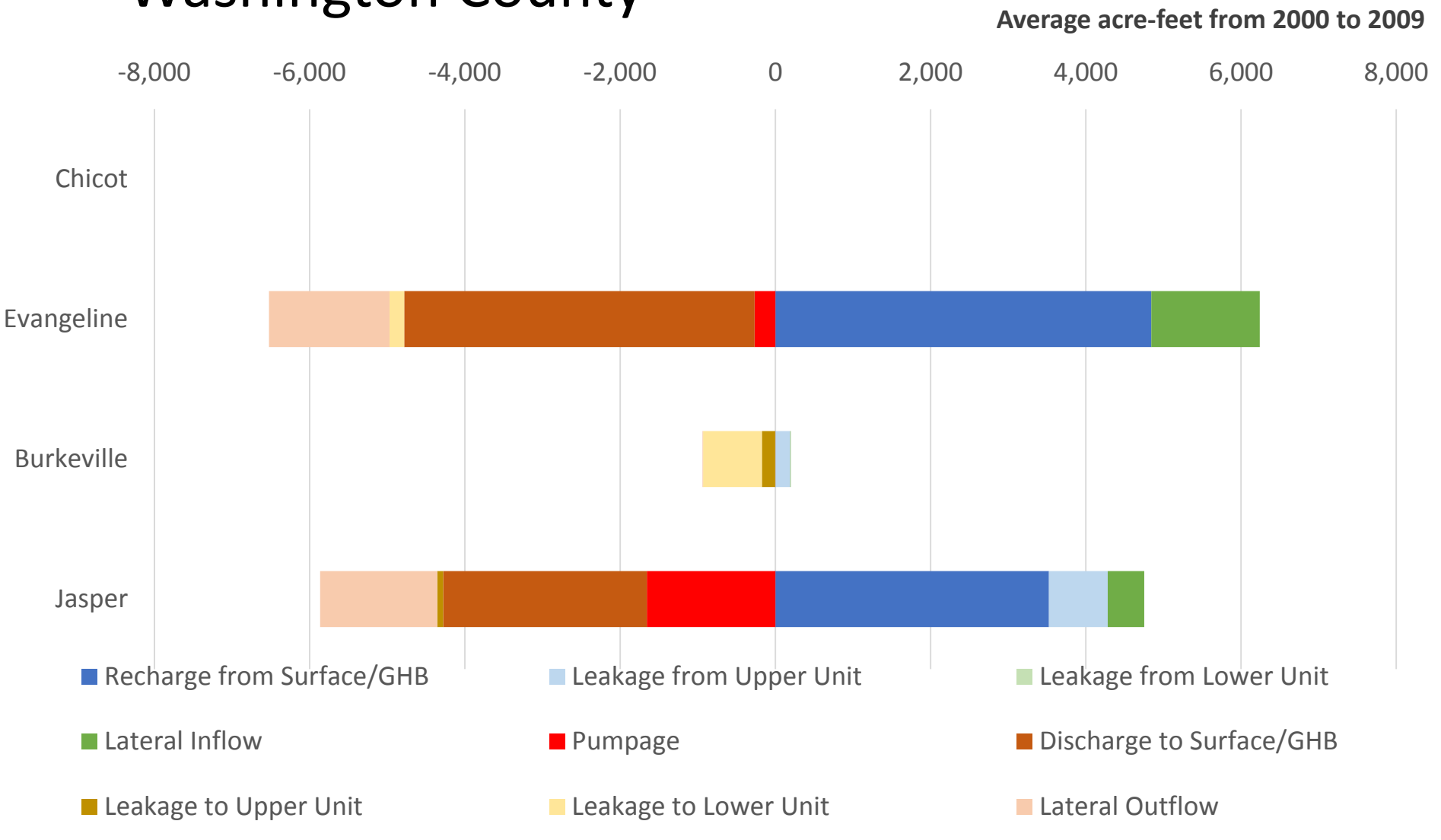
- Orange County



Phase 3: Explanatory Report

Hydrological Conditions

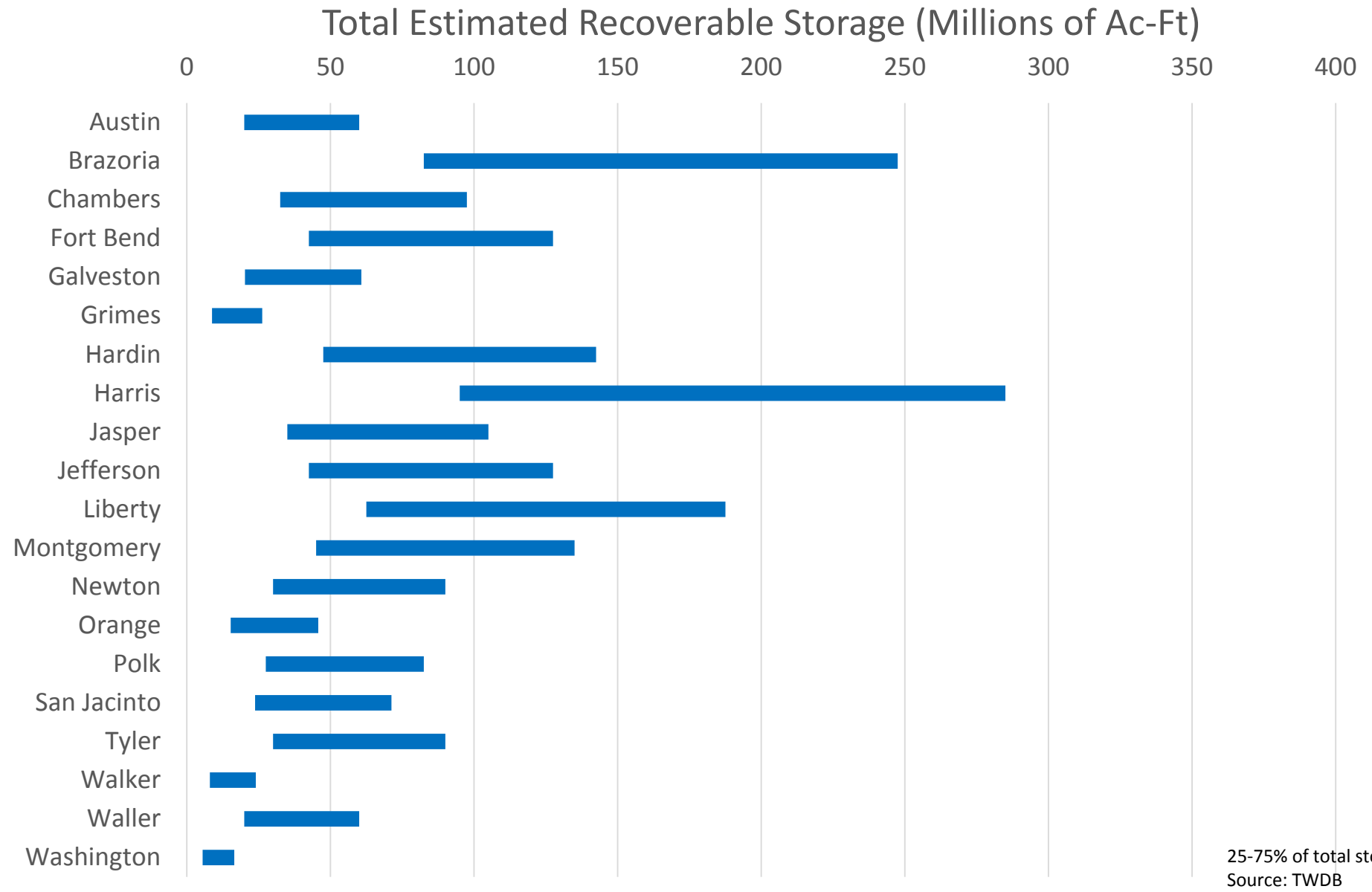
- Washington County



Phase 3: Explanatory Report

Hydrological Conditions

Gulf Coast Aquifer
Total Estimated
Recoverable Storage



25-75% of total storage
Source: TWDB

Phase 3: Explanatory Report

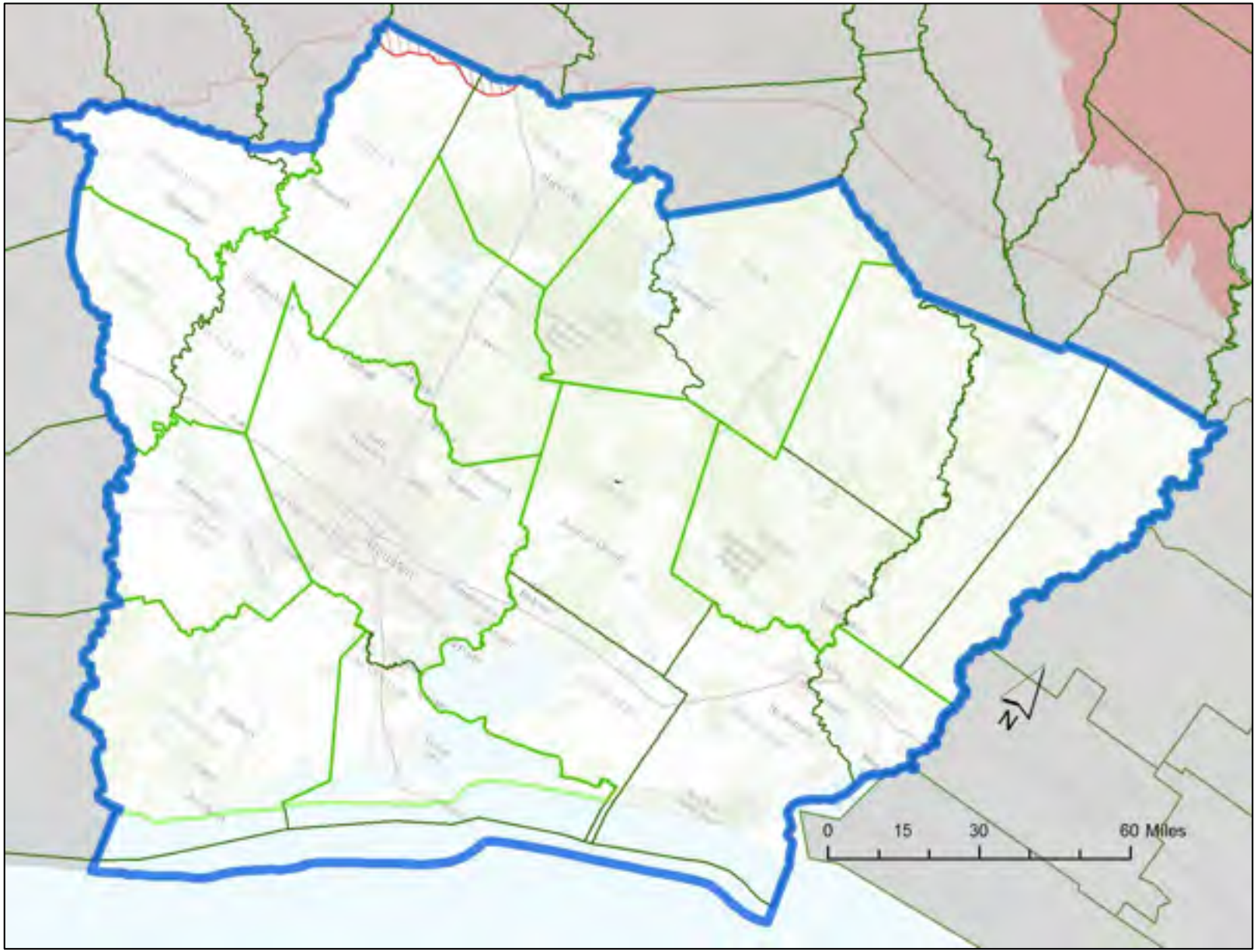
Hydrological Conditions

- Carrizo Sand Aquifer
  - *Groundwater Availability Model for the Central Part of the Carrizo-Wilcox Aquifer in Texas* (BEG, 2003)
  - Central Carrizo-Wilcox GAM Run
  - TWDB GAM Task 13-037

Phase 3: Explanatory Report

Hydrological Conditions

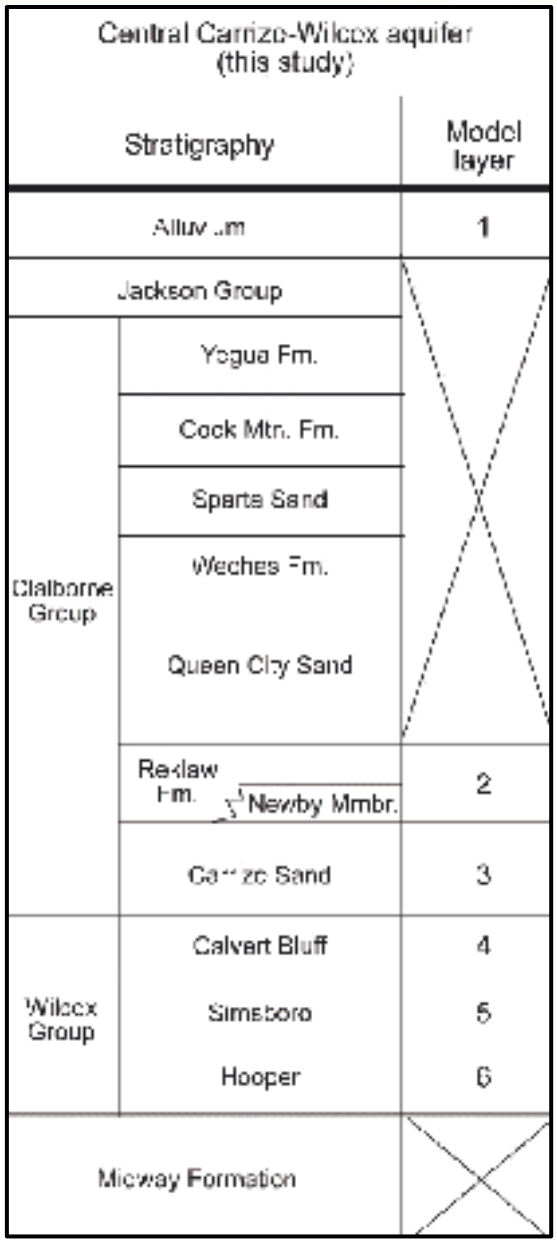
Carrizo Aquifer
Location Map



Phase 3: Explanatory Report

Hydrological Conditions

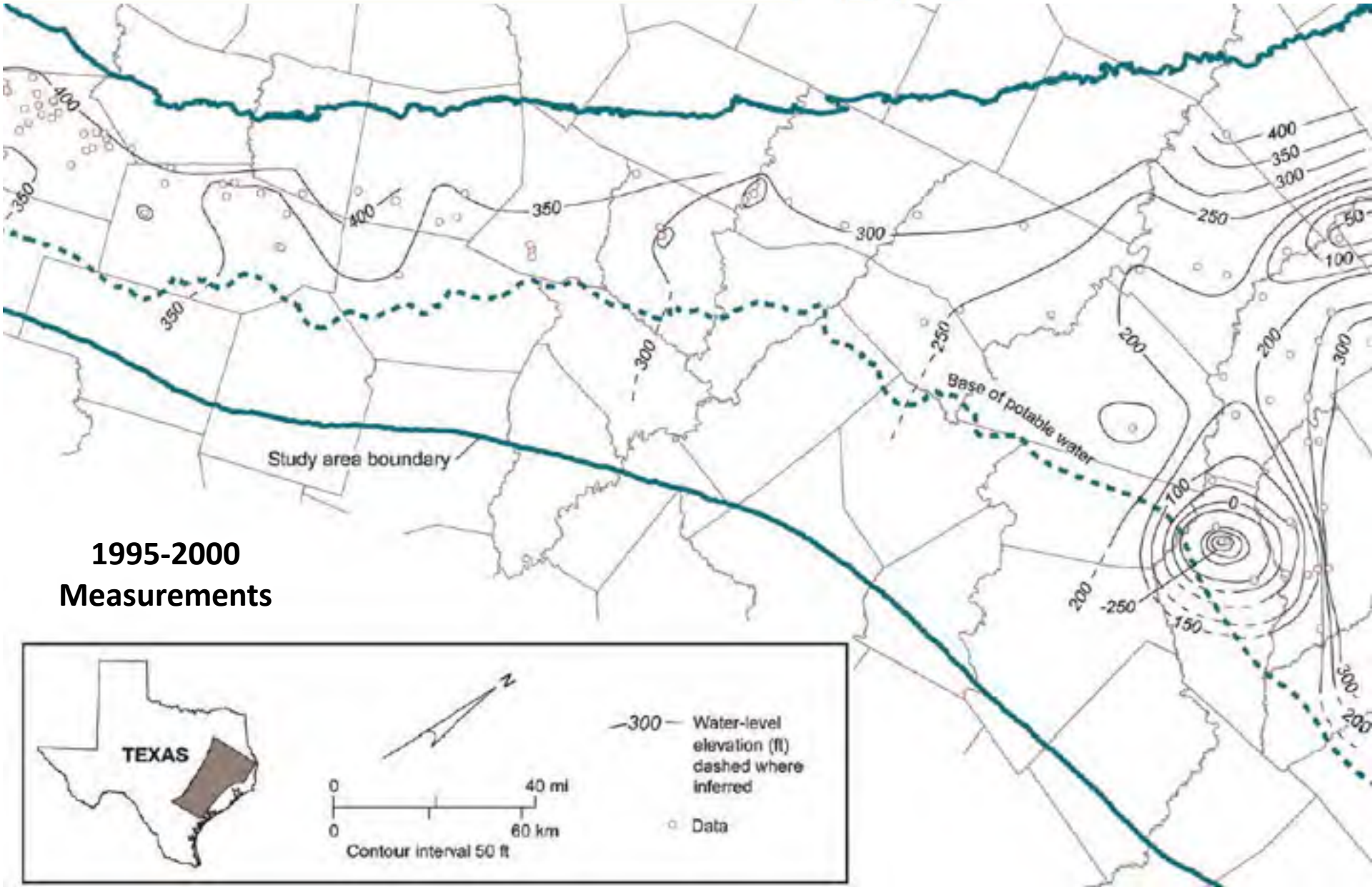
Carrizo Aquifer Stratigraphy



Phase 3: Explanatory Report

Hydrological Conditions

Carrizo Aquifer
Measured Water Surface

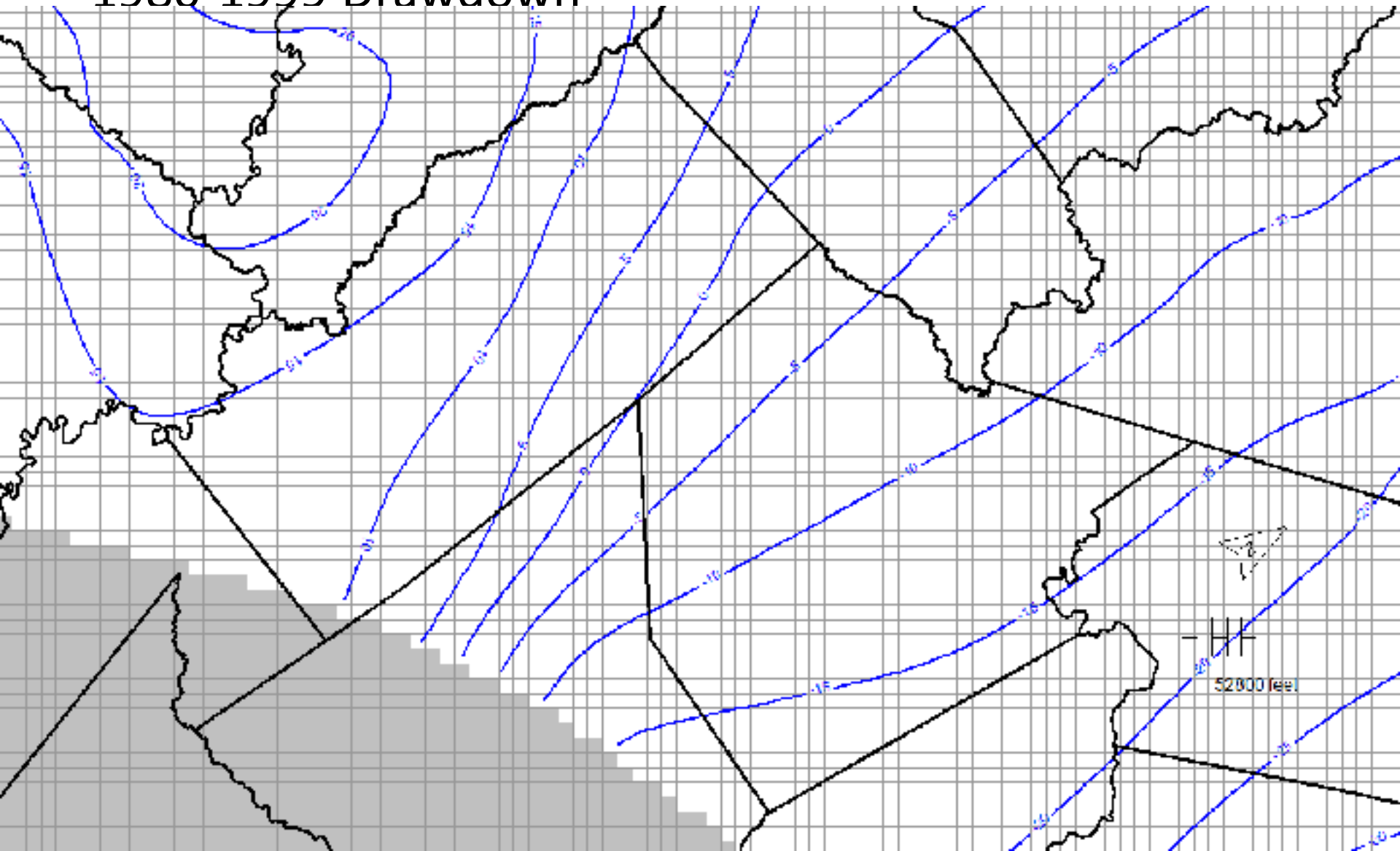


Phase 3: Explanatory Report

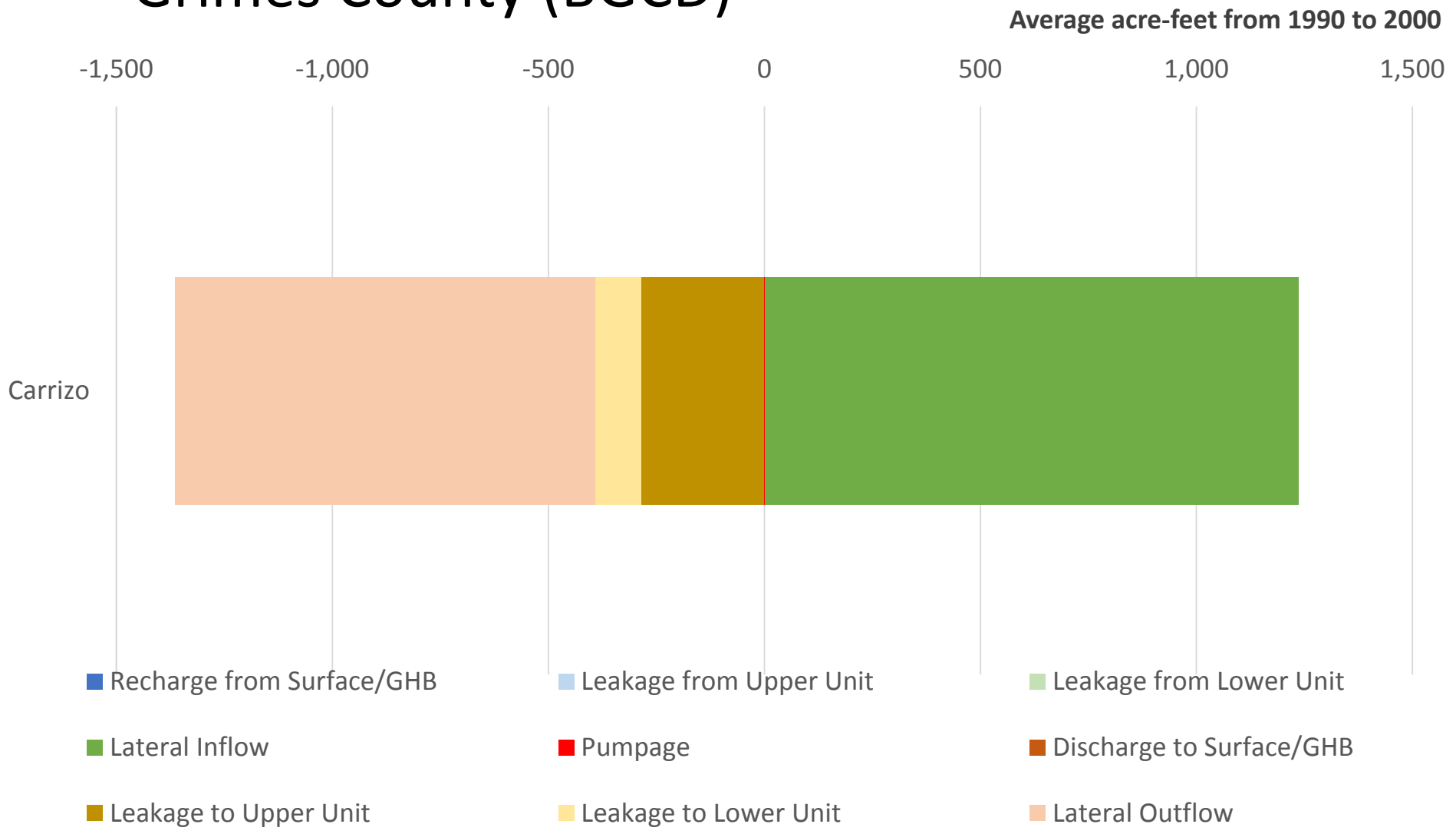
Hydrological Conditions

Carrizo Aquifer
Long-Term Trends

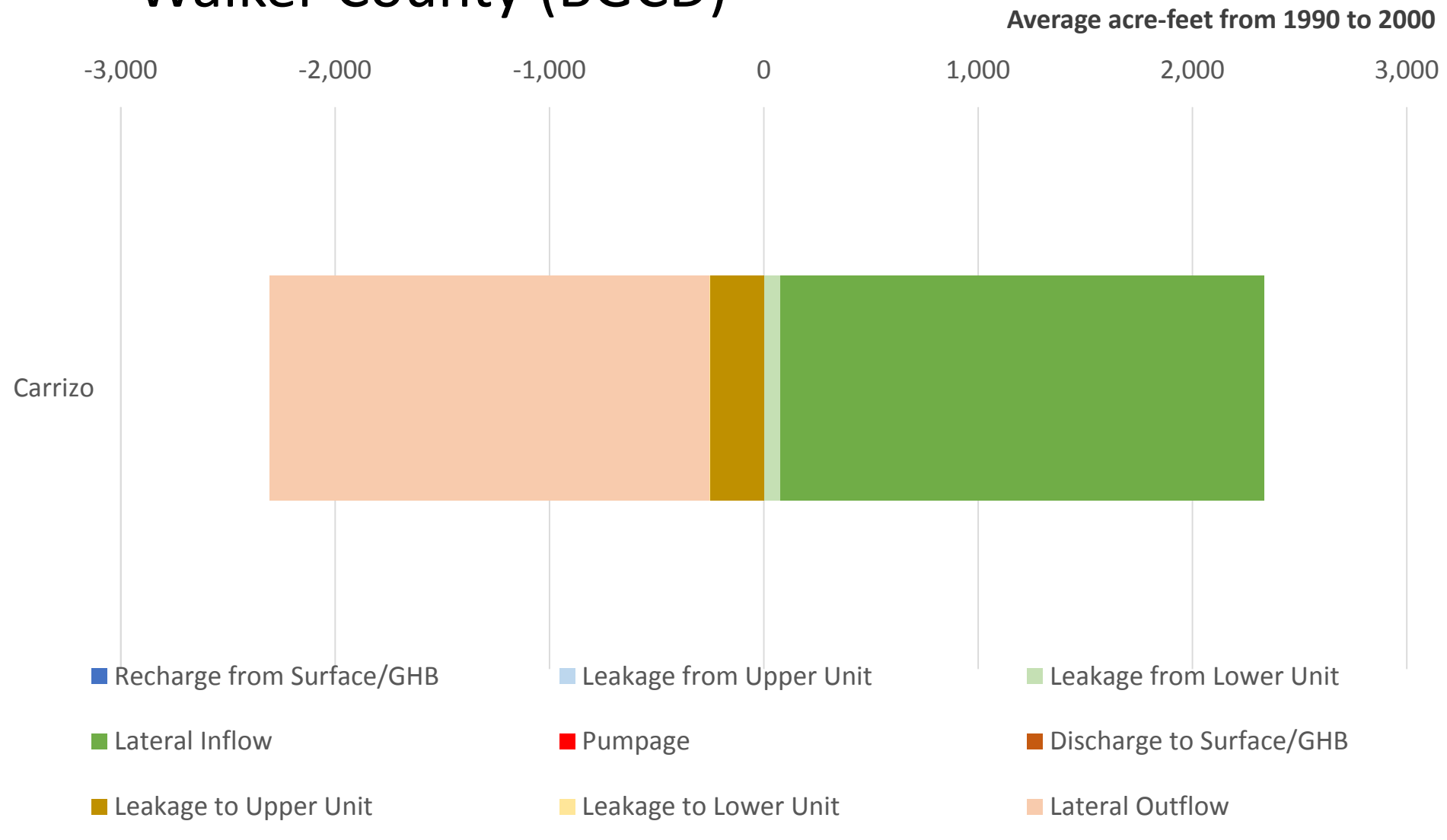
- 1980-1999 Drawdown



- Grimes County (BGCD)



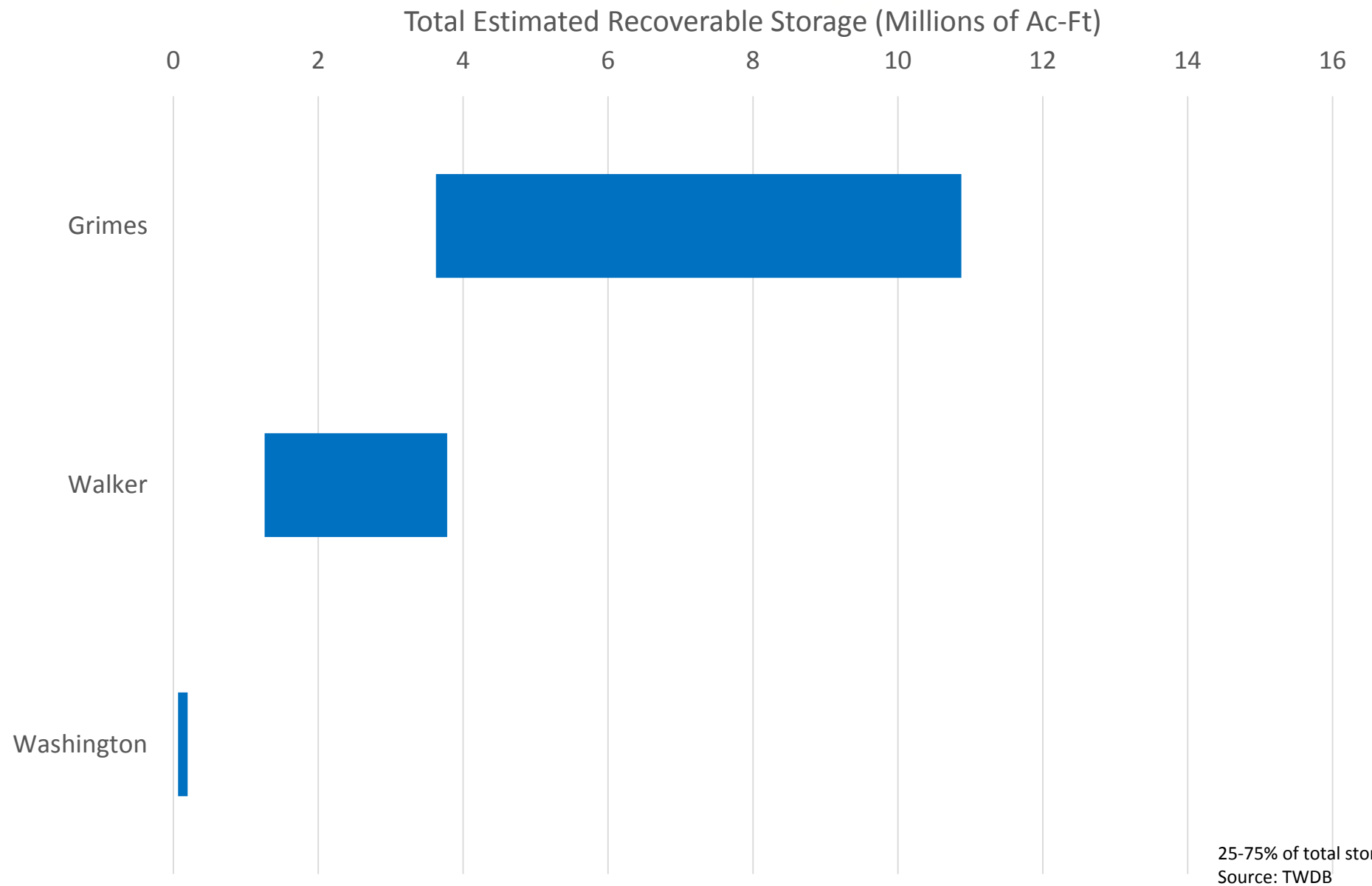
- Walker County (BGCD)



Phase 3: Explanatory Report

Hydrological Conditions

Carrizo Aquifer
Total Estimated
Recoverable Storage



25-75% of total storage
Source: TWDB

Phase 3: Explanatory Report

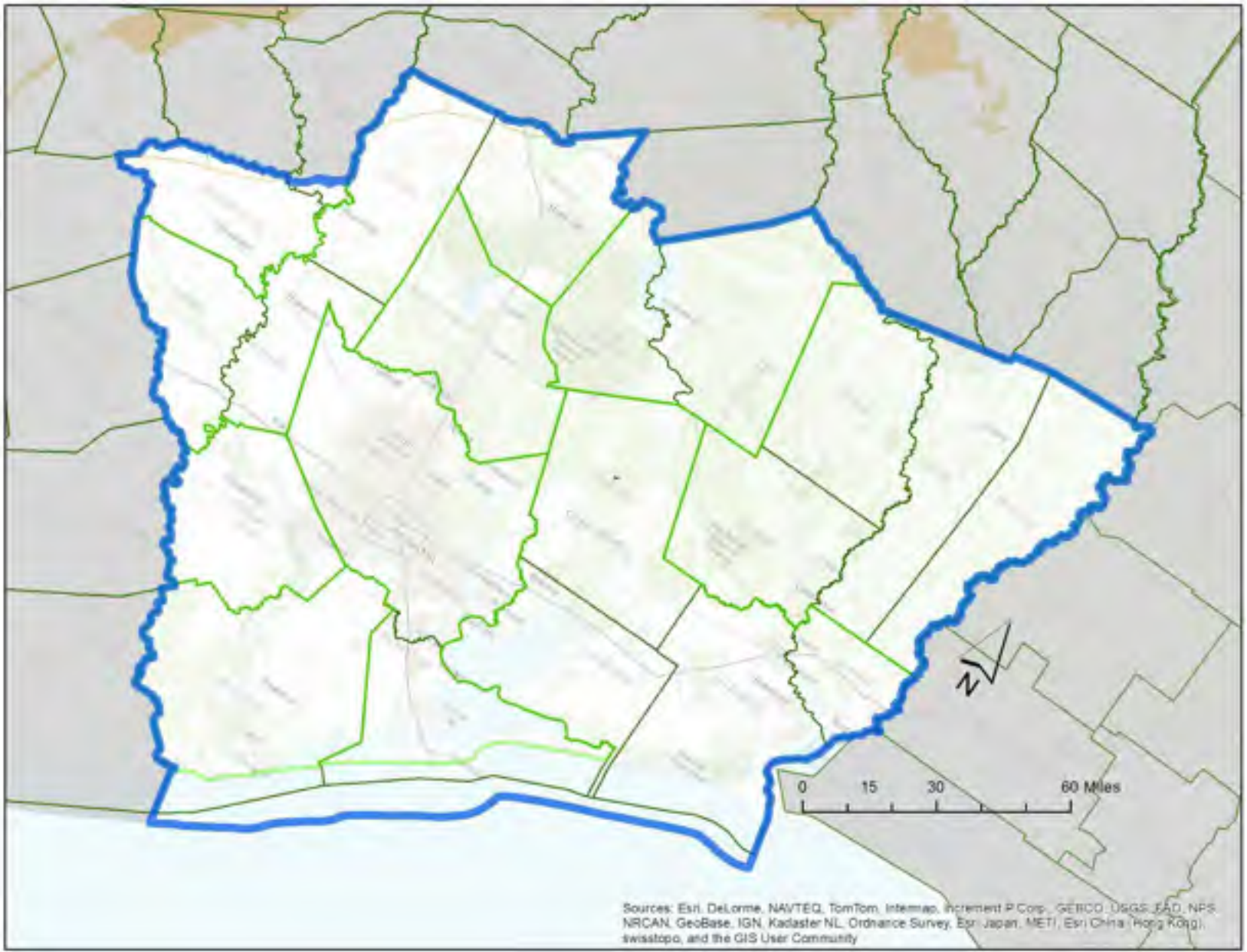
Hydrological Conditions

- Queen City Aquifer
  - *Groundwater Availability Models for the Queen City and Sparta Aquifers* (INTERA, 2004)
  - Central Carrizo-Wilcox GAM Run
  - TWDB GAM Task 13-037

Phase 3: Explanatory Report

Hydrological Conditions

Queen City Aquifer
Location Map



Phase 3: Explanatory Report

Hydrological Conditions

Queen City Aquifer Stratigraphy

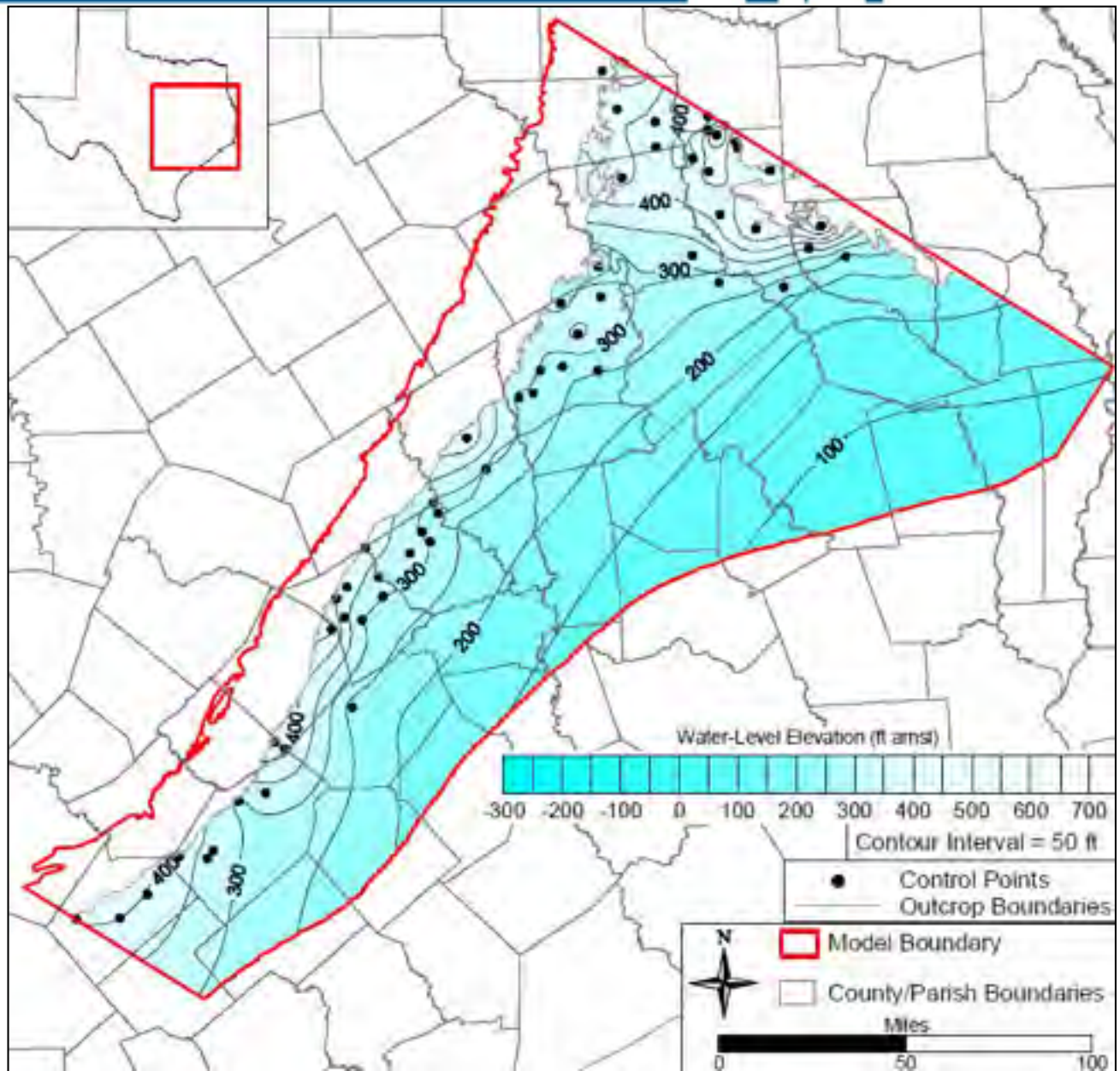
Central Carrizo-Wilcox aquifer (this study)

Stratigraphy		Model layer
Alluvium		1
Jackson Group		
Claiborne Group	Yegua Fm.	
	Cook Mtn. Fm.	
	Sparta Sand	
	Weches Fm.	
	Queen City Sand	
	Reklaw Fm. / Newby Mmbr.	2
	Carrizo Sand	3
Wilcox Group	Calvert Bluff	4
	Simsboro	5
	Hooper	6
Midway Formation		

Phase 3: Explanatory Report

Hydrological Conditions

Queen City Aquifer
Measured Water Surface



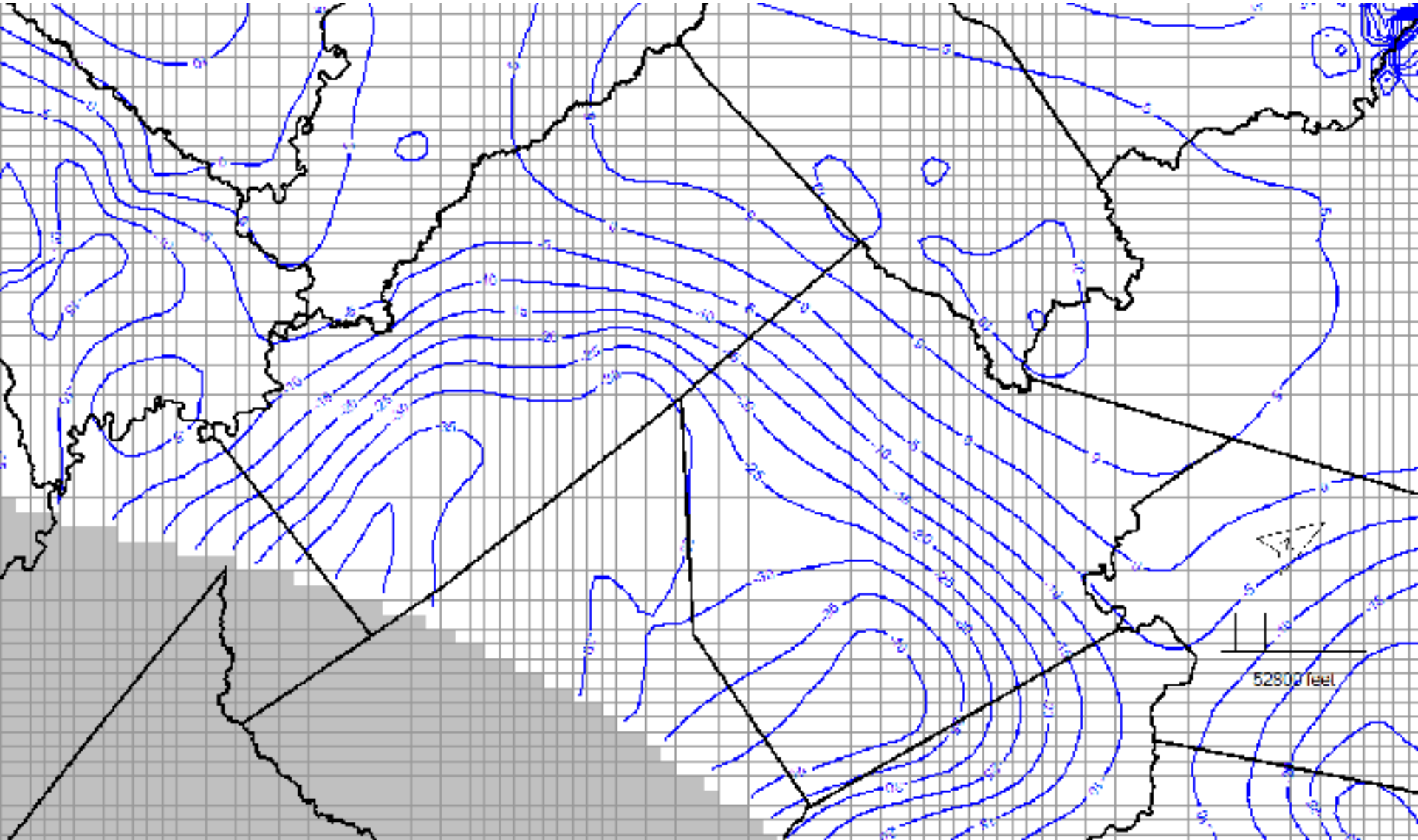
1999
Estimated

Phase 3: Explanatory Report

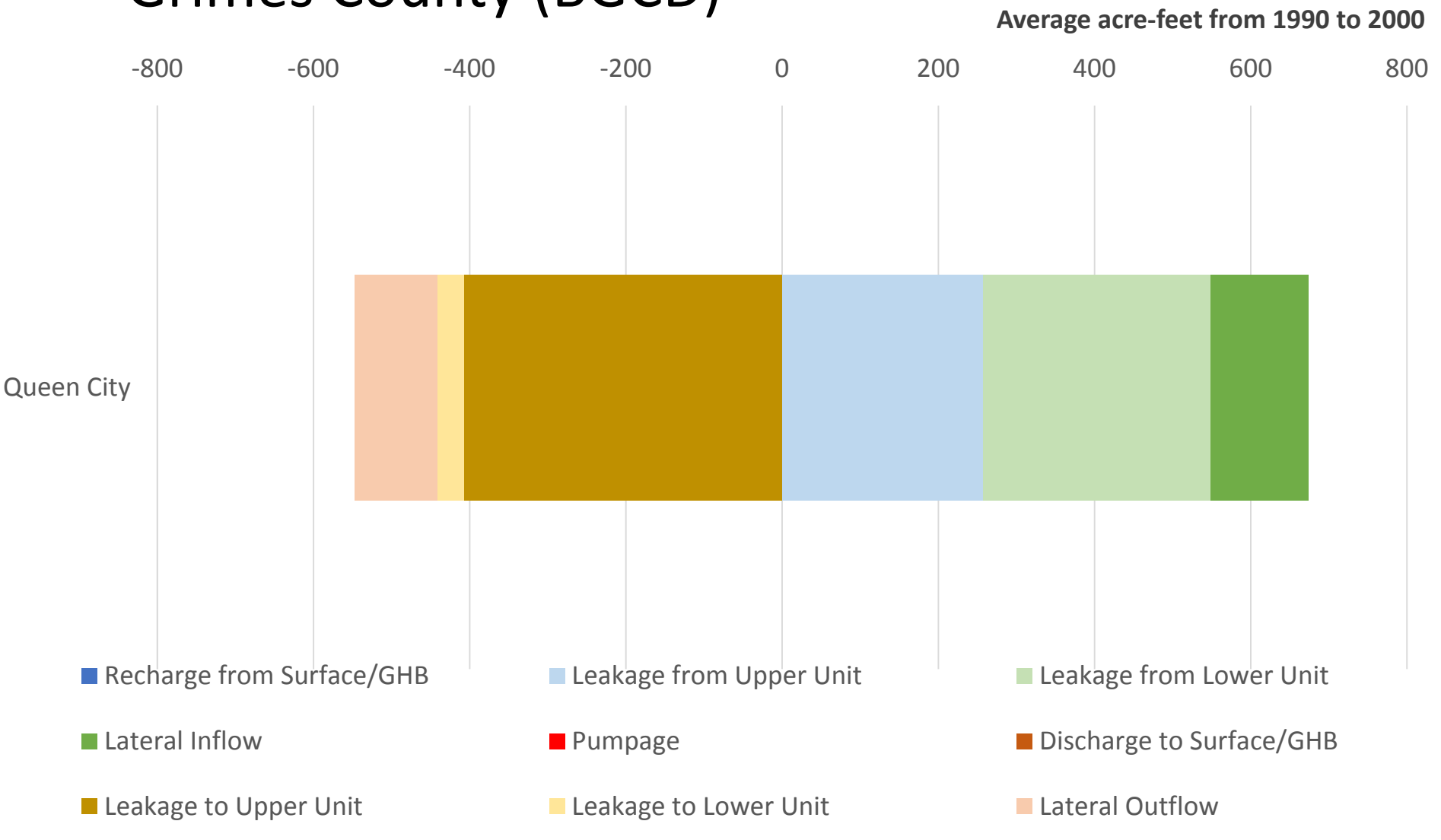
Hydrological Conditions

Queen City Aquifer
Long-Term Trends

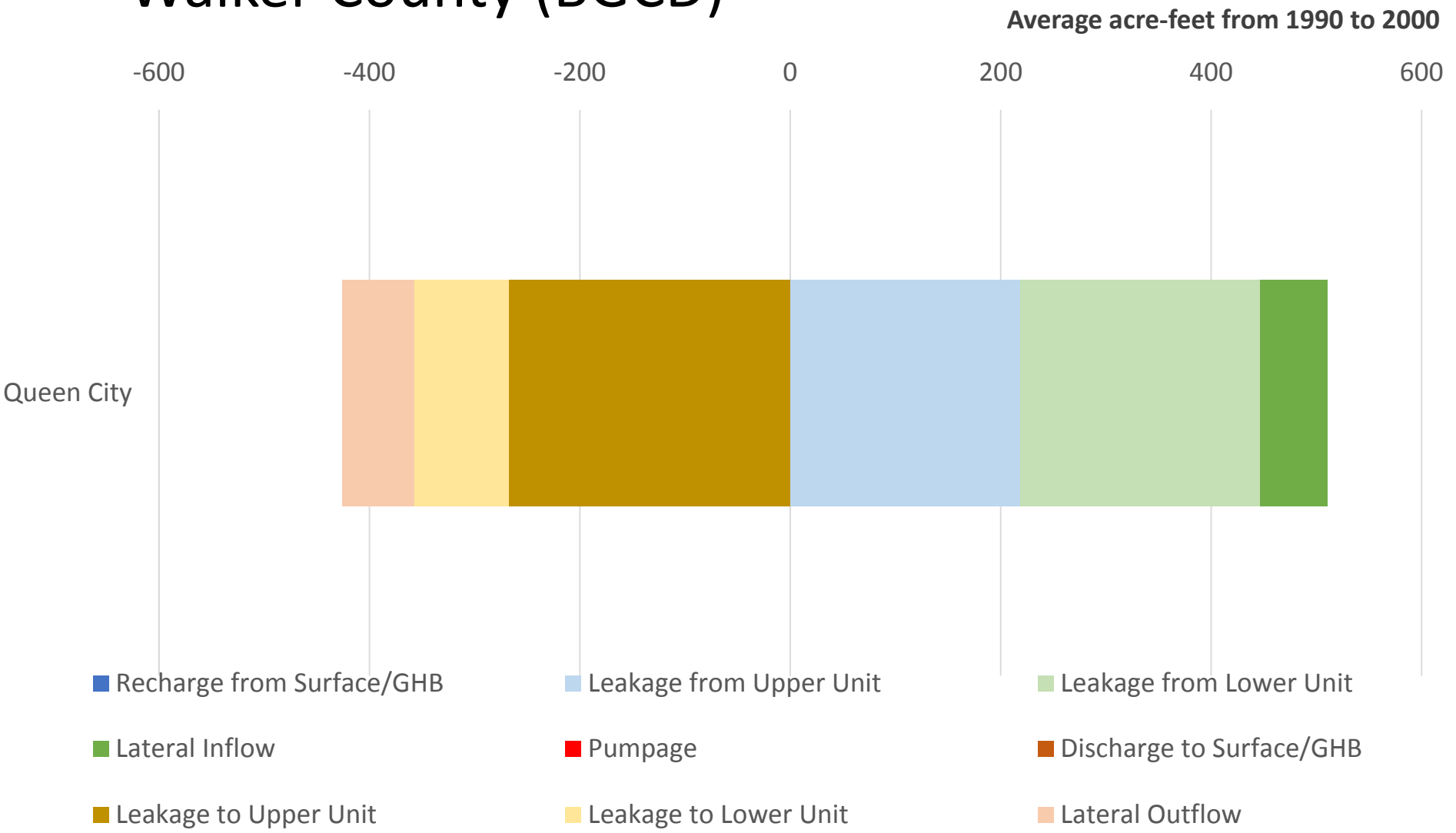
- 1980-1999 Drawdown



- Grimes County (BGCD)



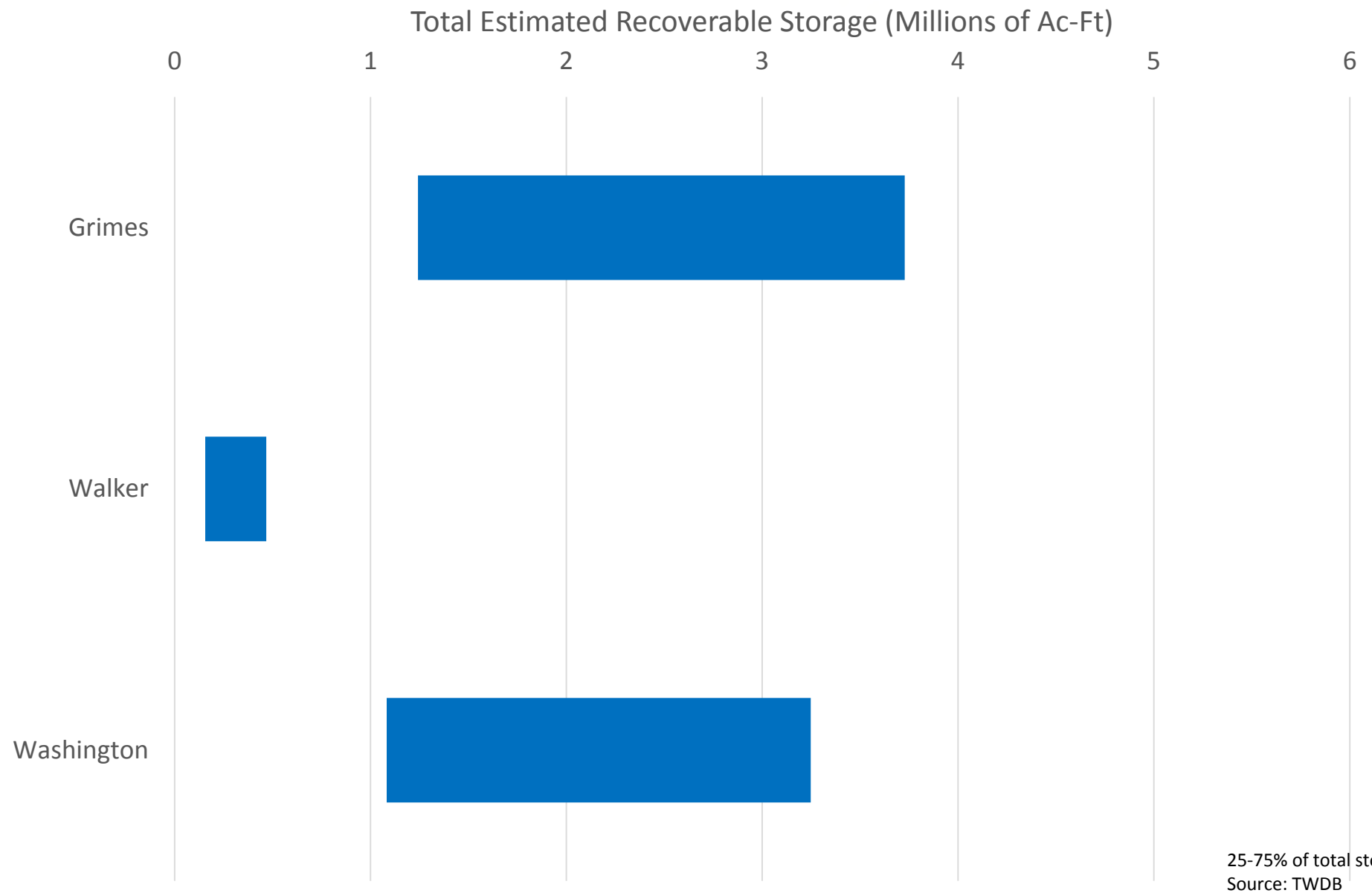
- Walker County (BGCD)



Phase 3: Explanatory Report

Hydrological Conditions

Queen City Aquifer Total Estimated Recoverable Storage



25-75% of total storage
Source: TWDB

Phase 3: Explanatory Report

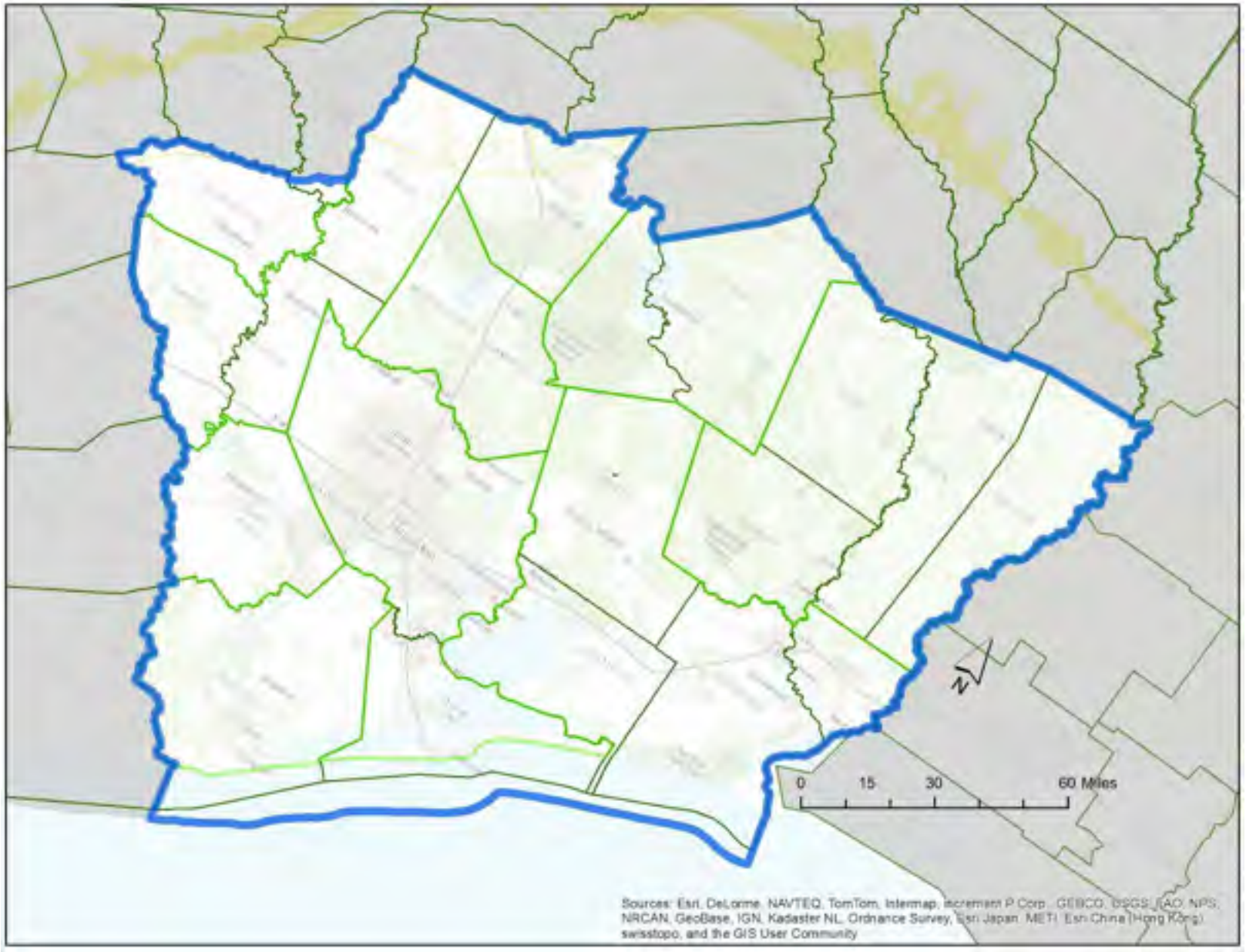
Hydrological Conditions

- Sparta Aquifer
  - *Groundwater Availability Models for the Queen City and Sparta Aquifers* (INTERA, 2004)
  - Central Carrizo-Wilcox GAM Run
  - TWDB GAM Task 13-037

Phase 3: Explanatory Report

Hydrological Conditions

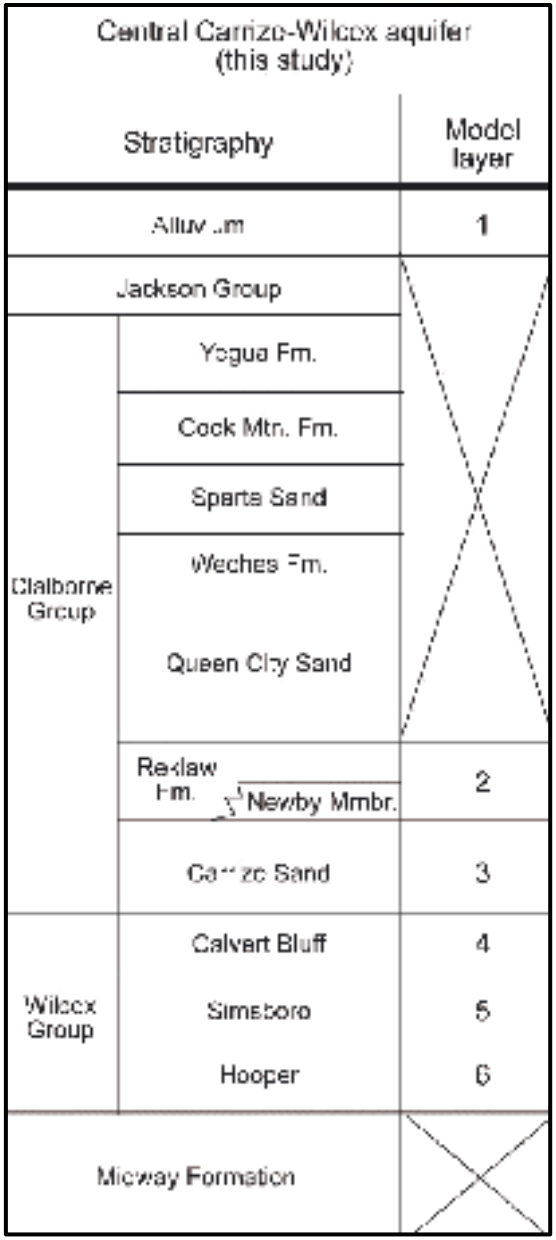
Sparta Aquifer
Location Map



Phase 3: Explanatory Report

Hydrological Conditions

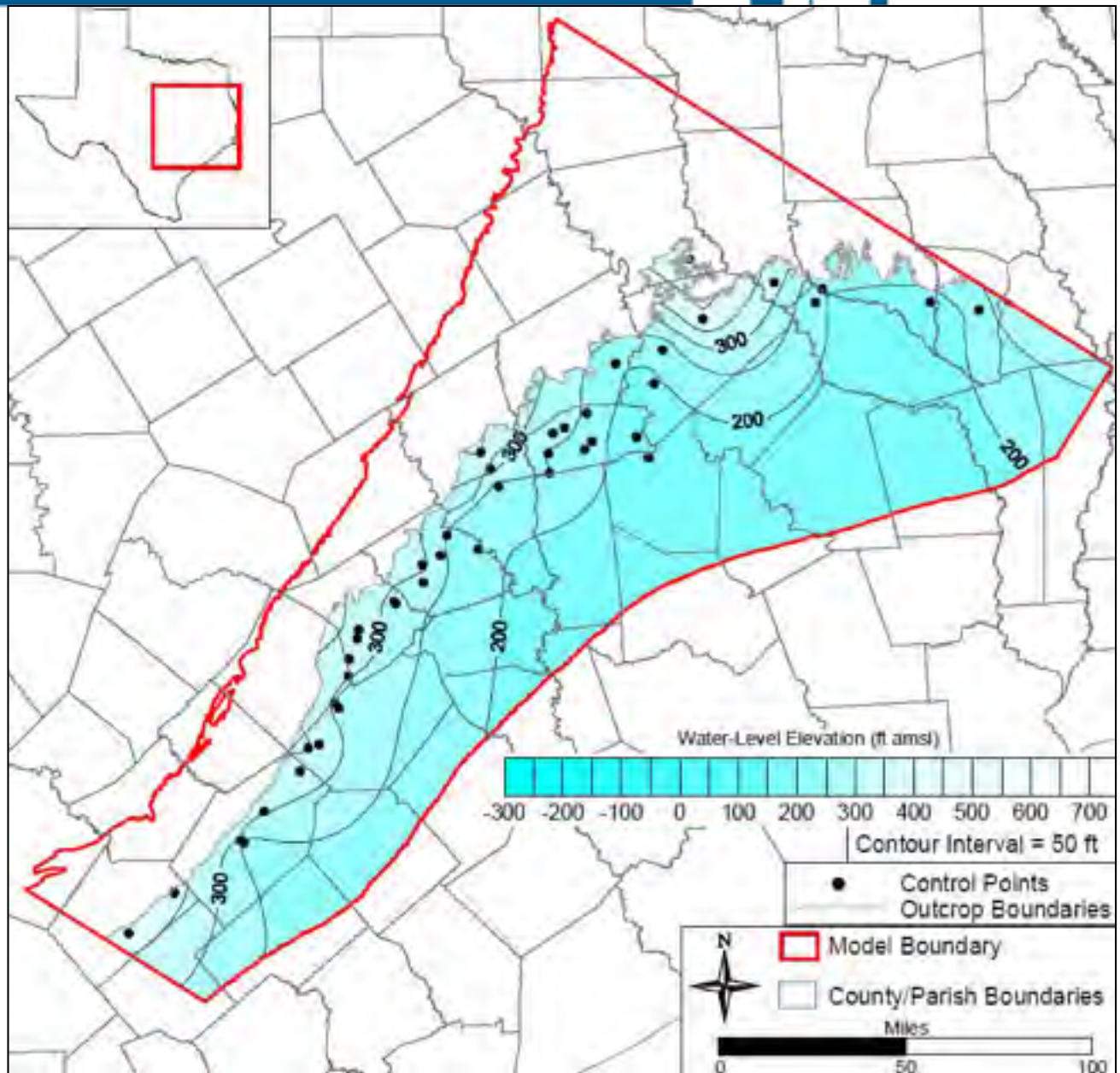
Sparta Aquifer Stratigraphy



Phase 3: Explanatory Report

Hydrological Conditions

Sparta Aquifer
Measured Water Surface



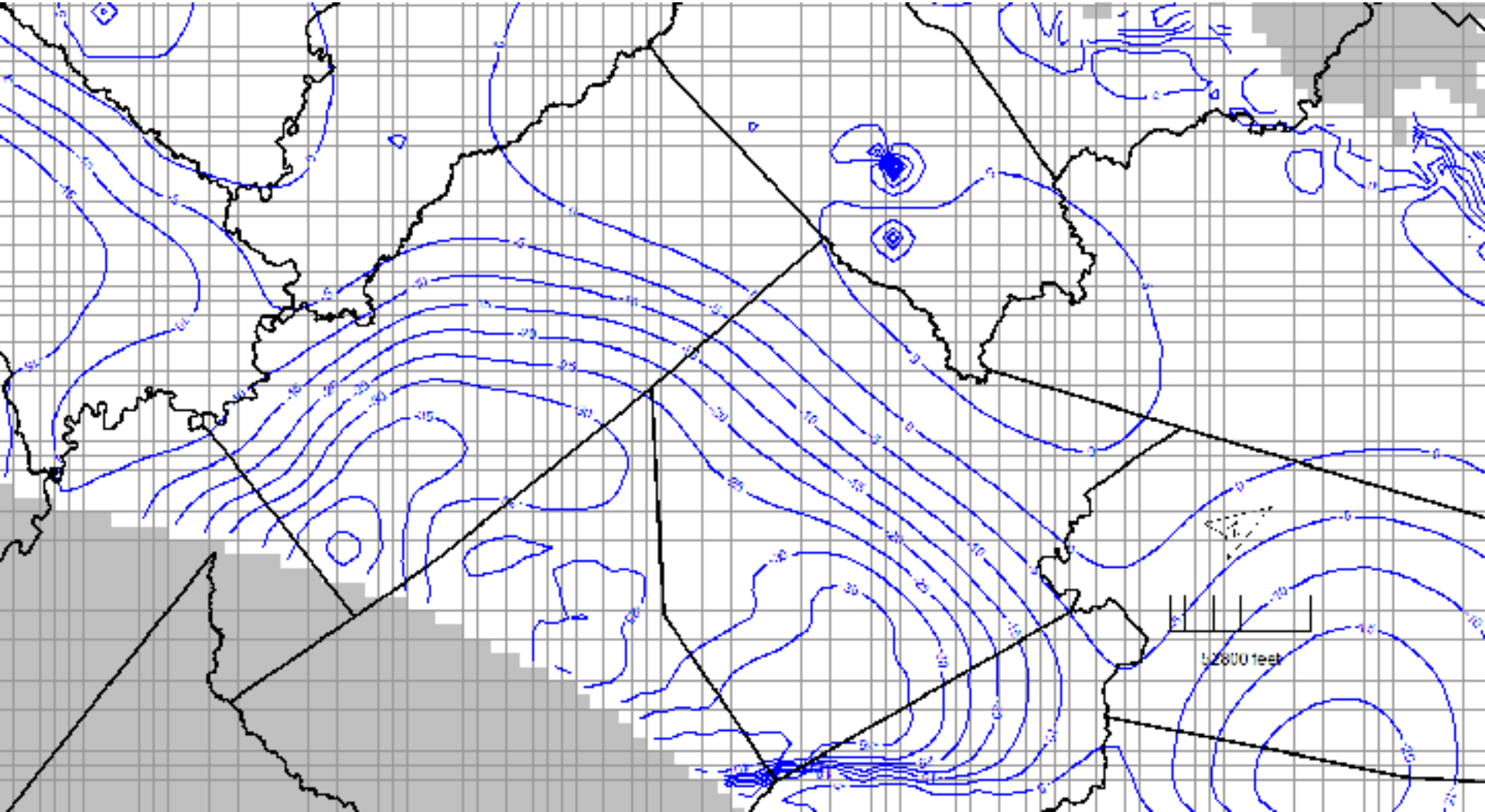
1999
Estimated

Phase 3: Explanatory Report

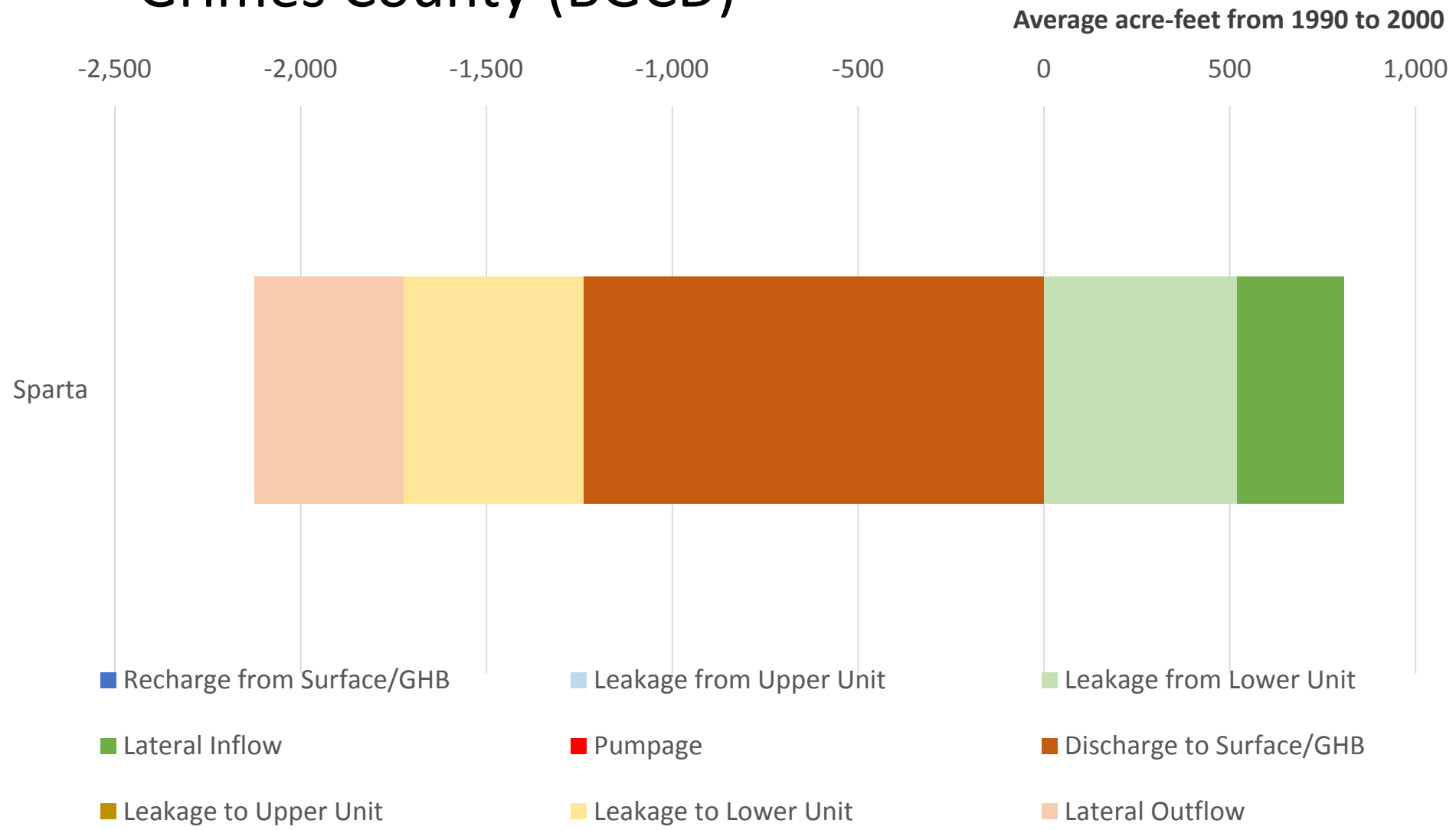
Hydrological Conditions

Sparta Aquifer
Long-Term Trends

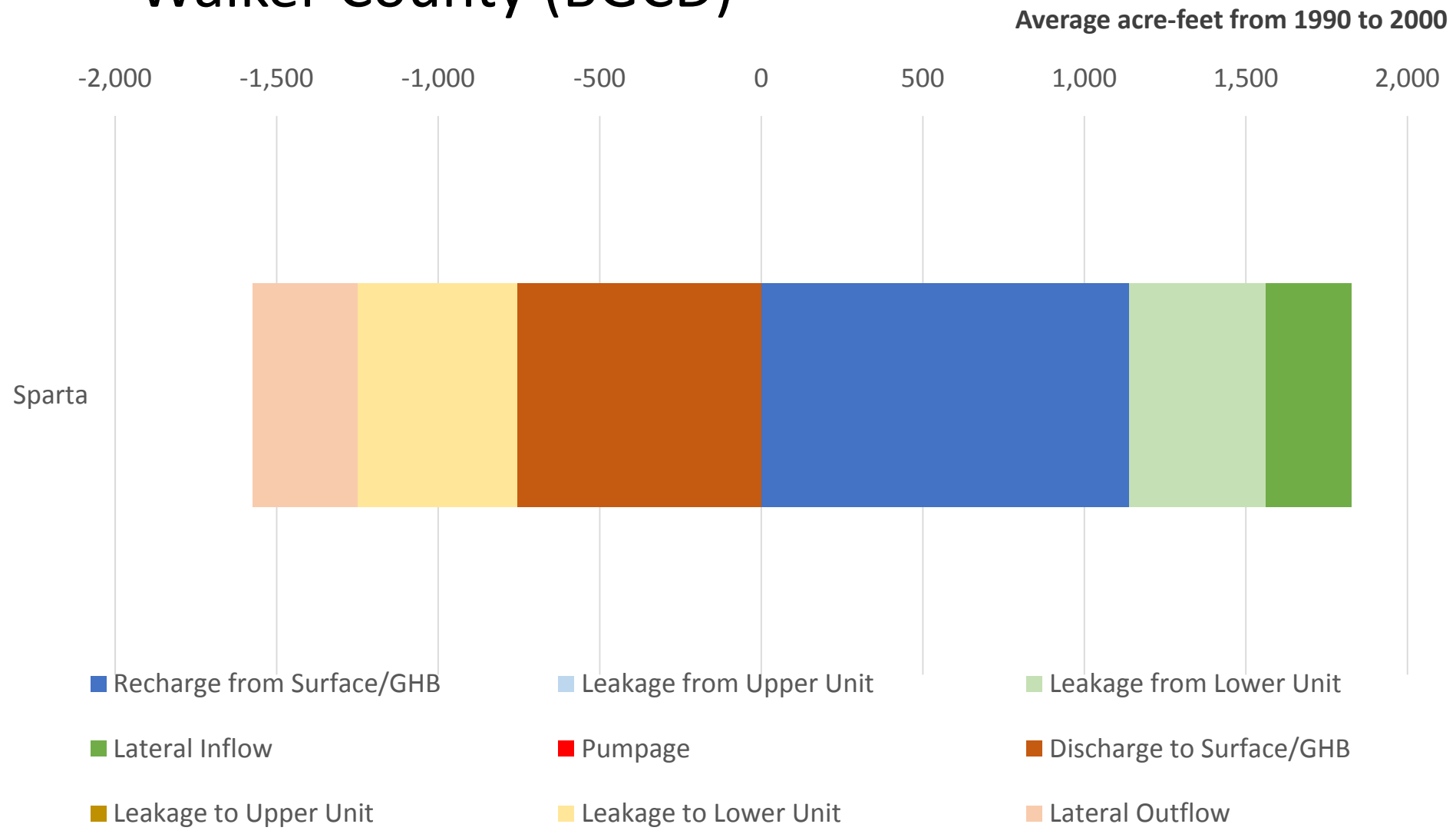
- 1980-1999 Drawdown



- Grimes County (BGCD)



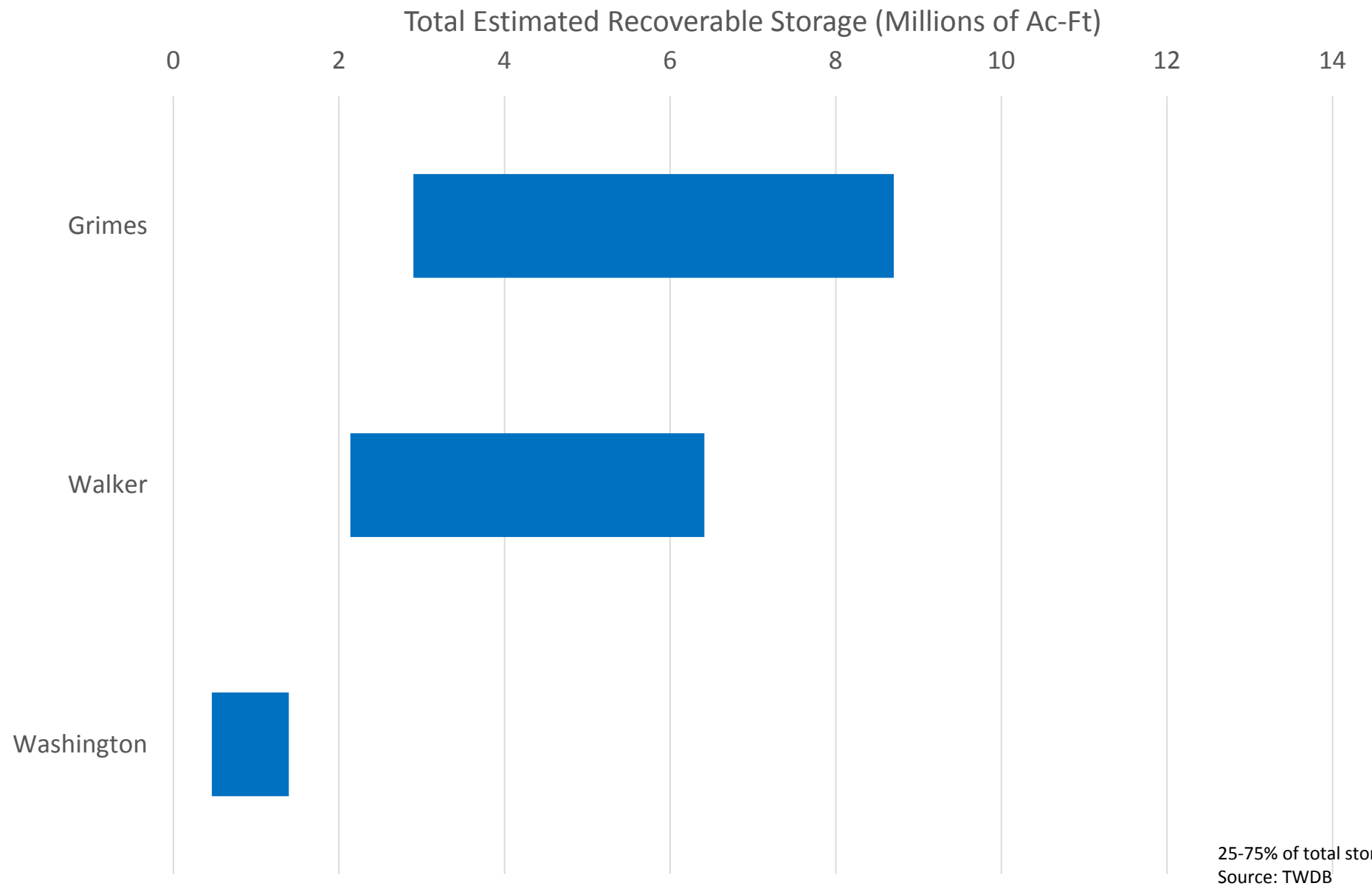
- Walker County (BGCD)



Phase 3: Explanatory Report

Hydrological Conditions

Sparta Aquifer
Total Estimated
Recoverable Storage



25-75% of total storage
Source: TWDB

Phase 3: Explanatory Report

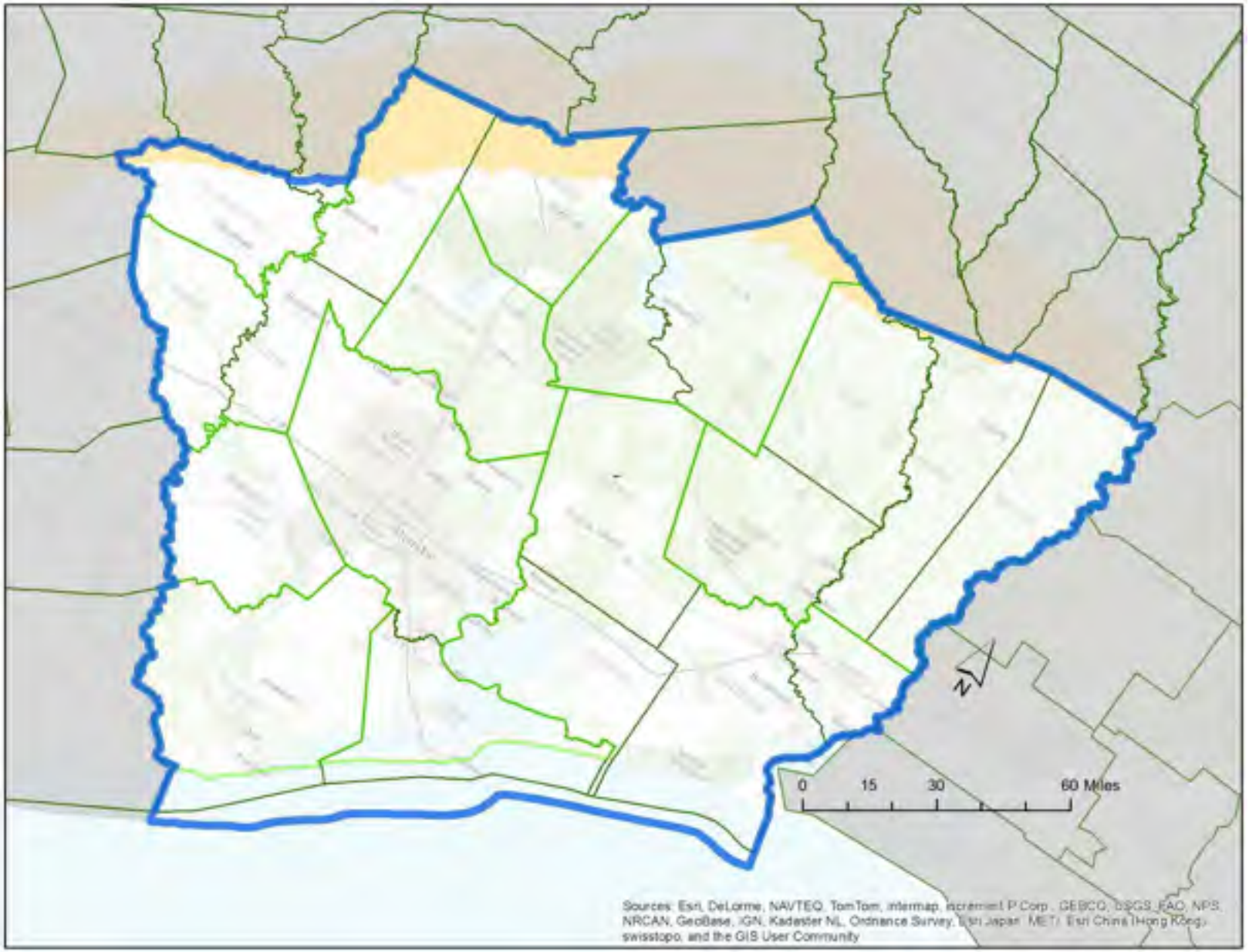
Hydrological Conditions

- Yegua-Jackson Aquifer
  - *Final Report: Groundwater Availability Model for the Yegua-Jackson Aquifer* (INTERA, Rev. 2010)
  - Yegua-Jackson GAM Run
  - TWDB GAM Task 13-037

Phase 3: Explanatory Report

Hydrological Conditions

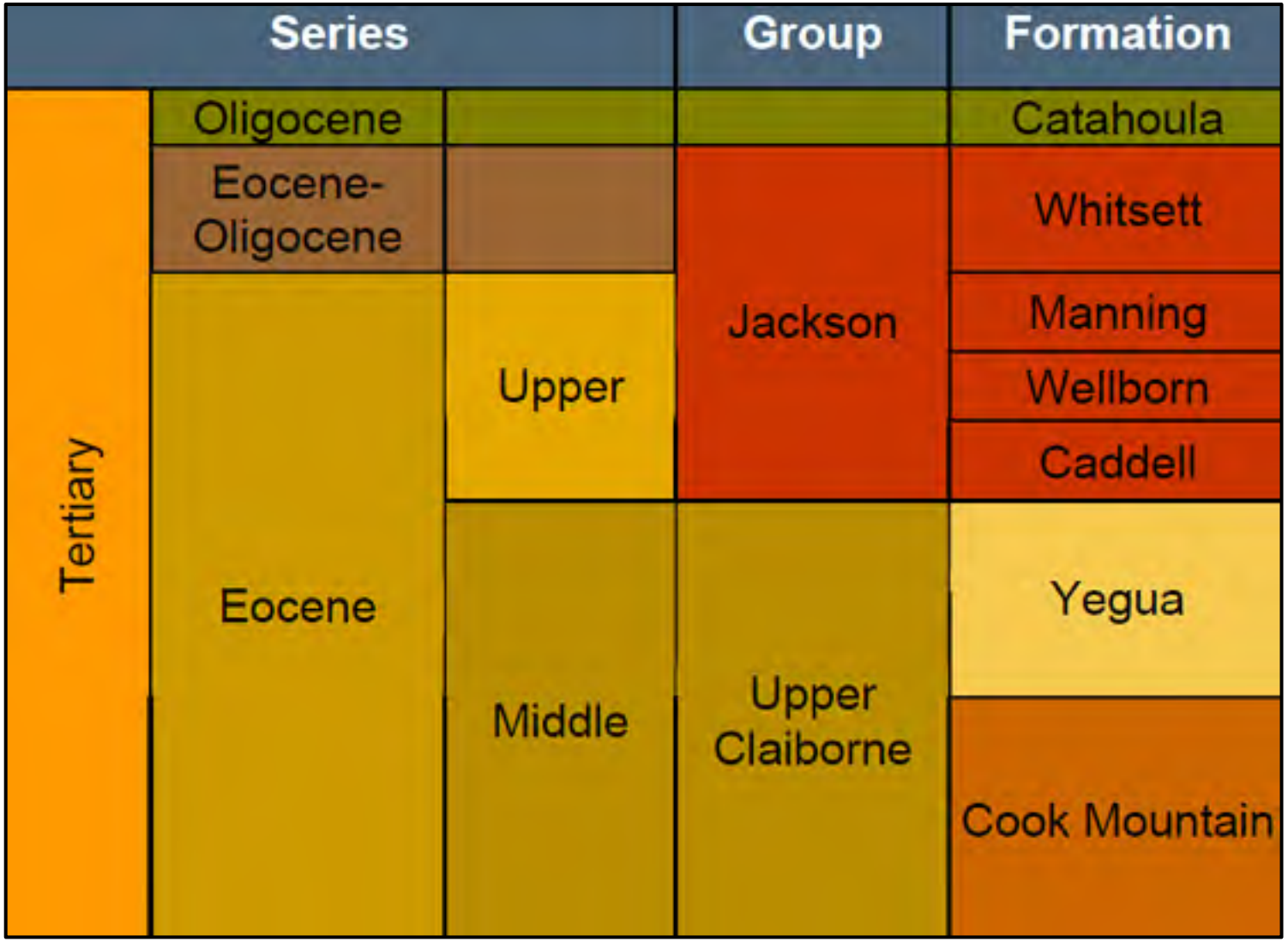
Yegua-Jackson Aquifer
Location Map



Phase 3: Explanatory Report

Hydrological Conditions

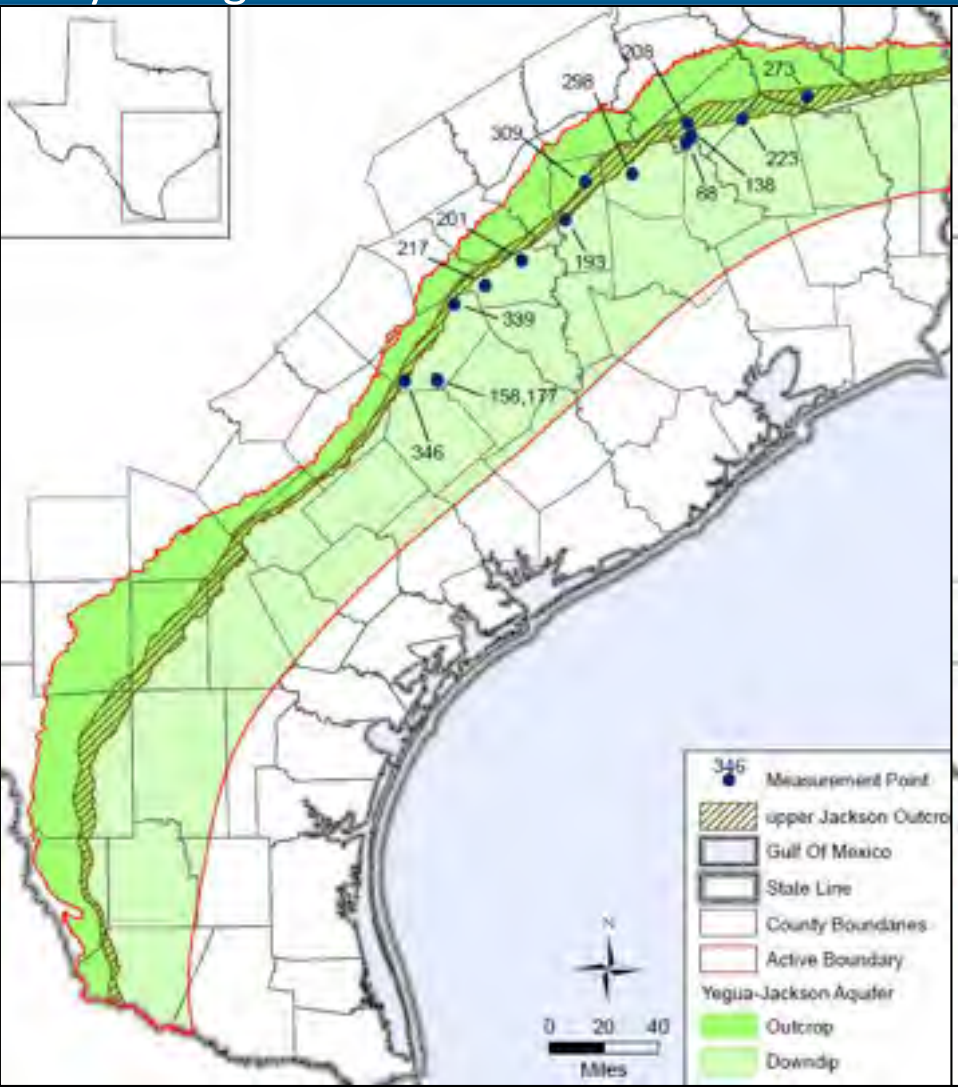
Yegua-Jackson Aquifer Stratigraphy



Phase 3: Explanatory Report

Hydrological Conditions

Yegua-Jackson Aquifer
Measured Water Surface



Upper Jackson

1997 Estimated

Lower Jackson

Phase 3: Explanatory Report

Hydrological Conditions

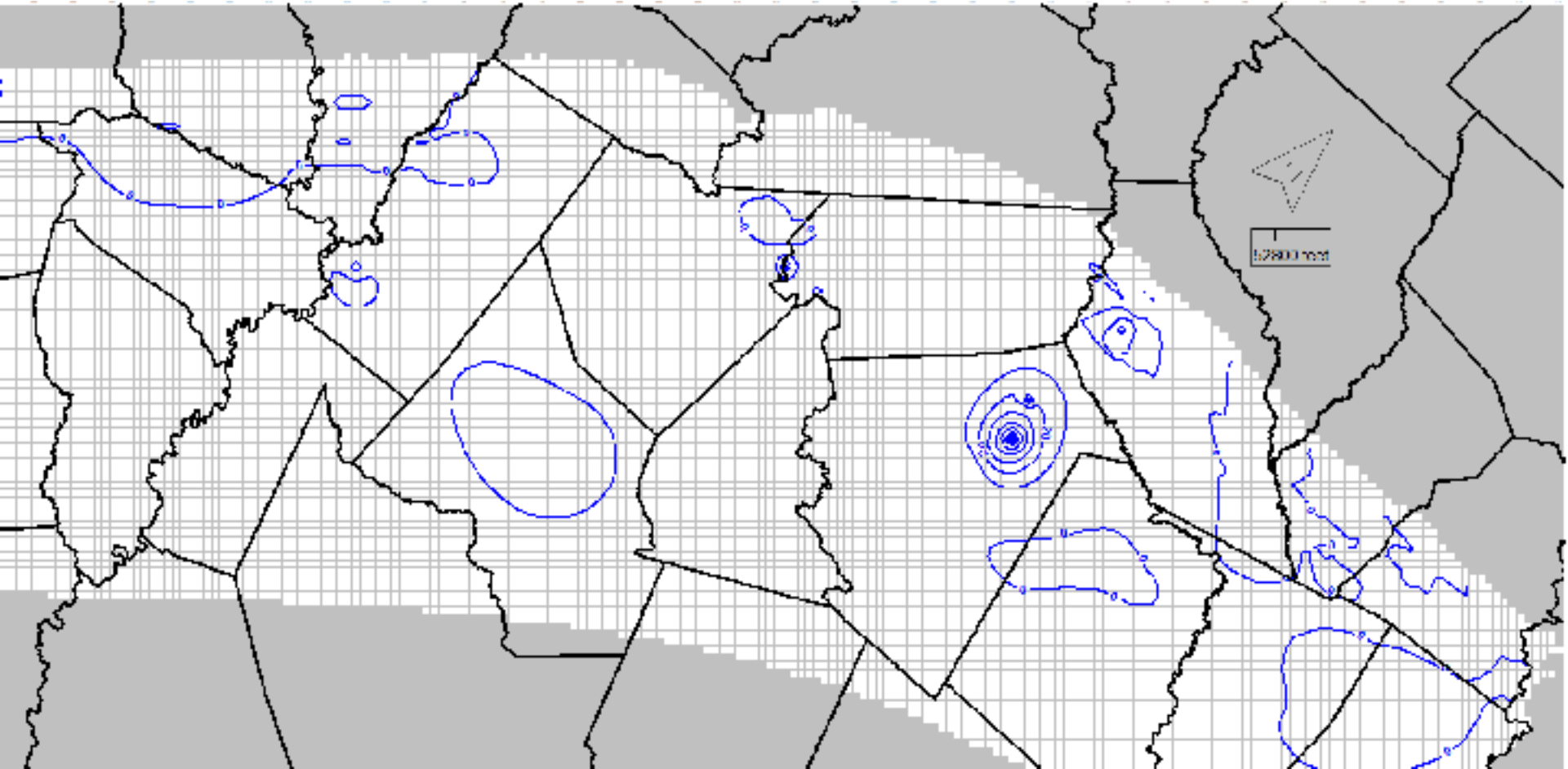
Yegua-Jackson Aquifer
Measured Water Surface

Upper Yegua

1997 Estimated

Lower Yegua

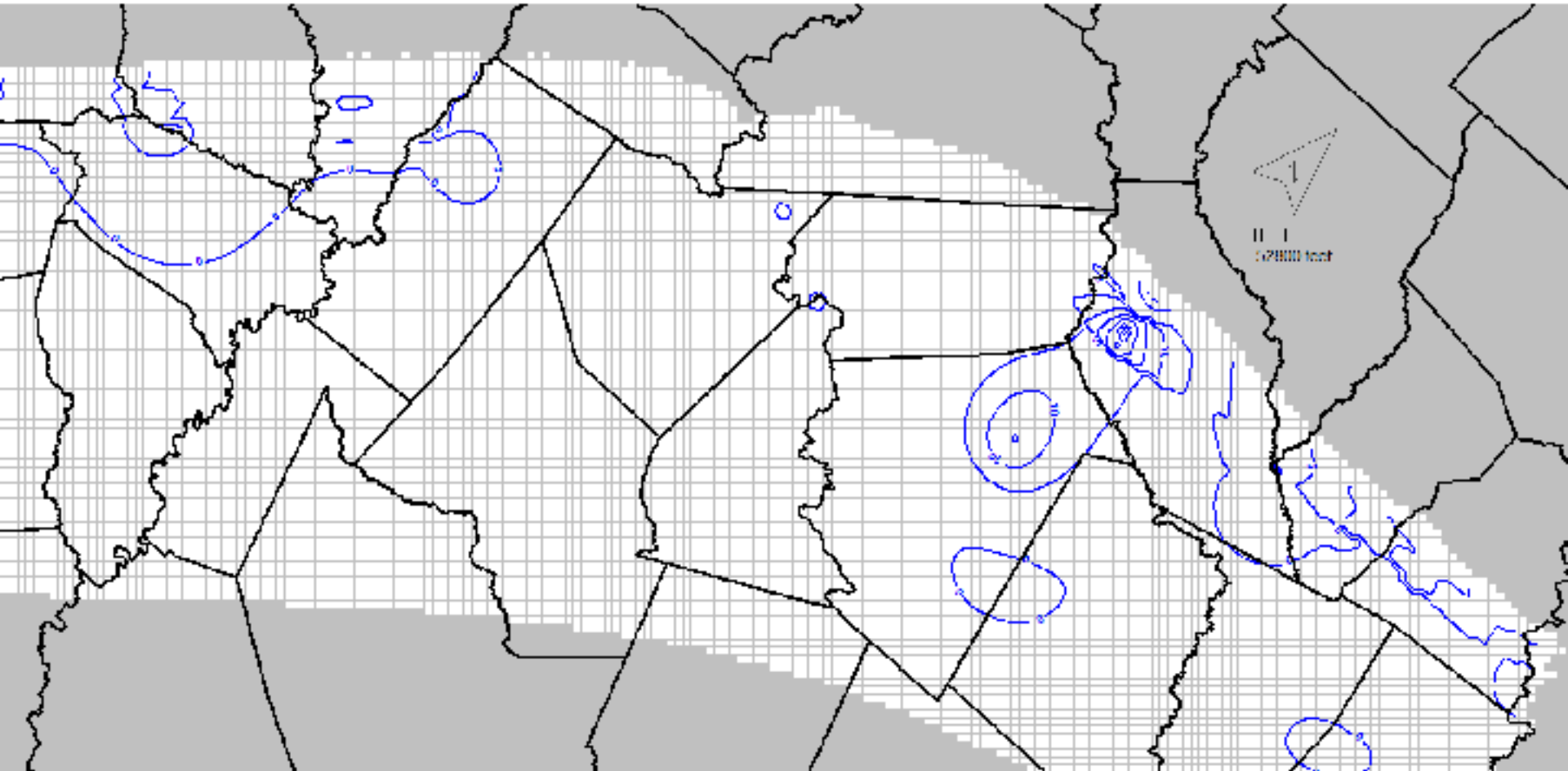
- 1980-1999 Drawdown – Upper Jackson



Phase 3: Explanatory Report

Hydrological Conditions

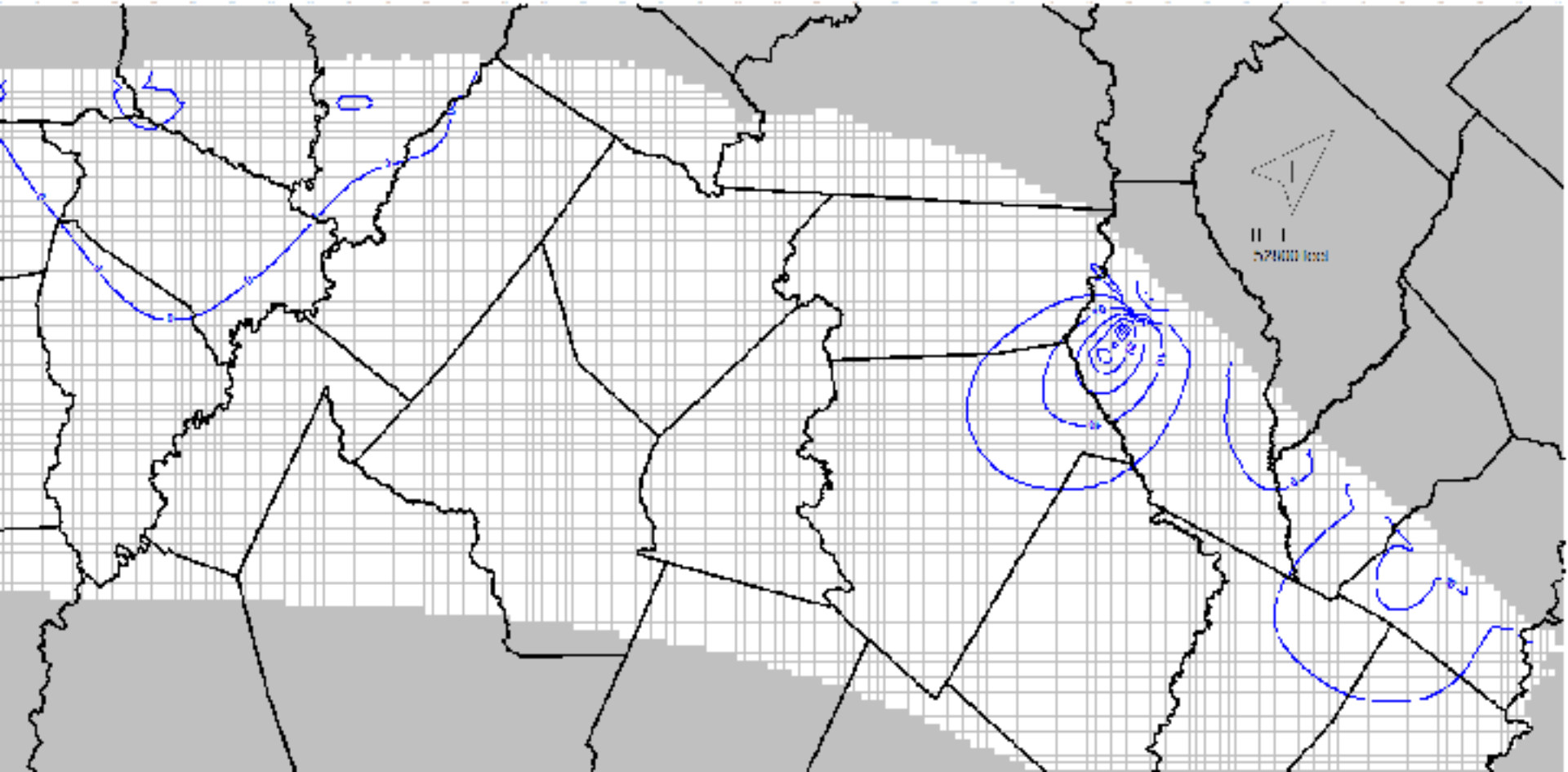
- 1980-1999 Drawdown – Lower Jackson



Phase 3: Explanatory Report

Hydrological Conditions

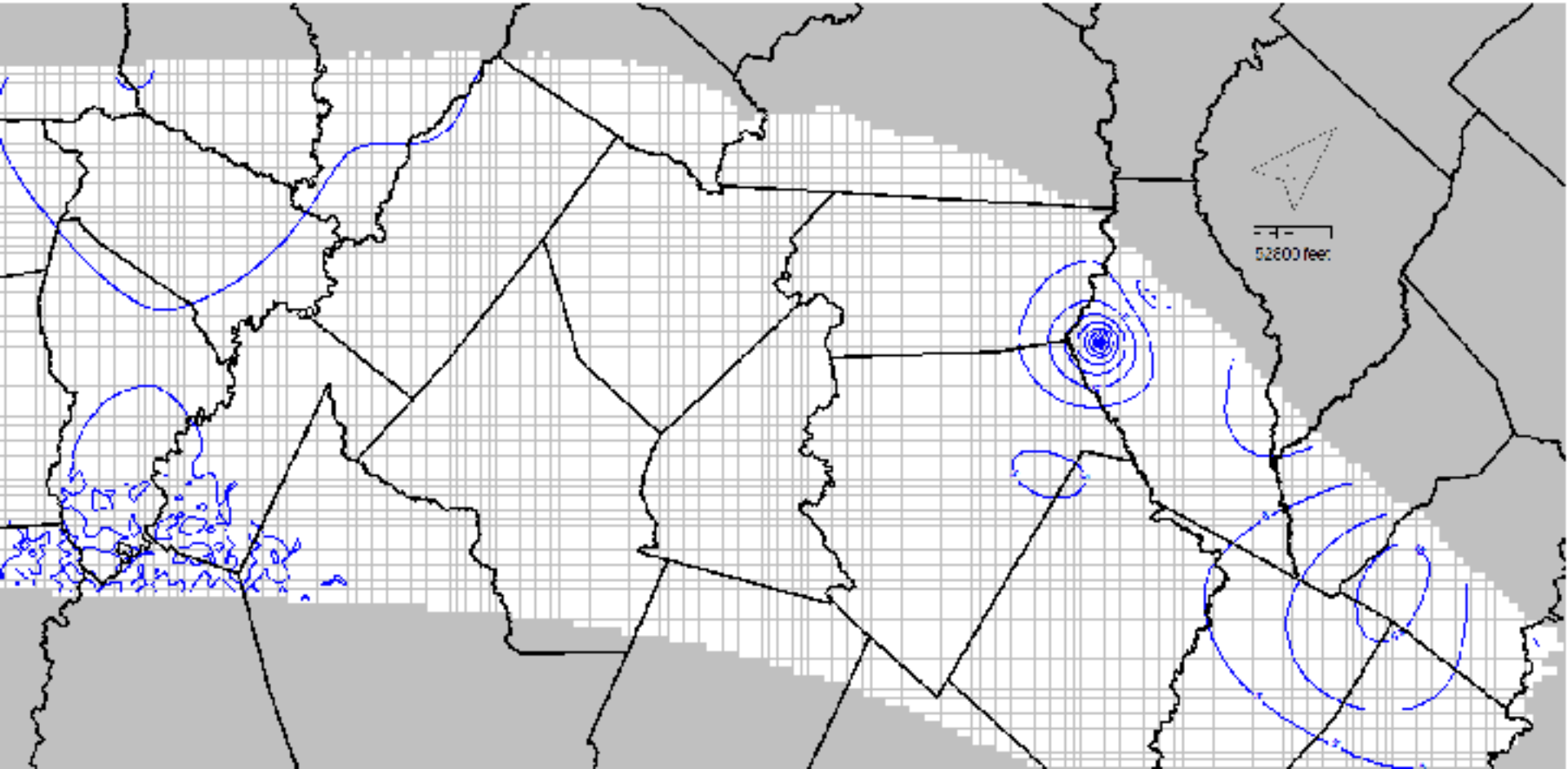
- 1980-1999 Drawdown – Upper Yegua



Phase 3: Explanatory Report

Hydrological Conditions

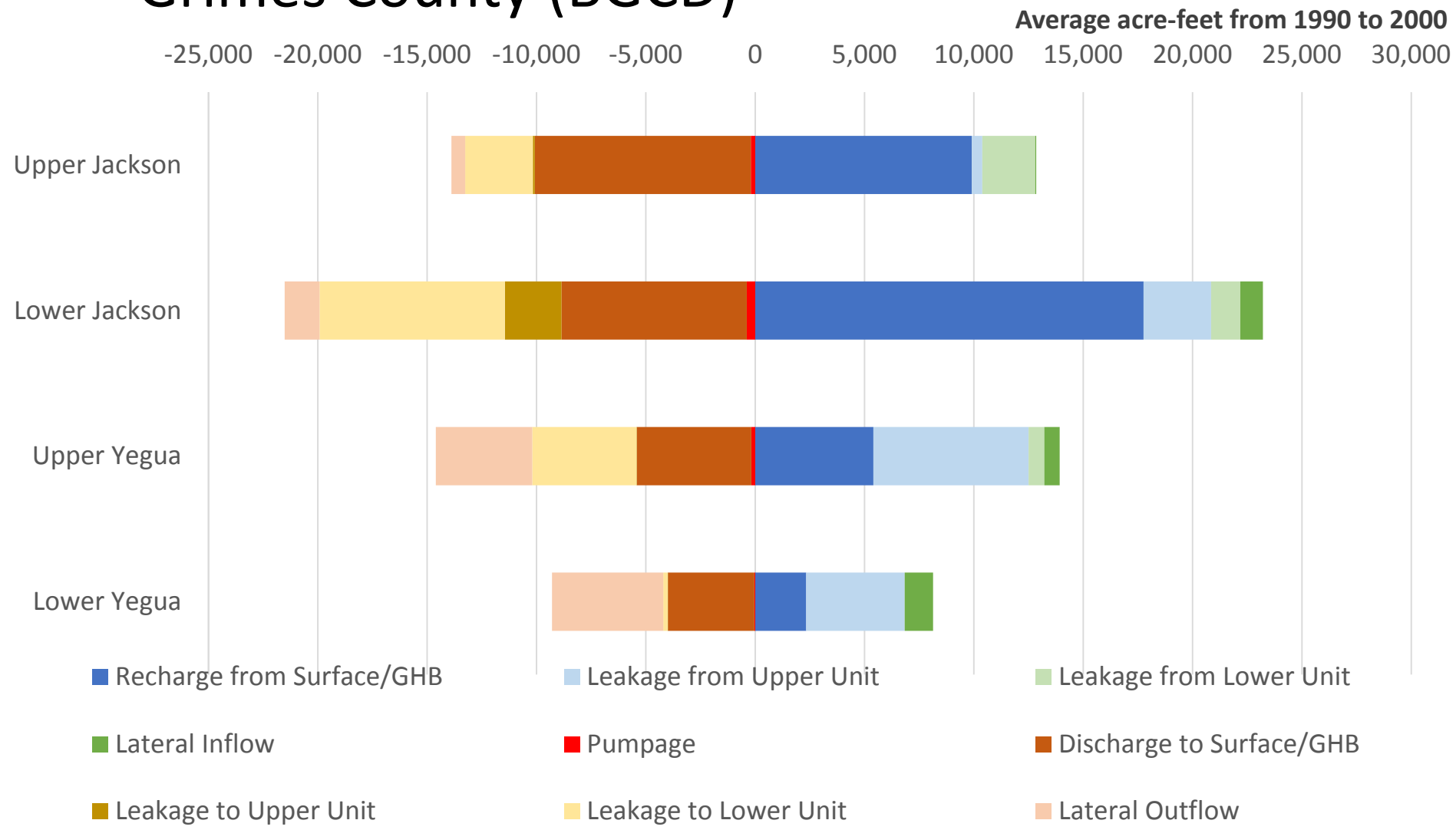
- 1980-1999 Drawdown – Lower Yegua



Phase 3: Explanatory Report

Hydrological Conditions

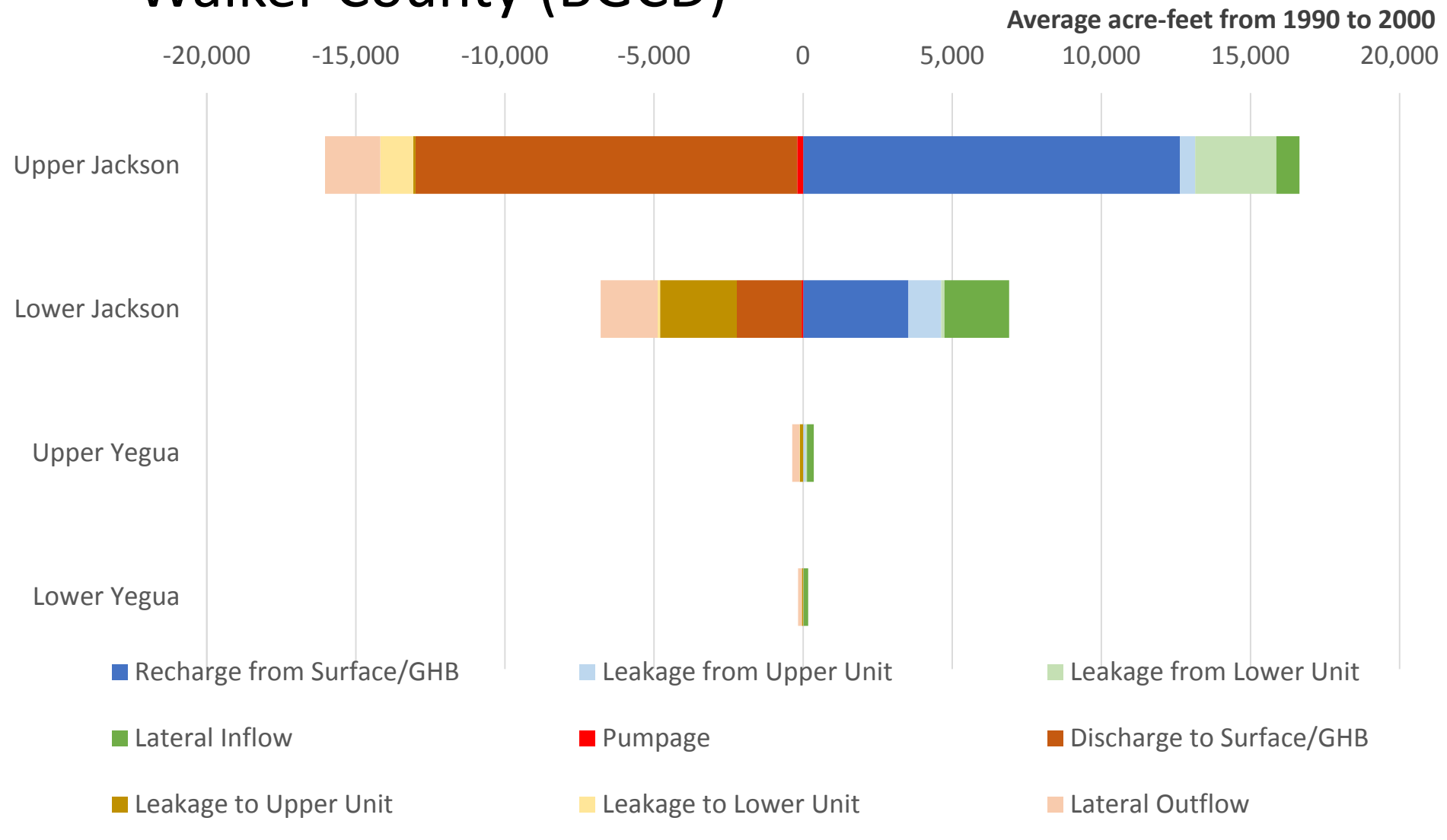
- Grimes County (BGCD)



Phase 3: Explanatory Report

Hydrological Conditions

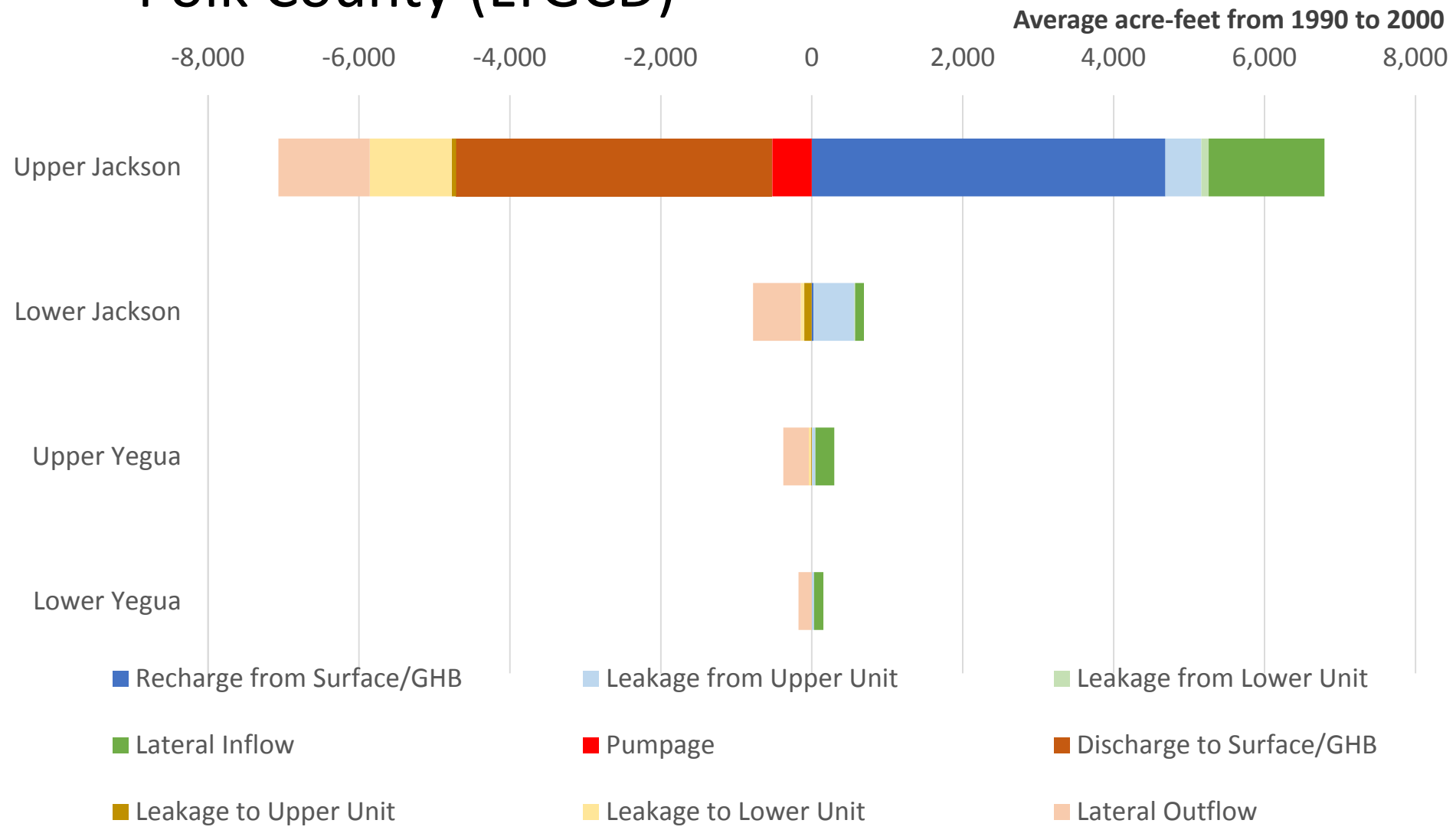
- Walker County (BGCD)



Phase 3: Explanatory Report

Hydrological Conditions

- Polk County (LTGCD)

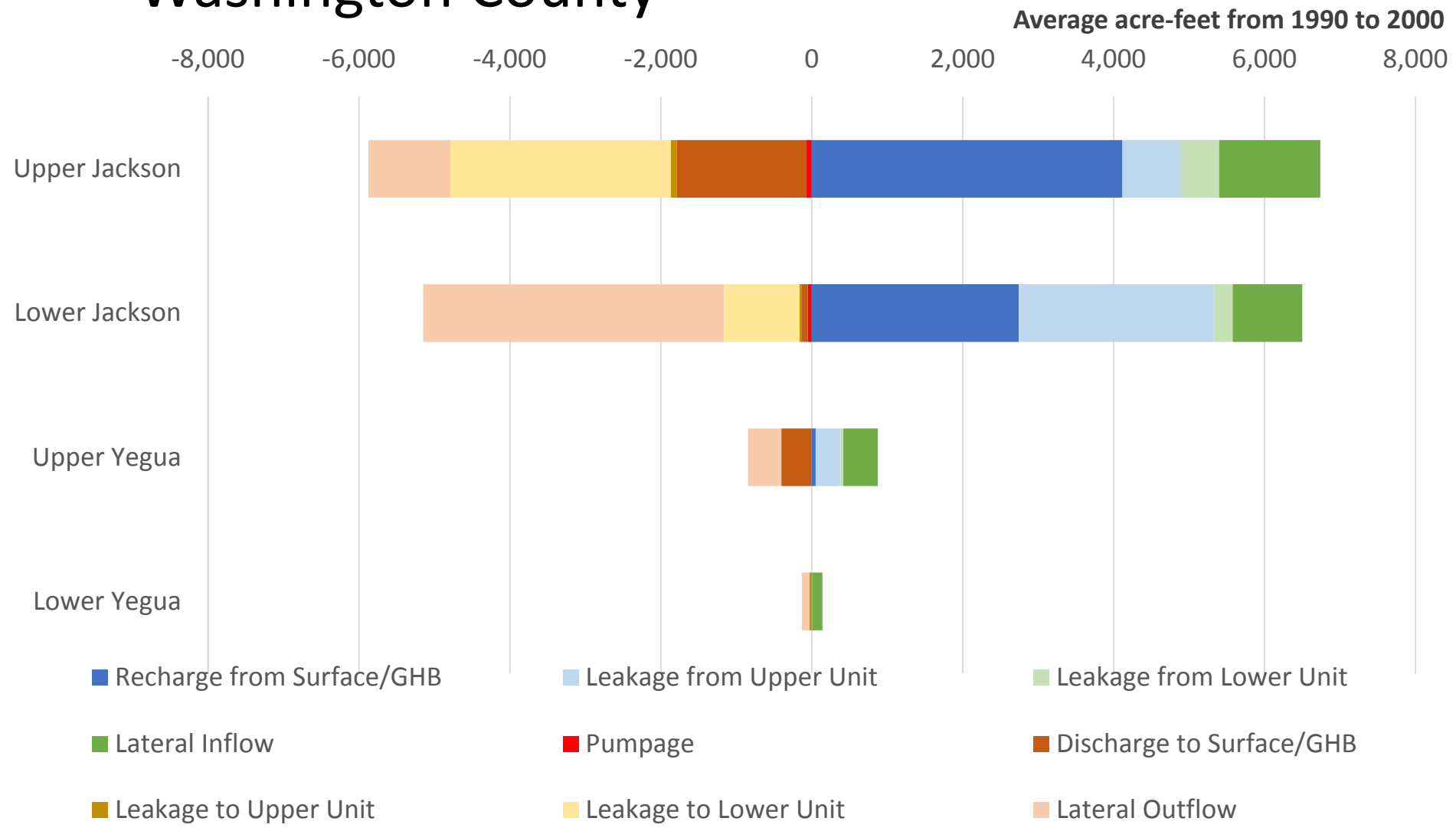


Phase 3: Explanatory Report

Hydrological Conditions

Yegua-Jackson Aquifer
Water Budget

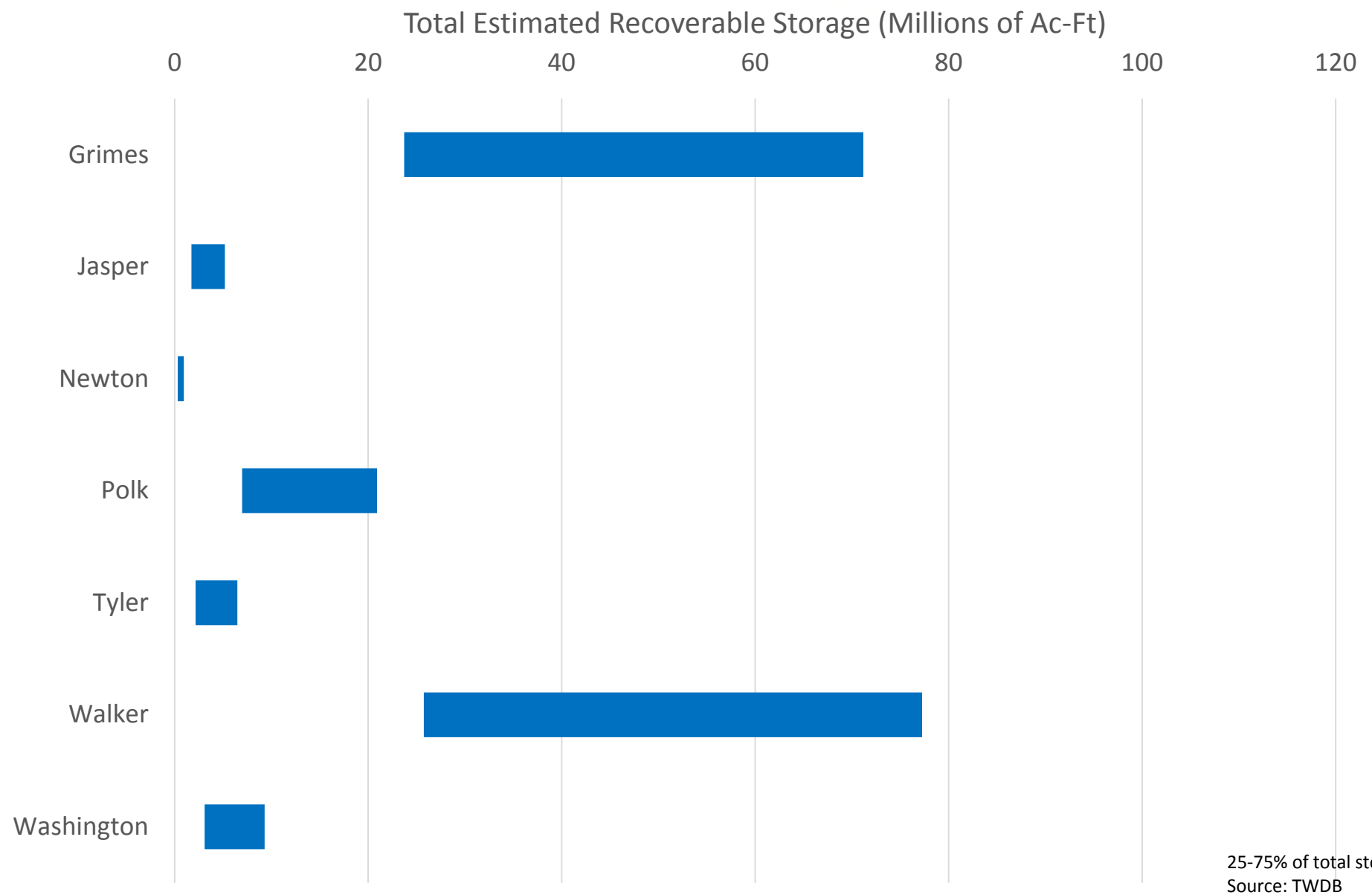
- Washington County



Phase 3: Explanatory Report

Hydrological Conditions

Yegua-Jackson Aquifer Total Estimated Recoverable Storage



25-75% of total storage
Source: TWDB

Phase 3: Explanatory Report

Hydrological Conditions

- Discussion

Water Budgets

Gulf Coast Aquifer

Angelina County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	—	—	18
Storage	—	—	—	0
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Jasper	—	—	—	0
Total Inflow	0	0	0	18

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	—	—	—	0
Leakage To Upper Unit	—	—	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Jasper	—	—	—	18
Total Outflow	0	0	0	18
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	—	—	—	0

All values are average acre-feet per year from 2000 through 2009.

Austin County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	9,821	12,741	0	—
Storage	7,473	788	59	424
Leakage From Upper Unit	—	8,311	352	359
Leakage From Lower Unit	8	—	—	—
Lateral Flow From Colorado	871	442	1	333
Lateral Flow From Fort Bend	2,305	664	0	52
Lateral Flow From Fayette	—	74	2	262
Lateral Flow From Waller	437	527	0	71
Lateral Flow From Washington	—	569	3	882
Lateral Flow From Wharton	591	23	0	26
Total Inflow	21,507	24,139	419	2,409

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	610	7,864	—	1,653
Evapotranspiration/Stream Gain (GHB)	62	6,932	0	—
Storage	13	103	18	5
Leakage To Upper Unit	—	8	67	37
Leakage To Lower Unit	8,311	352	359	—
Lateral Flow To Colorado	1,918	1,814	3	44
Lateral Flow To Fayette	—	—	1	—
Lateral Flow To Fort Bend	7,589	2,134	0	145
Lateral Flow To Waller	1,573	3,271	3	422
Lateral Flow To Washington	—	1,175	5	87
Lateral Flow To Wharton	1,431	554	0	16
Total Outflow	21,507	24,206	456	2,409
Inflow - Outflow	0	-67	-37	0
Storage Increase (+)/Decrease(-)	-7,460	-685	-42	-419

All values are average acre-feet per year from 2000 through 2009.

Brazoria County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	48,416	—	—	—
Storage	3,935	1,720	—	—
Leakage From Upper Unit	—	10,307	—	—
Leakage From Lower Unit	54	—	—	—
Lateral Flow From Fort Bend	6,724	3,521	—	—
Lateral Flow From Galveston	849	1,633	—	—
Lateral Flow From Harris	167	1,898	—	—
Lateral Flow From Matagorda	1,042	439	—	—
Lateral Flow From Wharton	364	192	—	—
Lateral Flow From Out of State	1,543	1,054	—	—
Total Inflow	63,094	20,764	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	35,329	168	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	500	138	—	—
Leakage To Upper Unit	—	54	—	—
Leakage To Lower Unit	10,307	—	—	—
Lateral Flow To Fort Bend	7,674	12,299	—	—
Lateral Flow To Galveston	870	656	—	—
Lateral Flow To Harris	2,379	5,041	—	—
Lateral Flow To Matagorda	5,151	1,569	—	—
Lateral Flow To Wharton	43	—	—	—
Lateral Flow To Out of State	852	852	—	—
Total Outflow	63,105	20,776	0	0
Inflow - Outflow	-11	-13	0	0
Storage Increase (+)/Decrease(-)	-3,436	-1,581	—	—

All values are average acre-feet per year from 2000 through 2009.

Brazos County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	—	—	42
Storage	—	—	—	41
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Grimes	—	—	—	137
Lateral Flow From Washington	—	—	—	189
Total Inflow	0	0	0	409

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	17
Evapotranspiration/Stream Gain (GHB)	—	—	—	344
Storage	—	—	—	—
Leakage To Upper Unit	—	—	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Grimes	—	—	—	19
Lateral Flow To Washington	—	—	—	30
Total Outflow	0	0	0	409
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	—	—	—	—

All values are average acre-feet per year from 2000 through 2009.

Calhoun County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	196	—	—	—
Storage	13	12	—	—
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	154	—	—	—
Lateral Flow From Jackson	74	104	—	—
Lateral Flow From Matagorda	32	29	—	—
Lateral Flow From Out of State	368	164	—	—
Total Inflow	838	310	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	8	—	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	10	9	—	—
Leakage To Upper Unit	—	154	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Jackson	508	46	—	—
Lateral Flow To Matagorda	37	7	—	—
Lateral Flow To Out of State	275	94	—	—
Total Outflow	838	310	0	0
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	-3	-3	—	—

All values are average acre-feet per year from 2000 through 2009.

Chambers County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	9,017	—	—	—
Storage	136	61	—	—
Leakage From Upper Unit	—	2,369	—	—
Leakage From Lower Unit	37	—	—	—
Lateral Flow From Galveston	153	70	—	—
Lateral Flow From Harris	43	78	—	—
Lateral Flow From Jefferson	167	198	—	—
Lateral Flow From Liberty	5,285	1,627	—	—
Lateral Flow From Out of State	1,624	1,889	—	—
Total Inflow	16,462	6,293	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	5,318	260	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	207	119	—	—
Leakage To Upper Unit	—	37	—	—
Leakage To Lower Unit	2,369	—	—	—
Lateral Flow To Galveston	51	63	—	—
Lateral Flow To Harris	5,678	2,224	—	—
Lateral Flow To Jefferson	198	129	—	—
Lateral Flow To Liberty	390	415	—	—
Lateral Flow To Out of State	2,248	3,043	—	—
Total Outflow	16,458	6,289	0	0
Inflow - Outflow	4	4	0	0
Storage Increase (+)/Decrease(-)	71	58	—	—

All values are average acre-feet per year from 2000 through 2009.

Colorado County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	20,447	7,720	—	—
Storage	23,648	437	127	149
Leakage From Upper Unit	—	14,185	166	84
Leakage From Lower Unit	1,630	—	—	—
Lateral Flow From Austin	1,918	1,814	3	44
Lateral Flow From Fayette	—	530	7	1,198
Lateral Flow From Jackson	132	40	0	0
Lateral Flow From Lavaca	5,708	1,701	3	86
Lateral Flow From Wharton	318	113	0	1
Total Inflow	53,802	26,541	306	1,562

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	11,585	13,134	—	975
Evapotranspiration/Stream Gain (GHB)	347	4,691	—	—
Storage	14	60	65	9
Leakage To Upper Unit	—	1,630	229	87
Leakage To Lower Unit	14,185	166	84	—
Lateral Flow To Austin	871	442	1	333
Lateral Flow To Fayette	—	347	3	57
Lateral Flow To Jackson	422	151	0	1
Lateral Flow To Lavaca	445	324	1	30
Lateral Flow To Wharton	25,932	5,824	9	70
Total Outflow	53,800	26,770	393	1,562
Inflow - Outflow	1	-228	-87	0
Storage Increase (+)/Decrease(-)	-23,635	-377	-62	-139

All values are average acre-feet per year from 2000 through 2009.

Fayette County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	2,799	0	4,387
Storage	—	2	420	2,000
Leakage From Upper Unit	—	—	105	485
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Austin	—	—	1	—
Lateral Flow From Colorado	—	347	3	57
Lateral Flow From Lavaca	—	55	1	132
Lateral Flow From Washington	—	—	0	33
Total Inflow	0	3,204	530	7,094

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	1,330
Evapotranspiration/Stream Gain (GHB)	—	2,172	2	3,056
Storage	—	0	0	1
Leakage To Upper Unit	—	—	32	1
Leakage To Lower Unit	—	105	485	—
Lateral Flow To Austin	—	74	2	262
Lateral Flow To Colorado	—	530	7	1,198
Lateral Flow To Lavaca	—	354	2	953
Lateral Flow To Washington	—	—	—	294
Total Outflow	0	3,236	531	7,095
Inflow - Outflow	0	-32	-1	-2
Storage Increase (+)/Decrease(-)	—	-2	-420	-1,999

All values are average acre-feet per year from 2000 through 2009.

Fort Bend County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	55,225	—	—	—
Storage	44,826	9,968	62	406
Leakage From Upper Unit	—	51,896	10	—
Leakage From Lower Unit	3	—	—	—
Lateral Flow From Austin	7,589	2,134	0	145
Lateral Flow From Brazoria	7,674	12,299	—	—
Lateral Flow From Harris	6,274	2,976	0	10
Lateral Flow From Wharton	4,607	1,451	0	43
Lateral Flow From Waller	7,311	1,686	1	70
Total Inflow	133,509	82,410	73	673

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	39,394	57,392	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	560	176	14	—
Leakage To Upper Unit	—	3	111	52
Leakage To Lower Unit	51,896	10	—	—
Lateral Flow To Austin	2,305	664	0	52
Lateral Flow To Brazoria	6,724	3,521	—	—
Lateral Flow To Harris	27,660	19,584	0	524
Lateral Flow To Waller	847	428	0	42
Lateral Flow To Wharton	4,122	740	0	4
Total Outflow	133,508	82,517	125	674
Inflow - Outflow	0	-107	-52	0
Storage Increase (+)/Decrease(-)	-44,266	-9,792	-49	—

All values are average acre-feet per year from 2000 through 2009.

Galveston County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	3,361	—	—	—
Storage	114	11	—	—
Leakage From Upper Unit	—	1,496	—	—
Leakage From Lower Unit	46	—	—	—
Lateral Flow From Brazoria	870	656	—	—
Lateral Flow From Chambers	51	63	—	—
Lateral Flow From Harris	102	923	—	—
Lateral Flow From Out of State	5,427	4,292	—	—
Total Inflow	9,971	7,440	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	1,318	66	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	402	129	—	—
Leakage To Upper Unit	—	46	—	—
Leakage To Lower Unit	1,496	—	—	—
Lateral Flow To Brazoria	849	1,633	—	—
Lateral Flow To Chambers	153	70	—	—
Lateral Flow To Harris	1,250	3,138	—	—
Lateral Flow To Out of State	4,501	2,357	—	—
Total Outflow	9,969	7,438	0	0

Inflow - Outflow	2	2	0	0
Storage Increase (+)/Decrease(-)	287	119	—	—

All values are average acre-feet per year from 2000 through 2009.

Grimes County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	1,848	1,439	1	2,384
Storage	597	537	82	5,713
Leakage From Upper Unit	—	2,346	81	147
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Brazos	—	—	—	19
Lateral Flow From Montgomery	—	7	0	20
Lateral Flow From Washington	—	42	0	158
Lateral Flow From Waller	2	287	1	203
Lateral Flow From Walker	—	—	—	11
Total Inflow	2,447	4,658	164	8,656

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	990	—	2,741
Evapotranspiration/Stream Gain (GHB)	—	1,421	1	1,097
Storage	0	8	0	383
Leakage To Upper Unit	—	—	14	3
Leakage To Lower Unit	2,346	81	147	—
Lateral Flow To Brazos	—	—	—	137
Lateral Flow To Montgomery	26	543	3	3,379
Lateral Flow To Waller	74	1,593	2	852
Lateral Flow To Washington	—	35	0	42
Lateral Flow To Walker	—	—	—	23
Total Outflow	2,447	4,671	167	8,658
Inflow - Outflow	0	-13	-3	-2
Storage Increase (+)/Decrease(-)	-597	-529	-82	-5,330

All values are average acre-feet per year from 2000 through 2009.

Hardin County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	23,814	—	—	—
Storage	7,579	1,431	105	78
Leakage From Upper Unit	—	19,555	25	—
Leakage From Lower Unit	69	—	—	—
Lateral Flow From Jasper	2,225	2,200	0	—
Lateral Flow From Jefferson	1,137	833	—	—
Lateral Flow From Liberty	1,632	721	0	51
Lateral Flow From Orange	416	452	—	—
Lateral Flow From Polk	1,279	1,020	4	304
Lateral Flow From Tyler	3,130	2,934	3	476
Total Inflow	41,283	29,146	137	909

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	2,461	15,539	—	—
Evapotranspiration/Stream Gain (GHB)	1	—	—	—
Storage	1,280	101	33	59
Leakage To Upper Unit	—	69	464	361
Leakage To Lower Unit	19,555	25	—	—
Lateral Flow To Jasper	12,738	10,433	0	176
Lateral Flow To Jefferson	1,372	805	—	—
Lateral Flow To Liberty	2,980	1,862	1	256
Lateral Flow To Polk	12	19	0	12
Lateral Flow To Orange	884	757	—	—
Lateral Flow To Tyler	—	—	0	44
Total Outflow	41,283	29,611	498	909
Inflow - Outflow	0	-464	-361	0
Storage Increase (+)/Decrease(-)	-6,299	-1,330	-73	-19

All values are average acre-feet per year from 2000 through 2009.

Harris County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	131,941	—	—	—
Storage	46,651	8,429	733	5,179
Leakage From Upper Unit	—	187,061	1,181	4
Leakage From Lower Unit	1,736	—	—	—
Lateral Flow From Brazoria	2,379	5,041	—	—
Lateral Flow From Chambers	5,678	2,224	—	—
Lateral Flow From Fort Bend	27,660	19,584	0	524
Lateral Flow From Galveston	1,250	3,138	—	—
Lateral Flow From Liberty	12,040	3,223	0	588
Lateral Flow From Montgomery	33,337	17,670	8	3,637
Lateral Flow From Waller	6,854	4,044	3	1,113
Lateral Flow From Out of State	7,106	5,787	—	—
Total Inflow	276,632	256,201	1,926	11,045

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	56,417	236,953	—	6,582
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	15,400	2,573	1,275	4
Leakage To Upper Unit	—	1,736	867	222
Leakage To Lower Unit	187,061	1,181	4	—
Lateral Flow To Brazoria	167	1,898	—	—
Lateral Flow To Chambers	43	78	—	—
Lateral Flow To Fort Bend	6,274	2,976	0	10
Lateral Flow To Galveston	102	923	—	—
Lateral Flow To Liberty	2,257	338	0	5
Lateral Flow To Montgomery	2,694	3,595	2	3,889
Lateral Flow To Waller	193	892	1	364
Lateral Flow To Out of State	6,022	3,919	—	—
Total Outflow	276,631	257,062	2,149	11,077
Inflow - Outflow	1	-861	-223	-32
Storage Increase (+)/Decrease(-)	-31,250	-5,856	542	-5,175

All values are average acre-feet per year from 2000 through 2009.

Jackson County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	23,199	—	—	—
Storage	11,028	195	6	0
Leakage From Upper Unit	—	3,227	2	—
Leakage From Lower Unit	2,687	—	—	—
Lateral Flow From Calhoun	508	46	—	—
Lateral Flow From Colorado	422	151	0	1
Lateral Flow From Lavaca	4,019	1,608	0	10
Lateral Flow From Matagorda	1,021	329	—	—
Lateral Flow From Wharton	919	401	—	0
Lateral Flow From Out of State	577	38	—	—
Total Inflow	44,381	5,995	8	11

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	32,478	1,389	—	—
Evapotranspiration/Stream Gain (GHB)	1	—	—	—
Storage	984	182	3	2
Leakage To Upper Unit	—	2,687	14	9
Leakage To Lower Unit	3,227	2	—	—
Lateral Flow To Colorado	132	40	0	0
Lateral Flow To Calhoun	74	104	—	—
Lateral Flow To Lavaca	—	—	—	0
Lateral Flow To Matagorda	1,148	291	—	—
Lateral Flow To Wharton	5,971	1,198	0	0
Lateral Flow To Out of State	365	116	—	—
Total Outflow	44,380	6,009	17	11
Inflow - Outflow	1	-14	-9	0
Storage Increase (+)/Decrease(-)	-10,044	-13	-3	1

All values are average acre-feet per year from 2000 through 2009.

Jasper County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	15,393	2,027	2	6,605
Storage	3,550	1,073	192	2,832
Leakage From Upper Unit	—	9,735	60	119
Leakage From Lower Unit	263	—	—	—
Lateral Flow From Angelina	—	—	—	18
Lateral Flow From Hardin	12,738	10,433	0	176
Lateral Flow From Newton	4,885	4,523	6	1,049
Lateral Flow From Orange	2,719	2,916	—	—
Lateral Flow From Tyler	577	623	4	643
Total Inflow	40,126	31,331	264	11,442

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	22,903	24,648	—	3,791
Evapotranspiration/Stream Gain (GHB)	200	835	1	4,967
Storage	849	156	41	873
Leakage To Upper Unit	—	263	491	396
Leakage To Lower Unit	9,735	60	119	—
Lateral Flow To Angelina	—	—	—	0
Lateral Flow To Hardin	2,225	2,200	0	—
Lateral Flow To Newton	3,038	2,720	7	1,231
Lateral Flow To Orange	679	492	—	—
Lateral Flow To Tyler	496	448	1	184
Total Outflow	40,126	31,822	661	11,443
Inflow - Outflow	0	-491	-396	-1
Storage Increase (+)/Decrease(-)	-2,701	-917	-151	-1,959

All values are average acre-feet per year from 2000 through 2009.

Jefferson County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	7,466	—	—	—
Storage	156	80	—	—
Leakage From Upper Unit	—	2,242	—	—
Leakage From Lower Unit	238	—	—	—
Lateral Flow From Chambers	198	129	—	—
Lateral Flow From Hardin	1,372	805	—	—
Lateral Flow From Liberty	473	367	—	—
Lateral Flow From Orange	247	324	—	—
Lateral Flow From Out of State	156	38	—	—
Total Inflow	10,306	3,986	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	3,275	33	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	270	36	—	—
Leakage To Upper Unit	—	238	—	—
Leakage To Lower Unit	2,242	—	—	—
Lateral Flow To Chambers	167	198	—	—
Lateral Flow To Hardin	1,137	833	—	—
Lateral Flow To Liberty	22	167	—	—
Lateral Flow To Orange	3,171	2,466	—	—
Lateral Flow To Out of State	23	16	—	—
Total Outflow	10,306	3,987	0	0
Inflow - Outflow	0	-2	0	0
Storage Increase (+)/Decrease(-)	113	-44	—	—

All values are average acre-feet per year from 2000 through 2009.

Lavaca County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	1,271	13,774	0	1,826
Storage	10,051	317	246	2,460
Leakage From Upper Unit	—	1,551	143	316
Leakage From Lower Unit	281	—	—	—
Lateral Flow From Colorado	445	324	1	30
Lateral Flow From Fayette	—	354	2	953
Lateral Flow From Jackson	—	—	—	0
Total Inflow	12,049	16,321	392	5,586

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	770	3,091	—	4,838
Evapotranspiration/Stream Gain (GHB)	0	9,281	0	287
Storage	—	275	9	184
Leakage To Upper Unit	—	281	114	51
Leakage To Lower Unit	1,551	143	316	—
Lateral Flow To Colorado	5,708	1,701	3	86
Lateral Flow To Fayette	—	55	1	132
Lateral Flow To Jackson	4,019	1,608	0	10
Total Outflow	12,048	16,435	443	5,586
Inflow - Outflow	0	-114	-51	-1
Storage Increase (+)/Decrease(-)	—	-42	-237	-2,277

All values are average acre-feet per year from 2000 through 2009.

Liberty County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	32,957	—	—	—
Storage	7,950	395	100	700
Leakage From Upper Unit	—	23,131	20	0
Leakage From Lower Unit	99	—	—	—
Lateral Flow From Chambers	390	415	—	—
Lateral Flow From Hardin	2,980	1,862	1	256
Lateral Flow From Harris	2,257	338	0	5
Lateral Flow From Jefferson	22	167	—	—
Lateral Flow From Montgomery	1,009	423	0	27
Lateral Flow From Polk	309	490	2	167
Lateral Flow From San Jacinto	1,281	1,678	6	636
Total Inflow	49,252	28,898	129	1,791

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	3,360	21,722	—	181
Evapotranspiration/Stream Gain (GHB)	690	—	—	—
Storage	114	113	24	14
Leakage To Upper Unit	—	99	260	156
Leakage To Lower Unit	23,131	20	0	—
Lateral Flow To Chambers	5,285	1,627	—	—
Lateral Flow To Hardin	1,632	721	0	51
Lateral Flow To Harris	12,040	3,223	0	588
Lateral Flow To Jefferson	473	367	—	—
Lateral Flow To Montgomery	2,475	1,169	0	806
Lateral Flow To Polk	—	18	0	—
Lateral Flow To San Jacinto	50	77	0	0
Total Outflow	49,250	29,158	286	1,797
Inflow - Outflow	2	-260	-156	-5
Storage Increase (+)/Decrease(-)	-7,836	-281	-76	-685

All values are average acre-feet per year from 2000 through 2009.

Matagorda County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	21,537	—	—	—
Storage	3,379	1,375	—	—
Leakage From Upper Unit	—	835	—	—
Leakage From Lower Unit	4,291	—	—	—
Lateral Flow From Brazoria	5,151	1,569	—	—
Lateral Flow From Calhoun	37	7	—	—
Lateral Flow From Jackson	1,148	291	—	—
Lateral Flow From Wharton	2,553	1,395	—	—
Lateral Flow From Out of State	1,789	1,462	—	—
Total Inflow	39,885	6,934	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	33,624	36	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	578	271	—	—
Leakage To Upper Unit	—	4,291	—	—
Leakage To Lower Unit	835	—	—	—
Lateral Flow To Brazoria	1,042	439	—	—
Lateral Flow To Calhoun	32	29	—	—
Lateral Flow To Jackson	1,021	329	—	—
Lateral Flow To Wharton	1,992	197	—	—
Lateral Flow To Out of State	771	1,350	—	—
Total Outflow	39,896	6,942	0	0
Inflow - Outflow	-10	-8	0	0
Storage Increase (+)/Decrease(-)	-2,801	-1,104	—	—

All values are average acre-feet per year from 2000 through 2009.

Montgomery County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	31,407	2,251	1	548
Storage	31,140	5,783	413	8,690
Leakage From Upper Unit	—	30,813	105	64
Leakage From Lower Unit	98	—	—	—
Lateral Flow From Grimes	26	543	3	3,379
Lateral Flow From Harris	2,694	3,595	2	3,889
Lateral Flow From Liberty	2,475	1,169	0	806
Lateral Flow From Waller	987	1,027	1	1,166
Lateral Flow From San Jacinto	366	1,556	4	1,943
Lateral Flow From Walker	12	477	4	10,845
Total Inflow	69,207	47,213	534	31,331

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	3,426	27,017	—	27,377
Evapotranspiration/Stream Gain (GHB)	343	1,141	0	12
Storage	92	704	60	85
Leakage To Upper Unit	—	98	470	69
Leakage To Lower Unit	30,813	105	64	—
Lateral Flow To Grimes	—	7	0	20
Lateral Flow To Harris	33,337	17,670	8	3,637
Lateral Flow To Liberty	1,009	423	0	27
Lateral Flow To San Jacinto	110	328	0	140
Lateral Flow To Waller	76	190	0	—
Lateral Flow To Walker	1	—	0	79
Total Outflow	69,207	47,683	603	31,446
Inflow - Outflow	0	-470	-69	-115
Storage Increase (+)/Decrease(-)	-31,048	-5,079	-353	-8,605

All values are average acre-feet per year from 2000 through 2009.

Newton County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	6,079	3,935	1	7,803
Storage	1,927	461	133	806
Leakage From Upper Unit	—	3,020	212	290
Leakage From Lower Unit	2,119	—	—	—
Lateral Flow From Jasper	3,038	2,720	7	1,231
Lateral Flow From Orange	—	13	—	—
Lateral Flow From Sabine	—	—	—	74
Lateral Flow From Out of State	—	108	—	—
Total Inflow	13,163	10,257	354	10,203

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	21	1,680	—	1,340
Evapotranspiration/Stream Gain (GHB)	1,928	1,386	2	6,777
Storage	39	12	5	86
Leakage To Upper Unit	—	2,119	681	628
Leakage To Lower Unit	3,020	212	290	—
Lateral Flow To Jasper	4,885	4,523	6	1,049
Lateral Flow To Orange	3,270	898	—	—
Lateral Flow To Sabine	—	—	—	323
Lateral Flow To Out of State	—	108	—	—
Total Outflow	13,163	10,938	982	10,203
Inflow - Outflow	0	-681	-628	-1
Storage Increase (+)/Decrease(-)	-1,888	-449	-128	-720

All values are average acre-feet per year from 2000 through 2009.

Orange County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	11,533	—	—	—
Storage	260	114	—	—
Leakage From Upper Unit	—	1,409	—	—
Leakage From Lower Unit	1,328	—	—	—
Lateral Flow From Hardin	884	757	—	—
Lateral Flow From Jasper	679	492	—	—
Lateral Flow From Jefferson	3,171	2,466	—	—
Lateral Flow From Newton	3,270	898	—	—
Total Inflow	21,126	6,136	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	16,125	1,067	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	210	37	—	—
Leakage To Upper Unit	—	1,328	—	—
Leakage To Lower Unit	1,409	—	—	—
Lateral Flow To Hardin	416	452	—	—
Lateral Flow To Jasper	2,719	2,916	—	—
Lateral Flow To Jefferson	247	324	—	—
Lateral Flow To Newton	—	13	—	—
Total Outflow	21,126	6,137	0	0
Inflow - Outflow	0	-1	0	0
Storage Increase (+)/Decrease(-)	-50	-77	—	—

All values are average acre-feet per year from 2000 through 2009.

Polk County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	1,441	12,027	4	3,368
Storage	618	80	393	3,454
Leakage From Upper Unit	—	690	179	388
Leakage From Lower Unit	270	—	—	—
Lateral Flow From Hardin	12	19	0	12
Lateral Flow From Liberty	—	18	0	—
Lateral Flow From San Jacinto	—	97	5	480
Lateral Flow From Trinity	—	—	—	59
Lateral Flow From Tyler	14	718	5	409
Total Inflow	2,354	13,649	586	8,170

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	841	—	3,335
Evapotranspiration/Stream Gain (GHB)	76	9,660	4	2,900
Storage	—	0	1	2
Leakage To Upper Unit	—	270	176	26
Leakage To Lower Unit	690	179	388	—
Lateral Flow To Hardin	1,279	1,020	4	304
Lateral Flow To Liberty	309	490	2	167
Lateral Flow To San Jacinto	—	548	26	727
Lateral Flow To Trinity	—	—	—	28
Lateral Flow To Tyler	—	818	11	681
Total Outflow	2,354	13,826	612	8,170
Inflow - Outflow	0	-177	-26	0
Storage Increase (+)/Decrease(-)	—	-80	-393	-3,452

All values are average acre-feet per year from 2000 through 2009.

Sabine County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	—	—	270
Storage	—	—	—	0
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Newton	—	—	—	323
Total Inflow	0	0	0	593

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	520
Storage	—	—	—	0
Leakage To Upper Unit	—	—	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Newton	—	—	—	74
Total Outflow	0	0	0	593
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	—	—	—	0

All values are average acre-feet per year from 2000 through 2009.

San Jacinto County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	4,127	2,227	2	554
Storage	1,624	145	379	2,525
Leakage From Upper Unit	—	4,047	76	374
Leakage From Lower Unit	183	—	—	—
Lateral Flow From Liberty	50	77	0	0
Lateral Flow From Montgomery	110	328	0	140
Lateral Flow From Polk	—	548	26	727
Lateral Flow From Trinity	—	—	—	161
Lateral Flow From Walker	1	61	2	1,706
Total Inflow	6,095	7,433	486	6,188

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	0	1,297	—	1,295
Evapotranspiration/Stream Gain (GHB)	312	2,603	2	1,057
Storage	87	21	26	14
Leakage To Upper Unit	—	183	79	11
Leakage To Lower Unit	4,047	76	374	—
Lateral Flow To Liberty	1,281	1,678	6	636
Lateral Flow To Montgomery	366	1,556	4	1,943
Lateral Flow To Polk	—	97	5	480
Lateral Flow To Trinity	—	—	—	120
Lateral Flow To Walker	2	3	0	631
Total Outflow	6,095	7,513	496	6,188
Inflow - Outflow	0	-80	-11	0
Storage Increase (+)/Decrease(-)	-1,537	-124	-353	-2,511

All values are average acre-feet per year from 2000 through 2009.

Trinity County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	—	—	675
Storage	—	—	—	203
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Polk	—	—	—	28
Lateral Flow From San Jacinto	—	—	—	120
Lateral Flow From Walker	—	—	—	131
Total Inflow	0	0	0	1,157

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	310
Evapotranspiration/Stream Gain (GHB)	—	—	—	600
Storage	—	—	—	0
Leakage To Upper Unit	—	—	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Polk	—	—	—	59
Lateral Flow To San Jacinto	—	—	—	161
Lateral Flow To Walker	—	—	—	26
Total Outflow	0	0	0	1,157
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	—	—	—	-203

All values are average acre-feet per year from 2000 through 2009.

Tyler County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	2,526	6,006	5	3,980
Storage	1,949	703	95	1,780
Leakage From Upper Unit	—	1,508	138	176
Leakage From Lower Unit	776	—	—	—
Lateral Flow From Hardin	—	—	0	44
Lateral Flow From Jasper	496	448	1	184
Lateral Flow From Polk	—	818	11	681
Total Inflow	5,747	9,483	250	6,846

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	824	—	2,036
Evapotranspiration/Stream Gain (GHB)	518	3,647	1	3,135
Storage	—	0	1	31
Leakage To Upper Unit	—	776	177	117
Leakage To Lower Unit	1,508	138	176	—
Lateral Flow To Hardin	3,130	2,934	3	476
Lateral Flow To Jasper	577	623	4	643
Lateral Flow To Polk	14	718	5	409
Total Outflow	5,747	9,661	367	6,847
Inflow - Outflow	0	-178	-117	-2
Storage Increase (+)/Decrease(-)	—	-703	-94	-1,749

All values are average acre-feet per year from 2000 through 2009.

Walker County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	15	645	1	5,323
Storage	0	33	19	14,673
Leakage From Upper Unit	—	4	12	24
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Grimes	—	—	—	23
Lateral Flow From Montgomery	1	—	0	79
Lateral Flow From San Jacinto	2	3	0	631
Lateral Flow From Trinity	—	—	—	26
Total Inflow	18	685	33	20,779

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	37	—	5,081
Evapotranspiration/Stream Gain (GHB)	—	99	0	2,753
Storage	—	2	0	253
Leakage To Upper Unit	—	—	2	—
Leakage To Lower Unit	4	12	24	—
Lateral Flow To Grimes	—	—	—	11
Lateral Flow To Montgomery	12	477	4	10,845
Lateral Flow To San Jacinto	1	61	2	1,706
Lateral Flow To Trinity	—	—	—	131
Total Outflow	18	687	33	20,781
Inflow - Outflow	0	-2	0	-2
Storage Increase (+)/Decrease(-)	—	-31	-19	-14,420

All values are average acre-feet per year from 2000 through 2009.

Waller County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	24,327	775	—	—
Storage	13,993	1,525	82	928
Leakage From Upper Unit	—	24,350	88	35
Leakage From Lower Unit	1	—	—	—
Lateral Flow From Austin	1,573	3,271	3	422
Lateral Flow From Fort Bend	847	428	0	42
Lateral Flow From Grimes	74	1,593	2	852
Lateral Flow From Harris	193	892	1	364
Lateral Flow From Montgomery	76	190	0	—
Lateral Flow From Washington	—	942	5	245
Total Inflow	41,084	33,965	182	2,888

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	803	24,992	—	169
Evapotranspiration/Stream Gain (GHB)	13	960	—	—
Storage	328	306	74	2
Leakage To Upper Unit	—	1	142	76
Leakage To Lower Unit	24,350	88	35	—
Lateral Flow To Austin	437	527	0	71
Lateral Flow To Fort Bend	7,311	1,686	1	70
Lateral Flow To Grimes	2	287	1	203
Lateral Flow To Harris	6,854	4,044	3	1,113
Lateral Flow To Montgomery	987	1,027	1	1,166
Lateral Flow To Washington	—	188	1	18
Total Outflow	41,084	34,107	258	2,889
Inflow - Outflow	0	-142	-76	0
Storage Increase (+)/Decrease(-)	-13,666	-1,218	-8	-926

All values are average acre-feet per year from 2000 through 2009.

Washington County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	4,844	2	3,525
Storage	—	126	667	1,113
Leakage From Upper Unit	—	—	191	757
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Austin	—	1,175	5	87
Lateral Flow From Brazos	—	—	—	30
Lateral Flow From Fayette	—	—	—	294
Lateral Flow From Grimes	—	35	0	42
Lateral Flow From Waller	—	188	1	18
Total Inflow	0	6,368	866	5,866

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	268	—	1,655
Evapotranspiration/Stream Gain (GHB)	—	4,514	3	2,625
Storage	—	13	4	2
Leakage To Upper Unit	—	—	170	77
Leakage To Lower Unit	—	191	757	—
Lateral Flow To Austin	—	569	3	882
Lateral Flow To Brazos	—	—	—	189
Lateral Flow To Fayette	—	—	0	33
Lateral Flow To Grimes	—	42	0	158
Lateral Flow To Waller	—	942	5	245
Total Outflow	0	6,538	943	5,867
Inflow - Outflow	0	-170	-77	0
Storage Increase (+)/Decrease(-)	—	-113	-663	-1,111

All values are average acre-feet per year from 2000 through 2009.

Wharton County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	58,559	—	—	—
Storage	52,398	3,579	57	29
Leakage From Upper Unit	—	8,080	18	—
Leakage From Lower Unit	7,641	—	—	—
Lateral Flow From Austin	1,431	554	0	16
Lateral Flow From Brazoria	43	—	—	—
Lateral Flow From Colorado	25,932	5,824	9	70
Lateral Flow From Fort Bend	4,122	740	0	4
Lateral Flow From Jackson	5,971	1,198	0	0
Lateral Flow From Matagorda	1,992	197	—	—
Total Inflow	158,090	20,173	85	119

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	129,708	8,663	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	10,950	387	22	0
Leakage To Upper Unit	—	7,641	111	49
Leakage To Lower Unit	8,080	18	—	—
Lateral Flow To Austin	591	23	0	26
Lateral Flow To Brazoria	364	192	—	—
Lateral Flow To Colorado	318	113	0	1
Lateral Flow To Fort Bend	4,607	1,451	0	43
Lateral Flow To Jackson	919	401	—	0
Lateral Flow To Matagorda	2,553	1,395	—	—
Total Outflow	158,090	20,284	134	119
Inflow - Outflow	0	-111	-49	0
Storage Increase (+)/Decrease(-)	-41,447	-3,192	-35	-29

All values are average acre-feet per year from 2000 through 2009.

Out of State				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	6,701	—	—	—
Storage	664	190	—	—
Leakage From Upper Unit	—	3,567	—	—
Leakage From Lower Unit	517	—	—	—
Lateral Flow From Brazoria	852	852	—	—
Lateral Flow From Calhoun	275	94	—	—
Lateral Flow From Chambers	2,248	3,043	—	—
Lateral Flow From Galveston	4,501	2,357	—	—
Lateral Flow From Harris	6,022	3,919	—	—
Lateral Flow From Jackson	365	116	—	—
Lateral Flow From Jefferson	23	16	—	—
Lateral Flow From Matagorda	771	1,350	—	—
Lateral Flow From Newton	—	108	—	—
Total Inflow	22,938	15,611	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	158	20	—	—
Evapotranspiration/Stream Gain (GHB)	0	—	—	—
Storage	617	239	—	—
Leakage To Upper Unit	—	517	—	—
Leakage To Lower Unit	3,567	—	—	—
Lateral Flow To Brazoria	1,543	1,054	—	—
Lateral Flow To Calhoun	368	164	—	—
Lateral Flow To Chambers	1,624	1,889	—	—
Lateral Flow To Galveston	5,427	4,292	—	—
Lateral Flow To Harris	7,106	5,787	—	—
Lateral Flow To Jackson	577	38	—	—
Lateral Flow To Jefferson	156	38	—	—
Lateral Flow To Newton	—	108	—	—
Lateral Flow To Matagorda	1,789	1,462	—	—
Total Outflow	22,933	15,608	0	0
Inflow - Outflow	5	3	0	0
Storage Increase (+)/Decrease(-)	-46	48	—	—

All values are average acre-feet per year from 2000 through 2009.

Water Budgets

Sparta, Queen City, and Carrizo Aquifers

Grimes County			
Inflow	**Sparta**	**Queen City**	**Carrizo**
Recharge	—	—	—
Storage	7	14	129
River Loss	—	—	—
Stream Loss	—	—	—
General Head Boundary	1,542	—	—
Leakage From Upper Unit	—	257	—
Leakage From Lower Unit	521	291	0
Lateral Flow From Brazos	77	62	253
Lateral Flow From Madison	179	59	560
Lateral Flow From Montgomery	3	0	—
Lateral Flow From Walker	19	2	—
Lateral Flow From Waller	2	1	219
Lateral Flow From Washington	6	1	203
Total Inflow	2,356	688	1,365

Outflow	**Sparta**	**Queen City**	**Carrizo**
Wells	2	0	2
Evapotranspiration	—	—	—
Storage	230	140	0
River Gain	—	—	—
Stream Gain	—	—	—
Spring Flow	—	—	—
General Head Boundary	1,237	—	—
Leakage To Upper Unit	—	407	282
Leakage To Lower Unit	485	33	108
Lateral Flow To Brazos	120	55	149
Lateral Flow To Madison	184	27	77
Lateral Flow To Montgomery	9	2	233
Lateral Flow To Walker	84	20	488
Lateral Flow To Waller	2	1	20
Lateral Flow To Washington	2	1	6
Total Outflow	2,356	688	1,365

Inflow - Outflow	(0)	(0)	0
Storage Increase (+)/Decrease(-)	224	126	(129)

All values are average acre-feet per year from 1990 through 2000.

Walker County			
Inflow	**Sparta**	**Queen City**	**Carrizo**
Recharge	—	—	—
Storage	4	2	3
River Loss	—	—	—
Stream Loss	—	—	—
General Head Boundary	1,140	—	—
Leakage From Upper Unit	—	218	3
Leakage From Lower Unit	421	228	73
Lateral Flow From Grimes	84	20	488
Lateral Flow From Houston	101	22	800
Lateral Flow From Madison	21	14	582
Lateral Flow From Montgomery	9	1	221
Lateral Flow From San Jacinto	10	2	—
Lateral Flow From Trinity	39	5	166
Total Inflow	1,830	513	2,336

Outflow	**Sparta**	**Queen City**	**Carrizo**
Wells	0	0	—
Evapotranspiration	—	—	—
Storage	257	87	31
River Gain	—	—	—
Stream Gain	—	—	—
Spring Flow	—	—	—
General Head Boundary	755	—	—
Leakage To Upper Unit	—	267	250
Leakage To Lower Unit	494	89	3
Lateral Flow To Grimes	19	2	—
Lateral Flow To Houston	20	3	193
Lateral Flow To Madison	201	48	264
Lateral Flow To Montgomery	4	1	67
Lateral Flow To San Jacinto	16	5	491
Lateral Flow To Trinity	64	9	1,036
Total Outflow	1,830	513	2,336
Inflow - Outflow	(0)	(0)	0
Storage Increase (+)/Decrease(-)	253	85	27

All values are average acre-feet per year from 1990 through 2000.

Water Budgets

Yegua-Jackson Aquifer

Grimes County					
Inflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Recharge	9,171	17,285	5,405	2,296	34,156
Storage	130	214	76	17	438
Stream Loss	730	403	—	38	1,171
Reservoir Loss	—	69	—	—	69
General Head Boundary	—	—	—	—	—
Leakage From Upper Unit	485	3,093	7,097	4,500	15,175
Leakage From Lower Unit	2,419	1,333	718	—	4,470
Lateral Flow From Brazos	16	20	564	1,290	2,652
Lateral Flow From Madison	—	—	—	0	1,453
Lateral Flow From Montgomery	5	3	1	1	5
Lateral Flow From Walker	5	998	137	8	1,143
Lateral Flow From Waller	3	0	0	1	2
Lateral Flow From Washington	16	13	1	1	17
Total Inflow	12,980	23,430	13,998	8,152	60,751

Outflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Wells	198	384	179	39	801
Evapotranspiration	1,367	1,297	1,075	—	3,739
Storage	66	386	0	0	453
Stream Gain	8,469	7,178	4,156	3,953	23,755
Reservoir Gain	—	—	—	—	—
Spring Flow	43	—	—	—	43
General Head Boundary	—	—	—	—	—
Leakage To Upper Unit	89	2,590	16	9	2,704
Leakage To Lower Unit	3,093	8,475	4,771	201	16,540
Lateral Flow To Brazos	201	709	544	2,712	4,166
Lateral Flow To Madison	—	50	3,736	2,321	6,107
Lateral Flow To Montgomery	39	6	2	1	49
Lateral Flow To Walker	384	828	123	53	1,388
Lateral Flow To Waller	3	1	1	0	4
Lateral Flow To Washington	1	0	1	0	3
Total Outflow	13,955	21,903	14,605	9,289	59,752
Inflow - Outflow	(974)	1,527	(606)	(1,137)	999
Storage Increase (+)/Decrease(-)	(64)	171	(76)	(16)	15

All values are average acre-feet per year from 1990 through 2000.

Polk County					
Inflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Recharge	4,091	23	—	—	4,114
Storage	353	86	79	23	541
Stream Loss	594	—	—	—	594
Reservoir Loss	—	—	—	—	—
General Head Boundary	—	—	—	—	—
Leakage From Upper Unit	476	542	47	30	1,095
Leakage From Lower Unit	98	9	1	—	108
Lateral Flow From Angelina	664	20	26	14	725
Lateral Flow From Hardin	0	0	0	0	0
Lateral Flow From Liberty	—	—	0	0	0
Lateral Flow From San Jacinto	2	0	1	1	5
Lateral Flow From Trinity	600	76	201	87	963
Lateral Flow From Tyler	269	21	22	21	332
Total Inflow	7,147	777	378	176	8,478

Outflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Wells	523	2	—	—	525
Evapotranspiration	319	—	—	—	319
Storage	79	0	—	1	80
Stream Gain	3,863	—	—	—	3,863
Reservoir Gain	—	—	—	—	—
Spring Flow	7	—	—	—	7
General Head Boundary	—	—	—	—	—
Leakage To Upper Unit	58	98	9	1	166
Leakage To Lower Unit	1,087	47	30	—	1,164
Lateral Flow From Angelina	932	597	323	163	2,015
Lateral Flow From Hardin	0	0	1	0	1
Lateral Flow From Liberty	0	0	0	0	0
Lateral Flow From San Jacinto	5	1	3	2	11
Lateral Flow From Trinity	243	24	0	—	267
Lateral Flow From Tyler	29	10	11	9	59
Total Outflow	7,146	778	378	176	8,478
Inflow - Outflow	0	(1)	(0)	0	(0)
Storage Increase (+)/Decrease(-)	(273)	(85)	—	(23)	(461)

All values are average acre-feet per year from 1990 through 2000.

Walker County					
Inflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Recharge	10,446	2,655	—	—	13,101
Storage	91	24	8	3	126
Stream Loss	2,043	876	—	—	2,919
Reservoir Loss	147	—	—	—	147
General Head Boundary	—	—	—	—	—
Leakage From Upper Unit	511	1,095	82	13	1,701
Leakage From Lower Unit	2,718	114	45	—	2,877
Lateral Flow From Grimes	384	828	123	53	1,388
Lateral Flow From Houston	—	1,042	5	2	1,049
Lateral Flow From Madison	—	236	3	12	251
Lateral Flow From Montgomery	26	9	8	7	50
Lateral Flow From San Jacinto	36	5	9	6	55
Lateral Flow From Trinity	332	48	82	75	536
Total Inflow	16,735	6,931	365	171	24,202

Outflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Wells	201	54	—	—	255
Evapotranspiration	—	—	—	—	—
Storage	755	87	—	—	842
Stream Gain	12,798	2,170	—	—	14,968
Reservoir Gain	—	—	—	—	—
Spring Flow	—	—	—	—	—
General Head Boundary	—	—	—	—	—
Leakage To Upper Unit	77	2,573	114	45	2,809
Leakage To Lower Unit	1,106	82	13	—	1,201
Lateral Flow From Grimes	998	137	8	0	1,143
Lateral Flow From Houston	—	9	75	64	148
Lateral Flow From Madison	571	1,241	147	58	2,018
Lateral Flow From Montgomery	18	3	0	—	21
Lateral Flow From San Jacinto	42	4	3	1	51
Lateral Flow From Trinity	223	517	4	3	747
Total Outflow	16,789	6,877	365	171	24,202
Inflow - Outflow	(54)	54	0	(0)	0
Storage Increase (+)/Decrease(-)	664	63	—	—	716

All values are average acre-feet per year from 1990 through 2000.

Washington County					
Inflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Recharge	3,180	2,297	51	—	5,528
Storage	25	3	0	0	28
Stream Loss	883	196	—	—	1,079
Reservoir Loss	53	248	—	—	301
General Head Boundary	—	—	—	—	—
Leakage From Upper Unit	766	2,585	334	4	3,689
Leakage From Lower Unit	516	251	33	—	800
Lateral Flow From Austin	14	11	23	13	62
Lateral Flow From Brazos	1	1	2	1	5
Lateral Flow From Burleson	1,002	437	37	30	1,507
Lateral Flow From Fayette	320	257	101	52	731
Lateral Flow From Grimes	1	0	1	0	3
Lateral Flow From Lee	—	215	289	39	543
Lateral Flow From Waller	2	1	3	2	7
Total Inflow	6,763	6,503	875	141	14,282

Outflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Wells	77	53	2	—	132
Evapotranspiration	—	—	—	—	—
Storage	876	1,379	26	9	2,290
Stream Gain	1,710	83	399	—	2,193
Reservoir Gain	—	2	—	—	2
Spring Flow	—	—	—	—	—
General Head Boundary	—	—	—	—	—
Leakage To Upper Unit	80	22	11	33	146
Leakage To Lower Unit	2,922	1,005	4	—	3,931
Lateral Flow From Austin	26	8	5	3	43
Lateral Flow From Brazos	64	17	28	8	117
Lateral Flow From Burleson	947	785	160	53	1,945
Lateral Flow From Fayette	27	7	12	7	54
Lateral Flow From Grimes	13	1	1	2	17
Lateral Flow From Lee	—	3,164	218	23	3,405
Lateral Flow From Waller	8	1	4	2	15
Total Outflow	6,749	6,528	870	141	14,288
Inflow - Outflow	13	(25)	5	0	(7)
Storage Increase (+)/Decrease(-)	851	1,376	25	9	2,261

All values are average acre-feet per year from 1990 through 2000.

Appendix K

TWDB Report: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 14

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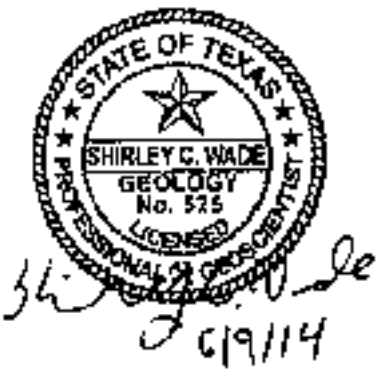
GAM Task 13-037: Total Estimated Recoverable Storage for Aquifers in Groundwater Management Area 14

by Shirley Wade, Ph.D., P.G., David Thorkildsen, P.G., and Roberto Anaya, P.G.
Texas Water Development Board
Groundwater Resources Division
(512) 463-6115[1]
June 09, 2014



The seal appearing on this document were authorized by Shirley C. Wade, P.G. 525, and David Thorkildsen, P.G. 705, and Roberto Anaya, P.G. 480 on June 09, 2014.

The total estimated recoverable storage in this report was calculated as follows: the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson aquifers, the Gulf Coast Aquifer System and the Brazos River Alluvium Aquifer (Shirley Wade); and the San Bernard, Navasota, San Jacinto, and Trinity river alluviums determined as relevant (David Thorkildsen), quality assurance and report preparation (Roberto Anaya).

[1] Contact information is for Roberto Anaya

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GAM TASK 13-037: TOTAL ESTIMATED RECOVERABLE STORAGE FOR AQUIFERS IN GROUNDWATER MANAGEMENT AREA 14

by Shirley Wade, Ph.D., P.G., David Thorkildsen, P.G., and Roberto Anaya, P.G.
Texas Water Development Board
Groundwater Resources Division
(512) 463-6115[2]
June 09, 2014

EXECUTIVE SUMMARY:

Texas Water Code, §36.108 (d) (Texas Water Code, 2011) states that, before voting on the proposed desired future conditions for a relevant aquifer within a groundwater management area, the groundwater conservation districts shall consider the total estimated recoverable storage as provided by the executive administrator of the Texas Water Development Board (TWDB) along with other factors listed in §36.108 (d). Texas Administrative Code Rule §356.10 (Texas Administrative Code, 2011) defines the total estimated recoverable storage as the estimated amount of groundwater within an aquifer that accounts for recovery scenarios that range between 25 percent and 75 percent of the porosity-adjusted aquifer volume.

This report discusses the methods, assumptions, and results of an analysis to estimate the total recoverable storage for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, Gulf Coast, and Brazos River Alluvium aquifers in addition to water-bearing alluvial sediments determined as relevant by Groundwater Management Area 14 groundwater conservation districts for the San Bernard, Navasota, San Jacinto, and Trinity rivers within Groundwater Management Area 14. Tables 1 through 20 summarize the total estimated recoverable storage required by the statute. The total estimated recoverable storage values are for areas within the official extent of the aquifers (and other portions deemed relevant by the groundwater conservation districts) in Groundwater Management Area 14. In addition, areas that currently have adopted desired future conditions but may be declared to be non-relevant are included

[2] Contact information is for Roberto Anaya

as the total estimated recoverable storage values are needed for the associated explanatory report per Texas Administrative Code Rule §356.31 (b) (Texas Administrative Code, 2011).

DEFINITION OF TOTAL ESTIMATED RECOVERABLE STORAGE:

The total estimated recoverable storage is defined as the estimated amount of groundwater within an aquifer that accounts for recovery scenarios that range between 25 percent and 75 percent of the porosity-adjusted aquifer volume. In other words, we assume that only 25 to 75 percent of groundwater held within an aquifer can be removed by pumping.

The total recoverable storage was estimated for the portion of the aquifers within Groundwater Management Area 14 that lie within the official lateral aquifer boundaries as delineated by George and others (2011). If portions of aquifers outside these boundaries were defined as relevant in the resolution dated August 25, 2010, that adopted the current desired future conditions, then estimates of total recoverable storage reported here include these specific areas. Total estimated recoverable storage values may include a mixture of water quality types, including fresh, brackish, and saline groundwater, because the available data and the existing groundwater availability models do not permit the differentiation between different water quality types. The total estimated recoverable storage values do not take into account the effects of land surface subsidence, degradation of water quality, or any changes to surface water-groundwater interaction that may occur as the result of extracting groundwater from the aquifer.

METHODS:

To estimate the total recoverable storage of an aquifer, we first calculated the total storage in an aquifer within the official and/or relevant aquifer boundary. The total storage is the volume of groundwater removed by pumping that completely drains the aquifer.

Aquifers can be either unconfined or confined (Figure 1). A well screened in an unconfined aquifer will have a water level equal to the water level outside the well or in the aquifer. Thus, unconfined aquifers have water levels within the aquifers. A confined aquifer is bounded by low permeable geologic units at the top and bottom, and the aquifer is under hydraulic pressure above the ambient atmospheric pressure. The water level at a well screened in a confined aquifer will be above the top of the aquifer. As a result, calculation of

total storage is also different between unconfined and confined aquifers. For an unconfined aquifer, the total storage is equal to the volume of groundwater removed by pumping that makes the water level fall to the aquifer bottom. For a confined aquifer, the total storage contains two parts. The first part is the groundwater released from the aquifer when the water level falls from above the top of the aquifer to the top of the aquifer. The reduction of hydraulic pressure in the aquifer by pumping causes expansion of groundwater and deformation of aquifer solids. The aquifer is still fully saturated to this point. The second part, just like unconfined aquifer, is the groundwater released from the aquifer when the water level falls from the top to the bottom of the aquifer. Given the same aquifer area and water level drop, the amount of water released in the second part is much greater than the first part. The difference is quantified by two parameters: storativity related to confined aquifers and specific yield related to unconfined aquifers. For example, storativity values range from 10^{-5} to 10^{-3} for most confined aquifers, while the specific yield values can be 0.01 to 0.3 for most unconfined aquifers. The equations for calculating the total storage are presented below:

- for unconfined aquifers

$$Total\ Storage\ = V_{drained} = Area \times S_y \times (Water\ Level - Bottom)$$

- for confined aquifers

$$Total\ Storage\ = V_{confined} + V_{drained}$$

  - confined part

$$V_{confined} = Area \times [\,S \times (Water\ Level - Top)]$$

or

$$V_{confined} = Area \times [\,S_s \times (\mathrm{Top} - \mathrm{Bottom}) \times (Water\ Level - Top)]$$

  - unconfined part

$$V_{drained} = Area \times \left[S_y \times (Top - Bottom)\right]$$

where:

- $V_{drained}$ = storage volume due to water draining from the formation (acre-feet)
- $V_{confined}$ = storage volume due to elastic properties of the aquifer and water(acre-feet)
- *Area* = area of aquifer (acre)
- *Water Level* = groundwater elevation (feet above mean sea level)

- *Top* = elevation of aquifer top (feet above mean sea level)
- *Bottom* = elevation of aquifer bottom (feet above mean sea level)
- S_y = specific yield (no units)
- S_s = specific storage (1/feet)
- *S* = storativity or storage coefficient (no units)

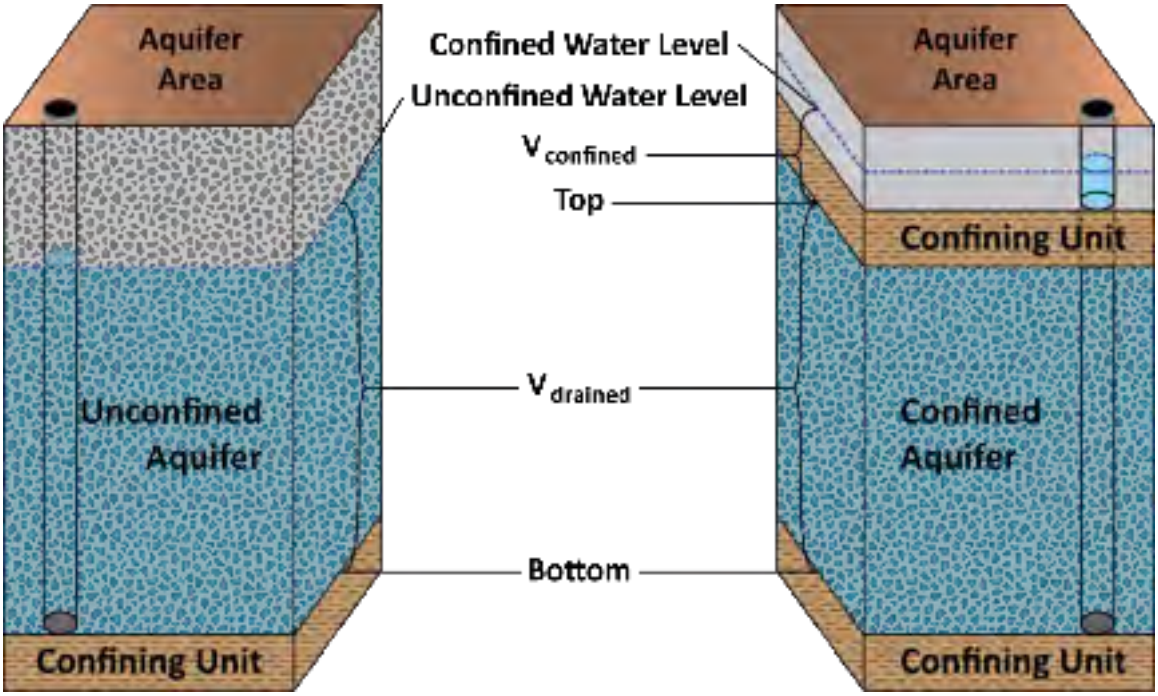

FIGURE 1. SCHEMATIC GRAPH SHOWING THE DIFFERENCE BETWEEN UNCONFINED AND CONFINED AQUIFERS.

As presented in the equations, calculation of the total storage requires data, such as aquifer top, aquifer bottom, aquifer storage properties, and water level. For the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, and Gulf Coast aquifers we extracted this information from existing groundwater availability model input and output files on a cell-by-cell basis.

For the Brazos River Alluvium Aquifer which does not have a groundwater availability model, we used an analytical approach. For each county, ArcMAP™ was used to estimate the Brazos River Alluvium Aquifer thickness (assuming base of the alluvium and land surface) and average water table depth (Shah and others, 2007; TWDB, 2013). Average Brazos River Alluvium Aquifer saturated thickness for each county was then calculated from average thickness minus average water table depth. Finally we estimated the total storage of the Brazos River

Alluvium Aquifer from average saturated thickness multiplied with area and an assumed specific yield value.

For the water bearing alluvial sediments determined as relevant for the San Bernard, Navasota, San Jacinto, and Trinity rivers, which do not have a groundwater availability model, we used an analytical approach. For each county, ArcMAP™ was used to calculate the acreage area for the delineated spatial extents of each of the river alluvia. The saturated thickness was then estimated based on water well and water-level data from the TWDB groundwater database for each of the acreage areas of the water bearing alluvial sediments determined as relevant (TWDB, 2011). Finally, we estimated the total storage for each of the river alluvia using average saturated thicknesses multiplied with associated areas and an assumed uniformly distributed specific yield values reported in the literature (Baker and others, 1974; Bradley, 2011; Cronin and Wilson, 1967; Johnson, 1967; Wilson, 1967).

The recoverable storage for each of the aquifers listed above was the product of its total storage and an estimated factor ranging from 25 percent to 75 percent.

PARAMETERS AND ASSUMPTIONS:

Carrizo-Wilcox, Queen City, and Sparta aquifers

- We used version 2.02 of the groundwater availability model for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers to estimate the total recoverable storage for the Carrizo-Wilcox, Queen City, and Sparta aquifers. See Dutton and others (2003) and Kelley and others (2004) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes eight layers which generally represent the Sparta Aquifer (Layer 1), the Weches Confining Unit (Layer 2), the Queen City Aquifer (Layer 3), the Reklaw Confining Unit (Layer 4), the Carrizo Formation (Layer 5), the Upper Wilcox Formation or Calvert Bluff Formation (Layer 6), the Middle Wilcox Formation or Simsboro Formation (Layer 7), and the Lower Wilcox Formation or Hooper Formation (Layer 8). To develop the estimates for the total estimated recoverable storage, we used Layer 1 (Sparta Aquifer), Layer 3 (Queen City Aquifer), and Layers 5 through 8 (Carrizo-Wilcox Aquifer system).

- The down-dip boundary of the model is based on the location of the Wilcox Growth Fault Zone, which is considered to be a barrier to flow (Kelley and others, 2004). This boundary is relatively deep and in the portion of the aquifer that is characterized as brackish to saline; consequently, the model includes parts of the formation beyond potable portions of the aquifer (Dutton and others, 2003). The groundwater in the official extent of the Carrizo-Wilcox, Queen City, and Sparta aquifers ranges from fresh to brackish in composition (Kelley and others, 2004).
- The groundwater availability model for the northern part of the Carrizo-Wilcox, Queen City, and Sparta aquifers was not considered for analysis because the active model area was more adequately covered by the overlap of the active model area for the central part of the Carrizo-Wilcox, Queen City, and Sparta aquifers.

Yegua-Jackson Aquifer and the Catahoula Formation portion of the Gulf Coast Aquifer System

- We used version 1.01 of the groundwater availability model for the Yegua-Jackson Aquifer to estimate the total recoverable storages of the Yegua-Jackson Aquifer. See Deeds and others (2010) for assumptions and limitations of the groundwater availability model.
- This groundwater availability model includes five layers which represent the outcrop section for the Yegua-Jackson Aquifer and the Catahoula Formation and other younger overlying units (Layer 1), the upper portion of the Jackson Group (Layer 2), the lower portion of the Jackson Group (Layer 3), the upper portion of the Yegua Group (Layer 4), and the lower portion of the Yegua Group (Layer 5). To develop the estimates for the total estimated recoverable storage in the Yegua-Jackson Aquifer, we used layers 1 through 5; however, we only used model cells in Layer 1 that represent the outcrop area of the Yegua-Jackson Aquifer.
- The down-dip boundary for the Yegua-Jackson Aquifer in this model was set to approximately coincide with the extent of the available geologic data, well beyond any active portion (groundwater use) of the aquifer (Deeds and others, 2010). Consequently, the model extends into zones of brackish and saline groundwater. The groundwater in the official extent of the Yegua-Jackson Aquifer ranges from fresh to brackish in composition (Deeds and others, 2010).

- For Jasper, Newton, Polk, Tyler, and Washington counties we used the official active areas of the groundwater availability model to estimate the total recoverable storage for the Yegua-Jackson Aquifer. However, for Grimes and Walker counties the desired future condition statement adopted on August 25, 2010,o included confined and brackish confined areas outside of the official aquifer area. Geographic information for those areas was submitted with the desired future condition statement. We used that information in this assessment to estimate the total recoverable storage for Grimes and Walker counties for layers 2 through 5 which represent the confined parts of the Yegua-Jackson units.

Gulf Coast Aquifer System

- We used version 3.01 of the groundwater availability model for the northern portion of the Gulf Coast Aquifer system for this analysis. See Kasmarek (2013) for assumptions and limitations of the model.
- The model has four layers which represent the Chicot Aquifer (Layer 1), the Evangeline Aquifer (Layer 2), the Burkeville confining unit (Layer 3), and the Jasper Aquifer and parts of the Catahoula Formation in direct hydrologic communication with the Jasper Aquifer (Layer 4).
- The southeastern boundary of flow in each hydrogeologic unit of the model was set at the down-dip limit of freshwater (defined in this case to be up to 10,000 milligrams per liter of total dissolved solids; Kasmarek, 2013).

Brazos River Alluvium Aquifer

- The Brazos River Alluvium Aquifer is under water table conditions in most places (George and others, 2011).
- The thickness of the Brazos River Alluvium Aquifer is based on a U.S. Geological Survey electromagnetic and resistivity imaging project (Shah and others, 2007).
- Water levels are from the TWDB groundwater database http://www.twdb.texas.gov/groundwater/data/gwdbrpt.asp accessed in July 2013. The three latest years of water level data were used to estimate the average water table depth for each county.
- We used a specific yield value of 0.15 from Cronin and others (1967).

San Bernard River Alluvium

- The areal extent of the San Bernard River Alluvium within Austin County was calculated to be 2,792 acres (USGS and TWDB, 2006).
- Average saturated thickness of the water bearing alluvium determined as relevant was calculated to be 20 feet (Thorkildsen and Backhouse, 2011).
- We used a specific yield value of 0.15 (Wilson, 1967).

Navasota River Alluvium

- The areal extent of the Navasota River Alluvium within Grimes County was calculated to be 12,004 acres (USGS and TWDB, 2006).
- Based on water well and water-level data from the TWDB groundwater database near the confluence of the Navasota and Brazos Rivers the water bearing alluvium determined as relevant has an average saturated thickness of 32 feet (TWDB, 2011).
- We used a specific yield value of 0.15 (Baker and others, 1974; Bradley, 2011; Johnson, 1967).

San Jacinto River Alluvium

- The areal extent of the San Jacinto River Alluvium within Walker County was calculated to be 7,399 acres (USGS and TWDB, 2006).
- Based on water well and water-level data from the TWDB groundwater database the water bearing alluvium determined as relevant has an average saturated thickness of 20 feet (TWDB, 2011).
- We used a specific yield value of 0.15 (Cronin and Wilson, 1967; Johnson, 1967).

Trinity River Alluvium

- The areal extent of the Trinity River Alluvium within Walker County was calculated to be 19,873 acres (USGS and TWDB, 2006).
- Based on water well and water-level data from the TWDB groundwater database the water bearing alluvium determined as relevant has an average saturated thickness of 23 feet (TWDB, 2011).
- We used a specific yield value of 0.15 (Cronin and Wilson, 1967; Johnson, 1967).

RESULTS:

Tables 1 through 20 summarize the total estimated recoverable storage required by statute. The county and groundwater conservation district total storage estimates are rounded to two or three significant digits. Figures 2 through 11 indicate the extent of the groundwater availability models or aquifer boundaries deemed relevant by the groundwater conservation districts in Groundwater Management Area 14 for the Carrizo-Wilcox, Queen City, Sparta, Yegua-Jackson, Gulf Coast, and Brazos River Alluvium aquifers as well as the water bearing alluvial sediments determined as relevant by Groundwater Management Area 14 groundwater conservation districts for the San Bernard, Navasota, San Jacinto, and Trinity rivers.

TABLE 1. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE CARRIZO-WILCOX AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Grimes	14,500,000	3,625,000	10,875,000
Walker	5,040,000	1,260,000	3,780,000
Washington	264,000	66,000	198,000
Total	19,804,000	4,951,000	14,853,000

TABLE 2. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[3] FOR THE CARRIZO-WILCOX AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	264,000	66,000	198,000
Bluebonnet GCD	19,500,000	4,875,000	14,625,000
Total	19,764,000	4,941,000	14,823,000

[3] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to three significant digits.

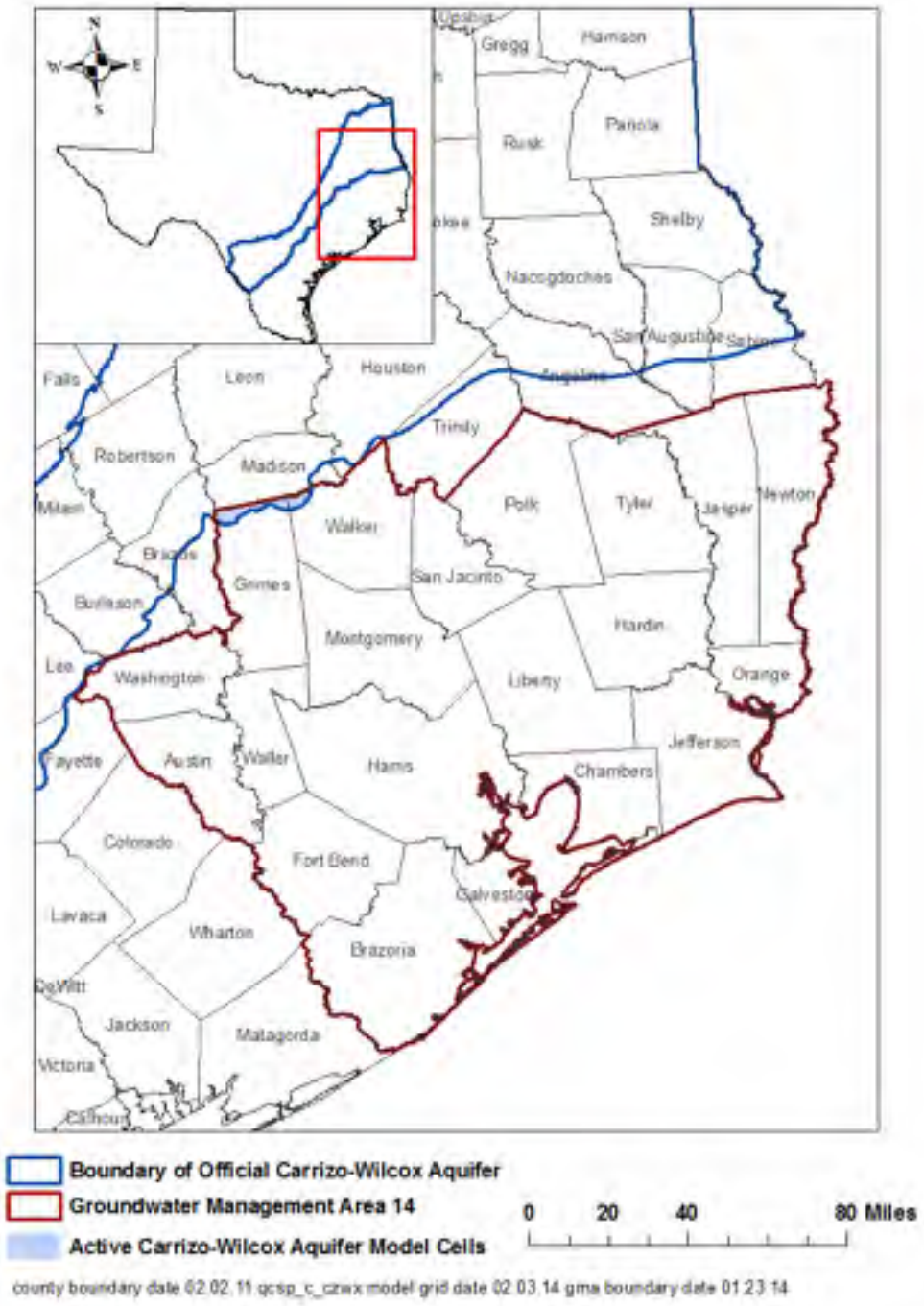

FIGURE 2. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE CARRIZO-WILCOX AQUIFER (TABLES 1 AND 2) WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 3. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE QUEEN CITY AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Grimes	4,970,000	1,242,500	3,727,500
Walker	624,000	156,000	468,000
Washington	4,330,000	1,082,500	3,247,500
Total	9,924,000	2,481,000	7,443,000

TABLE 4. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[4] FOR THE QUEEN CITY AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	4,330,000	1,082,500	3,247,500
Bluebonnet GCD	5,590,000	1,397,500	4,192,500
Total	9,920,000	2,480,000	7,440,000

[4] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to three significant digits.

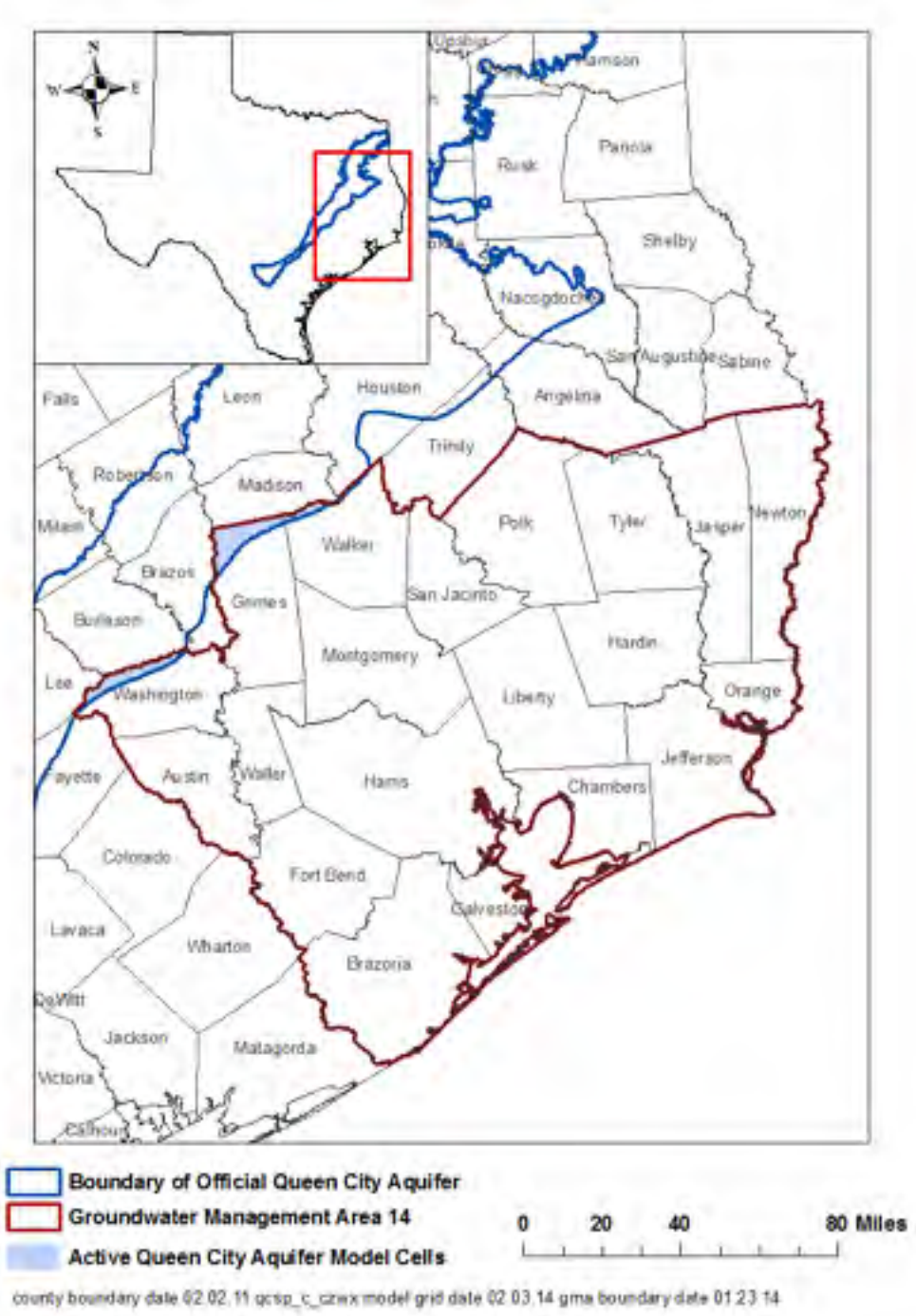

FIGURE 3. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE QUEEN CITY AQUIFER (TABLES 3 AND 4) WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 5. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE SPARTA AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Grimes	11,600,000	2,900,000	8,700,000
Walker	8,550,000	2,137,500	6,412,500
Washington	1,860,000	465,000	1,395,000
Total	22,010,000	5,502,500	16,507,500

TABLE 6. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[5] FOR THE SPARTA AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	1,860,000	465,000	1,395,000
Bluebonnet GCD	20,100,000	5,025,000	15,075,000
Total	21,960,000	5,490,000	16,470,000

[5] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to three significant digits.

FIGURE 4. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE CENTRAL PART OF THE CARRIZO-WILCOX, QUEEN CITY, AND SPARTA AQUIFERS USED TO ESTIMATE TOTAL RECOVERABLE STORAGE FOR THE SPARTA AQUIFER (TABLES 5 AND 6) WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 7. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE YEGUA-JACKSON AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Grimes	94,900,000	23,725,000	71,175,000
Jasper	6,930,000	1,732,500	5,197,500
Newton	1,270,000	317,500	952,500
Polk	27,900,000	6,975,000	20,925,000
Tyler	8,650,000	2,162,500	6,487,500
Walker	103,000,000	25,750,000	77,250,000
Washington	12,400,000	3,100,000	9,300,000
Total	255,050,000	63,762,500	191,287,500

TABLE 8. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[6] FOR THE YEGUA-JACKSON AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	12,400,000	3,100,000	9,300,000
Bluebonnet GCD	198,000,000	49,500,000	148,500,000
Lower Trinity GCD	28,000,000	7,000,000	21,000,000
Southeast Texas GCD	16,900,000	4,225,000	12,675,000
Total	255,300,000	63,825,000	191,475,000

[6] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to three significant digits.

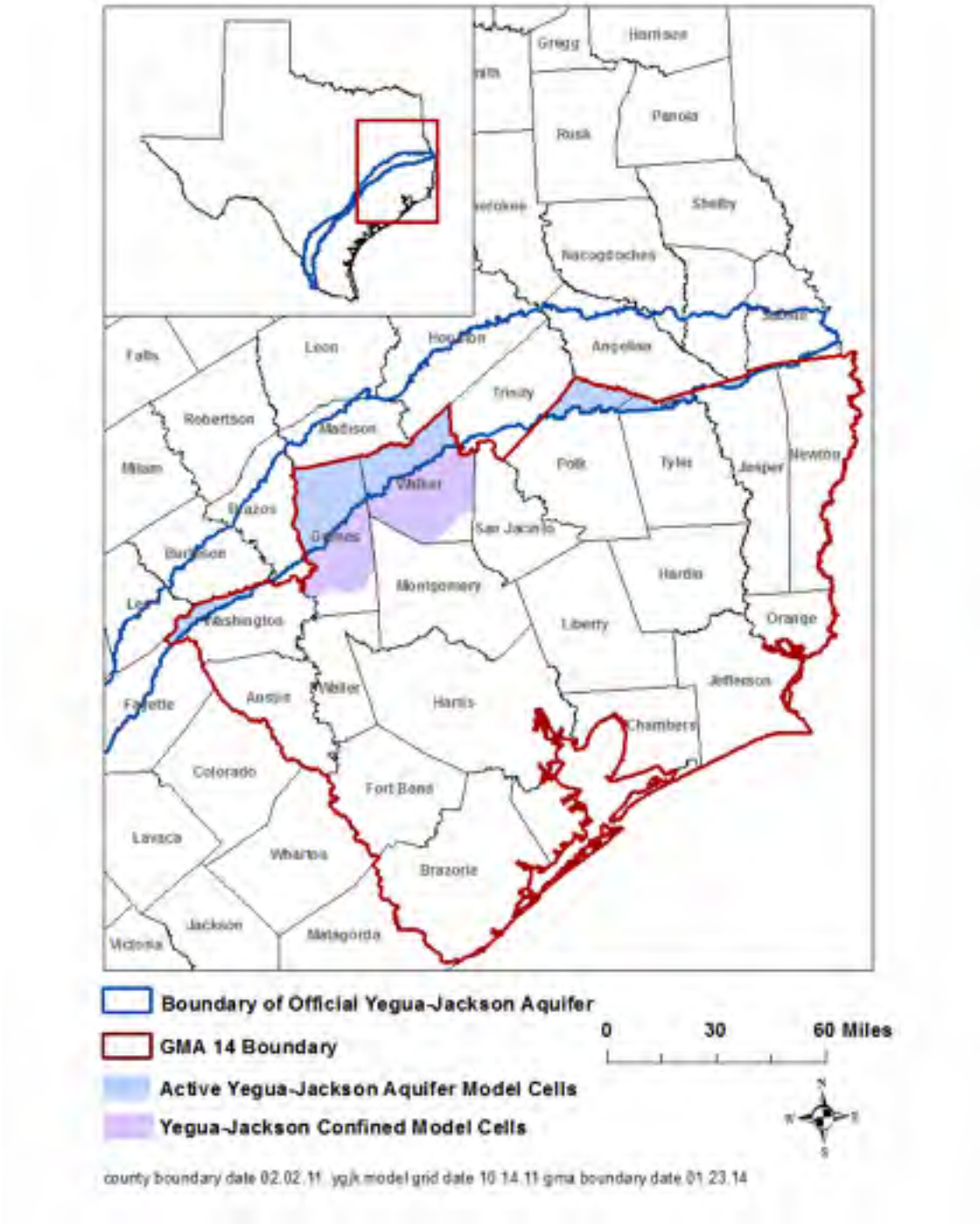

FIGURE 5. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE YEGUA-JACKSON AQUIFER USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 7 AND 8) FOR THE YEGUA-JACKSON AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 9. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE GULF COAST AQUIFER SYSTEM WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Austin	80,000,000	20,000,000	60,000,000
Brazoria	330,000,000	82,500,000	247,500,000
Chambers	130,000,000	32,500,000	97,500,000
Fort Bend	170,000,000	42,500,000	127,500,000
Galveston	81,000,000	20,250,000	60,750,000
Grimes	35,000,000	8,750,000	26,250,000
Hardin	190,000,000	47,500,000	142,500,000
Harris	380,000,000	95,000,000	285,000,000
Jasper	140,000,000	35,000,000	105,000,000
Jefferson	170,000,000	42,500,000	127,500,000
Liberty	250,000,000	62,500,000	187,500,000
Montgomery	180,000,000	45,000,000	135,000,000
Newton	120,000,000	30,000,000	90,000,000
Orange	61,000,000	15,250,000	45,750,000
Polk	110,000,000	27,500,000	82,500,000
San Jacinto	95,000,000	23,750,000	71,250,000
Tyler	120,000,000	30,000,000	90,000,000
Walker	32,000,000	8,000,000	24,000,000
Waller	80,000,000	20,000,000	60,000,000
Washington	22,000,000	5,500,000	16,500,000
Total	2,776,000,000	694,000,000	2,082,000,000

TABLE 10. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[7] FOR THE GULF COAST AQUIFER SYSTEM WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	640,000,000	160,000,000	480,000,000
Bluebonnet GCD	230,000,000	57,500,000	172,500,000
Brazoria County GCD	330,000,000	82,500,000	247,500,000
Fort Bend Subsidence District	170,000,000	42,500,000	127,500,000
Harris-Galveston Coastal Subsidence District	460,000,000	115,000,000	345,000,000
Lone Star GCD	180,000,000	45,000,000	135,000,000
Lower Trinity GCD	200,000,000	50,000,000	150,000,000
Southeast Texas GCD	570,000,000	142,500,000	427,500,000
Total	2,780,000,000	695,000,000	2,085,000,000

[7] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to two significant digits.

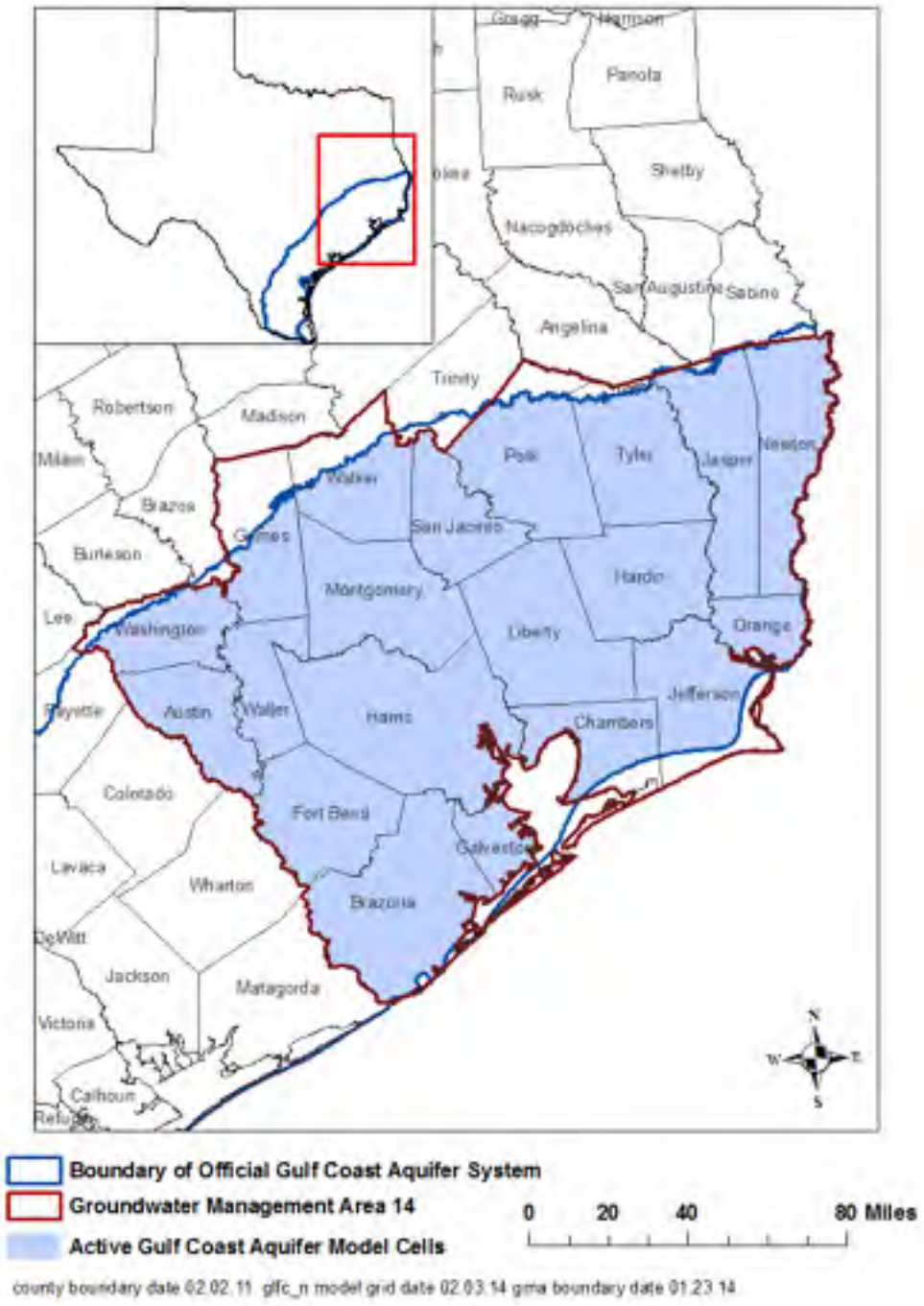

FIGURE 6. EXTENT OF THE GROUNDWATER AVAILABILITY MODEL FOR THE NORTHERN PART OF THE GULF COAST AQUIFER SYSTEM USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 9 AND 10) FOR THE GULF COAST AQUIFER SYSTEM WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 11. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE BRAZOS RIVER ALLUVIUM AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Austin	220,000	55,000	165,000
Fort Bend	1,010,000	252,500	757,500
Grimes	74,700	18,675	56,025
Waller	412,000	103,000	309,000
Washington	179,000	44,750	134,250
Total	1,895,700	473,925	1,421,775

TABLE 12. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT[8] FOR THE BRAZOS RIVER ALLUVIUM AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO THREE SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
No District	179,140	179,000	44,750
Bluebonnet GCD	707,000	176,750	530,250
Fort Bend Subsidence District	1,010,000	252,500	757,500
Total	1,896,000	474,000	1,422,000

[8] The total estimated recoverable storage values by groundwater conservation district and county for an aquifer may not be the same because the numbers have been rounded to three significant digits.

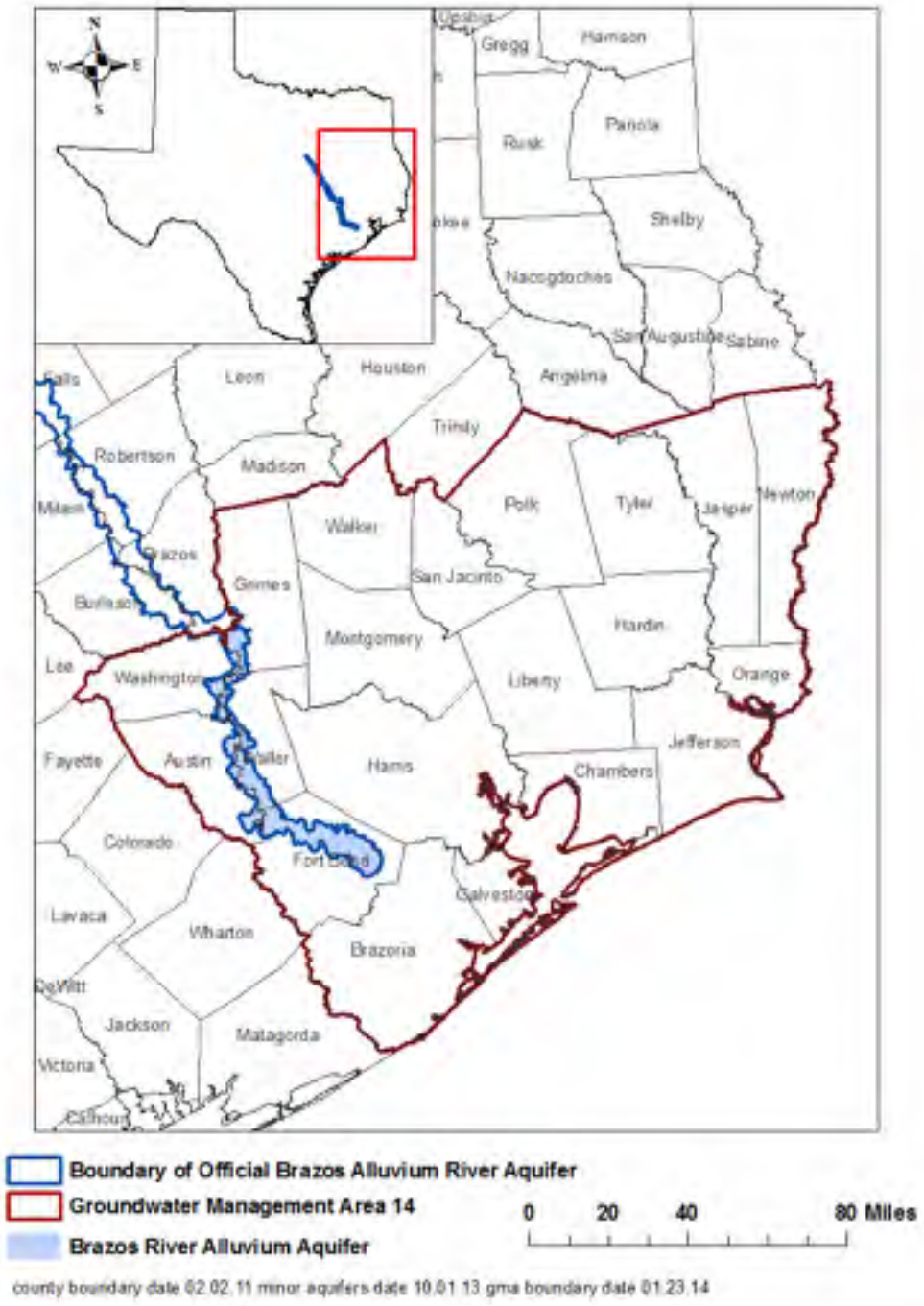

FIGURE 7. EXTENT OF THE BRAZOS RIVER ALLUVIUM AQUIFER USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 11 AND 12) FOR THE BRAZOS RIVER ALLUVIUM AQUIFER WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 13. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE SAN BERNARD RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Austin	8,400	2,100	6,300
Total	8,400	2,100	6,300

TABLE 14. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT FOR THE SAN BERNARD RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bluebonnet GCD	8,400	2,100	6,300
Total	8,400	2,100	6,300

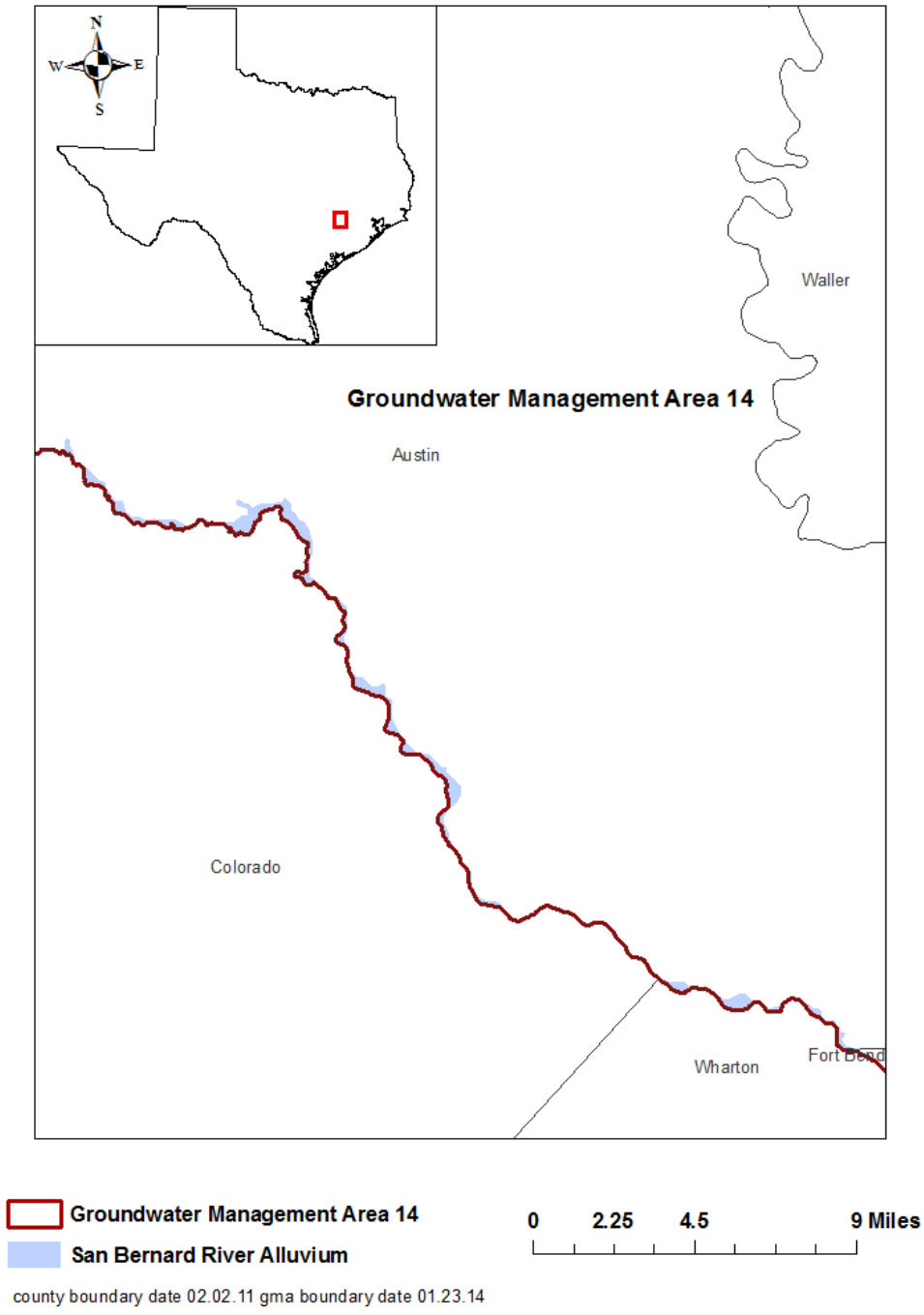

FIGURE 8. EXTENT OF THE SAN BERNARD RIVER ALLUVIUM DETERMINED AS RELEVANT IN AUSTIN COUNTY USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 13 AND 14) FOR THE SAN BERNARD RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 15. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE NAVASOTA RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Grimes	58,000	14,500	43,500
Total	58,000	14,500	43,500

TABLE 16. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT FOR THE NAVASOTA RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bluebonnet GCD	58,000	14,500	43,500
Total	58,000	14,500	43,500

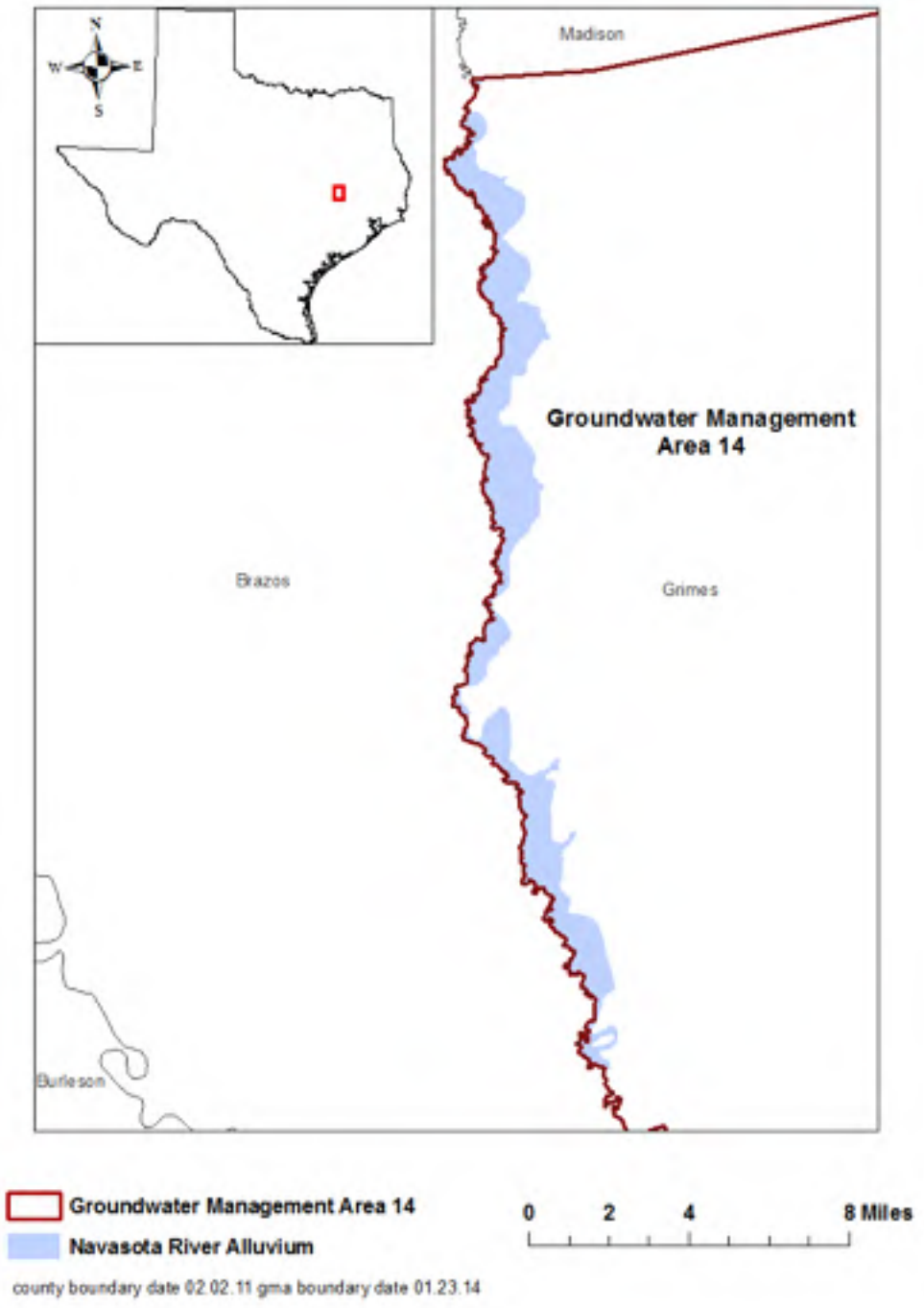

FIGURE 9. EXTENT OF THE NAVASOTA RIVER ALLUVIUM DETERMINED AS RELEVANT IN GRIMES COUNTY USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 15 AND 16) FOR NAVASOTA RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 17. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE SAN JACINTO RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Walker	22,000	5,500	16,500
Total	22,000	5,500	16,500

TABLE 18. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT FOR THE SAN JACINTO RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bluebonnet GCD	22,000	5,500	16,500
Total	22,000	5,500	16,500

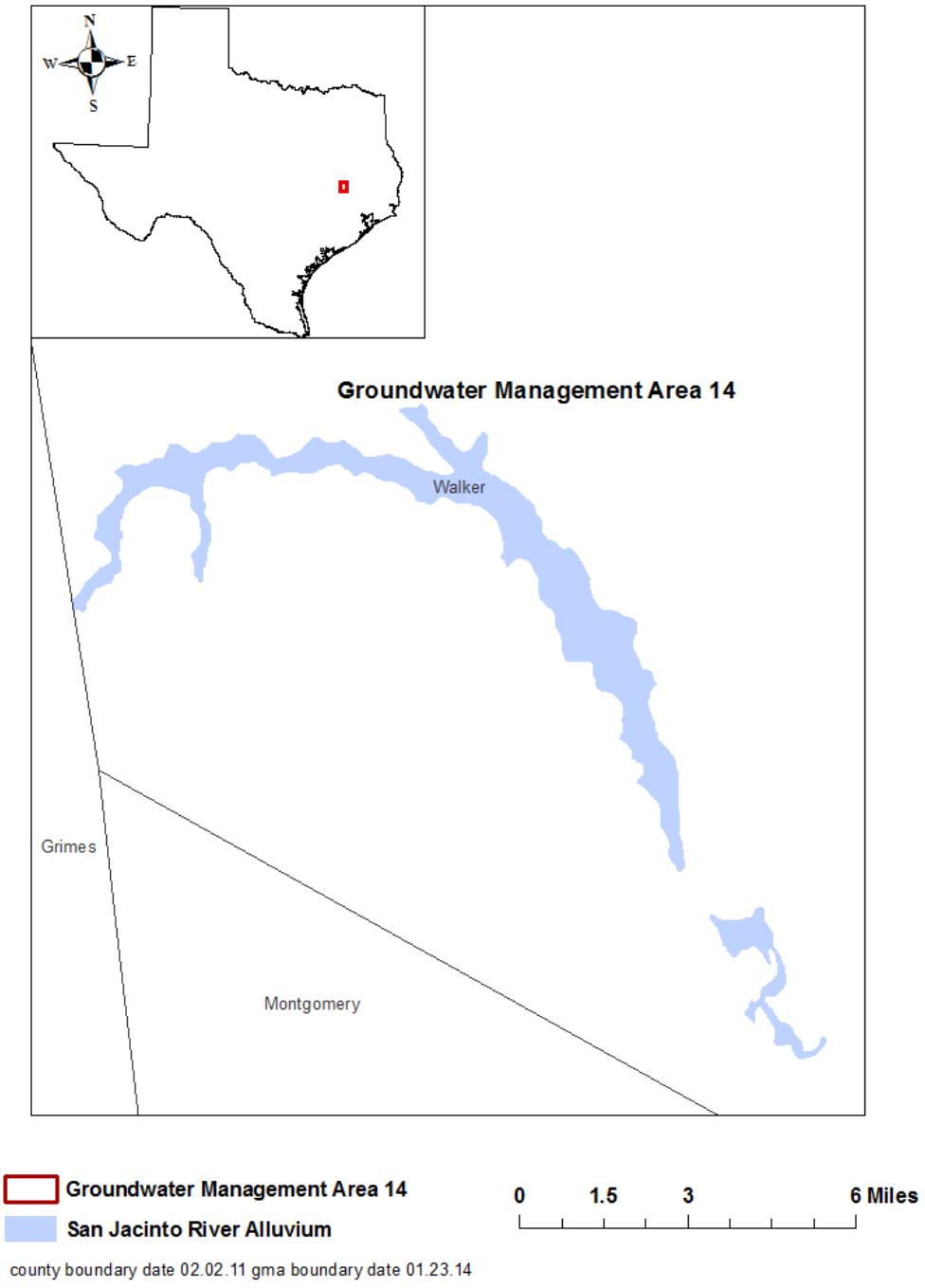

FIGURE 10. EXTENT OF THE SAN JACINTO RIVER ALLUVIUM DETERMINED AS RELEVANT IN WALKER COUNTY USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 17 AND 18) FOR THE SAN JACINTO RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14.

TABLE 19. TOTAL ESTIMATED RECOVERABLE STORAGE BY COUNTY FOR THE TRINITY RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14. COUNTY TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

County	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Walker	69,000	17,250	51,750
Total	69,000	17,250	51,750

TABLE 20. TOTAL ESTIMATED RECOVERABLE STORAGE BY GROUNDWATER CONSERVATION DISTRICT FOR THE TRINTY RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14. GROUNDWATER CONSERVATION DISTRICT TOTAL ESTIMATES ARE ROUNDED TO TWO SIGNIFICANT DIGITS.

Groundwater Conservation District (GCD)	*Total Storage (acre-feet)*	*25 percent of Total Storage (acre-feet)*	*75 percent of Total Storage (acre-feet)*
Bluebonnet GCD	69,000	17,250	51,750
Total	69,000	17,250	51,750

FIGURE 11. EXTENT OF THE TRINITY RIVER ALLUVIUM DETERMINED AS RELEVANT IN WALKER COUNTY USED TO ESTIMATE TOTAL RECOVERABLE STORAGE (TABLES 19 AND 20) FOR THE TRINITY RIVER ALLUVIUM DETERMINED AS RELEVANT WITHIN GROUNDWATER MANAGEMENT AREA 14.

LIMITATIONS

The groundwater models used in completing this analysis are the best available scientific tools that can be used to meet the stated objective(s). To the extent that this analysis will be used for planning purposes and/or regulatory purposes related to pumping in the past and into the future, it is important to recognize the assumptions and limitations associated with the use of the results. In reviewing the use of models in environmental regulatory decision making, the National Research Council (2007) noted:

> *"Models will always be constrained by computational limitations, assumptions, and knowledge gaps. They can best be viewed as tools to help inform decisions rather than as machines to generate truth or make decisions. Scientific advances will never make it possible to build a perfect model that accounts for every aspect of reality or to prove that a given model is correct in all respects for a particular regulatory application. These characteristics make evaluation of a regulatory model more complex than solely a comparison of measurement data with model results."*

Because the application of the groundwater model was designed to address regional scale questions, the results are most effective on a regional scale. The TWDB makes no warranties or representations relating to the actual conditions of any aquifer at a particular location or at a particular time.

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Appendix L

Prepared water budgets by county for GMA 14

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Water Budgets

Gulf Coast Aquifer

Angelina County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	—	—	18
Storage	—	—	—	0
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Jasper	—	—	—	0
Total Inflow	0	0	0	18

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	—	—	—	0
Leakage To Upper Unit	—	—	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Jasper	—	—	—	18
Total Outflow	0	0	0	18
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	—	—	—	0

All values are average acre-feet per year from 2000 through 2009.

Austin County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	9,821	12,741	0	—
Storage	7,473	788	59	424
Leakage From Upper Unit	—	8,311	352	359
Leakage From Lower Unit	8	—	—	—
Lateral Flow From Colorado	871	442	1	333
Lateral Flow From Fort Bend	2,305	664	0	52
Lateral Flow From Fayette	—	74	2	262
Lateral Flow From Waller	437	527	0	71
Lateral Flow From Washington	—	569	3	882
Lateral Flow From Wharton	591	23	0	26
Total Inflow	21,507	24,139	419	2,409

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	610	7,864	—	1,653
Evapotranspiration/Stream Gain (GHB)	62	6,932	0	—
Storage	13	103	18	5
Leakage To Upper Unit	—	8	67	37
Leakage To Lower Unit	8,311	352	359	—
Lateral Flow To Colorado	1,918	1,814	3	44
Lateral Flow To Fayette	—	—	1	—
Lateral Flow To Fort Bend	7,589	2,134	0	145
Lateral Flow To Waller	1,573	3,271	3	422
Lateral Flow To Washington	—	1,175	5	87
Lateral Flow To Wharton	1,431	554	0	16
Total Outflow	21,507	24,206	456	2,409
Inflow - Outflow	0	-67	-37	0
Storage Increase (+)/Decrease(-)	-7,460	-685	-42	-419

All values are average acre-feet per year from 2000 through 2009.

Brazoria County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	48,416	—	—	—
Storage	3,935	1,720	—	—
Leakage From Upper Unit	—	10,307	—	—
Leakage From Lower Unit	54	—	—	—
Lateral Flow From Fort Bend	6,724	3,521	—	—
Lateral Flow From Galveston	849	1,633	—	—
Lateral Flow From Harris	167	1,898	—	—
Lateral Flow From Matagorda	1,042	439	—	—
Lateral Flow From Wharton	364	192	—	—
Lateral Flow From Out of State	1,543	1,054	—	—
Total Inflow	63,094	20,764	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	35,329	168	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	500	138	—	—
Leakage To Upper Unit	—	54	—	—
Leakage To Lower Unit	10,307	—	—	—
Lateral Flow To Fort Bend	7,674	12,299	—	—
Lateral Flow To Galveston	870	656	—	—
Lateral Flow To Harris	2,379	5,041	—	—
Lateral Flow To Matagorda	5,151	1,569	—	—
Lateral Flow To Wharton	43	—	—	—
Lateral Flow To Out of State	852	852	—	—
Total Outflow	63,105	20,776	0	0
Inflow - Outflow	-11	-13	0	0
Storage Increase (+)/Decrease(-)	-3,436	-1,581	—	—

All values are average acre-feet per year from 2000 through 2009.

Brazos County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	—	—	42
Storage	—	—	—	41
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Grimes	—	—	—	137
Lateral Flow From Washington	—	—	—	189
Total Inflow	0	0	0	409

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	17
Evapotranspiration/Stream Gain (GHB)	—	—	—	344
Storage	—	—	—	—
Leakage To Upper Unit	—	—	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Grimes	—	—	—	19
Lateral Flow To Washington	—	—	—	30
Total Outflow	0	0	0	409
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	—	—	—	—

All values are average acre-feet per year from 2000 through 2009.

Calhoun County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	196	—	—	—
Storage	13	12	—	—
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	154	—	—	—
Lateral Flow From Jackson	74	104	—	—
Lateral Flow From Matagorda	32	29	—	—
Lateral Flow From Out of State	368	164	—	—
Total Inflow	838	310	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	8	—	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	10	9	—	—
Leakage To Upper Unit	—	154	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Jackson	508	46	—	—
Lateral Flow To Matagorda	37	7	—	—
Lateral Flow To Out of State	275	94	—	—
Total Outflow	838	310	0	0
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	-3	-3	—	—

All values are average acre-feet per year from 2000 through 2009.

Chambers County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	9,017	—	—	—
Storage	136	61	—	—
Leakage From Upper Unit	—	2,369	—	—
Leakage From Lower Unit	37	—	—	—
Lateral Flow From Galveston	153	70	—	—
Lateral Flow From Harris	43	78	—	—
Lateral Flow From Jefferson	167	198	—	—
Lateral Flow From Liberty	5,285	1,627	—	—
Lateral Flow From Out of State	1,624	1,889	—	—
Total Inflow	16,462	6,293	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	5,318	260	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	207	119	—	—
Leakage To Upper Unit	—	37	—	—
Leakage To Lower Unit	2,369	—	—	—
Lateral Flow To Galveston	51	63	—	—
Lateral Flow To Harris	5,678	2,224	—	—
Lateral Flow To Jefferson	198	129	—	—
Lateral Flow To Liberty	390	415	—	—
Lateral Flow To Out of State	2,248	3,043	—	—
Total Outflow	16,458	6,289	0	0
Inflow - Outflow	4	4	0	0
Storage Increase (+)/Decrease(-)	71	58	—	—

All values are average acre-feet per year from 2000 through 2009.

Colorado County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	20,447	7,720	—	—
Storage	23,648	437	127	149
Leakage From Upper Unit	—	14,185	166	84
Leakage From Lower Unit	1,630	—	—	—
Lateral Flow From Austin	1,918	1,814	3	44
Lateral Flow From Fayette	—	530	7	1,198
Lateral Flow From Jackson	132	40	0	0
Lateral Flow From Lavaca	5,708	1,701	3	86
Lateral Flow From Wharton	318	113	0	1
Total Inflow	53,802	26,541	306	1,562

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	11,585	13,134	—	975
Evapotranspiration/Stream Gain (GHB)	347	4,691	—	—
Storage	14	60	65	9
Leakage To Upper Unit	—	1,630	229	87
Leakage To Lower Unit	14,185	166	84	—
Lateral Flow To Austin	871	442	1	333
Lateral Flow To Fayette	—	347	3	57
Lateral Flow To Jackson	422	151	0	1
Lateral Flow To Lavaca	445	324	1	30
Lateral Flow To Wharton	25,932	5,824	9	70
Total Outflow	53,800	26,770	393	1,562
Inflow - Outflow	1	-228	-87	0
Storage Increase (+)/Decrease(-)	-23,635	-377	-62	-139

All values are average acre-feet per year from 2000 through 2009.

Fayette County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	2,799	0	4,387
Storage	—	2	420	2,000
Leakage From Upper Unit	—	—	105	485
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Austin	—	—	1	—
Lateral Flow From Colorado	—	347	3	57
Lateral Flow From Lavaca	—	55	1	132
Lateral Flow From Washington	—	—	0	33
Total Inflow	0	3,204	530	7,094

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	1,330
Evapotranspiration/Stream Gain (GHB)	—	2,172	2	3,056
Storage	—	0	0	1
Leakage To Upper Unit	—	—	32	1
Leakage To Lower Unit	—	105	485	—
Lateral Flow To Austin	—	74	2	262
Lateral Flow To Colorado	—	530	7	1,198
Lateral Flow To Lavaca	—	354	2	953
Lateral Flow To Washington	—	—	—	294
Total Outflow	0	3,236	531	7,095
Inflow - Outflow	0	-32	-1	-2
Storage Increase (+)/Decrease(-)	—	-2	-420	-1,999

All values are average acre-feet per year from 2000 through 2009.

Fort Bend County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	55,225	—	—	—
Storage	44,826	9,968	62	406
Leakage From Upper Unit	—	51,896	10	—
Leakage From Lower Unit	3	—	—	—
Lateral Flow From Austin	7,589	2,134	0	145
Lateral Flow From Brazoria	7,674	12,299	—	—
Lateral Flow From Harris	6,274	2,976	0	10
Lateral Flow From Wharton	4,607	1,451	0	43
Lateral Flow From Waller	7,311	1,686	1	70
Total Inflow	133,509	82,410	73	673

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	39,394	57,392	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	560	176	14	—
Leakage To Upper Unit	—	3	111	52
Leakage To Lower Unit	51,896	10	—	—
Lateral Flow To Austin	2,305	664	0	52
Lateral Flow To Brazoria	6,724	3,521	—	—
Lateral Flow To Harris	27,660	19,584	0	524
Lateral Flow To Waller	847	428	0	42
Lateral Flow To Wharton	4,122	740	0	4
Total Outflow	133,508	82,517	125	674
Inflow - Outflow	0	-107	-52	0
Storage Increase (+)/Decrease(-)	-44,266	-9,792	-49	—

All values are average acre-feet per year from 2000 through 2009.

Galveston County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	3,361	—	—	—
Storage	114	11	—	—
Leakage From Upper Unit	—	1,496	—	—
Leakage From Lower Unit	46	—	—	—
Lateral Flow From Brazoria	870	656	—	—
Lateral Flow From Chambers	51	63	—	—
Lateral Flow From Harris	102	923	—	—
Lateral Flow From Out of State	5,427	4,292	—	—
Total Inflow	9,971	7,440	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	1,318	66	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	402	129	—	—
Leakage To Upper Unit	—	46	—	—
Leakage To Lower Unit	1,496	—	—	—
Lateral Flow To Brazoria	849	1,633	—	—
Lateral Flow To Chambers	153	70	—	—
Lateral Flow To Harris	1,250	3,138	—	—
Lateral Flow To Out of State	4,501	2,357	—	—
Total Outflow	9,969	7,438	0	0

Inflow - Outflow	2	2	0	0
Storage Increase (+)/Decrease(-)	287	119	—	—

All values are average acre-feet per year from 2000 through 2009.

Grimes County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	1,848	1,439	1	2,384
Storage	597	537	82	5,713
Leakage From Upper Unit	—	2,346	81	147
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Brazos	—	—	—	19
Lateral Flow From Montgomery	—	7	0	20
Lateral Flow From Washington	—	42	0	158
Lateral Flow From Waller	2	287	1	203
Lateral Flow From Walker	—	—	—	11
Total Inflow	2,447	4,658	164	8,656

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	990	—	2,741
Evapotranspiration/Stream Gain (GHB)	—	1,421	1	1,097
Storage	0	8	0	383
Leakage To Upper Unit	—	—	14	3
Leakage To Lower Unit	2,346	81	147	—
Lateral Flow To Brazos	—	—	—	137
Lateral Flow To Montgomery	26	543	3	3,379
Lateral Flow To Waller	74	1,593	2	852
Lateral Flow To Washington	—	35	0	42
Lateral Flow To Walker	—	—	—	23
Total Outflow	2,447	4,671	167	8,658
Inflow - Outflow	0	-13	-3	-2
Storage Increase (+)/Decrease(-)	-597	-529	-82	-5,330

All values are average acre-feet per year from 2000 through 2009.

Hardin County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	23,814	—	—	—
Storage	7,579	1,431	105	78
Leakage From Upper Unit	—	19,555	25	—
Leakage From Lower Unit	69	—	—	—
Lateral Flow From Jasper	2,225	2,200	0	—
Lateral Flow From Jefferson	1,137	833	—	—
Lateral Flow From Liberty	1,632	721	0	51
Lateral Flow From Orange	416	452	—	—
Lateral Flow From Polk	1,279	1,020	4	304
Lateral Flow From Tyler	3,130	2,934	3	476
Total Inflow	41,283	29,146	137	909

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	2,461	15,539	—	—
Evapotranspiration/Stream Gain (GHB)	1	—	—	—
Storage	1,280	101	33	59
Leakage To Upper Unit	—	69	464	361
Leakage To Lower Unit	19,555	25	—	—
Lateral Flow To Jasper	12,738	10,433	0	176
Lateral Flow To Jefferson	1,372	805	—	—
Lateral Flow To Liberty	2,980	1,862	1	256
Lateral Flow To Polk	12	19	0	12
Lateral Flow To Orange	884	757	—	—
Lateral Flow To Tyler	—	—	0	44
Total Outflow	41,283	29,611	498	909
Inflow - Outflow	0	-464	-361	0
Storage Increase (+)/Decrease(-)	-6,299	-1,330	-73	-19

All values are average acre-feet per year from 2000 through 2009.

Harris County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	131,941	—	—	—
Storage	46,651	8,429	733	5,179
Leakage From Upper Unit	—	187,061	1,181	4
Leakage From Lower Unit	1,736	—	—	—
Lateral Flow From Brazoria	2,379	5,041	—	—
Lateral Flow From Chambers	5,678	2,224	—	—
Lateral Flow From Fort Bend	27,660	19,584	0	524
Lateral Flow From Galveston	1,250	3,138	—	—
Lateral Flow From Liberty	12,040	3,223	0	588
Lateral Flow From Montgomery	33,337	17,670	8	3,637
Lateral Flow From Waller	6,854	4,044	3	1,113
Lateral Flow From Out of State	7,106	5,787	—	—
Total Inflow	276,632	256,201	1,926	11,045

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	56,417	236,953	—	6,582
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	15,400	2,573	1,275	4
Leakage To Upper Unit	—	1,736	867	222
Leakage To Lower Unit	187,061	1,181	4	—
Lateral Flow To Brazoria	167	1,898	—	—
Lateral Flow To Chambers	43	78	—	—
Lateral Flow To Fort Bend	6,274	2,976	0	10
Lateral Flow To Galveston	102	923	—	—
Lateral Flow To Liberty	2,257	338	0	5
Lateral Flow To Montgomery	2,694	3,595	2	3,889
Lateral Flow To Waller	193	892	1	364
Lateral Flow To Out of State	6,022	3,919	—	—
Total Outflow	276,631	257,062	2,149	11,077
Inflow - Outflow	1	-861	-223	-32
Storage Increase (+)/Decrease(-)	-31,250	-5,856	542	-5,175

All values are average acre-feet per year from 2000 through 2009.

Jackson County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	23,199	—	—	—
Storage	11,028	195	6	0
Leakage From Upper Unit	—	3,227	2	—
Leakage From Lower Unit	2,687	—	—	—
Lateral Flow From Calhoun	508	46	—	—
Lateral Flow From Colorado	422	151	0	1
Lateral Flow From Lavaca	4,019	1,608	0	10
Lateral Flow From Matagorda	1,021	329	—	—
Lateral Flow From Wharton	919	401	—	0
Lateral Flow From Out of State	577	38	—	—
Total Inflow	44,381	5,995	8	11

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	32,478	1,389	—	—
Evapotranspiration/Stream Gain (GHB)	1	—	—	—
Storage	984	182	3	2
Leakage To Upper Unit	—	2,687	14	9
Leakage To Lower Unit	3,227	2	—	—
Lateral Flow To Colorado	132	40	0	0
Lateral Flow To Calhoun	74	104	—	—
Lateral Flow To Lavaca	—	—	—	0
Lateral Flow To Matagorda	1,148	291	—	—
Lateral Flow To Wharton	5,971	1,198	0	0
Lateral Flow To Out of State	365	116	—	—
Total Outflow	44,380	6,009	17	11
Inflow - Outflow	1	-14	-9	0
Storage Increase (+)/Decrease(-)	-10,044	-13	-3	1

All values are average acre-feet per year from 2000 through 2009.

Jasper County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	15,393	2,027	2	6,605
Storage	3,550	1,073	192	2,832
Leakage From Upper Unit	—	9,735	60	119
Leakage From Lower Unit	263	—	—	—
Lateral Flow From Angelina	—	—	—	18
Lateral Flow From Hardin	12,738	10,433	0	176
Lateral Flow From Newton	4,885	4,523	6	1,049
Lateral Flow From Orange	2,719	2,916	—	—
Lateral Flow From Tyler	577	623	4	643
Total Inflow	40,126	31,331	264	11,442

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	22,903	24,648	—	3,791
Evapotranspiration/Stream Gain (GHB)	200	835	1	4,967
Storage	849	156	41	873
Leakage To Upper Unit	—	263	491	396
Leakage To Lower Unit	9,735	60	119	—
Lateral Flow To Angelina	—	—	—	0
Lateral Flow To Hardin	2,225	2,200	0	—
Lateral Flow To Newton	3,038	2,720	7	1,231
Lateral Flow To Orange	679	492	—	—
Lateral Flow To Tyler	496	448	1	184
Total Outflow	40,126	31,822	661	11,443
Inflow - Outflow	0	-491	-396	-1
Storage Increase (+)/Decrease(-)	-2,701	-917	-151	-1,959

All values are average acre-feet per year from 2000 through 2009.

Jefferson County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	7,466	—	—	—
Storage	156	80	—	—
Leakage From Upper Unit	—	2,242	—	—
Leakage From Lower Unit	238	—	—	—
Lateral Flow From Chambers	198	129	—	—
Lateral Flow From Hardin	1,372	805	—	—
Lateral Flow From Liberty	473	367	—	—
Lateral Flow From Orange	247	324	—	—
Lateral Flow From Out of State	156	38	—	—
Total Inflow	10,306	3,986	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	3,275	33	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	270	36	—	—
Leakage To Upper Unit	—	238	—	—
Leakage To Lower Unit	2,242	—	—	—
Lateral Flow To Chambers	167	198	—	—
Lateral Flow To Hardin	1,137	833	—	—
Lateral Flow To Liberty	22	167	—	—
Lateral Flow To Orange	3,171	2,466	—	—
Lateral Flow To Out of State	23	16	—	—
Total Outflow	10,306	3,987	0	0
Inflow - Outflow	0	-2	0	0
Storage Increase (+)/Decrease(-)	113	-44	—	—

All values are average acre-feet per year from 2000 through 2009.

Lavaca County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	1,271	13,774	0	1,826
Storage	10,051	317	246	2,460
Leakage From Upper Unit	—	1,551	143	316
Leakage From Lower Unit	281	—	—	—
Lateral Flow From Colorado	445	324	1	30
Lateral Flow From Fayette	—	354	2	953
Lateral Flow From Jackson	—	—	—	0
Total Inflow	12,049	16,321	392	5,586

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	770	3,091	—	4,838
Evapotranspiration/Stream Gain (GHB)	0	9,281	0	287
Storage	—	275	9	184
Leakage To Upper Unit	—	281	114	51
Leakage To Lower Unit	1,551	143	316	—
Lateral Flow To Colorado	5,708	1,701	3	86
Lateral Flow To Fayette	—	55	1	132
Lateral Flow To Jackson	4,019	1,608	0	10
Total Outflow	12,048	16,435	443	5,586
Inflow - Outflow	0	-114	-51	-1
Storage Increase (+)/Decrease(-)	—	-42	-237	-2,277

All values are average acre-feet per year from 2000 through 2009.

Liberty County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	32,957	—	—	—
Storage	7,950	395	100	700
Leakage From Upper Unit	—	23,131	20	0
Leakage From Lower Unit	99	—	—	—
Lateral Flow From Chambers	390	415	—	—
Lateral Flow From Hardin	2,980	1,862	1	256
Lateral Flow From Harris	2,257	338	0	5
Lateral Flow From Jefferson	22	167	—	—
Lateral Flow From Montgomery	1,009	423	0	27
Lateral Flow From Polk	309	490	2	167
Lateral Flow From San Jacinto	1,281	1,678	6	636
Total Inflow	49,252	28,898	129	1,791

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	3,360	21,722	—	181
Evapotranspiration/Stream Gain (GHB)	690	—	—	—
Storage	114	113	24	14
Leakage To Upper Unit	—	99	260	156
Leakage To Lower Unit	23,131	20	0	—
Lateral Flow To Chambers	5,285	1,627	—	—
Lateral Flow To Hardin	1,632	721	0	51
Lateral Flow To Harris	12,040	3,223	0	588
Lateral Flow To Jefferson	473	367	—	—
Lateral Flow To Montgomery	2,475	1,169	0	806
Lateral Flow To Polk	—	18	0	—
Lateral Flow To San Jacinto	50	77	0	0
Total Outflow	49,250	29,158	286	1,797
Inflow - Outflow	2	-260	-156	-5
Storage Increase (+)/Decrease(-)	-7,836	-281	-76	-685

All values are average acre-feet per year from 2000 through 2009.

Matagorda County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	21,537	—	—	—
Storage	3,379	1,375	—	—
Leakage From Upper Unit	—	835	—	—
Leakage From Lower Unit	4,291	—	—	—
Lateral Flow From Brazoria	5,151	1,569	—	—
Lateral Flow From Calhoun	37	7	—	—
Lateral Flow From Jackson	1,148	291	—	—
Lateral Flow From Wharton	2,553	1,395	—	—
Lateral Flow From Out of State	1,789	1,462	—	—
Total Inflow	39,885	6,934	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	33,624	36	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	578	271	—	—
Leakage To Upper Unit	—	4,291	—	—
Leakage To Lower Unit	835	—	—	—
Lateral Flow To Brazoria	1,042	439	—	—
Lateral Flow To Calhoun	32	29	—	—
Lateral Flow To Jackson	1,021	329	—	—
Lateral Flow To Wharton	1,992	197	—	—
Lateral Flow To Out of State	771	1,350	—	—
Total Outflow	39,896	6,942	0	0
Inflow - Outflow	-10	-8	0	0
Storage Increase (+)/Decrease(-)	-2,801	-1,104	—	—

All values are average acre-feet per year from 2000 through 2009.

Montgomery County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	31,407	2,251	1	548
Storage	31,140	5,783	413	8,690
Leakage From Upper Unit	—	30,813	105	64
Leakage From Lower Unit	98	—	—	—
Lateral Flow From Grimes	26	543	3	3,379
Lateral Flow From Harris	2,694	3,595	2	3,889
Lateral Flow From Liberty	2,475	1,169	0	806
Lateral Flow From Waller	987	1,027	1	1,166
Lateral Flow From San Jacinto	366	1,556	4	1,943
Lateral Flow From Walker	12	477	4	10,845
Total Inflow	69,207	47,213	534	31,331

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	3,426	27,017	—	27,377
Evapotranspiration/Stream Gain (GHB)	343	1,141	0	12
Storage	92	704	60	85
Leakage To Upper Unit	—	98	470	69
Leakage To Lower Unit	30,813	105	64	—
Lateral Flow To Grimes	—	7	0	20
Lateral Flow To Harris	33,337	17,670	8	3,637
Lateral Flow To Liberty	1,009	423	0	27
Lateral Flow To San Jacinto	110	328	0	140
Lateral Flow To Waller	76	190	0	—
Lateral Flow To Walker	1	—	0	79
Total Outflow	69,207	47,683	603	31,446
Inflow - Outflow	0	-470	-69	-115
Storage Increase (+)/Decrease(-)	-31,048	-5,079	-353	-8,605

All values are average acre-feet per year from 2000 through 2009.

Newton County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	6,079	3,935	1	7,803
Storage	1,927	461	133	806
Leakage From Upper Unit	—	3,020	212	290
Leakage From Lower Unit	2,119	—	—	—
Lateral Flow From Jasper	3,038	2,720	7	1,231
Lateral Flow From Orange	—	13	—	—
Lateral Flow From Sabine	—	—	—	74
Lateral Flow From Out of State	—	108	—	—
Total Inflow	13,163	10,257	354	10,203

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	21	1,680	—	1,340
Evapotranspiration/Stream Gain (GHB)	1,928	1,386	2	6,777
Storage	39	12	5	86
Leakage To Upper Unit	—	2,119	681	628
Leakage To Lower Unit	3,020	212	290	—
Lateral Flow To Jasper	4,885	4,523	6	1,049
Lateral Flow To Orange	3,270	898	—	—
Lateral Flow To Sabine	—	—	—	323
Lateral Flow To Out of State	—	108	—	—
Total Outflow	13,163	10,938	982	10,203
Inflow - Outflow	0	-681	-628	-1
Storage Increase (+)/Decrease(-)	-1,888	-449	-128	-720

All values are average acre-feet per year from 2000 through 2009.

Orange County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	11,533	—	—	—
Storage	260	114	—	—
Leakage From Upper Unit	—	1,409	—	—
Leakage From Lower Unit	1,328	—	—	—
Lateral Flow From Hardin	884	757	—	—
Lateral Flow From Jasper	679	492	—	—
Lateral Flow From Jefferson	3,171	2,466	—	—
Lateral Flow From Newton	3,270	898	—	—
Total Inflow	21,126	6,136	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	16,125	1,067	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	210	37	—	—
Leakage To Upper Unit	—	1,328	—	—
Leakage To Lower Unit	1,409	—	—	—
Lateral Flow To Hardin	416	452	—	—
Lateral Flow To Jasper	2,719	2,916	—	—
Lateral Flow To Jefferson	247	324	—	—
Lateral Flow To Newton	—	13	—	—
Total Outflow	21,126	6,137	0	0
Inflow - Outflow	0	-1	0	0
Storage Increase (+)/Decrease(-)	-50	-77	—	—

All values are average acre-feet per year from 2000 through 2009.

Polk County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	1,441	12,027	4	3,368
Storage	618	80	393	3,454
Leakage From Upper Unit	—	690	179	388
Leakage From Lower Unit	270	—	—	—
Lateral Flow From Hardin	12	19	0	12
Lateral Flow From Liberty	—	18	0	—
Lateral Flow From San Jacinto	—	97	5	480
Lateral Flow From Trinity	—	—	—	59
Lateral Flow From Tyler	14	718	5	409
Total Inflow	2,354	13,649	586	8,170

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	841	—	3,335
Evapotranspiration/Stream Gain (GHB)	76	9,660	4	2,900
Storage	—	0	1	2
Leakage To Upper Unit	—	270	176	26
Leakage To Lower Unit	690	179	388	—
Lateral Flow To Hardin	1,279	1,020	4	304
Lateral Flow To Liberty	309	490	2	167
Lateral Flow To San Jacinto	—	548	26	727
Lateral Flow To Trinity	—	—	—	28
Lateral Flow To Tyler	—	818	11	681
Total Outflow	2,354	13,826	612	8,170
Inflow - Outflow	0	-177	-26	0
Storage Increase (+)/Decrease(-)	—	-80	-393	-3,452

All values are average acre-feet per year from 2000 through 2009.

Sabine County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	—	—	270
Storage	—	—	—	0
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Newton	—	—	—	323
Total Inflow	0	0	0	593

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	520
Storage	—	—	—	0
Leakage To Upper Unit	—	—	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Newton	—	—	—	74
Total Outflow	0	0	0	593
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	—	—	—	0

All values are average acre-feet per year from 2000 through 2009.

San Jacinto County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	4,127	2,227	2	554
Storage	1,624	145	379	2,525
Leakage From Upper Unit	—	4,047	76	374
Leakage From Lower Unit	183	—	—	—
Lateral Flow From Liberty	50	77	0	0
Lateral Flow From Montgomery	110	328	0	140
Lateral Flow From Polk	—	548	26	727
Lateral Flow From Trinity	—	—	—	161
Lateral Flow From Walker	1	61	2	1,706
Total Inflow	6,095	7,433	486	6,188

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	0	1,297	—	1,295
Evapotranspiration/Stream Gain (GHB)	312	2,603	2	1,057
Storage	87	21	26	14
Leakage To Upper Unit	—	183	79	11
Leakage To Lower Unit	4,047	76	374	—
Lateral Flow To Liberty	1,281	1,678	6	636
Lateral Flow To Montgomery	366	1,556	4	1,943
Lateral Flow To Polk	—	97	5	480
Lateral Flow To Trinity	—	—	—	120
Lateral Flow To Walker	2	3	0	631
Total Outflow	6,095	7,513	496	6,188
Inflow - Outflow	0	-80	-11	0
Storage Increase (+)/Decrease(-)	-1,537	-124	-353	-2,511

All values are average acre-feet per year from 2000 through 2009.

Trinity County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	—	—	675
Storage	—	—	—	203
Leakage From Upper Unit	—	—	—	—
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Polk	—	—	—	28
Lateral Flow From San Jacinto	—	—	—	120
Lateral Flow From Walker	—	—	—	131
Total Inflow	0	0	0	1,157

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	—	—	310
Evapotranspiration/Stream Gain (GHB)	—	—	—	600
Storage	—	—	—	0
Leakage To Upper Unit	—	—	—	—
Leakage To Lower Unit	—	—	—	—
Lateral Flow To Polk	—	—	—	59
Lateral Flow To San Jacinto	—	—	—	161
Lateral Flow To Walker	—	—	—	26
Total Outflow	0	0	0	1,157
Inflow - Outflow	0	0	0	0
Storage Increase (+)/Decrease(-)	—	—	—	-203

All values are average acre-feet per year from 2000 through 2009.

Tyler County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	2,526	6,006	5	3,980
Storage	1,949	703	95	1,780
Leakage From Upper Unit	—	1,508	138	176
Leakage From Lower Unit	776	—	—	—
Lateral Flow From Hardin	—	—	0	44
Lateral Flow From Jasper	496	448	1	184
Lateral Flow From Polk	—	818	11	681
Total Inflow	5,747	9,483	250	6,846

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	824	—	2,036
Evapotranspiration/Stream Gain (GHB)	518	3,647	1	3,135
Storage	—	0	1	31
Leakage To Upper Unit	—	776	177	117
Leakage To Lower Unit	1,508	138	176	—
Lateral Flow To Hardin	3,130	2,934	3	476
Lateral Flow To Jasper	577	623	4	643
Lateral Flow To Polk	14	718	5	409
Total Outflow	5,747	9,661	367	6,847
Inflow - Outflow	0	-178	-117	-2
Storage Increase (+)/Decrease(-)	—	-703	-94	-1,749

All values are average acre-feet per year from 2000 through 2009.

Walker County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	15	645	1	5,323
Storage	0	33	19	14,673
Leakage From Upper Unit	—	4	12	24
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Grimes	—	—	—	23
Lateral Flow From Montgomery	1	—	0	79
Lateral Flow From San Jacinto	2	3	0	631
Lateral Flow From Trinity	—	—	—	26
Total Inflow	18	685	33	20,779

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	37	—	5,081
Evapotranspiration/Stream Gain (GHB)	—	99	0	2,753
Storage	—	2	0	253
Leakage To Upper Unit	—	—	2	—
Leakage To Lower Unit	4	12	24	—
Lateral Flow To Grimes	—	—	—	11
Lateral Flow To Montgomery	12	477	4	10,845
Lateral Flow To San Jacinto	1	61	2	1,706
Lateral Flow To Trinity	—	—	—	131
Total Outflow	18	687	33	20,781
Inflow - Outflow	0	-2	0	-2
Storage Increase (+)/Decrease(-)	—	-31	-19	-14,420

All values are average acre-feet per year from 2000 through 2009.

Waller County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	24,327	775	—	—
Storage	13,993	1,525	82	928
Leakage From Upper Unit	—	24,350	88	35
Leakage From Lower Unit	1	—	—	—
Lateral Flow From Austin	1,573	3,271	3	422
Lateral Flow From Fort Bend	847	428	0	42
Lateral Flow From Grimes	74	1,593	2	852
Lateral Flow From Harris	193	892	1	364
Lateral Flow From Montgomery	76	190	0	—
Lateral Flow From Washington	—	942	5	245
Total Inflow	41,084	33,965	182	2,888

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	803	24,992	—	169
Evapotranspiration/Stream Gain (GHB)	13	960	—	—
Storage	328	306	74	2
Leakage To Upper Unit	—	1	142	76
Leakage To Lower Unit	24,350	88	35	—
Lateral Flow To Austin	437	527	0	71
Lateral Flow To Fort Bend	7,311	1,686	1	70
Lateral Flow To Grimes	2	287	1	203
Lateral Flow To Harris	6,854	4,044	3	1,113
Lateral Flow To Montgomery	987	1,027	1	1,166
Lateral Flow To Washington	—	188	1	18
Total Outflow	41,084	34,107	258	2,889
Inflow - Outflow	0	-142	-76	0
Storage Increase (+)/Decrease(-)	-13,666	-1,218	-8	-926

All values are average acre-feet per year from 2000 through 2009.

Washington County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	—	4,844	2	3,525
Storage	—	126	667	1,113
Leakage From Upper Unit	—	—	191	757
Leakage From Lower Unit	—	—	—	—
Lateral Flow From Austin	—	1,175	5	87
Lateral Flow From Brazos	—	—	—	30
Lateral Flow From Fayette	—	—	—	294
Lateral Flow From Grimes	—	35	0	42
Lateral Flow From Waller	—	188	1	18
Total Inflow	0	6,368	866	5,866

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	—	268	—	1,655
Evapotranspiration/Stream Gain (GHB)	—	4,514	3	2,625
Storage	—	13	4	2
Leakage To Upper Unit	—	—	170	77
Leakage To Lower Unit	—	191	757	—
Lateral Flow To Austin	—	569	3	882
Lateral Flow To Brazos	—	—	—	189
Lateral Flow To Fayette	—	—	0	33
Lateral Flow To Grimes	—	42	0	158
Lateral Flow To Waller	—	942	5	245
Total Outflow	0	6,538	943	5,867
Inflow - Outflow	0	-170	-77	0
Storage Increase (+)/Decrease(-)	—	-113	-663	-1,111

All values are average acre-feet per year from 2000 through 2009.

Wharton County				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	58,559	—	—	—
Storage	52,398	3,579	57	29
Leakage From Upper Unit	—	8,080	18	—
Leakage From Lower Unit	7,641	—	—	—
Lateral Flow From Austin	1,431	554	0	16
Lateral Flow From Brazoria	43	—	—	—
Lateral Flow From Colorado	25,932	5,824	9	70
Lateral Flow From Fort Bend	4,122	740	0	4
Lateral Flow From Jackson	5,971	1,198	0	0
Lateral Flow From Matagorda	1,992	197	—	—
Total Inflow	158,090	20,173	85	119

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	129,708	8,663	—	—
Evapotranspiration/Stream Gain (GHB)	—	—	—	—
Storage	10,950	387	22	0
Leakage To Upper Unit	—	7,641	111	49
Leakage To Lower Unit	8,080	18	—	—
Lateral Flow To Austin	591	23	0	26
Lateral Flow To Brazoria	364	192	—	—
Lateral Flow To Colorado	318	113	0	1
Lateral Flow To Fort Bend	4,607	1,451	0	43
Lateral Flow To Jackson	919	401	—	0
Lateral Flow To Matagorda	2,553	1,395	—	—
Total Outflow	158,090	20,284	134	119
Inflow - Outflow	0	-111	-49	0
Storage Increase (+)/Decrease(-)	-41,447	-3,192	-35	-29

All values are average acre-feet per year from 2000 through 2009.

Out of State				
Inflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Recharge/Stream Loss (GHB)	6,701	—	—	—
Storage	664	190	—	—
Leakage From Upper Unit	—	3,567	—	—
Leakage From Lower Unit	517	—	—	—
Lateral Flow From Brazoria	852	852	—	—
Lateral Flow From Calhoun	275	94	—	—
Lateral Flow From Chambers	2,248	3,043	—	—
Lateral Flow From Galveston	4,501	2,357	—	—
Lateral Flow From Harris	6,022	3,919	—	—
Lateral Flow From Jackson	365	116	—	—
Lateral Flow From Jefferson	23	16	—	—
Lateral Flow From Matagorda	771	1,350	—	—
Lateral Flow From Newton	—	108	—	—
Total Inflow	22,938	15,611	0	0

Outflow	**Chicot**	**Evangeline**	**Burkeville**	**Jasper**
Wells	158	20	—	—
Evapotranspiration/Stream Gain (GHB)	0	—	—	—
Storage	617	239	—	—
Leakage To Upper Unit	—	517	—	—
Leakage To Lower Unit	3,567	—	—	—
Lateral Flow To Brazoria	1,543	1,054	—	—
Lateral Flow To Calhoun	368	164	—	—
Lateral Flow To Chambers	1,624	1,889	—	—
Lateral Flow To Galveston	5,427	4,292	—	—
Lateral Flow To Harris	7,106	5,787	—	—
Lateral Flow To Jackson	577	38	—	—
Lateral Flow To Jefferson	156	38	—	—
Lateral Flow To Newton	—	108	—	—
Lateral Flow To Matagorda	1,789	1,462	—	—
Total Outflow	22,933	15,608	0	0
Inflow - Outflow	5	3	0	0
Storage Increase (+)/Decrease(-)	-46	48	—	—

All values are average acre-feet per year from 2000 through 2009.

Water Budgets

Sparta, Queen City, and Carrizo Aquifers

Grimes County			
Inflow	**Sparta**	**Queen City**	**Carrizo**
Recharge	—	—	—
Storage	7	14	129
River Loss	—	—	—
Stream Loss	—	—	—
General Head Boundary	1,542	—	—
Leakage From Upper Unit	—	257	—
Leakage From Lower Unit	521	291	0
Lateral Flow From Brazos	77	62	253
Lateral Flow From Madison	179	59	560
Lateral Flow From Montgomery	3	0	—
Lateral Flow From Walker	19	2	—
Lateral Flow From Waller	2	1	219
Lateral Flow From Washington	6	1	203
Total Inflow	2,356	688	1,365

Outflow	**Sparta**	**Queen City**	**Carrizo**
Wells	2	0	2
Evapotranspiration	—	—	—
Storage	230	140	0
River Gain	—	—	—
Stream Gain	—	—	—
Spring Flow	—	—	—
General Head Boundary	1,237	—	—
Leakage To Upper Unit	—	407	282
Leakage To Lower Unit	485	33	108
Lateral Flow To Brazos	120	55	149
Lateral Flow To Madison	184	27	77
Lateral Flow To Montgomery	9	2	233
Lateral Flow To Walker	84	20	488
Lateral Flow To Waller	2	1	20
Lateral Flow To Washington	2	1	6
Total Outflow	2,356	688	1,365

Inflow - Outflow	(0)	(0)	0
Storage Increase (+)/Decrease(-)	224	126	(129)

All values are average acre-feet per year from 1990 through 2000.

Walker County			
Inflow	**Sparta**	**Queen City**	**Carrizo**
Recharge	—	—	—
Storage	4	2	3
River Loss	—	—	—
Stream Loss	—	—	—
General Head Boundary	1,140	—	—
Leakage From Upper Unit	—	218	3
Leakage From Lower Unit	421	228	73
Lateral Flow From Grimes	84	20	488
Lateral Flow From Houston	101	22	800
Lateral Flow From Madison	21	14	582
Lateral Flow From Montgomery	9	1	221
Lateral Flow From San Jacinto	10	2	—
Lateral Flow From Trinity	39	5	166
Total Inflow	1,830	513	2,336

Outflow	**Sparta**	**Queen City**	**Carrizo**
Wells	0	0	—
Evapotranspiration	—	—	—
Storage	257	87	31
River Gain	—	—	—
Stream Gain	—	—	—
Spring Flow	—	—	—
General Head Boundary	755	—	—
Leakage To Upper Unit	—	267	250
Leakage To Lower Unit	494	89	3
Lateral Flow To Grimes	19	2	—
Lateral Flow To Houston	20	3	193
Lateral Flow To Madison	201	48	264
Lateral Flow To Montgomery	4	1	67
Lateral Flow To San Jacinto	16	5	491
Lateral Flow To Trinity	64	9	1,036
Total Outflow	1,830	513	2,336
Inflow - Outflow	(0)	(0)	0
Storage Increase (+)/Decrease(-)	253	85	27

All values are average acre-feet per year from 1990 through 2000.

Water Budgets

Yegua-Jackson Aquifer

Grimes County					
Inflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Recharge	9,171	17,285	5,405	2,296	34,156
Storage	130	214	76	17	438
Stream Loss	730	403	—	38	1,171
Reservoir Loss	—	69	—	—	69
General Head Boundary	—	—	—	—	—
Leakage From Upper Unit	485	3,093	7,097	4,500	15,175
Leakage From Lower Unit	2,419	1,333	718	—	4,470
Lateral Flow From Brazos	16	20	564	1,290	2,652
Lateral Flow From Madison	—	—	—	0	1,453
Lateral Flow From Montgomery	5	3	1	1	5
Lateral Flow From Walker	5	998	137	8	1,143
Lateral Flow From Waller	3	0	0	1	2
Lateral Flow From Washington	16	13	1	1	17
Total Inflow	12,980	23,430	13,998	8,152	60,751

Outflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Wells	198	384	179	39	801
Evapotranspiration	1,367	1,297	1,075	—	3,739
Storage	66	386	0	0	453
Stream Gain	8,469	7,178	4,156	3,953	23,755
Reservoir Gain	—	—	—	—	—
Spring Flow	43	—	—	—	43
General Head Boundary	—	—	—	—	—
Leakage To Upper Unit	89	2,590	16	9	2,704
Leakage To Lower Unit	3,093	8,475	4,771	201	16,540
Lateral Flow To Brazos	201	709	544	2,712	4,166
Lateral Flow To Madison	—	50	3,736	2,321	6,107
Lateral Flow To Montgomery	39	6	2	1	49
Lateral Flow To Walker	384	828	123	53	1,388
Lateral Flow To Waller	3	1	1	0	4
Lateral Flow To Washington	1	0	1	0	3
Total Outflow	13,955	21,903	14,605	9,289	59,752
Inflow - Outflow	(974)	1,527	(606)	(1,137)	999
Storage Increase (+)/Decrease(-)	(64)	171	(76)	(16)	15

All values are average acre-feet per year from 1990 through 2000.

Polk County					
Inflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Recharge	4,091	23	—	—	4,114
Storage	353	86	79	23	541
Stream Loss	594	—	—	—	594
Reservoir Loss	—	—	—	—	—
General Head Boundary	—	—	—	—	—
Leakage From Upper Unit	476	542	47	30	1,095
Leakage From Lower Unit	98	9	1	—	108
Lateral Flow From Angelina	664	20	26	14	725
Lateral Flow From Hardin	0	0	0	0	0
Lateral Flow From Liberty	—	—	0	0	0
Lateral Flow From San Jacinto	2	0	1	1	5
Lateral Flow From Trinity	600	76	201	87	963
Lateral Flow From Tyler	269	21	22	21	332
Total Inflow	7,147	777	378	176	8,478

Outflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Wells	523	2	—	—	525
Evapotranspiration	319	—	—	—	319
Storage	79	0	—	1	80
Stream Gain	3,863	—	—	—	3,863
Reservoir Gain	—	—	—	—	—
Spring Flow	7	—	—	—	7
General Head Boundary	—	—	—	—	—
Leakage To Upper Unit	58	98	9	1	166
Leakage To Lower Unit	1,087	47	30	—	1,164
Lateral Flow From Angelina	932	597	323	163	2,015
Lateral Flow From Hardin	0	0	1	0	1
Lateral Flow From Liberty	0	0	0	0	0
Lateral Flow From San Jacinto	5	1	3	2	11
Lateral Flow From Trinity	243	24	0	—	267
Lateral Flow From Tyler	29	10	11	9	59
Total Outflow	7,146	778	378	176	8,478
Inflow - Outflow	0	(1)	(0)	0	(0)
Storage Increase (+)/Decrease(-)	(273)	(85)	—	(23)	(461)

All values are average acre-feet per year from 1990 through 2000.

Walker County					
Inflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Recharge	10,446	2,655	—	—	13,101
Storage	91	24	8	3	126
Stream Loss	2,043	876	—	—	2,919
Reservoir Loss	147	—	—	—	147
General Head Boundary	—	—	—	—	—
Leakage From Upper Unit	511	1,095	82	13	1,701
Leakage From Lower Unit	2,718	114	45	—	2,877
Lateral Flow From Grimes	384	828	123	53	1,388
Lateral Flow From Houston	—	1,042	5	2	1,049
Lateral Flow From Madison	—	236	3	12	251
Lateral Flow From Montgomery	26	9	8	7	50
Lateral Flow From San Jacinto	36	5	9	6	55
Lateral Flow From Trinity	332	48	82	75	536
Total Inflow	16,735	6,931	365	171	24,202

Outflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Wells	201	54	—	—	255
Evapotranspiration	—	—	—	—	—
Storage	755	87	—	—	842
Stream Gain	12,798	2,170	—	—	14,968
Reservoir Gain	—	—	—	—	—
Spring Flow	—	—	—	—	—
General Head Boundary	—	—	—	—	—
Leakage To Upper Unit	77	2,573	114	45	2,809
Leakage To Lower Unit	1,106	82	13	—	1,201
Lateral Flow From Grimes	998	137	8	0	1,143
Lateral Flow From Houston	—	9	75	64	148
Lateral Flow From Madison	571	1,241	147	58	2,018
Lateral Flow From Montgomery	18	3	0	—	21
Lateral Flow From San Jacinto	42	4	3	1	51
Lateral Flow From Trinity	223	517	4	3	747
Total Outflow	16,789	6,877	365	171	24,202
Inflow - Outflow	(54)	54	0	(0)	0
Storage Increase (+)/Decrease(-)	664	63	—	—	716

All values are average acre-feet per year from 1990 through 2000.

Washington County					
Inflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Recharge	3,180	2,297	51	—	5,528
Storage	25	3	0	0	28
Stream Loss	883	196	—	—	1,079
Reservoir Loss	53	248	—	—	301
General Head Boundary	—	—	—	—	—
Leakage From Upper Unit	766	2,585	334	4	3,689
Leakage From Lower Unit	516	251	33	—	800
Lateral Flow From Austin	14	11	23	13	62
Lateral Flow From Brazos	1	1	2	1	5
Lateral Flow From Burleson	1,002	437	37	30	1,507
Lateral Flow From Fayette	320	257	101	52	731
Lateral Flow From Grimes	1	0	1	0	3
Lateral Flow From Lee	—	215	289	39	543
Lateral Flow From Waller	2	1	3	2	7
Total Inflow	6,763	6,503	875	141	14,282

Outflow	**Upper Jackson**	**Lower Jackson**	**Upper Yegua**	**Lower Yegua**	**Yegua-Jackson**
Wells	77	53	2	—	132
Evapotranspiration	—	—	—	—	—
Storage	876	1,379	26	9	2,290
Stream Gain	1,710	83	399	—	2,193
Reservoir Gain	—	2	—	—	2
Spring Flow	—	—	—	—	—
General Head Boundary	—	—	—	—	—
Leakage To Upper Unit	80	22	11	33	146
Leakage To Lower Unit	2,922	1,005	4	—	3,931
Lateral Flow From Austin	26	8	5	3	43
Lateral Flow From Brazos	64	17	28	8	117
Lateral Flow From Burleson	947	785	160	53	1,945
Lateral Flow From Fayette	27	7	12	7	54
Lateral Flow From Grimes	13	1	1	2	17
Lateral Flow From Lee	—	3,164	218	23	3,405
Lateral Flow From Waller	8	1	4	2	15
Total Outflow	6,749	6,528	870	141	14,288
Inflow - Outflow	13	(25)	5	0	(7)
Storage Increase (+)/Decrease(-)	851	1,376	25	9	2,261

All values are average acre-feet per year from 1990 through 2000.

Appendix M

Presentation materials related to consideration of environmental factors

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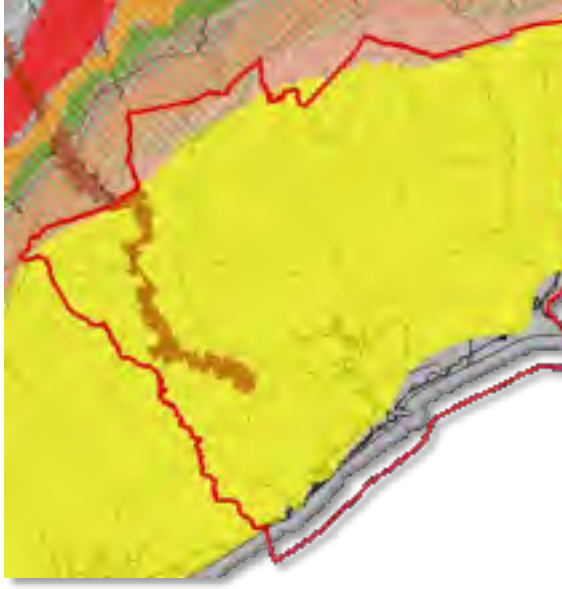


Explanatory Report

ENVIRONMENTAL IMPACTS

June 24, 2014

Phase 3: Explanatory Report

Environmental Impacts

- Environmental Impacts
  - *"other environmental impacts, including impacts on spring flow and other interactions between groundwater and surface water" TWC 36.108 (d) (4)*
  - Groundwater-Surface Water Interaction
  - Spring Flow
  - Source Varies by Aquifer
    - Gulf Coast: Available literature and studies
    - Carrizo: Central Carrizo-Wilcox GAM
    - Queen City: Central Carrizo-Wilcox GAM
    - Sparta: Central Carrizo-Wilcox GAM
    - Yegua-Jackson: Yegua-Jackson GAM

Phase 3: Explanatory Report

Environmental Impacts

- Gulf Coast Aquifer
  - NGC GAM does not include the “stream package” used to estimate groundwater and surface water interaction
  - Groundwater and surface water interaction occurs based on USGS and TWDB studies
  - LCRA studies show groundwater and surface water interaction limited to the shallow groundwater system and the river, similar conditions could occur in GMA-14

Phase 3: Explanatory Report

Environmental Impacts

- Carrizo, Queen City, and Sparta Aquifers
  - Carrizo-Wilcox GAM
  - No outflow to streams, rivers, or springs within Grimes or Walker Counties

Phase 3: Explanatory Report

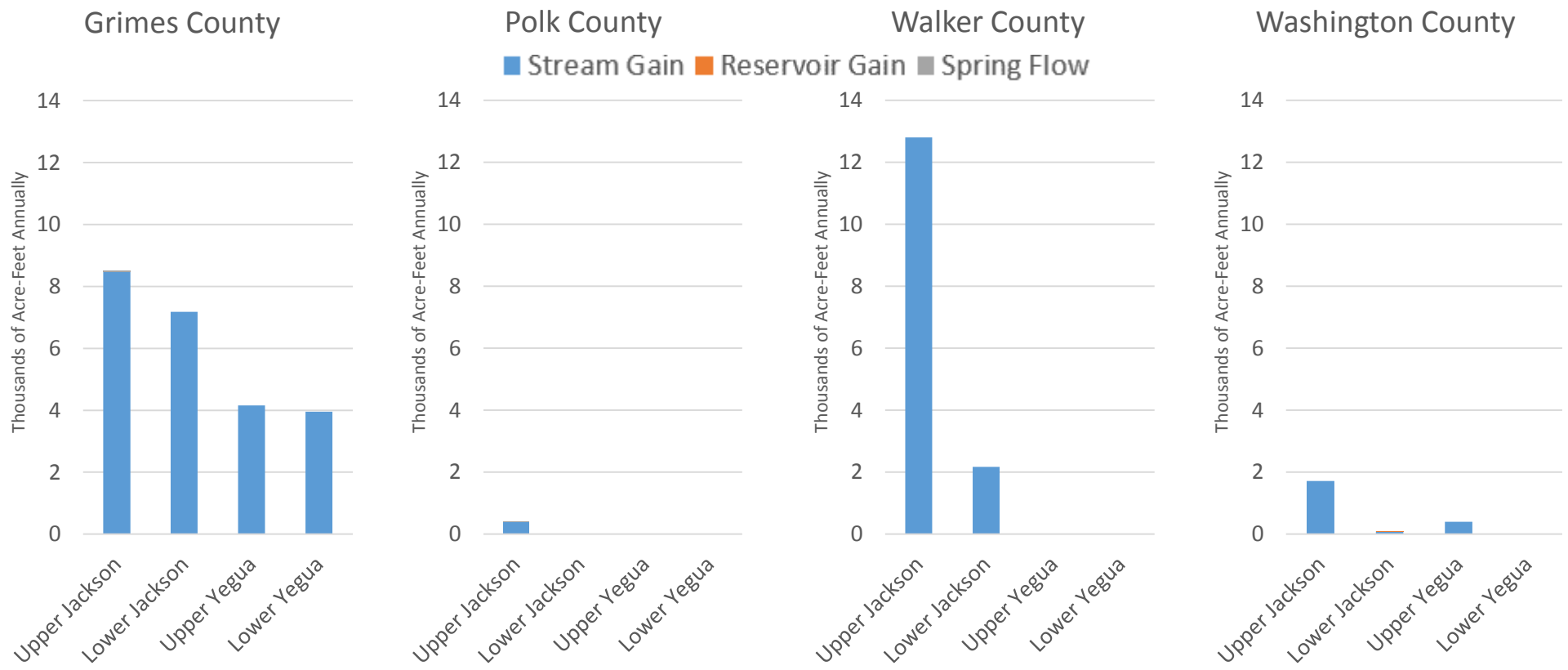
Environmental Impacts

- Yegua-Jackson Aquifer
  - Substantial amount of total recharge to Yegua-Jackson stays in shallow groundwater system to become stream discharge
  - Discharge to streams occurs in Grimes, Polk, Walker and Washington Counties
  - Yegua-Jackson is classified as a minor aquifer

Phase 3: Explanatory Report

Environmental Impacts

- Yegua-Jackson Aquifer
  - Includes Stream Gain, Reservoir Gain, and Spring Flow components in budget



Phase 3: Explanatory Report

Environmental Impacts

- Discussion

Appendix N

Presentation materials related to consideration of subsidence

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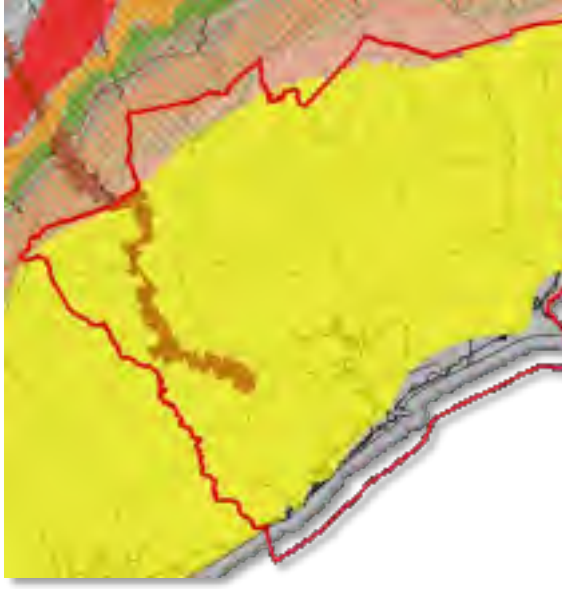


Explanatory Report

SUBSIDENCE

June 24, 2014

Phase 3: Explanatory Report

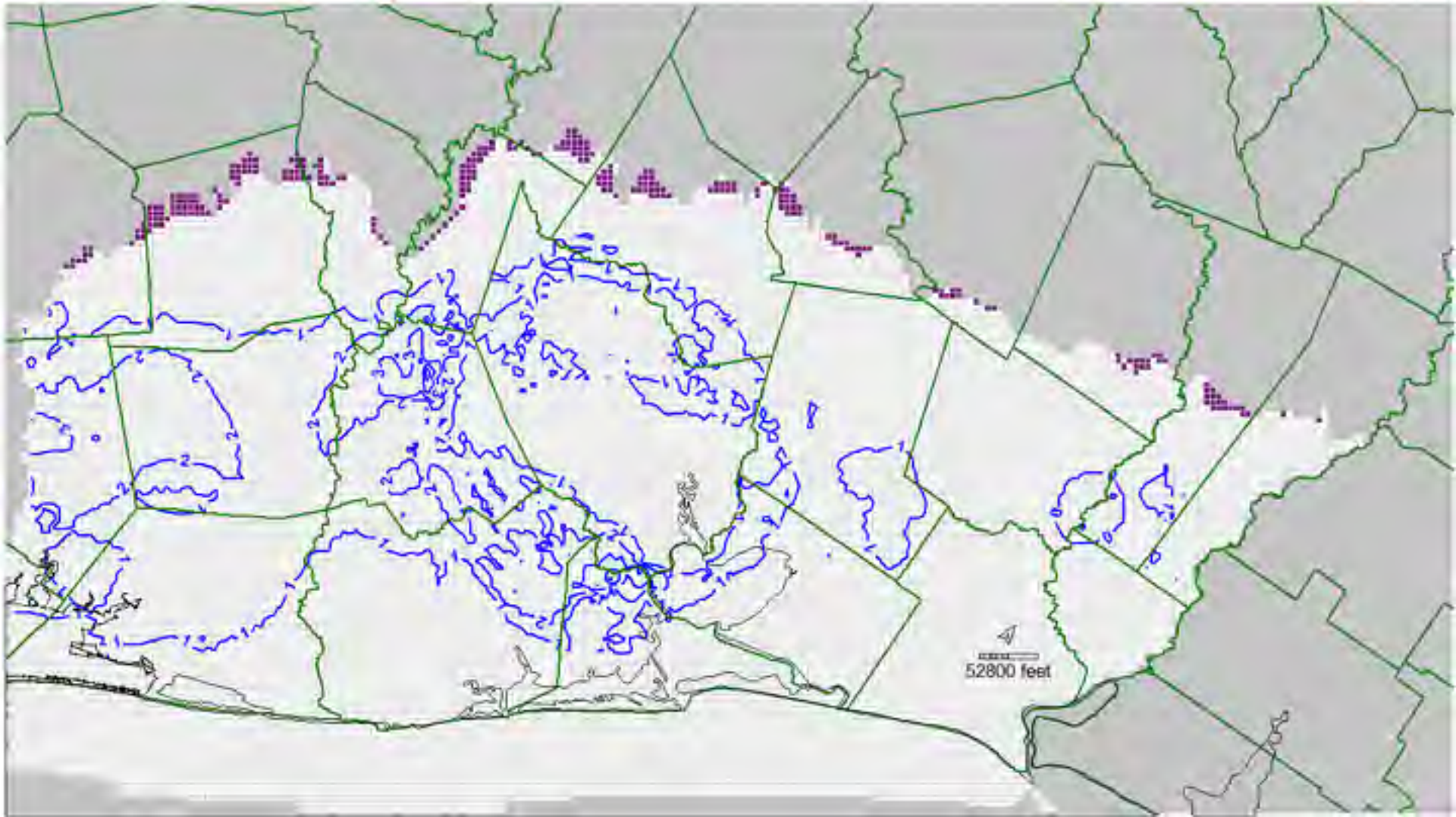
Subsidence

- Subsidence
  - *"the impact on subsidence" TWC 36.108 (d) (5)*
  - Fort Bend, Galveston, and Harris Counties
    - PRESS model results
  - All Other Counties
    - Results from NGC GAM Run 2 (SUB package)

Phase 3: Explanatory Report

Subsidence

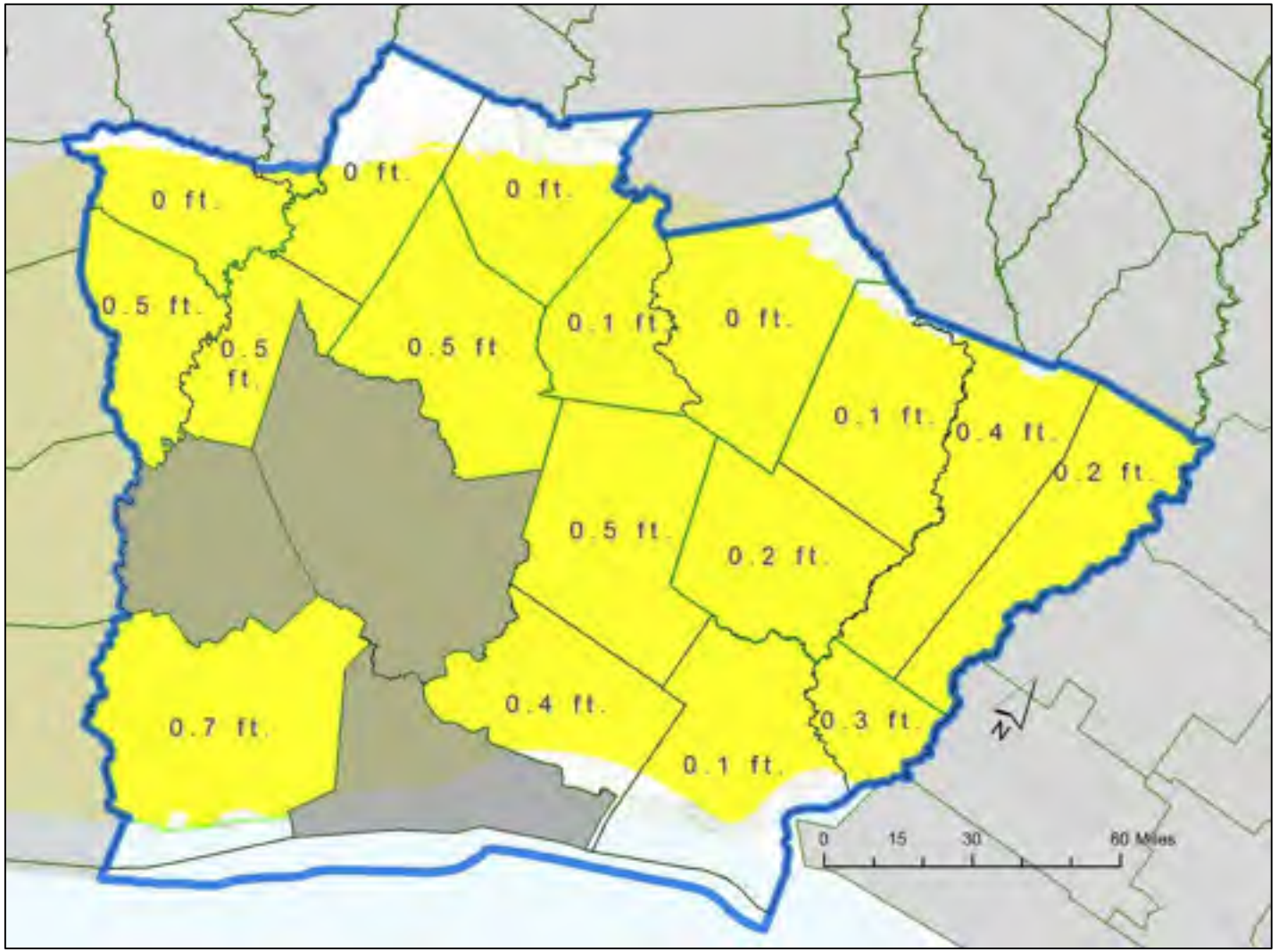
- SUB Results – 2010-2070 subsidence in feet



Phase 3: Explanatory Report

Subsidence

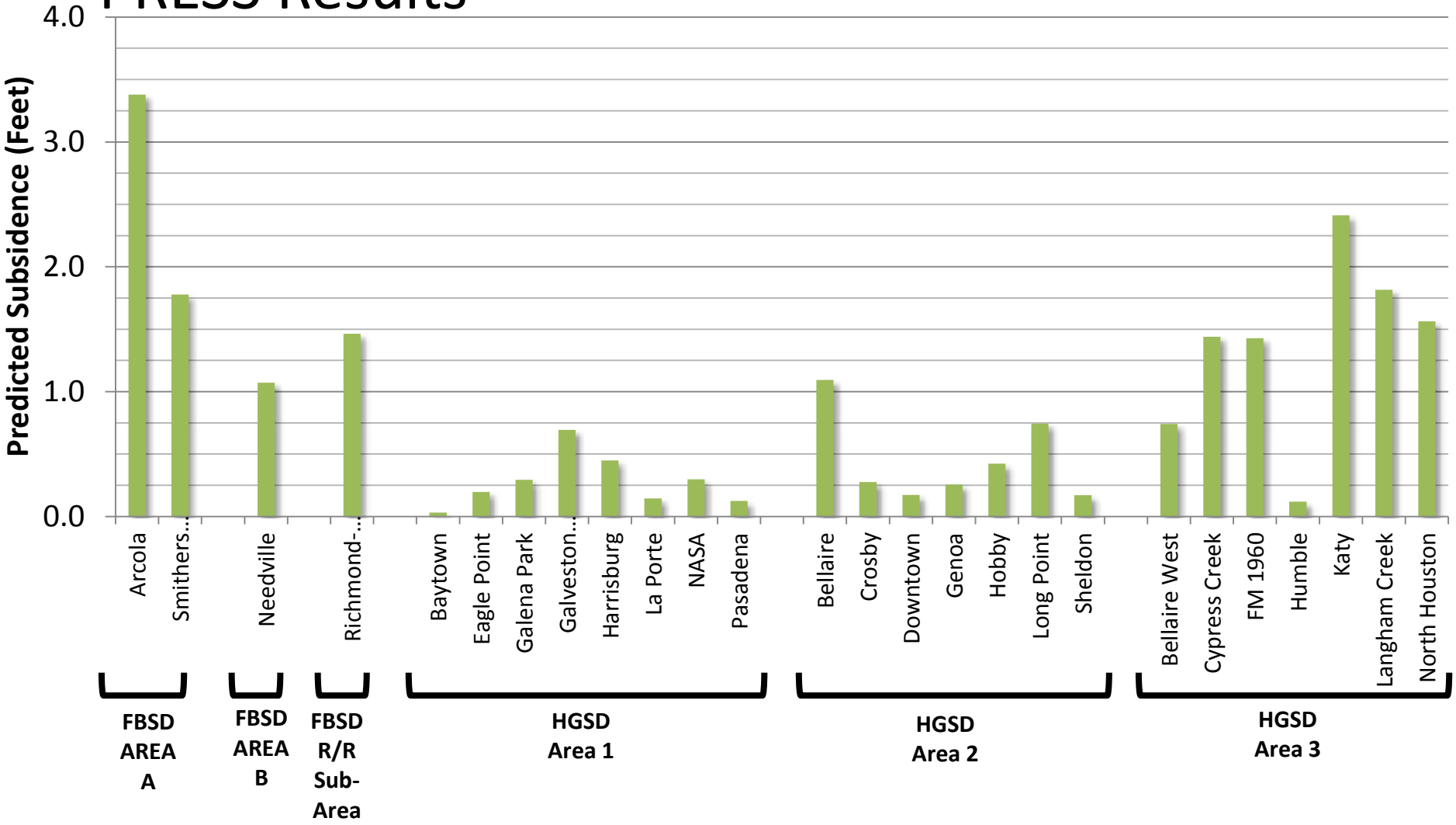
- SUB Results (2010-2070)



Phase 3: Explanatory Report

Subsidence

- PRESS Results



Phase 3: Explanatory Report

Subsidence

- Discussion

Appendix O

Presentation materials related to consideration of socioeconomics

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Groundwater Management Area 14 Meeting

Lone Star Groundwater Conservation District Offices

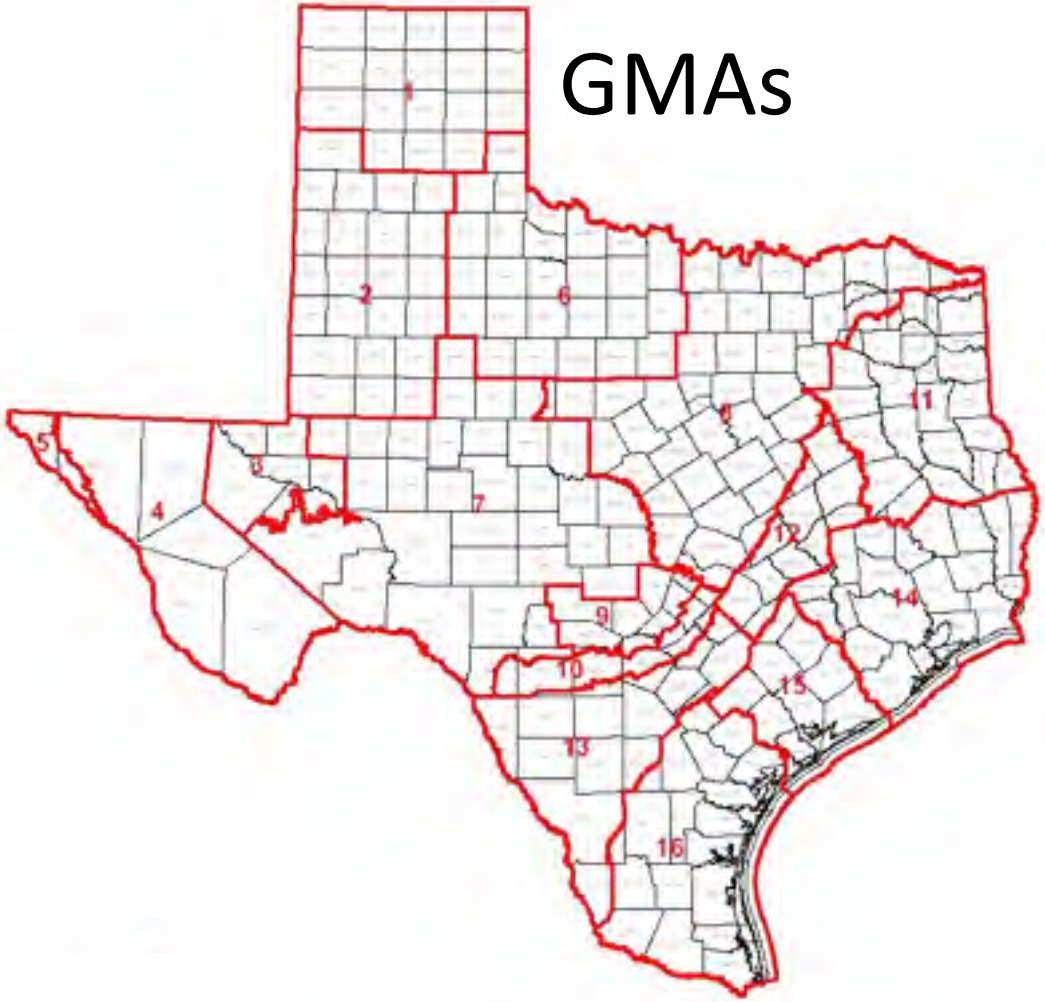
Conroe, Texas

September 23, 2014

Today's Considerations

- **<u>TWC Section 36.108 (d) (6) – socioeconomic impacts reasonably expected to occur</u>**
- TWC Section 36.108 (d) (7) – impact on the interests and rights in private property

GMAs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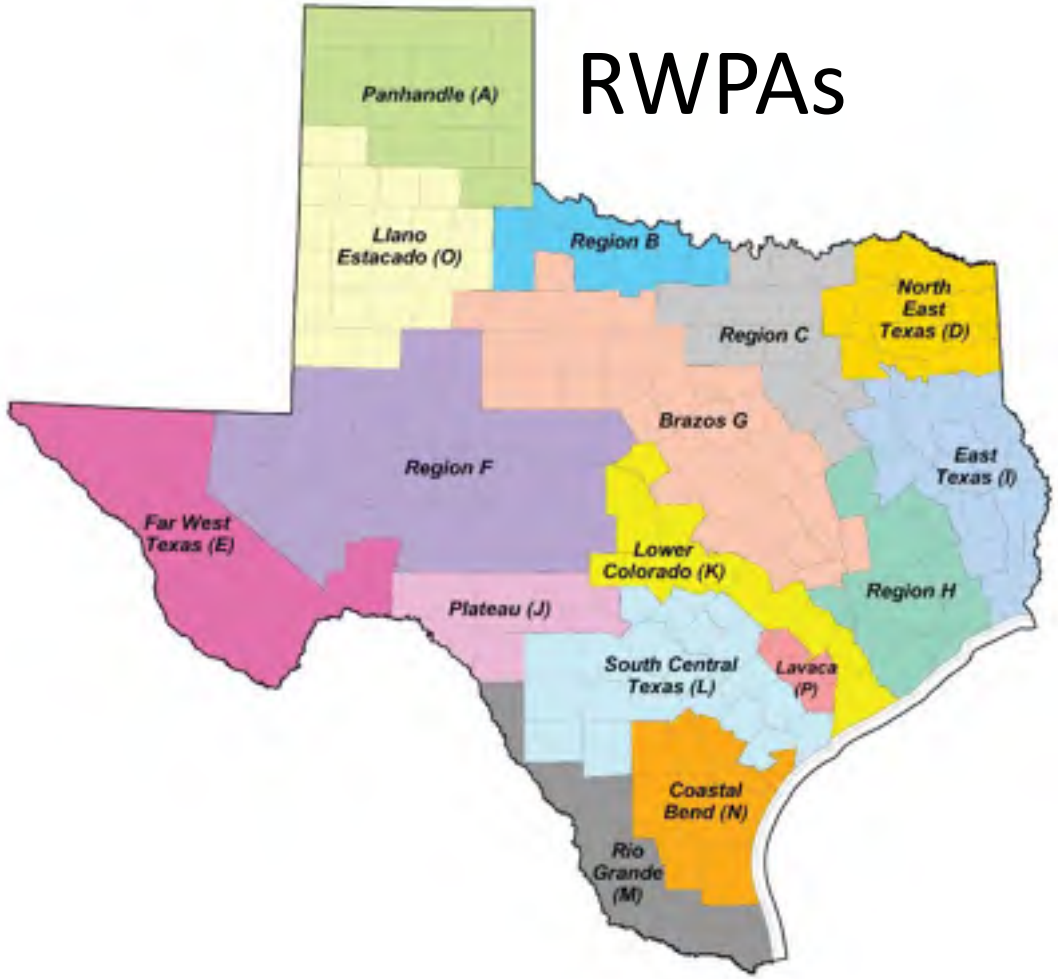
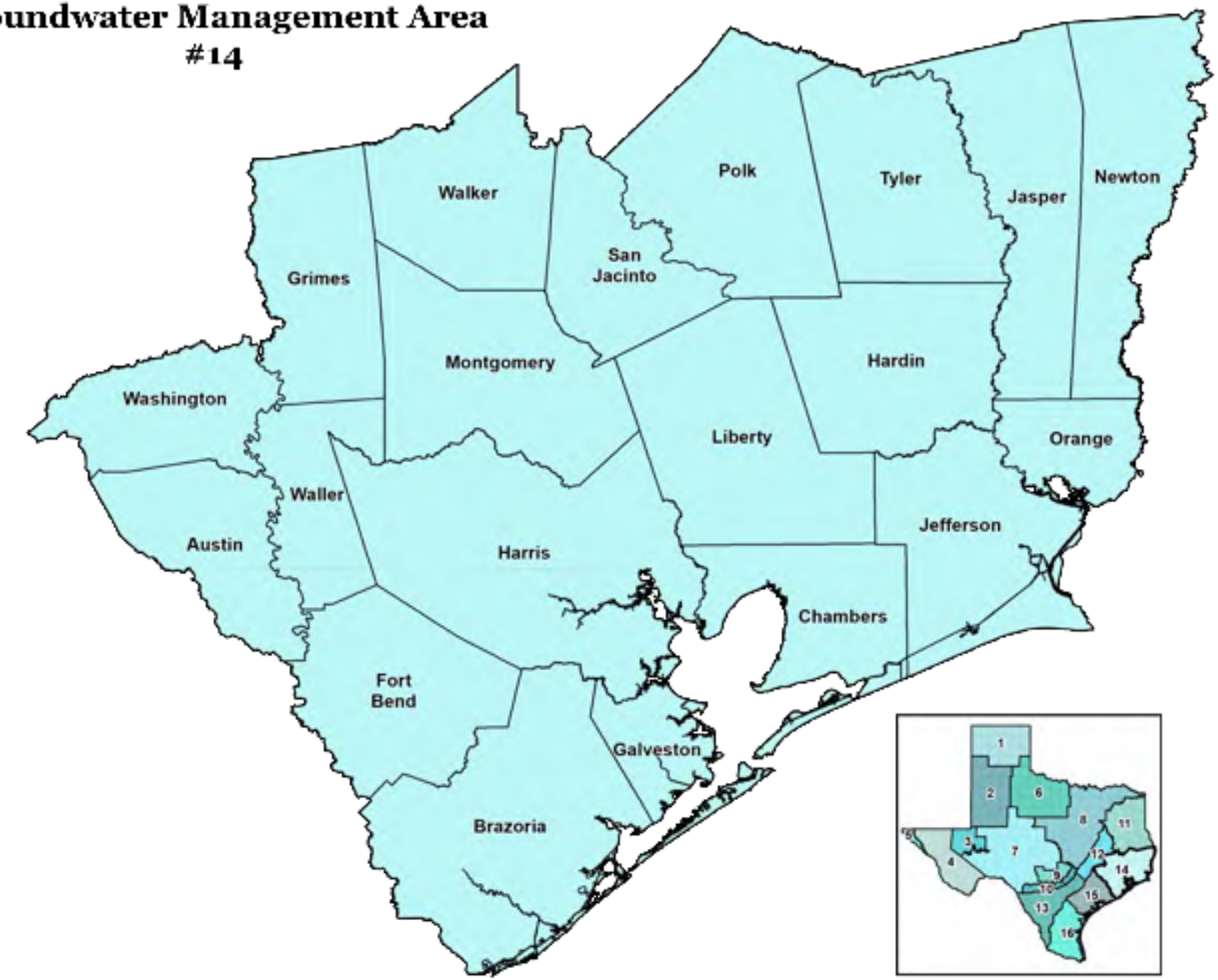
RWPAs


Panhandle (A)
Llano Estacado (O)
Region B
North East Texas (D)
Region C
Brazos G
Region F
East Texas (I)
Far West Texas (E)
Lower Colorado (K)
Plateau (J)
Region H
South Central Texas (L)
Lavaca (P)
Coastal Bend (N)
Rio Grande (M)

Groundwater Management Area #14



TNRIS

Texas Water Development Board

Socioeconomic Impacts and Water Planning in Texas – A Brief History

- Texas Water Code Chapter 16.051 (a) the board shall prepare, develop, formulate, and adopt a comprehensive state water plan that . . . shall provide for . . . further economic development (companion provision in TWC Chapter 16.053 (a, b) for regional water plans).
- Texas Administrative Code (TAC), Title 31, Chapter 357.7 (4)(A) states, "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs*."

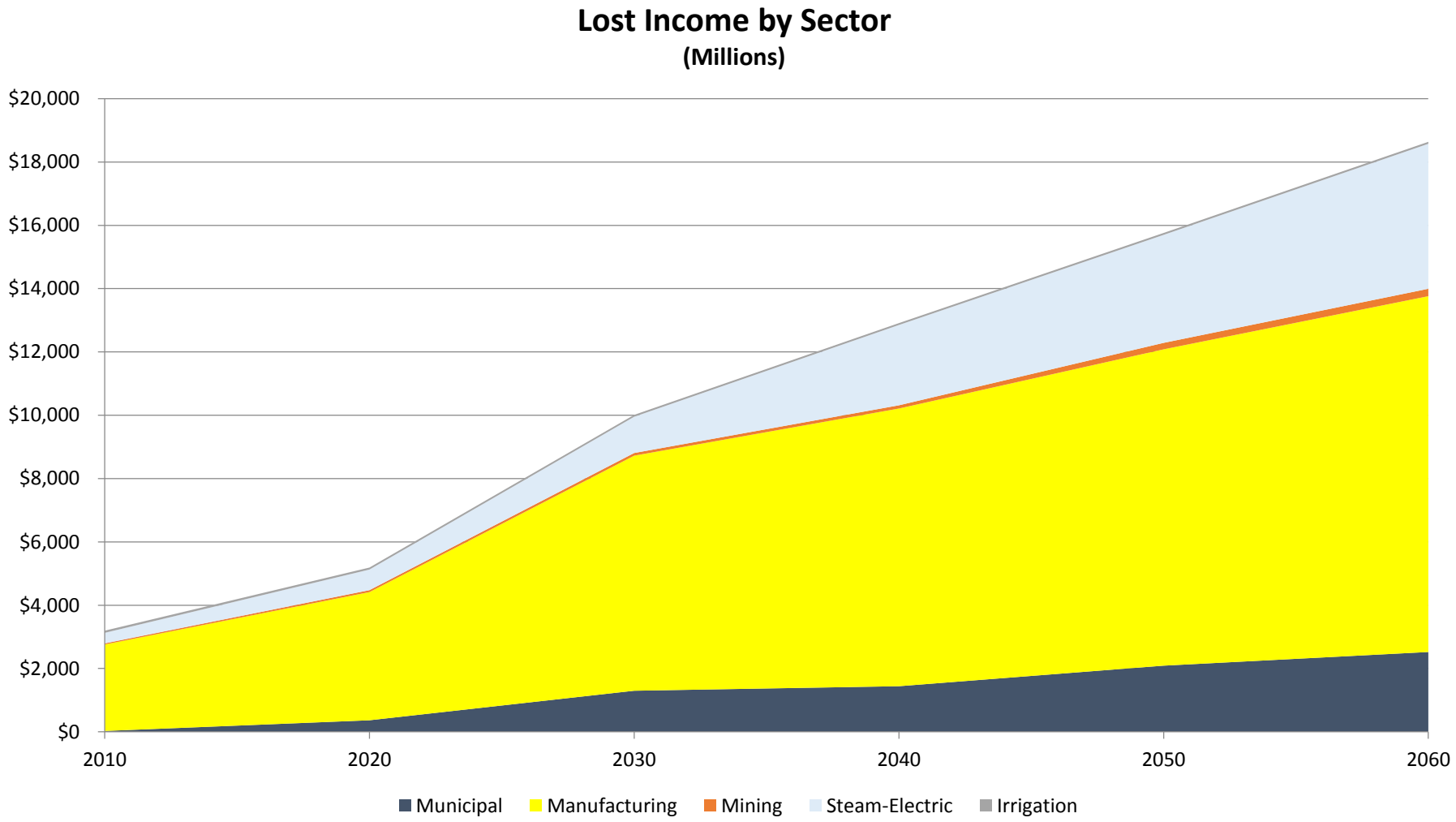
Socioeconomic Impacts and Water Planning in Texas – A Brief History (cont.)

- TAC, Title 31, Chapter 357.40 (a) RWPs shall include a quantitative description of the socioeconomic impacts of not meeting the identified water needs pursuant to §357.33(c) of this title (relating to Needs Analysis: Comparison of Water Supplies and Demands).

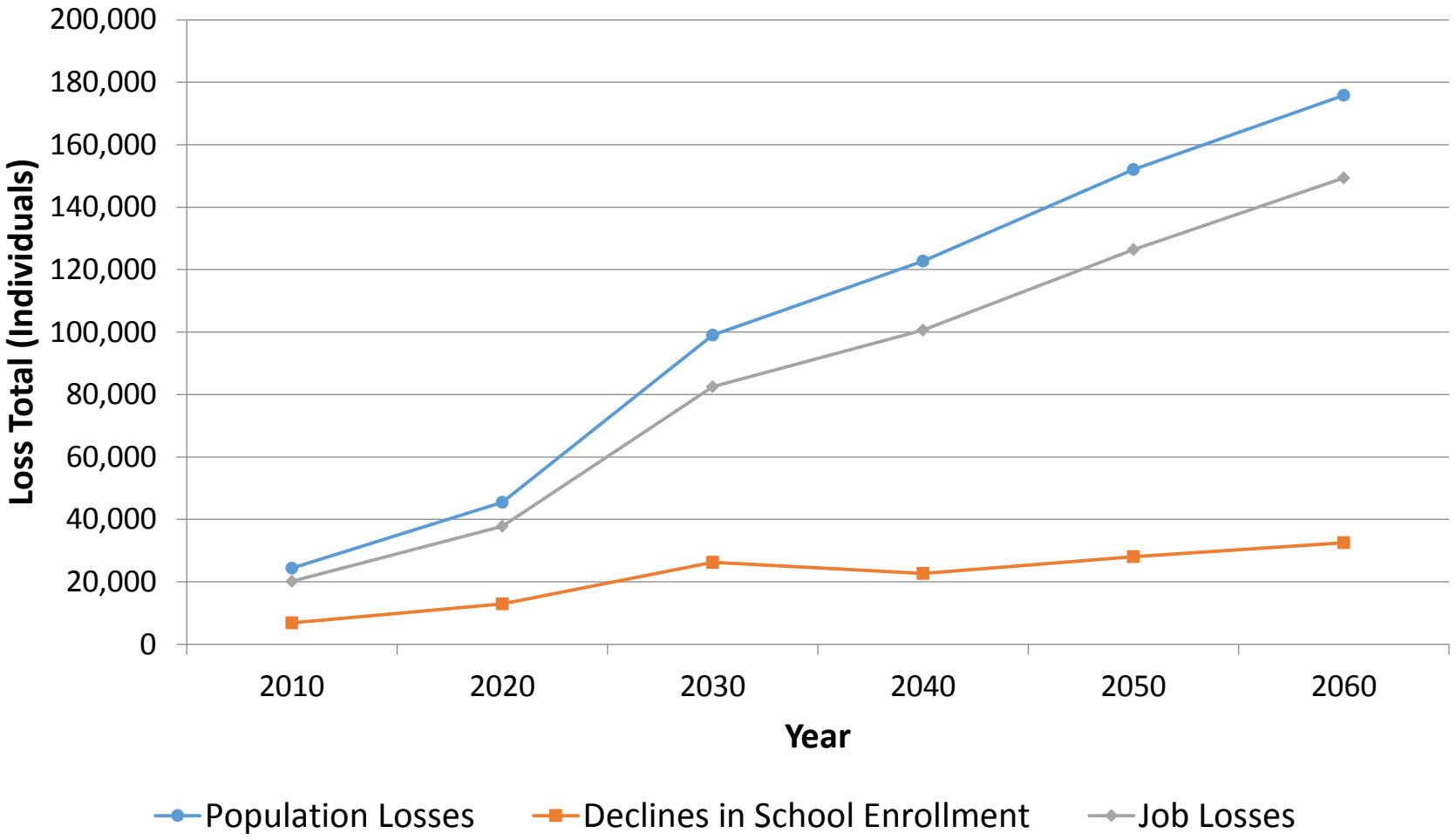
Socioeconomic Impacts Analysis

- Executed by TWDB at request of RWPGs
- Uses water supply needs from Regional Water Plan
- Point estimates of 1-year drought at 10-year intervals
- Analysis attempts to measure the impacts in the event that water user groups do not meet their identified water supply needs associated with a drought of record for one year.
- Multiple impacts examined
  - Sales, income, and tax revenue
  - Jobs
  - Population
  - School enrollment
- Results incorporated into final Regional Water Plan

Socioeconomic Impacts Analysis – 2011 Region H Water Plan



Socioeconomic Impact Analysis – 2011 Region H Water Plan



Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

- Regional Water Planning (from TWDB)
  - Generate Input-Output Models combined with Social Accounting Models (IO/SAM) and develop economic baselines. Utilizes IMPLAN (Impact for Planning Analysis) software.
    - Economic baseline developed for counties, planning regions, and the state based on variables for 528 economic sectors as follows:

Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

- output – total production of goods and services measured by gross sales revenues
- final sales – sales to end user in Texas (a region) and exports out of region
- Employment – number of full and part-time jobs required by a given industry
- Regional income – total payroll costs paid by industries, corporate income, rental income, and interest payments
- Business taxes – sales, excise, fees, licenses and other taxes paid during normal operation

Socioeconomic impact of not meeting water supply needs vs. impact of proposed desired future conditions

- Regional Water Planning (from TWDB - cont.)
  - Estimate direct and indirect impacts to business, industry, and agriculture
  - Impact associated with domestic water usage
- While useful for planning purposes, socioeconomic impacts developed for regional water planning do not represent a benefit-cost analysis.
- Analysis only executed for water user groups with needs for additional water supply.

Impacts by County for the Brazos G Regional Water Planning Area ($ millions)

Grimes County ($millions)						
	2010	2020	2030	2040	2050	2060
Wickson Creek SUD						
Monetary value of domestic water shortages	$0.38	$3.16	$5.02	$12.50	$13.81	$18.29
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$2.18	$2.73	$3.16
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	69	86	100
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.31	$0.39	$0.45
Lost utility revenues	$0.58	$1.08	$1.41	$1.67	$1.89	$2.11
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$264.45	$288.65	$314.58	$349.15	$401.00
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$37.96	$41.43	$45.15	$50.11	$57.56
Lost jobs due to reduced electrical generation	0	899	981	1,069	1,187	1,363

The only other county in GMA 14 within the Brazos G Regional Water Planning Area is Washington County, which did not have any water supply needs in the 2011 Brazos G Regional Water Plan. For full analysis, see TWDB correspondence to Dale Spurgin from Stuart Norvell dated May 17, 2010, titled “Socioeconomic impact analysis of not meeting water needs for the 2011 Brazos G Regional Water Plan.”

Impacts on Water User Group for the Region H Water Planning Area ($ millions)

Municipal ($millions)						
	2010	2020	2030	2040	2050	2060
Alvin						
Monetary value of domestic water shortages	$0.00	$0.16	$0.32	$0.44	$0.80	$1.09
Lost utility revenues	$0.00	$0.31	$0.58	$0.79	$1.14	$1.55
Ames						
Monetary value of domestic water shortages	$0.00	$0.03	$0.07	$0.12	$0.76	$1.12
Lost utility revenues	$0.00	$0.04	$0.08	$0.12	$0.17	$0.22
Angleton						
Monetary value of domestic water shortages	$0.32	$0.33	$0.35	$0.35	$0.42	$0.58
Lost utility revenues	$0.51	$0.52	$0.55	$0.57	$0.67	$0.83
Arcola						
Monetary value of domestic water shortages	$0.00	$1.17	$4.90	$5.56	$6.43	$8.83
Lost income from reduced commercial business activity	$0.00	$0.00	$0.12	$0.15	$0.19	$0.24
Lost jobs due to reduced commercial business activity	0	0	5	6	8	10
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.02	$0.02	$0.03	$0.04
Lost utility revenues	$0.00	$0.26	$0.56	$0.64	$0.74	$0.86
Bailey's Prairie						
Monetary value of domestic water shortages	$0.00	$0.01	$0.07	$0.13	$0.23	$0.02
Lost utility revenues	$0.00	$0.01	$0.01	$0.02	$0.02	$0.03
Beach City						
Monetary value of domestic water shortages	$3.82	$7.01	$8.99	$10.87	$12.77	$14.64
Lost income from reduced commercial business activity	$0.26	$0.41	$0.55	$0.67	$0.80	$0.93
Lost jobs due to reduced commercial business activity	10	17	22	27	32	38
Lost state and local taxes from reduced commercial business activity	$0.04	$0.06	$0.09	$0.10	$0.12	$0.14
Lost utility revenues	$0.45	$0.64	$0.82	$0.97	$1.13	$1.30
Beasley						
Monetary value of domestic water shortages	$0.00	$0.01	$0.04	$0.09	$0.58	$0.99
Lost utility revenues	$0.00	$0.02	$0.05	$0.08	$0.13	$0.18

Impacts by county are not presented in the 2011 Region H Water Plan. For full analysis, see TWDB correspondence to the Honorable Mark Evans from Stuart Norvell dated May 19, 2010, titled “Socioeconomic impact analysis of not meeting water needs for the 2011 Region H Regional Water Plan.”

Impacts on Water User Group for the Region I Water Planning Area ($ millions)

Municipal ($millions)						
	2010	2020	2030	2040	2050	2060
Athens						
Monetary value of domestic water shortages	$0.00	$1.25	$1.68	$1.34	$1.76	$2.32
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.09	$0.13	$0.18
Lost jobs due to reduced commercial business activity	0	0	0	3	5	7
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.01	$0.02	$0.03
Lost utility revenues	$0.00	$0.09	$0.12	$0.15	$0.21	$0.27
Brownsboro						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.06
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01
Bullard						
Monetary value of domestic water shortages	$0.00	$0.01	$0.05	$0.11	$0.25	$0.40
Lost utility revenues	$0.00	$0.02	$0.07	$0.13	$0.22	$0.34
Community Water Company						
Monetary value of domestic water shortages	$0.08	$0.97	$1.22	$1.84	$2.74	$4.27
Lost utility revenues	$0.07	$0.15	$0.20	$0.23	$0.30	$0.40
County-other (Anderson)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.07
County-other (Angelina)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.11
County-other (Hardin)						
Monetary value of domestic water shortages	$0.16	$0.30	$0.33	$0.35	$0.41	$0.55
County-other (Henderson)						
Monetary value of domestic water shortages	$0.11	$0.26	$0.44	$0.59	$0.93	$1.62
County-other (Jasper)						
Monetary value of domestic water shortages	$0.10	$0.19	$0.23	$0.15	$0.13	$0.13
County-other (Orange)						
Monetary value of domestic water shortages	$0.12	$0.08	$0.04	$0.01	$0.00	$0.00

Impacts by county are not presented in the 2011 East Texas Regional Water Plan. For full analysis, see TWDB correspondence to Kelley Holcomb from Stuart Norvell dated June 1, 2010, titled “Socioeconomic impact analysis of not meeting water needs for the 2011 East Texas Regional Water Plan.”

Potential socioeconomic impact of proposed DFCs

During the first round of joint-planning (2005 – 2010), the TWDB adopted rules to describe what is to be considered in the petition process. With the passage of Senate Bill 660, these **rules were repealed**.

TAC § 356.45. Board Evaluation, Consideration, and Deliberation

(a) The executive administrator shall prepare a list of findings based on evidence received at the hearing and may also provide a summary, analysis, and recommendations relating to revisions to districts' plans and desired future conditions to the board.

Potential socioeconomic impact of proposed DFCs (cont. – note, these rules repealed with passage of SB 660 in 2011)

TAC § 356.45. Board Evaluation, Consideration, and Deliberation (cont.)

(b) The executive administrator or the board may, at any stage of the process described in this subchapter, terminate the proceedings on a petition when an agreement is reached resolving the petition or a petition has been withdrawn. Any such agreements shall become a part of the record.

(c) The board shall base any recommended revisions to a plan and to the desired future conditions only on evidence in the hearing record. The board shall consider the following criteria when determining whether a desired future condition is reasonable:

Potential socioeconomic impact of proposed DFCs (cont. – note, these rules repealed with passage of SB 660 in 2011)

(1) the adopted desired future conditions are physically possible and the consideration given groundwater use;

(2) the socio-economic impacts reasonably expected to occur;

(3) the environmental impacts including, but not limited to, impacts to spring flow or other interaction between groundwater and surface water;

(4) the state's policy and legislative directives;

(5) the impact on private property rights;

(6) the reasonable and prudent development of the state's groundwater resources; and

(7) any other information relevant to the specific desired future condition.

Petitions from the first round and socioeconomic impacts considered

- GMA 1
  - TWDB report dated February 10, 2010
- GMA 12
  - TWDB report dated June 13, 2012

Potential socioeconomic impact of proposed DFCs

- TWC Chapter 36.108 (d) and (d) (6) states, “the districts shall consider groundwater availability models and other data or information for the management area and shall propose for adoption desired future conditions for the relevant aquifers within the management area. Before voting on the proposed desired future conditions of the aquifers . . . the districts shall consider **socioeconomic impacts reasonably expected to occur**;”
- Proposed DFCs are quantitative descriptions at specific points in time (decadal) of groundwater resources in a management area.
- This requirement was added to the requirements of joint planning with the passage of Senate Bill 660 in 2011.

Potential socioeconomic impact of proposed DFCs

- From a qualitative perspective, both positive and negative socioeconomic impacts may potentially result from implementation of proposed DFCs.
  - Proposed DFCs may require conversion to alternative supply, which may have increased costs associated to infrastructure, operation, and maintenance.
  - Proposed DFCs may reduce/eliminate the costs of lowering pumps and either drilling or deepening of wells.
  - Proposed DFCs may reduce/eliminate the costs associated with subsidence (including legal costs assigned to parties determined to be liable).

Potential socioeconomic impact of proposed DFCs

- Positive and negative socioeconomic impacts potentially resulting from implementation of proposed DFCs:
  - Proposed DFCs may serve to sustain/enhance economic growth due to assurances provided by diversified water portfolio.
  - Alternatives to proposed DFCs may result in short-term reduction in utility rates due to reduction in cost of water management strategy implementation.
  - Alternatives to proposed DFCs may result in significant but unquantified production costs due to transition from confined to unconfined conditions in local aquifers.

Appendix P

TWDB Report: Socioeconomic Impacts of Projected Water Shortages for the Brazos G Water Planning Area (Brazos G) Prepared in Support of the 2011 Brazos G Regional Water Plan

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TEXAS WATER DEVELOPMENT BOARD

James E. Herring, *Chairman*
Lewis H. McMahan, *Member*
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J. Kevin Ward
Executive Administrator

Jack Hunt, *Vice Chairman*
Thomas Weir Labatt III, *Member*
Joe M. Crutcher, *Member*

May 17, 2010

Mr. Dale Spurgin
Chairman, Brazos G Regional Water Planning Group
c/o Jones County
P.O. Box 148
Anson, Texas 79501

Re: Socioeconomic Impact Analysis of Not Meeting Water Needs for the 2011 Brazos G Regional Water Plan

Dear Chairman Spurgin:

We have received your request for technical assistance to complete the socioeconomic impact analysis of not meeting water needs. In response, enclosed is a report that describes our methodology and presents the results. Section 1 provides an overview of the methodology, and Section 2 presents results at the regional level, and Appendix 2 show results for individual water user groups.

If you have any questions or comments, please feel free to contact me at (512) 463-7928 or by email at stuart.norvell@twdb.state.tx.us.

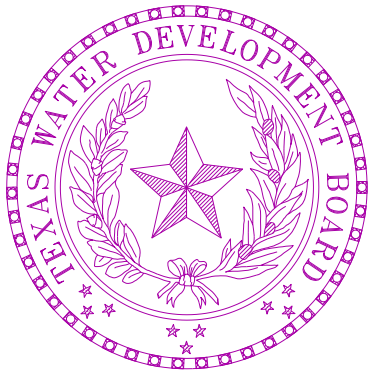
Sincerely,

Stuart D. Norvell
Manager, Water Planning Research and Analysis
Water Resources Planning Division

SN/ao

Enclosure

c: David Dunn, HDR
Lann Bookout, TWDB
S. Doug Shaw, TWDB



Socioeconomic Impacts of Projected Water Shortages for the Brazos G Regional Water Planning Area (Region G)

Prepared in Support of the 2011 Brazos G Regional Water Plan

Stuart D. Norvell, Managing Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

S. Doug Shaw, Agricultural Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

May 2010

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Introduction

Water shortages during drought would likely curtail or eliminate economic activity in business and industries reliant on water. For example, without water farmers cannot irrigate; refineries cannot produce gasoline, and paper mills cannot make paper. Unreliable water supplies would not only have an immediate and real impact on existing businesses and industry, but they could also adversely affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages would disrupt activity in homes, schools and government and could adversely affect public health and safety. For all of the above reasons, it is important to analyze and understand how restricted water supplies during drought could affect communities throughout the state.

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance: "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs*" [(§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted this report in support of the Brazos G Regional Water Planning Group (Region G).

This document summarizes the results of our analysis and discusses the methodology used to generate the results. Section 1 outlines the overall methodology and discusses approaches and assumptions specific to each water use category (i.e., irrigation, livestock, mining, steam-electric, municipal and manufacturing). Section 2 presents the results for each category where shortages are reported at the regional planning area level and river basin level. Results for individual water user groups are not presented, but are available upon request.

1. Methodology

Section 1 provides a general overview of how economic and social impacts were measured. In addition, it summarizes important clarifications, assumptions and limitations of the study.

1.1 Economic Impacts of Water Shortages

1.1.1 General Approach

Economic analysis as it relates to water resources planning generally falls into two broad areas. Supply side analysis focuses on costs and alternatives of developing new water supplies or implementing programs that provide additional water from current supplies. Demand side analysis concentrates on impacts or benefits of providing water to people, businesses and the environment. Analysis in this report focuses strictly on demand side impacts. When analyzing the economic impacts of water shortages as defined in Texas water planning, three potential scenarios are possible:

1) Scenario 1 involves situations where there are physical shortages of raw surface or groundwater due to drought of record conditions. For example, City A relies on a reservoir with average conservation storage of 500 acre-feet per year and a firm yield of 100 acre feet. In 2010, the city uses about 50 acre-feet per year, but by 2030 their demands are expected to increase to 200

acre-feet. Thus, in 2030 the reservoir would not have enough water to meet the city's demands, and people would experience a shortage of 100 acre-feet assuming drought of record conditions. Under normal or average climatic conditions, the reservoir would likely be able to provide reliable water supplies well beyond 2030.

2) Scenario 2 is a situation where despite drought of record conditions, water supply sources can meet existing use requirements; however, limitations in water infrastructure would preclude future water user groups from accessing these water supplies. For example, City B relies on a river that can provide 500 acre-feet per year during drought of record conditions and other constraints as dictated by planning assumptions. In 2010, the city is expected to use an estimated 100 acre-feet per year and by 2060 it would require no more than 400 acre-feet. But the intake and pipeline that currently transfers water from the river to the city's treatment plant has a capacity of only 200 acre-feet of water per year. Thus, the city's water supplies are adequate even under the most restrictive planning assumptions, but their conveyance system is too small. This implies that at some point – perhaps around 2030 - infrastructure limitations would constrain future population growth and any associated economic activity or impacts.

3) Scenario 3 involves water user groups that rely primarily on aquifers that are being depleted. In this scenario, projected and in some cases existing demands may be unsustainable as groundwater levels decline. Areas that rely on the Ogallala aquifer are a good example. In some communities in the region, irrigated agriculture forms a major base of the regional economy. With less irrigation water from the Ogallala, population and economic activity in the region could decline significantly assuming there are no offsetting developments.

Assessing the social and economic effects of each of the above scenarios requires various levels and methods of analysis and would generate substantially different results for a number of reasons; the most important of which has to do with the time frame of each scenario. Scenario 1 falls into the general category of static analysis. This means that models would measure impacts for a small interval of time such as a drought. Scenarios 2 and 3, on the other hand imply a dynamic analysis meaning that models are concerned with changes over a much longer time period.

Since administrative rules specify that planning analysis be evaluated under drought of record conditions (a static and random event), socioeconomic impact analysis developed by the TWDB for the state water plan is based on assumptions of Scenario 1. Estimated impacts under scenario 1 are point estimates for years in which needs are reported (2010, 2020, 2030, 2040, 2050 and 2060). They are independent and distinct "what if" scenarios for a particular year and shortages are assumed to be temporary events resulting from drought of record conditions. Estimated impacts measure what would happen if water user groups experience water shortages for a period of one year.

The TWDB recognize that dynamic models may be more appropriate for some water user groups; however, combining approaches on a statewide basis poses several problems. For one, it would require a complex array of analyses and models, and might require developing supply and demand forecasts under "normal" climatic conditions as opposed to drought of record conditions. Equally important is the notion that combining the approaches would produce inconsistent results across regions resulting in a so-called "apples to oranges" comparison.

A variety tools are available to estimate economic impacts, but by far, the most widely used today are input-output models (IO models) combined with social accounting matrices (SAMs). Referred to as IO/SAM models, these tools formed the basis for estimating economic impacts for agriculture (irrigation and livestock water uses) and industry (manufacturing, mining, steam-electric and commercial business activity for municipal water uses).

Since the planning horizon extends through 2060, economic variables in the baseline are adjusted in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Future values for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category.

The following steps outline the overall process.

Step 1*: Generate IO/SAM Models and Develop Economic Baseline*

IO/SAM models were estimated using propriety software known as IMPLAN PRO™ (Impact for Planning Analysis). IMPLAN is a modeling system originally developed by the U.S. Forestry Service in the late 1970s. Today, the Minnesota IMPLAN Group (MIG Inc.) owns the copyright and distributes data and software. It is probably the most widely used economic impact model in existence. IMPLAN comes with databases containing the most recently available economic data from a variety of sources.[1] Using IMPLAN software and data, transaction tables conceptually similar to the one discussed previously were estimated for each county in the region and for the region as a whole. Each transaction table contains 528 economic sectors and allows one to estimate a variety of economic statistics including:

- **total sales -** total production measured by sales revenues;
- **intermediate sales -** sales to other businesses and industries within a given region;
- **final sales –** sales to end users in a region and exports out of a region**;**
- **employment -** number of full and part-time jobs (annual average) required by a given industry including self-employment;
- **regional income -** total payroll costs (wages and salaries plus benefits) paid by industries, corporate income, rental income and interest payments; and
- **business taxes -** sales, excise, fees, licenses and other taxes paid during normal operation of an industry (does not include income taxes).

TWDB analysts developed an economic baseline containing each of the above variables using year 2000 data. Since the planning horizon extends through 2060, economic variables in the baseline were allowed to change in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Projections for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category. Monetary impacts in future years are reported in constant year 2006 dollars.

It is important to stress that employment, income and business taxes are the most useful variables when comparing the relative contribution of an economic sector to a regional economy. Total sales as reported in IO/SAM models are less desirable and can be misleading because they include sales to other industries in the region for use in the production of other goods. For example, if a mill buys grain from local farmers and uses it to produce feed, sales of both the processed feed and raw corn are counted

[1]The IMPLAN database consists of national level technology matrices based on benchmark input-output accounts generated by the U.S. Bureau of Economic Analysis and estimates of final demand, final payments, industry output and employment for various economic sectors. IMPLAN regional data (i.e. states, a counties or groups of counties within a state) are divided into two basic categories: 1) data on an industry basis including value-added, output and employment, and 2) data on a commodity basis including final demands and institutional sales. State-level data are balanced to national totals using a matrix ratio allocation system and county data are balanced to state totals.

as "output" in an IO model. Thus, total sales double-count or overstate the true economic value of goods and services produced in an economy. They are not consistent with commonly used measures of output such as Gross National Product (GNP), which counts only final sales.

Another important distinction relates to terminology. Throughout this report, the term *sector* refers to economic subdivisions used in the IMPLAN database and resultant input-output models (528 individual sectors based on Standard Industrial Classification Codes). In contrast, the phrase *water use category* refers to water user groups employed in state and regional water planning including irrigation, livestock, mining, municipal, manufacturing and steam electric. Each IMPLAN sector was assigned to a specific water use category.

Step 2: *Estimate Direct and Indirect Economic Impacts of Water Needs*

Direct impacts are reductions in output by sectors experiencing water shortages. For example, without adequate cooling and process water a refinery would have to curtail or cease operation, car washes may close, or farmers may not be able to irrigate and sales revenues fall. Indirect impacts involve changes in inter-industry transactions as supplying industries respond to decreased demands for their services, and how seemingly non-related businesses are affected by decreased incomes and spending due to direct impacts. For example, if a farmer ceases operations due to a lack of irrigation water, they would likely reduce expenditures on supplies such as fertilizer, labor and equipment, and businesses that provide these goods would suffer as well.

Direct impacts accrue to immediate businesses and industries that rely on water and without water industrial processes could suffer. However, output responses may vary depending upon the severity of shortages. A small shortage relative to total water use would likely have a minimal impact, but large shortages could be critical. For example, farmers facing small shortages might fallow marginally productive acreage to save water for more valuable crops. Livestock producers might employ emergency culling strategies, or they may consider hauling water by truck to fill stock tanks. In the case of manufacturing, a good example occurred in the summer of 1999 when Toyota Motor Manufacturing experienced water shortages at a facility near Georgetown, Kentucky.[2] As water levels in the Kentucky River fell to historic lows due to drought, plant managers sought ways to curtail water use such as reducing rinse operations to a bare minimum and recycling water by funneling it from paint shops to boilers. They even considered trucking in water at a cost of 10 times what they were paying. Fortunately, rains at the end of the summer restored river levels, and Toyota managed to implement cutbacks without affecting production, but it was a close call. If rains had not replenished the river, shortages could have severely reduced output.[3]

To account for uncertainty regarding the relative magnitude of impacts to farm and business operations, the following analysis employs the concept of elasticity. Elasticity is a number that shows how a change in one variable will affect another. In this case, it measures the relationship between a percentage reduction in water availability and a percentage reduction in output. For example, an elasticity of 1.0 indicates that a 1.0 percent reduction in water availability would result in a 1.0 percent reduction in

[2] Royal, W. "*High And Dry - Industrial Centers Face Water Shortages*." in Industry Week, Sept, 2000.

[3] The efforts described above are not planned programmatic or long-term operational changes. They are emergency measures that individuals might pursue to alleviate what they consider a temporary condition. Thus, they are not characteristic of long-term management strategies designed to ensure more dependable water supplies such as capital investments in conservation technology or development of new water supplies.

economic output. An elasticity of 0.50 would indicate that for every 1.0 percent of unavailable water, output is reduced by 0.50 percent and so on. Output elasticities used in this study are:[4]

- if water needs are 0 to 5 percent of total water demand, no corresponding reduction in output is assumed;
- if water needs are 5 to 30 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.50 percent reduction in output;
- if water needs are 30 to 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.75 percent reduction in output; and
- if water needs are greater than 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 1.0 percent (i.e., a proportional reduction).

In some cases, elasticities are adjusted depending upon conditions specific to a given water user group.

Once output responses to water shortages were estimated, direct impacts to total sales, employment, regional income and business taxes were derived using regional level economic multipliers estimating using IO/SAM models. The formula for a given IMPLAN sector is:

$$D_{i,t} = Q_{i,t} *, S_{i,t} * E_Q * RFD_i * DM_{i(Q, L, I, T)}$$

where:

$D_{i,t}$ = direct economic impact to sector *i* in period *t*

$Q_{i,t}$ = total sales for sector *i* in period *t* in an affected county

$RFD_{i,}$ = ratio of final demand to total sales for sector *i* for a given region

$S_{i,t}$ = water shortage as percentage of total water use in period *t*

E_Q = elasticity of output and water use

$DM_{i(L, I, T)}$ = direct output multiplier coefficients for labor (L), income (I) and taxes (T) for sector *i*.

Secondary impacts were derived using the same formula used to estimate direct impacts; however, indirect multiplier coefficients are used. Methods and assumptions specific to each water use sector are discussed in Sections 1.1.2 through 1.1.4.

[4] Elasticities are based on one of the few empirical studies that analyze potential relationships between economic output and water shortages in the United States. The study, conducted in California, showed that a significant number of industries would suffer reduced output during water shortages. Using a survey based approach researchers posed two scenarios to different industries. In the first scenario, they asked how a 15 percent cutback in water supply lasting one year would affect operations. In the second scenario, they asked how a 30 percent reduction lasting one year would affect plant operations. In the case of a 15 percent shortage, reported output elasticities ranged from 0.00 to 0.76 with an average value of 0.25. For a 30 percent shortage, elasticities ranged from 0.00 to 1.39 with average of 0.47. For further information, see, California Urban Water Agencies, "*Cost of Industrial Water Shortages,*" Spectrum Economics, Inc. November, 1991.

General Assumptions and Clarification of the Methodology

As with any attempt to measure and quantify human activities at a societal level, assumptions are necessary and every model has limitations. Assumptions are needed to maintain a level of generality and simplicity such that models can be applied on several geographic levels and across different economic sectors. In terms of the general approach used here several clarifications and cautions are warranted:

1. Shortages as reported by regional planning groups are the starting point for socioeconomic analyses.

2. Estimated impacts are point estimates for years in which needs are reported (i.e., 2010, 2020, 2030, 2040, 2050 and 2060).They are independent and distinct "what if" scenarios for each particular year and water shortages are assumed to be temporary events resulting from severe drought conditions combined with infrastructure limitations. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals and resultant impacts are measured. Given, that reported figures are not cumulative in nature, it is inappropriate to sum impacts over the entire planning horizon. Doing so, would imply that the analysis predicts that drought of record conditions will occur every ten years in the future, which is not the case. Similarly, authors of this report recognize that in many communities needs are driven by population growth, and in the future total population will exceed the amount of water available due to infrastructure limitations, regardless of whether or not there is a drought. This implies that infrastructure limitations would constrain economic growth. However, since needs as defined by planning rules are based upon water supply and demand under the assumption of drought of record conditions, it improper to conduct economic analysis that focuses on growth related impacts over the planning horizon. Figures generated from such an analysis would presume a 50-year drought of record, which is unrealistic. Estimating lost economic activity related to constraints on population and commercial growth due to lack of water would require developing water supply and demand forecasts under "normal" or "most likely" future climatic conditions.

3. While useful for planning purposes, this study is not a benefit-cost analysis. Benefit cost analysis is a tool widely used to evaluate the economic feasibility of specific policies or projects as opposed to estimating economic impacts of unmet water needs. Nevertheless, one could include some impacts measured in this study as part of a benefit cost study if done so properly. Since this is not a benefit cost analysis, future impacts are not weighted differently. In other words, estimates are not discounted. If used as a measure of economic benefits, one should incorporate a measure of uncertainty into the analysis. In this type of analysis, a typical method of discounting future values is to assign probabilities of the drought of record recurring again in a given year, and weight monetary impacts accordingly. This analysis assumes a probability of one.

4. IO multipliers measure the strength of backward linkages to supporting industries (i.e., those who sell inputs to an affected sector). However, multipliers say nothing about forward linkages consisting of businesses that purchase goods from an affected sector for further processing. For example, ranchers in many areas sell most of their animals to local meat packers who process animals into a form that consumers ultimately see in grocery stores and restaurants. Multipliers do not capture forward linkages to meat packers, and since meat packers sell livestock purchased from ranchers as "final sales," multipliers for the ranching sector do fully account for all losses to a region's economy. Thus, as mentioned previously, in some cases closely linked sectors were moved from one water use category to another.

5. Cautions regarding interpretations of direct and secondary impacts are warranted. IO/SAM multipliers are based on "fixed-proportion production functions," which basically means that input use - including labor - moves in lockstep fashion with changes in levels of output. In a

scenario where output (i.e., sales) declines, losses in the immediate sector or supporting sectors could be much less than predicted by an IO/SAM model for several reasons. For one, businesses will likely expect to continue operating so they might maintain spending on inputs for future use; or they may be under contractual obligations to purchase inputs for an extended period regardless of external conditions. Also, employers may not lay-off workers given that experienced labor is sometimes scarce and skilled personnel may not be readily available when water shortages subside. Lastly people who lose jobs might find other employment in the region. As a result, direct losses for employment and secondary losses in sales and employment should be considered an upper bound. Similarly, since projected population losses are based on reduced employment in the region, they should be considered an upper bound as well.

6. IO models are static. Models and resultant multipliers are based upon the structure of the U.S. and regional economies in 2006. In contrast, water shortages are projected to occur well into the future. Thus, the analysis assumes that the general structure of the economy remains the same over the planning horizon, and the farther out into the future we go, this assumption becomes less reliable.

7. Impacts are annual estimates. If one were to assume that conditions persisted for more than one year, figures should be adjusted to reflect the extended duration. The drought of record in most regions of Texas lasted several years.

8. Monetary figures are reported in constant year 2006 dollars.

1.1.2 Impacts to Agriculture

Irrigated Crop Production

The first step in estimating impacts to irrigation required calculating gross sales for IMPLAN crop sectors. Default IMPLAN data do not distinguish irrigated production from dry-land production. Once gross sales were known other statistics such as employment and income were derived using IMPLAN direct multiplier coefficients. Gross sales for a given crop are based on two data sources:

1) county-level statistics collected and maintained by the TWDB and the USDA Farm Services Agency (FSA) including the number of irrigated acres by crop type and water application per acre, and

2) regional-level data published by the Texas Agricultural Statistics Service (TASS) including prices received for crops (marketing year averages), crop yields and crop acreages.

Crop categories used by the TWDB differ from those used in IMPLAN datasets. To maintain consistency, sales and other statistics are reported using IMPLAN crop classifications. Table 1 shows the TWDB crops included in corresponding IMPLAN sectors, and Table 2 summarizes acreage and estimated annual water use for each crop classification (five-year average from 2003-2007). Table 3 displays average (2003-2007) gross revenues per acre for IMPLAN crop categories.

Table 1: Crop Classifications Used in TWDB Water Use Survey and Corresponding IMPLAN Crop Sectors

IMPLAN Category	TWDB Category
Oilseeds	Soybeans and "other oil crops"
Grains	Grain sorghum, corn, wheat and "other grain crops"
Vegetable and melons	"Vegetables" and potatoes
Tree nuts	Pecans
Fruits	Citrus, vineyard and other orchard
Cotton	Cotton
Sugarcane and sugar beets	Sugarcane and sugar beets
All "other" crops	"Forage crops", peanuts, alfalfa, hay and pasture, rice and "all other crops"

Table 2: Summary of Irrigated Crop Acreage and Water Demand for the Brazos G Regional Water Planning Area (average 2003-2007)

Sector	Acres (1000s)	Distribution of acres	Water use (1000s of AF)	Distribution of water use
Oilseeds	3.4	2%	3.4	1%
Grains	62.4	30%	58.6	27%
Vegetable and melons	5.7	3%	5.1	2%
Tree nuts	13.2	6%	18.7	9%
Fruits	<1	<1%	<1	<1%
Cotton	71.7	35%	78.4	36%
Sugarcane and sugar beets	50.6	24%	54.7	25%
Total	206.9	100%	219.0	100%

Source: Water demand figures are a 5- year average (2003-2007) of the TWDB's annual Irrigation Water Use Estimates. Statistics for irrigated crop acreage are based upon annual survey data collected by the TWDB and the Farm Service Agency. Values do not include acreage or water use for the TWDB categories classified by the Farm Services Agency as "failed acres," "golf course" or "waste water."

Table 3: Average Gross Sales Revenues per Acre for Irrigated Crops for the Brazos G Regional Water Planning Area (2003-2007)		
IMPLAN Sector	**Gross revenues per acre**	**Crops included in estimates**
Oilseeds	$268	Based on five-year (2003-2007) average weighted by acreage for "irrigated soybeans" and "irrigated other oil crops."
Grains	$256	Based on five-year (2003-2007) average weighted by acreage for "irrigated grain sorghum," "irrigated corn", "irrigated wheat" and "irrigated 'other' grain crops."
Vegetable and melons	$6,151	Based on five-year (2003-2007) average weighted by acreage for "irrigated shallow and deep root vegetables", "irrigated Irish potatoes" and "irrigated melons."
Tree nuts	$3,420	Based on five-year (2003-2007) average weighted by acreage for "irrigated pecans."
Fruits	$2,175	Based on five-year (2003-2007) average weighted by acreage for "irrigated citrus", "irrigated vineyards" and "irrigated 'other' orchard."
Cotton	$499	Based on five-year (2003-2007) average weighted by acreage for "irrigated cotton."
All Other Crops	$582	Irrigated figure is based on five-year (2003-2007) average weighted by acreage for "irrigated 'forage' crops", "irrigated peanuts", "irrigated alfalfa", "irrigated 'hay' and pasture" and "irrigated 'all other' crops."
*Figures are rounded. Source: Based on data from the Texas Agricultural Statistics Service, Texas Water Development Board, and Texas A&M University.		

An important consideration when estimating impacts to irrigation was determining which crops are affected by water shortages. One approach is the so-called rationing model, which assumes that farmers respond to water supply cutbacks by fallowing the lowest value crops in the region first and the highest valued crops last until the amount of water saved equals the shortage.[5] For example, if farmer A grows vegetables (higher value) and farmer B grows wheat (lower value) and they both face a proportionate cutback in irrigation water, then farmer B will sell water to farmer A. Farmer B will fallow her irrigated acreage before farmer A fallows anything. Of course, this assumes that farmers can and do transfer enough water to allow this to happen. A different approach involves constructing farm-level profit maximization models that conform to widely-accepted economic theory that farmers make decisions based on marginal net returns. Such models have good predictive capability, but data requirements and complexity are high. Given that a detailed analysis for each region would require a substantial amount of farm-level data and analysis, the following investigation assumes that projected shortages are distributed equally across predominant crops in the region. Predominant in this case are crops that comprise at least one percent of total acreage in the region.

The following steps outline the overall process used to estimate direct impacts to irrigated agriculture:

1. *Distribute shortages across predominant crop types in the region*. Again, unmet water needs were distributed equally across crop sectors that constitute one percent or more of irrigated acreage.

2. *Estimate associated reductions in output for affected crop sectors*. Output reductions are based on elasticities discussed previously and on estimated values per acre for different crops. Values per acre stem from the same data used to estimate output for the year 2006 baseline. Using multipliers, we then generate estimates of forgone income, jobs, and tax revenues based on reductions in gross sales and final demand.

Livestock

The approach used for the livestock sector is basically the same as that used for crop production. As is the case with crops, livestock categorizations used by the TWDB differ from those used in IMPLAN datasets, and TWDB groupings were assigned to a given IMPLAN sector (Table 4). Then we:

1) *Distribute projected water needs equally among predominant livestock sectors and estimate lost output*: As is the case with irrigation, shortages are assumed to affect all livestock sectors equally; however, the category of "other" is not included given its small size. If water needs were small relative to total demands, we assume that producers would haul in water by truck to fill stock tanks. The cost per acre-foot ($24,000) is based on 2008 rates charged by various water haulers in Texas, and assumes that the average truck load is 6,500 gallons at a hauling distance of 60 miles.

3) *Estimate reduced output in forward processors for livestock sectors*. Reductions in output for livestock sectors are assumed to have a proportional impact on forward processors in the region such as meat packers. In other words, if the cows were gone, meat-packing plants or fluid milk

[5] The rationing model was initially proposed by researchers at the University of California at Berkeley, and was then modified for use in a study conducted by the U.S. Environmental Protection Agency that evaluated how proposed water supply cutbacks recommended to protect water quality in the Bay/Delta complex in California would affect farmers in the Central Valley. See, Zilberman, D., Howitt, R. and Sunding, D. "*Economic Impacts of Water Quality Regulations in the San Francisco Bay and Delt*a." Western Consortium for Public Health. May 1993.

manufacturers) would likely have little to process. This is not an unreasonable premise. Since the 1950s, there has been a major trend towards specialized cattle feedlots, which in turn has decentralized cattle purchasing from livestock terminal markets to direct sales between producers and slaughterhouses. Today, the meat packing industry often operates large processing facilities near high concentrations of feedlots to increase capacity utilization.[6] As a result, packers are heavily dependent upon nearby feedlots. For example, a recent study by the USDA shows that on average meat packers obtain 64 percent of cattle from within 75 miles of their plant, 82 percent from within 150 miles and 92 percent from within 250 miles.[7]

Table 4: Description of Livestock Sectors

IMPLAN Category	TWDB Category
Cattle ranching and farming	Cattle, cow calf, feedlots and dairies
Poultry and egg production	Poultry production.
Other livestock	Livestock other than cattle and poultry (i.e., horses, goats, sheep, hogs)
Milk manufacturing	Fluid milk manufacturing, cheese manufacturing, ice cream manufacturing etc.
Meat packing	Meat processing present in the region from slaughter to final processing

1.1.3 Impacts to Municipal Water User Groups

Disaggregation of Municipal Water Demands

Estimating the economic impacts for the municipal water user groups is complicated for a number of reasons. For one, municipal use comprises a range of consumers including commercial businesses, institutions such as schools and government and households. However, reported water needs are not distributed among different municipal water users. In other words, how much of a municipal need is commercial and how much is residential (domestic)?

The amount of commercial water use as a percentage of total municipal demand was estimated based on "GED" coefficients (gallons per employee per day) published in secondary sources.[8] For example, if year 2006 baseline data for a given economic sector (e.g., amusement and recreation services) shows

[6] Ferreira, W.N. "*Analysis of the Meat Processing Industry in the United States*." Clemson University Extension Economics Report ER211, January 2003.

[7] Ward, C.E. "*Summary of Results from USDA's Meatpacking Concentration Study*." Oklahoma Cooperative Extension Service, OSU Extension Facts WF-562.

[8] Sources for GED coefficients include: Gleick, P.H., Haasz, D., Henges-Jeck, C., Srinivasan, V., Wolff, G. Cushing, K.K., and Mann, A. "*Waste Not, Want Not*: *The Potential for Urban Water Conservation in California*." Pacific Institute. November 2003. U.S. Bureau of the Census. 1982 Census of Manufacturers: Water Use in Manufacturing. USGPO, Washington D.C. See also: "*U.S. Army Engineer Institute for Water Resources, IWR Report 88-R-6.*," Fort Belvoir, VA. See also, Joseph, E. S., 1982, "*Municipal and Industrial Water Demands of the Western United States*." Journal of the Water Resources Planning and Management Division, Proceedings of the American Society of Civil Engineers, v. 108, no. WR2, p. 204-216. See also, Baumann, D. D., Boland, J. J., and Sims, J. H., 1981, "*Evaluation of Water Conservation for Municipal and Industrial Water Supply*." U.S. Army Corps of Engineers, Institute for Water Resources, Contract no. 82-C1.

employment at 30 jobs and the GED coefficient is 200, then average daily water use by that sector is (30 x 200 = 6,000 gallons) or 6.7 acre-feet per year. Water not attributed to commercial use is considered domestic, which includes single and multi-family residential consumption, institutional uses and all use designated as "county-other." Based on our analysis, commercial water use is about 5 to 35 percent of municipal demand. Less populated rural counties occupy the lower end of the spectrum, while larger metropolitan counties are at the higher end.

After determining the distribution of domestic versus commercial water use, we developed methods for estimating impacts to the two groups.

Domestic Water Uses

Input output models are not well suited for measuring impacts of shortages for domestic water uses, which make up the majority of the municipal water use category. To estimate impacts associated with domestic water uses, municipal water demand and needs are subdivided into residential, and commercial and institutional use. Shortages associated with residential water uses are valued by estimating proxy demand functions for different water user groups allowing us to estimate the marginal value of water, which would vary depending upon the level of water shortages. The more severe the water shortage, the more costly it becomes. For instance, a 2 acre-foot shortage for a group of households that use 10 acre-feet per year would not be as severe as a shortage that amounted to 8 acre-feet. In the case of a 2 acre-foot shortage, households would probably have to eliminate some or all outdoor water use, which could have implicit and explicit economic costs including losses to the horticultural and landscaping industry. In the case of an 8 acre-foot shortage, people would have to forgo all outdoor water use and most indoor water consumption. Economic impacts would be much higher in the latter case because people, and would be forced to find emergency alternatives assuming alternatives were available.

To estimate the value of domestic water uses, TWDB staff developed marginal loss functions based on constant elasticity demand curves. This is a standard and well-established method used by economists to value resources such as water that have an explicit monetary cost.

A constant price elasticity of demand is estimated using a standard equation:

$$w = kc^{(-\varepsilon)}$$

where:

- w is equal to average monthly residential water use for a given water user group measured in thousands of gallons;
- k is a constant intercept;
- c is the average cost of water per 1,000 gallons; and
- ε is the price elasticity of demand.

Price elasticities (-0.30 for indoor water use and -0.50 for outdoor use) are based on a study by Bell et al.[9] that surveyed 1,400 water utilities in Texas that serve at least 1,000 people to estimate demand elasticity for several variables including price, income, weather etc. Costs of water and average

[9] Bell, D.R. and Griffin, R.C. "*Community Water Demand in Texas as a Century is Turned*." Research contract report prepared for the Texas Water Development Board. May 2006.

use per month per household are based on data from the Texas Municipal League's annual water and wastewater rate surveys - specifically average monthly household expenditures on water and wastewater in different communities across the state. After examining variance in costs and usage, three different categories of water user groups based on population (population less than 5,000, cities with populations ranging from 5,000 to 99,999 and cities with populations exceeding 100,000) were selected to serve as proxy values for municipal water groups that meet the criteria (Table 5).[10]

Table 5: Water Use and Costs Parameters Used to Estimated Water Demand Functions (average monthly costs per acre-foot for delivered water and average monthly use per household)

Community Population	Water	Wastewater	Total monthly cost	Avg. monthly use (gallons)
Less than or equal to 5,000	$1,335	$1,228	$2,563	6,204
5,000 to 100,000	$1,047	$1,162	$2,209	7,950
Great than or equal to 100,000	$718	$457	$1,190	8,409

Source: Based on annual water and wastewater rate surveys published by the Texas Municipal League.

As an example, Table 6 shows the economic impact per acre-foot of domestic water needs for municipal water user groups with population exceeding 100,000 people. There are several important assumptions incorporated in the calculations:

1) Reported values are net of the variable costs of treatment and distribution such as expenses for chemicals and electricity since using less water involves some savings to consumers and utilities alike; and for outdoor uses we do not include any value for wastewater.

2) Outdoor and "non-essential" water uses would be eliminated before indoor water consumption was affected, which is logical because most water utilities in Texas have drought contingency plans that generally specify curtailment or elimination of outdoor water use during droughts.[11] Determining how much water is used for outdoor purposes is based on several secondary sources. The first is a major study sponsored by the American Water Works Association, which surveyed cities in states including Colorado, Oregon, Washington, California, Florida and Arizona. On average across all cities surveyed 58 percent of single family residential water use was for outdoor activities. In cities with climates comparable to large metropolitan areas of Texas, the average was

[10] Ideally, one would want to estimate demand functions for each individual utility in the state. However, this would require an enormous amount of time and resources. For planning purposes, we believe the values generated from aggregate data are more than sufficient.

[11] In Texas, state law requires retail and wholesale water providers to prepare and submit plans to the Texas Commission on Environmental Quality (TCEQ). Plans must specify demand management measures for use during drought including curtailment of "non-essential water uses." Non-essential uses include, but are not limited to, landscape irrigation and water for swimming pools or fountains. For further information see the Texas Environmental Quality Code §288.20.

40 percent.[12] Earlier findings of the U.S. Water Resources Council showed a national average of 33 percent. Similarly, the United States Environmental Protection Agency (USEPA) estimated that landscape watering accounts for 32 percent of total residential and commercial water use on annual basis.[13] A study conducted for the California Urban Water Agencies (CUWA) calculated average annual values ranging from 25 to 35 percent.[14] Unfortunately, there does not appear to be any comprehensive research that has estimated non-agricultural outdoor water use in Texas. As an approximation, an average annual value of 30 percent based on the above references was selected to serve as a rough estimate in this study.

3) As shortages approach 100 percent values become immense and theoretically infinite at 100 percent because at that point death would result, and willingness to pay for water is immeasurable. Thus, as shortages approach 80 percent of monthly consumption, we assume that households and non-water intensive commercial businesses (those that use water only for drinking and sanitation would have water delivered by tanker truck or commercial water delivery companies. Based on reports from water companies throughout the state, we estimate that the cost of trucking in water is around $21,000 to $27,000 per acre-feet assuming a hauling distance of between 20 to 60 miles. This is not an unreasonable assumption. The practice was widespread during the 1950s drought and recently during droughts in this decade. For example, in 2000 at the heels of three consecutive drought years Electra - a small town in North Texas - was down to its last 45 days worth of reservoir water when rain replenished the lake, and the city was able to refurbish old wells to provide supplemental groundwater. At the time, residents were forced to limit water use to 1,000 gallons per person per month - less than half of what most people use - and many were having water delivered to their homes by private contractors.[15] In 2003 citizens of Ballinger, Texas, were also faced with a dwindling water supply due to prolonged drought. After three years of drought, Lake Ballinger, which supplies water to more than 4,300 residents in Ballinger and to 600 residents in nearby Rowena, was almost dry. Each day, people lined up to get water from a well in nearby City Park. Trucks hauling trailers outfitted with large plastic and metal tanks hauled water to and from City Park to Ballinger.[16]

[12] See, Mayer, P.W., DeOreo, W.B., Opitz, E.M., Kiefer, J.C., Davis, W., Dziegielewski, D., Nelson, J.O. "*Residential End Uses of Water*." Research sponsored by the American Water Works Association and completed by Aquacraft, Inc. and Planning and Management Consultants, Ltd. (PMCL@CDM).

[13] U.S. Environmental Protection Agency. *"Cleaner Water through Conservation*." USEPA Report no. 841-B-95-002. April, 1995.

[14] Planning and Management Consultants, Ltd. "*Evaluating Urban Water Conservation Programs: A Procedures Manual*." Prepared for the California Urban Water Agencies. February 1992.

[15] Zewe, C. "*Tap Threatens to Run Dry in Texas Town*." July 11, 2000. CNN Cable News Network.

[16] Associated Press, "*Ballinger Scrambles to Finish Pipeline before Lake Dries Up*." May 19, 2003.

Table 6: Economic Losses Associated with Domestic Water Shortages in Communities with Populations Exceeding 100,000 people

Water shortages as a percentage of total monthly household demands	No. of gallons remaining per household per day	No of gallons remaining per person per day	Economic loss (per acre-foot)	Economic loss (per gallon)
1%	278	93	$748	$0.00005
5%	266	89	$812	$0.0002
10%	252	84	$900	$0.0005
15%	238	79	$999	$0.0008
20%	224	75	$1,110	$0.0012
25%	210	70	$1,235	$0.0015
30%[a]	196	65	$1,699	$0.0020
35%	182	61	$3,825	$0.0085
40%	168	56	$4,181	$0.0096
45%	154	51	$4,603	$0.011
50%	140	47	$5,109	$0.012
55%	126	42	$5,727	$0.014
60%	112	37	$6,500	$0.017
65%	98	33	$7,493	$0.02
70%	84	28	$8,818	$0.02
75%	70	23	$10,672	$0.03
80%	56	19	$13,454	$0.04
85%	42	14	$18,091 ($24,000)[b]	$0.05 ($0.07)[b]
90%	28	9	$27,363 ($24,000)	$0.08 ($0.07)
95%	14	5	$55,182 ($24,000)	$0.17 ($0.07)
99%	3	0.9	$277,728 ($24,000)	$0.85 ($0.07)
99.9%	1	0.5	$2,781,377 ($24,000)	$8.53 ($0.07)
100%	0	0	Infinite ($24,000)	Infinite ($0.07)

[a] The first 30 percent of needs are assumed to be restrictions of outdoor water use; when needs reach 30 percent of total demands all outdoor water uses would be restricted. Needs greater than 30 percent include indoor use

[b] As shortages approach 100 percent the value approaches infinity assuming there are not alternatives available; however, we assume that communities would begin to have water delivered by tanker truck at an estimated cost of $24,000 per acre-foot when shortages breached 85 percent.

Commercial Businesses

Effects of water shortages on commercial sectors were estimated in a fashion similar to other business sectors meaning that water shortages would affect the ability of these businesses to operate. This is particularly true for "water intensive" commercial sectors that are need large amounts of water (in addition to potable and sanitary water) to provide their services. These include:

- car-washes,
- laundry and cleaning facilities,
- sports and recreation clubs and facilities including race tracks,
- amusement and recreation services,
- hospitals and medical facilities,
- hotels and lodging places, and
- eating and drinking establishments.

A key assumption is that commercial operations would not be affected until water shortages were at least 50 percent of total municipal demand. In other words, we assume that residential water consumers would reduce water use including all non-essential uses before businesses were affected.

An example will illustrate the breakdown of municipal water needs and the overall approach to estimating impacts of municipal needs. Assume City A experiences an unexpected shortage of 50 acre-feet per year when their demands are 200 acre-feet per year. Thus, shortages are only 25 percent of total municipal use and residents of City A could eliminate needs by restricting landscape irrigation. City B, on the other hand, has a deficit of 150 acre-feet in 2020 and a projected demand of 200 acre-feet. Thus, total shortages are 75 percent of total demand. Emergency outdoor and some indoor conservation measures could eliminate 50 acre-feet of projected needs, yet 50 acre-feet would still remain. To eliminate" the remaining 50 acre-feet water intensive commercial businesses would have to curtail operations or shut down completely.

Three other areas were considered when analyzing municipal water shortages: 1) lost revenues to water utilities, 2) losses to the horticultural and landscaping industries stemming for reduction in water available for landscape irrigation, and 3) lost revenues and related economic impacts associated with reduced water related recreation.

Water Utility Revenues

Estimating lost water utility revenues was straightforward. We relied on annual data from the "*Water and Wastewater Rate Survey*" published annually by the Texas Municipal League to calculate an average value per acre-foot for water and sewer. For water revenues, average retail water and sewer rates multiplied by total water needs served as a proxy. For lost wastewater, total unmet needs were adjusted for return flow factor of 0.60 and multiplied by average sewer rates for the region. Needs reported as "county-other" were excluded under the presumption that these consist primarily of self-supplied water uses. In addition, 15 percent of water demand and needs are considered non-billed or "unaccountable" water that comprises things such as leakages and water for municipal government functions (e.g., fire departments). Lost tax receipts are based on current rates for the "miscellaneous gross receipts tax, "which the state collects from utilities located in most incorporated cities or towns in Texas. We do not include lost water utility revenues when aggregating impacts of municipal water shortages to regional and state levels to prevent double counting.

Horticultural and Landscaping Industry

The horticultural and landscaping industry, also referred to as the "green Industry," consists of businesses that produce, distribute and provide services associated with ornamental plants, landscape and garden supplies and equipment. Horticultural industries often face big losses during drought. For example, the recent drought in the Southeast affecting the Carolinas and Georgia horticultural and landscaping businesses had a harsh year. Plant sales were down, plant mortality increased, and watering costs increased. Many businesses were forced to close locations, lay off employees, and even file for bankruptcy. University of Georgia economists put statewide losses for the industry at around $3.2 billion during the 3-year drought that ended in 2008.[17] Municipal restrictions on outdoor watering play a significant role. During drought, water restrictions coupled with persistent heat has a psychological effect on homeowners that reduces demands for landscaping products and services. Simply put, people were afraid to spend any money on new plants and landscaping.

In Texas, there do not appear to be readily available studies that analyze the economic effects of water shortages on the industry. However, authors of this report believe negative impacts do and would result in restricting landscape irrigation to municipal water consumers. The difficulty in measuring them is two-fold. First, as noted above, data and research for these types of impacts that focus on Texas are limited; and second, economic data provided by IMPLAN do not disaggregate different sectors of the green industry to a level that would allow for meaningful and defensible analysis.[18]

Recreational Impacts

Recreational businesses often suffer when water levels and flows in rivers, springs and reservoirs fall significantly during drought. During droughts, many boat docks and lake beaches are forced to close, leading to big losses for lakeside business owners and local communities. Communities adjacent to popular river and stream destinations such as Comal Springs and the Guadalupe River also see their business plummet when springs and rivers dry up. Although there are many examples of businesses that have suffered due to drought, dollar figures for drought-related losses to the recreation and tourism industry are not readily available, and very difficult to measure without extensive local surveys. Thus, while they are important, economic impacts are not measured in this study.

Table 7 summarizes impacts of municipal water shortages at differing levels of magnitude, and shows the ranges of economic costs or losses per acre-foot of shortage for each level.

[17] Williams, D. *"Georgia landscapers eye rebound from Southeast drought."* Atlanta Business Chronicle, Friday, June 19, 2009

[18] Economic impact analyses prepared by the TWDB for 2006 regional water plans did include estimates for the horticultural industry. However, year 2000 and prior IMPLAN data were disaggregated to a finer level. In the current dataset (2006), the sector previously listed as "Landscaping and Horticultural Services" (IMPLAN Sector 27) is aggregated into "Services to Buildings and Dwellings" (IMPLAN Sector 458).

Table 7: Impacts of Municipal Water Shortages at Different Magnitudes of Shortages		
Water shortages as percent of total municipal demands	Impacts	Economic costs per acre-foot*
0-30%	✓ Lost water utility revenues ✓ Restricted landscape irrigation and non-essential water uses	$730 - $2,040
30-50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use	$2,040 - $10,970
>50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use ✓ Restriction or elimination of commercial water use ✓ Importing water by tanker truck	$10,970 - varies
*Figures are rounded		

1.1.4 Industrial Water User Groups

Manufacturing

Impacts to manufacturing were estimated by distributing water shortages among industrial sectors at the county level. For example, if a planning group estimates that during a drought of record water supplies in County A would only meet 50 percent of total annual demands for manufactures in the county, we reduced output for each sector by 50 percent. Since projected manufacturing demands are based on TWDB Water Uses Survey data for each county, we only include IMPLAN sectors represented in the TWBD survey database. Some sectors in IMPLAN databases are not part of the TWDB database given that they use relatively small amounts of water - primarily for on-site sanitation and potable purposes. To maintain consistency between IMPLAN and TWDB databases, Standard Industrial Classification (SIC) codes both databases were cross referenced in county with shortages. Non-matches were excluded when calculating direct impacts.

Mining

The process of mining is very similar to that of manufacturing. We assume that within a given county, shortages would apply equally to relevant mining sectors, and IMPLAN sectors are cross referenced with TWDB data to ensure consistency.

In Texas, oil and gas extraction and sand and gravel (aggregates) operations are the primary mining industries that rely on large volumes of water. For sand and gravel, estimated output reductions are straightforward; however, oil and gas is more complicated for a number of reasons. IMPLAN does not necessarily report the physical extraction of minerals by geographic local, but rather the sales revenues reported by a particular corporation.

For example, at the state level revenues for IMPLAN sector 19 (oil and gas extraction) and sector 27 (drilling oil and gas wells) totals $257 billion. Of this, nearly $85 billion is attributed to Harris County. However, only a very small fraction (less than one percent) of actual production takes place in the county. To measure actual potential losses in well head capacity due to water shortages, we relied on county level production data from the Texas Railroad Commission (TRC) and average well-head market prices for crude and gas to estimate lost revenues in a given county. After which, we used to IMPLAN ratios to estimate resultant losses in income and employment.

Other considerations with respect to mining include:

1) Petroleum and gas extraction industry only uses water in significant amounts for secondary recovery. Known in the industry as enhanced or water flood extraction, secondary recovery involves pumping water down injection wells to increase underground pressure thereby pushing oil or gas into other wells. IMPLAN output numbers do not distinguish between secondary and non-secondary recovery. To account for the discrepancy, county-level TRC data that show the proportion of barrels produced using secondary methods were used to adjust IMPLAN data to reflect only the portion of sales attributed to secondary recovery.

2) A substantial portion of output from mining operations goes directly to businesses that are classified as manufacturing in our schema. Thus, multipliers measuring backward linkages for a given manufacturer might include impacts to a supplying mining operation. Care was taken not to double count in such situations if both a mining operation and a manufacturer were reported as having water shortages.

Steam-electric

At minimum without adequate cooling water, power plants cannot safely operate. As water availability falls below projected demands, water levels in lakes and rivers that provide cooling water would also decline. Low water levels could affect raw water intakes and outfalls at electrical generating units in several ways. For one, power plants are regulated by thermal emission guidelines that specify the maximum amount of heat that can go back into a river or lake via discharged cooling water. Low water levels could result in permit compliance issues due to reduced dilution and dispersion of heat and subsequent impacts on aquatic biota near outfalls.[19] However, the primary concern would be a loss of head (i.e., pressure) over intake structures that would decrease flows through intake tunnels. This would affect safety related pumps, increase operating costs and/or result in sustained shut-downs. Assuming plants did shutdown, they would not be able to generate electricity.

[19] Section 316 (b) of the Clean Water Act requires that thermal wastewater discharges do not harm fish and other wildlife.

Among all water use categories steam-electric is unique and cautions are needed when applying methods used in this study. Measured changes to an economy using input-output models stem directly from changes in sales revenues. In the case of water shortages, one assumes that businesses will suffer lost output if process water is in short supply. For power generation facilities this is true as well. However, the electric services sector in IMPLAN represents a corporate entity that may own and operate several electrical generating units in a given region. If one unit became inoperable due to water shortages, plants in other areas or generation facilities that do not rely heavily on water such as gas powered turbines might be able to compensate for lost generating capacity. Utilities could also offset lost production via purchases on the spot market.[20] Thus, depending upon the severity of the shortages and conditions at a given electrical generating unit, energy supplies for local and regional communities could be maintained. But in general, without enough cooling water, utilities would have to throttle back plant operations, forcing them to buy or generate more costly power to meet customer demands.

Measuring impacts end users of electricity is not part of this study as it would require extensive local and regional level analysis of energy production and demand. To maintain consistency with other water user groups, impacts of steam-electric water shortages are measured in terms of lost revenues (and hence income) and jobs associated with shutting down electrical generating units.

1.2 Social Impacts of Water Shortages

As the name implies, the effects of water shortages can be social or economic. Distinctions between the two are both semantic and analytical in nature – more so analytic in the sense that social impacts are harder to quantify. Nevertheless, social effects associated with drought and water shortages are closely tied to economic impacts. For example, they might include:

- demographic effects such as changes in population,
- disruptions in institutional settings including activity in schools and government,
- conflicts between water users such as farmers and urban consumers,
- health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations),
- mental and physical stress (e.g., anxiety, depression, domestic violence),
- public safety issues from forest and range fires and reduced fire fighting capability,
- increased disease caused by wildlife concentrations,
- loss of aesthetic and property values, and
- reduced recreational opportunities.[21]

[20] Today, most utilities participate in large interstate "power pools" and can buy or sell electricity "on the grid" from other utilities or power marketers. Thus, assuming power was available to buy, and assuming that no contractual or physical limitations were in place such as transmission constraints; utilities could offset lost power that resulted from waters shortages with purchases via the power grid.

[21] Based on information from the website of the National Drought Mitigation Center at the University of Nebraska Lincoln. Available online at: http://www.drought.unl.edu/risk/impacts.htm. See also, Vanclay, F. "*Social Impact Assessment*." in Petts, J. (ed) International Handbook of Environmental Impact Assessment. 1999.

Social impacts measured in this study focus strictly on demographic effects including changes in population and school enrollment. Methods are based on demographic projection models developed by the Texas State Data Center and used by the TWDB for state and regional water planning. Basically, the social impact model uses results from the economic component of the study and assesses how changes in labor demand would affect migration patterns in a region. Declines in labor demand as measured using adjusted IMPLAN data are assumed to affect net economic migration in a given regional water planning area. Employment losses are adjusted to reflect the notion that some people would not relocate but would seek employment in the region and/or public assistance and wait for conditions to improve. Changes in school enrollment are simply the proportion of lost population between the ages of 5 and 17.

2.0 Results

Section 2 presents the results of the analysis at the regional level. Included are baseline economic data for each water use category, and estimated economic impacts of water shortages for water user groups with reported deficits. According to the 2011 *Brazos G Regional Water Plan*, during severe drought irrigation, municipal, manufacturing, mining and steam-electric water user groups would experience water shortages in the absence of new water management strategies.

2.1 Overview of Regional Economy

On an annual basis, the Region G economy generates slightly more than $46 billion in gross state product for Texas ($43 billion in income and $3 billion in business taxes) and supports 744,230 jobs (Table 8). Generating about $10 billion worth of income per year, agriculture, manufacturing, and mining are the primary base economic sectors in the region.[22] Municipal sectors also generate substantial amounts of income, nearly $32 billion per year, and are major employers in the region. While municipal sectors are the largest employer and source of wealth, many businesses that make up the municipal category such as restaurants and retail stores are non-basic industries meaning they exist to provide services to people who work would in base industries such as manufacturing, agriculture and mining. In other words, without base industries such agriculture, many municipal jobs in the region would not exist.

[22] Base industries are those that supply markets outside of the region. These industries are crucial to the local economy and are called the economic base of a region. Appendix A shows how IMPLAN's 529 sectors were allocated to water use category, and shows economic data for each sector.

Table 8: The Region G Economy by Water User Group ($millions)*						
Water Use Category	**Total sales**	**Intermediate sales**	**Final sales**	**Jobs**	**Income**	**Business taxes**
Irrigation	$159.73	$40.30	$119.46	2,784	$90.47	$2.64
Livestock	$2,659.43	$1,522.98	$1,136.45	34,292	$307.13	$42.31
Manufacturing	$19,735.61	$3,175.38	$16,560.23	96,518	$6,587.75	$141.50
Mining	$5,585.21	$3,026.40	$2,558.82	15,034	$3,128.40	$288.10
Steam-electric	$1,680.28	$472.70	$1,207.58	3,229	$1,166.79	$199.10
Municipal	$49,735.51	$10,714.82	$39,020.69	592,373	$31,871.14	$2,292.58
Regional total	$79,555.78	$18,952.58	$60,603.23	744,230	$43,151.68	$2,966.22

*Appendix 1 displays data for individual IMPLAN sectors that make up each water use category. Based on data from the Texas Water Development Board, and year 2006 data from the Minnesota IMPLAN Group, Inc.

2.2 Impacts of Agricultural Water Shortages

According to the 2011 *Brazos G Regional Water Plan*, during severe drought several counties in the region would experiences shortages of irrigation water. In 2010, shortages range from about 34 to 100 percent of annual irrigation demands, and farmers would be short nearly 59,700 acre-feet in 2010 and about 47,180 acre-feet in 2060. Shortages of these magnitudes would reduce gross state product (income plus state and local business taxes) by about $26 million in 2010 and $20 million in 2060 with potential job losses ranging from 463 to 360.

Table 9: Economic Impacts of Water Shortages for Irrigation Water User Groups ($millions)			
Decade	**Lost income from reduced crop production [a]**	**Lost state and local tax revenues from reduced crop production**	**Lost jobs from reduced crop production**
2010	$24.80	$1.32	463
2020	$23.59	$1.26	441
2030	$22.42	$1.20	420
2040	$21.27	$1.14	400
2050	$20.16	$1.08	380
2060	$19.07	$1.02	360

*Changes to income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.3 Impacts of Municipal Water Shortages

Water shortages are projected to occur in a significant number of communities in the region. Deficits range from approximately 14 to 100 percent of total annual water use. At the regional level, the estimated economic value of domestic water shortages totals $238 million in 2010 and $2,722 million in 2060 (Table 10). Municipal shortages would reduce gross state product (income plus taxes) by an estimated $58 million in 2010 and $1,868 million in 2060.

Table 10: Economic Impacts of Water Shortages for Municipal Water User Groups ($millions)

Decade	Monetary value of domestic water shortages	Lost income from reduced commercial business activity*	Lost state and local taxes from reduced commercial business activity	Lost jobs from reduced commercial business activity	Lost water utility revenues
2010	$238.10	$51.38	$6.93	1,652	$50.63
2020	$751.61	$614.12	$58.25	14,766	$120.77
2030	$1,041.76	$748.99	$73.96	17,326	$167.54
2040	$1,446.38	$1,088.72	$114.32	23,734	$236.80
2050	$2,028.11	$1,364.62	$146.91	29,429	$310.27
2060	$2,722.65	$1,684.30	$184.81	35,840	$390.48

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.4 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the region are projected to occur in Johnson, Lampasas, Limestone, Nolan and Williamson counties. In 2010, the Brazos G planning group estimates that these manufacturers would be short about 5,855 acre-feet; and by 2060, this figure increases to 12,236 acre-feet. Shortages of these magnitudes would reduce gross state product (income plus taxes) by an estimated $691 million in 2010 and $1,521 million in 2060 (Table 11).

Table 11: Economic Impacts of Water Shortages for Manufacturing Water User Groups ($millions)			
Decade	**Lost income due to reduced manufacturing output**	**Lost state and local business tax revenues due to reduced manufacturing output**	**Lost jobs due to reduced manufacturing output**
2010	$644.37	$46.61	8,577
2020	$797.15	$57.15	10,566
2030	$958.35	$68.56	12,683
2040	$1,121.77	$80.13	14,829
2050	$1,268.72	$90.54	16,759
2060	$1,419.33	$101.24	18,716
*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.			

2.5 Impacts of Mining Water Shortages

Ming water shortages in the region are projected to occur in Milam, Nolan, Stephens, and Williamson counties, and would primarily affect the oil and gas and aggregates operations. In total, shortages would reduce gross state product by $153 million in 2010 and $198 in 2060 (Table 12).

Table 12: Economic Impacts of Water Shortages for Mining Water User Groups ($millions)			
Decade	**Lost income due to reduced mining output**	**Lost state and local business tax revenues due to reduced mining output**	**Lost jobs due to reduced mining output**
2010	$140.88	$11.96	682
2020	$154.49	$13.21	760
2030	$161.48	$13.90	807
2040	$168.13	$14.55	852
2050	$174.88	$15.22	897
2060	$181.91	$15.86	937
*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.			

2.6 Impacts of Steam-electric Water Shortages

Water shortages for steam-electric water user groups are projected to occur in Bell, Bosque, Grimes, Johnson, Limestone, Milam, Nolan, Robertson, and Somervell counties, and would reduce gross state product by $1,176 million dollars in 2010, and $5,624 million 2060 (Table 13).

Table 13: Economic Impacts of Water Shortages for Steam-electric Water User Groups ($millions)

Decade	Lost income due to reduced electrical generation	Lost state and local business tax revenues due to reduced electrical generation	Lost jobs due to reduced electrical generation
2010	$1,028.57	$147.64	3,325
2020	$2,785.64	$400.29	7,127
2030	$3,729.69	$535.87	8,497
2040	$3,897.52	$567.53	9,081
2050	$4,354.88	$639.09	10,967
2060	$4,899.18	$724.41	17,264

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.7 Social Impacts of Water Shortages

As discussed previously, estimated social impacts focus on changes in population and school enrollment. In 2010, estimated population losses total 15,801 with corresponding reductions in school enrollment of 4,457 students (Table 14). In 2060, population in the region would decline by 71,604 people and school enrollment would fall by 20,314 students.

Table 14: Social Impacts of Water Shortages (2010-2060)

Year	Population Losses	Declines in School Enrollment
2010	15,801	4,457
2020	35,645	10,112
2030	41,465	11,764
2040	51,910	14,727
2050	61,309	17,393
2060	71,604	20,314

2.8 Distribution of Impacts by Major River Basin

Administrative rules require that impacts are presented by both planning region and major river basin. To meet rule requirements, impacts were allocated among basins based on the distribution of water shortages in relevant basins. For example, if 50 percent of water shortages in River Basin A and 50 percent occur in River Basin B, then impacts were split equally among the two basins. Table 14 displays the results for the Brazos G planning area.

Table 15: Distribution of Impacts by Major River Basin (2010-2060)

Water Use	2010	2020	2030	2040	2050	2060
Irrigation						
Brazos	97%	98%	98%	98%	98%	98%
Colorado	3%	2%	2%	2%	2%	2%
Manufacturing						
Brazos	99%	99%	99%	99%	99%	99%
Trinity	1%	1%	1%	1%	1%	1%
Mining						
Brazos	99.9%	99.9%	99.9%	99.9%	99.9%	99.9%
Colorado	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Municipal						
Brazos	99%	97%	95%	94%	93%	92%
Trinity	1%	3%	5%	6%	7%	8%
Steam-electric						
Brazos	100%	100%	100%	100%	100%	100%

Appendix: Economic Data for Individual IMPLAN Sectors for Brazos G Regional Water Planning Area

Economic Data for Agricultural Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Irrigation	Tree nut farming	44	$45.08	$9.24	$35.84	630	$31.08	$1.10
Irrigation	Cotton farming	8	$34.75	$0.49	$34.26	559	$12.80	$0.32
Irrigation	Vegetable and melon farming	3	$31.88	$1.01	$30.87	453	$23.41	$0.30
Irrigation	All “other” crop farming	10	$29.44	$27.38	$2.06	300	$14.39	$0.57
Irrigation	Grain farming	2	$16.10	$1.97	$14.13	784	$7.40	$0.29
Irrigation	Fruit farming	5	$1.72	$0.18	$1.54	33	$0.98	$0.04
Irrigation	Oilseed farming	1	$0.76	$0.03	$0.76	25	$0.41	$0.02
	Total irrigation	NA	$159.73	$40.30	$119.46	2,784	$90.47	$2.64
Livestock	Cattle ranching and farming	11	$1,642.54	$1,138.93	$503.61	27,902	$129.76	$34.53
Livestock	Poultry and egg production	12	$97.67	$76.55	$21.12	454	$32.89	$0.33
Livestock	Animal production- except cattle and poultry	13	$54.61	$46.30	$8.31	2,687	$5.31	$0.84
Livestock	Poultry processing	70	$685.51	$218.11	$467.40	2,946	$120.12	$5.48
Livestock	Fluid milk processing	62	$179.11	$43.09	$136.02	303	$19.06	$1.13
	Total livestock	NA	$2,659.43	$1,522.98	$1,136.45	34,292	$307.13	$42.31
	Total agriculture	NA	$2,819.16	$1,563.28	$1,255.91	37,076	$397.60	$44.95

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Mining and Steam-electric Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Mining	Oil and gas extraction	19	$3,065.31	$2,846.72	$218.59	6,597	$1,758.18	$190.89
Mining	Drilling oil and gas wells	27	$1,306.48	$6.52	$1,299.95	2,153	$364.29	$48.04
Mining	Support activities for oil and gas operations	28	$949.28	$131.85	$817.43	5,036	$860.13	$39.53
Mining	Sand- gravel- clay- and refractory mining	25	$146.56	$15.47	$131.09	884	$86.24	$4.06
Mining	Coal mining	20	$53.10	$19.90	$33.20	91	$24.77	$4.69
Mining	Stone mining and quarrying	24	$43.11	$4.44	$38.67	158	$25.18	$0.38
Mining	Other nonmetallic mineral mining	26	$13.94	$1.39	$12.54	77	$5.95	$0.33
Mining	Support activities for other mining	29	$7.44	$0.11	$7.33	38	$3.65	$0.18
Total Mining	NA	$5,585.21	$3,026.40	$2,558.82	15,034	$3,128.40	$288.10	$5,585.21
Steam-electric	Power generation and supply	30	$1,680.28	$472.70	$1,207.58	3,229	$1,166.79	$199.10
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Manufacturing Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	New residential 1-unit structures-	33	$1,938.61	$0.00	$1,938.60	13,479	$608.94	$9.59
Manufacturing	Commercial and institutional buildings	38	$1,067.61	$0.00	$1,067.61	11,752	$521.30	$6.44
Manufacturing	Soft drink and ice manufacturing	85	$953.48	$53.26	$900.23	1,517	$138.54	$6.14
Manufacturing	Pharmaceutical and medicine manufacturing	160	$670.87	$122.60	$548.27	756	$178.23	$4.00
Manufacturing	Aircraft engine and engine parts manufacturing	352	$505.00	$138.38	$366.63	1,144	$155.51	$2.19
Manufacturing	Other new construction	41	$464.14	$0.00	$464.14	5,391	$241.85	$1.90
Manufacturing	Petroleum refineries	142	$449.32	$167.01	$282.31	11	$321.34	$11.68
Manufacturing	Laminated plastics plate- sheet- and shapes	174	$358.44	$180.38	$178.07	1,303	$143.41	$2.63
Manufacturing	Paperboard container manufacturing	126	$315.28	$3.34	$311.94	1,075	$67.50	$2.62
Manufacturing	Manufactured home- mobile home- manufacturing	121	$286.88	$0.00	$286.87	1,802	$113.27	$1.42
Manufacturing	Institutional furniture manufacturing	366	$282.70	$13.55	$269.15	1,819	$146.95	$0.89
Manufacturing	Other animal food manufacturing	47	$278.92	$33.64	$245.28	403	$18.71	$1.45
Manufacturing	New residential additions and alterations-all	35	$273.63	$0.00	$273.63	1,609	$96.47	$1.36
Manufacturing	Ice cream and frozen dessert manufacturing	66	$272.84	$142.98	$129.86	595	$46.16	$1.59
Manufacturing	Oil and gas field machinery and equipment	261	$270.10	$10.06	$260.04	773	$60.15	$1.23
Manufacturing	Confectionery manufacturing	58	$268.00	$13.65	$254.35	652	$92.17	$2.18
Manufacturing	Plastics pipe- fittings- and profile shapes	173	$230.93	$142.04	$88.89	606	$72.18	$1.63
Manufacturing	Fabricated pipe and pipe fitting manufacturing	252	$230.40	$26.03	$204.37	998	$100.01	$1.38
Manufacturing	Highway- street- bridge- and tunnel construct	39	$229.18	$0.00	$229.19	2,277	$111.64	$1.42
Manufacturing	Other concrete product manufacturing	195	$223.66	$2.92	$220.73	1,251	$98.92	$2.11
Manufacturing	Gypsum product manufacturing	197	$222.63	$0.78	$221.85	397	$70.12	$2.10
Manufacturing	New multifamily housing structures- all	34	$208.13	$0.00	$208.13	1,960	$94.13	$0.54
Manufacturing	Plastics plumbing fixtures and all other plastics	177	$201.49	$145.97	$55.52	1,099	$69.11	$1.19
Manufacturing	Foam product manufacturing	178	$200.29	$152.51	$47.79	717	$69.63	$1.40
Manufacturing	Fluid power cylinder and actuator manufacturing	299	$192.20	$4.05	$188.15	887	$63.31	$0.95
Manufacturing	Motor vehicle parts manufacturing	350	$180.51	$14.52	$166.00	361	$76.28	$1.49
Manufacturing	Ready-mix concrete manufacturing	192	$179.97	$0.87	$179.10	677	$55.33	$1.37
Manufacturing	Truck trailer manufacturing	347	$179.08	$3.94	$175.14	686	$35.58	$0.63

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Manufacturing Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	Machine shops	243	$178.17	$43.00	$135.17	1,450	$73.93	$1.18
Manufacturing	Cement manufacturing	191	$177.51	$0.47	$177.04	302	$78.53	$1.60
Manufacturing	Aircraft manufacturing	351	$177.32	$9.02	$168.30	354	$29.60	$0.62
Manufacturing	Dog and cat food manufacturing	46	$177.23	$17.11	$160.13	179	$14.13	$0.77
Manufacturing	Mineral wool manufacturing	201	$171.01	$2.08	$168.93	498	$73.34	$1.58
Manufacturing	Water- sewer- and pipeline construction	40	$168.28	$0.00	$168.28	1,492	$71.63	$1.04
Manufacturing	Fabricated structural metal manufacturing	233	$167.91	$8.69	$159.21	648	$59.84	$0.96
Manufacturing	Ferrous metal foundaries	221	$163.40	$0.16	$163.23	881	$56.62	$1.12
Manufacturing	Iron and steel forging	224	$156.55	$9.77	$146.78	608	$61.55	$0.88
Manufacturing	Wood kitchen cabinet and countertop manufacturing	362	$154.50	$120.36	$34.15	1,163	$71.67	$1.18
Manufacturing	Aluminum extruded product manufacturing	212	$148.03	$3.76	$144.28	474	$25.55	$0.90
Manufacturing	Natural gas distribution	31	$145.64	$58.37	$87.27	297	$32.11	$10.55
Manufacturing	Agriculture and forestry support activities	18	$141.23	$80.28	$60.95	5,149	$96.62	$1.35
Manufacturing	Nonwoven fabric mills	95	$137.43	$26.57	$110.85	442	$29.52	$0.84
Manufacturing	All other electronic component manufacturing	312	$135.26	$77.51	$57.75	460	$62.88	$1.06
Manufacturing	Sanitary paper product manufacturing	134	$134.83	$1.16	$133.67	224	$34.85	$1.62
Manufacturing	Conveyor and conveying equipment manufacturing	292	$132.03	$54.26	$77.77	456	$35.47	$0.66
Manufacturing	Motor vehicle body manufacturing	346	$127.68	$7.42	$120.27	485	$15.21	$0.33
Manufacturing	Metal window and door manufacturing	235	$125.60	$9.32	$116.28	691	$47.89	$0.74
Manufacturing	Lime manufacturing	196	$124.51	$1.24	$123.27	345	$40.71	$1.11
Manufacturing	Explosives manufacturing	168	$121.55	$35.55	$86.00	429	$61.11	$1.07
Manufacturing	Turned product and screw- nut- and bolts	244	$119.76	$24.67	$95.09	585	$58.27	$0.71
Manufacturing	Other computer peripheral equipments	305	$117.00	$36.29	$80.71	295	$12.65	$0.32
Manufacturing	Electric housewares and household fans	327	$115.53	$10.22	$105.32	378	$31.76	$0.86
Manufacturing	Scales- balances- and miscellaneous general	301	$115.50	$24.86	$90.65	400	$44.90	$0.75
Manufacturing	Animal- except poultry- slaughtering	67	$114.88	$30.71	$84.16	295	$14.16	$0.77
Manufacturing	Construction machinery manufacturing	259	$107.09	$14.61	$92.47	162	$14.09	$0.42

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Manufacturing Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Manufacturing	Abrasive product manufacturing	198	$104.59	$4.96	$99.62	446	$41.09	$0.91
Manufacturing	Broadcast and wireless communications equipment	307	$103.44	$24.52	$78.92	197	$13.17	$0.33
Manufacturing	Adhesive manufacturing	162	$102.18	$78.61	$23.56	203	$22.49	$0.46
Manufacturing	Farm machinery and equipment manufacturing	257	$100.66	$16.52	$84.14	254	$19.72	$0.20
	All other manufacturing	NA	$4,229.20	$944.73	$3,284.47	19,645	$1,335.56	$30.51
	Total manufacturing		**$19,735.61**	**$3,175.38**	**$16,560.23**	**96,518**	**$6,587.75**	**$141.50**
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Municipal Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Municipal	Federal Military	505	$5,398.96	-$0.01	$5,398.97	53,214	$5,398.96	$0.00
Municipal	Owner-occupied dwellings	509	$4,134.25	$0.00	$4,134.25	0	$3,202.67	$488.85
Municipal	State & Local Education	503	$3,638.62	$0.00	$3,638.61	93,621	$3,638.61	$0.00
Municipal	Wholesale trade	390	$2,684.16	$1,285.08	$1,399.08	20,099	$1,413.16	$397.00
Municipal	Food services and drinking places	481	$1,957.68	$249.99	$1,707.69	43,555	$758.49	$88.58
Municipal	Hospitals	467	$1,794.52	$0.00	$1,794.52	17,190	$899.96	$11.46
Municipal	Offices of physicians- dentists- and other he	465	$1,619.05	$0.00	$1,619.05	13,206	$1,152.85	$10.09
Municipal	Monetary authorities and depository credit in	430	$1,541.19	$507.60	$1,033.59	8,384	$1,082.25	$19.72
Municipal	State & Local Non-Education	504	$1,381.88	$0.00	$1,381.88	26,162	$1,381.87	$0.00
Municipal	Real estate	431	$1,343.73	$531.92	$811.81	7,944	$777.97	$165.04
Municipal	Telecommunications	422	$1,126.04	$386.77	$739.27	3,225	$460.43	$76.79
Municipal	Motor vehicle and parts dealers	401	$1,083.96	$117.87	$966.09	10,920	$555.67	$157.20
Municipal	General merchandise stores	410	$910.18	$95.93	$814.25	16,811	$408.49	$130.14
Municipal	Truck transportation	394	$908.42	$491.89	$416.54	7,254	$402.26	$9.13
Municipal	Other State and local government enterprises	499	$808.24	$263.19	$545.05	3,938	$288.25	$0.10
Municipal	Insurance carriers	427	$798.12	$232.73	$565.39	3,688	$237.92	$29.54
Municipal	Funds- trusts- and other financial vehicles	429	$734.00	$13.92	$720.08	1,505	$328.88	$17.92
Municipal	Architectural and engineering services	439	$640.46	$403.72	$236.74	5,597	$329.22	$2.73
Municipal	Nursing and residential care facilities	468	$613.22	$0.00	$613.22	14,217	$366.76	$8.63
Municipal	Food and beverage stores	405	$596.17	$79.71	$516.46	11,153	$298.63	$65.31
Municipal	Building material and garden supply stores	404	$551.74	$85.56	$466.17	6,730	$257.85	$78.43
Municipal	Automotive repair and maintenance- except car	483	$540.93	$128.49	$412.43	7,077	$205.09	$40.49
Municipal	Federal Non-Military	506	$526.97	$0.00	$526.97	3,389	$526.97	$0.00
Municipal	Colleges- universities- and junior colleges	462	$524.71	$27.84	$496.88	8,303	$304.44	$0.00
Municipal	Lessors of nonfinancial intangible assets	436	$520.11	$283.63	$236.47	322	$245.70	$22.19
Municipal	Gasoline stations	407	$455.86	$69.23	$386.62	6,499	$245.67	$66.27
Municipal	Civic- social- professional and similar organ	493	$451.97	$158.80	$293.17	13,738	$214.63	$1.35

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Municipal Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Municipal	Insurance agencies- brokerages- and related	428	$396.68	$232.78	$163.90	3,720	$336.42	$2.13
Municipal	Legal services	437	$380.70	$241.61	$139.09	3,998	$228.66	$7.17
Municipal	Securities- commodity contracts- investments	426	$373.97	$248.35	$125.62	3,428	$115.10	$3.43
Municipal	Services to buildings and dwellings	458	$348.92	$257.45	$91.47	6,799	$165.03	$6.04
Municipal	Maintenance and repair of nonresidential buil	43	$346.36	$229.49	$116.87	3,013	$128.35	$2.39
Municipal	Home health care services	464	$340.03	$0.00	$340.03	10,658	$198.20	$1.17
Municipal	Other ambulatory health care services	466	$334.74	$21.77	$312.97	2,343	$163.77	$2.43
Municipal	Postal service	398	$323.35	$220.14	$103.21	4,794	$258.16	$0.00
Municipal	Waste management and remediation services	460	$313.69	$176.32	$137.37	2,049	$143.32	$11.88
Municipal	Accounting and bookkeeping services	438	$297.34	$241.47	$55.87	3,781	$134.93	$1.10
Municipal	Scenic and sightseeing transportation and sup	397	$272.80	$102.34	$170.46	2,595	$185.57	$31.11
Municipal	Clothing and clothing accessories stores	408	$268.86	$33.66	$235.20	5,074	$137.77	$39.09
Municipal	Rail transportation	392	$263.26	$127.28	$135.98	763	$160.72	$5.09
Municipal	Machinery and equipment rental and leasing	434	$257.22	$139.89	$117.33	877	$100.03	$3.53
Municipal	Pipeline transportation	396	$242.55	$106.08	$136.48	207	$95.39	$20.52
Municipal	Office administrative services	452	$242.50	$107.88	$134.62	1,671	$122.73	$2.11
Municipal	State and local government electric utilities	498	$240.16	$64.88	$175.28	645	$121.70	$0.63
Municipal	Health and personal care stores	406	$232.40	$37.09	$195.31	3,698	$113.41	$32.99
Municipal	Hotels and motels- including casino hotels	479	$219.35	$113.00	$106.34	4,018	$116.71	$20.03
Municipal	Miscellaneous store retailers	411	$216.60	$26.88	$189.72	7,834	$131.02	$31.60
Municipal	Employment services	454	$211.33	$174.90	$36.43	8,252	$177.10	$1.01
Municipal	Radio and television broadcasting	420	$206.75	$164.12	$42.62	1,153	$64.87	$0.82
Municipal	Other maintenance and repair construction	45	$191.86	$66.87	$124.99	3,134	$117.97	$1.14
Municipal	Nonstore retailers	412	$190.20	$29.38	$160.82	4,700	$119.69	$21.57
Municipal	Management of companies and enterprises	451	$186.67	$175.54	$11.12	1,303	$89.11	$1.42
Municipal	Commercial machinery repair and maintenance	485	$184.15	$96.95	$87.20	1,665	$81.04	$5.86
Municipal	Management consulting services	444	$170.27	$131.07	$39.20	1,329	$84.59	$0.66
Municipal	Business support services	455	$169.08	$79.13	$89.95	3,436	$85.76	$3.25

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Municipal Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Municipal	Newpaper publishers	413	$167.04	$110.84	$56.20	1,601	$89.41	$1.19
Municipal	Furniture and home furnishings stores	402	$150.41	$23.00	$127.41	1,935	$72.68	$21.44
Municipal	Child day care services	469	$149.61	$0.00	$149.61	4,282	$90.78	$1.08
Municipal	Couriers and messengers	399	$147.97	$134.53	$13.44	3,171	$82.25	$1.91
Municipal	Advertising and related services	447	$147.95	$137.92	$10.03	1,158	$62.59	$1.04
Municipal	Social assistance- except child day care serv	470	$145.99	$0.03	$145.96	3,883	$88.56	$0.61
Municipal	Motion picture and video industries	418	$144.35	$103.29	$41.06	877	$36.25	$1.28
Municipal	Veterinary services	449	$140.51	$18.65	$121.86	2,165	$48.24	$2.88
Municipal	Personal care services	487	$134.56	$3.79	$130.77	2,812	$64.14	$4.80
Municipal	Other amusement- gambling- and recreation ind	478	$134.38	$7.31	$127.07	2,446	$64.12	$9.56
Municipal	Custom computer programming services	441	$128.28	$10.69	$117.58	1,800	$108.54	$0.67
Municipal	Religious organizations	491	$122.59	$0.00	$122.59	549	$70.18	$0.00
Municipal	Private households	494	$120.83	$0.00	$120.83	13,378	$120.83	$0.00
Municipal	Data processing services	424	$109.98	$22.57	$87.42	460	$57.49	$0.74
Municipal	Other personal services	490	$108.95	$9.20	$99.75	749	$37.40	$4.26
Municipal	Computer systems design services	442	$107.99	$65.73	$42.27	1,517	$91.60	$2.31
Municipal	Other educational services	463	$107.82	$9.10	$98.72	2,196	$55.82	$3.18
Municipal	Sporting goods- hobby- book and music stores	409	$104.82	$14.79	$90.03	2,734	$47.97	$14.74
Municipal	Facilities support services	453	$104.43	$24.58	$79.86	1,906	$68.50	$0.33
Municipal	Drycleaning and laundry services	489	$101.61	$25.86	$75.75	2,905	$49.70	$5.81
Municipal	All other miscellaneous professional and tech	450	$96.63	$86.27	$10.36	151	$41.31	$0.83
Municipal	Maintenance and repair of farm and nonfarm re	42	$95.19	$31.89	$63.31	716	$29.28	$0.42
Municipal	Automotive equipment rental and leasing	432	$91.44	$37.39	$54.04	609	$32.23	$1.77
Municipal	Other Federal Government enterprises	496	$90.63	$38.41	$52.22	5,235	$49.86	$0.00
Municipal	Scientific research and development services	446	$88.95	$68.36	$20.60	824	$41.92	$0.34
	All other municipal sectors	NA	$1,588.75	$427.42	$1,161.33	24,225	$692.53	$47.71
	Total municipal	**NA**	**$49,735.51**	**$10,714.82**	**$39,020.69**	**592,373**	**$31,871.14**	**$2,292.58**

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Appendix 2: Impacts by County for the Brazos G Regional Water Planning Area

Bell County ($millions)						
	2010	2020	2030	2040	2050	2060
Bartlett						
Monetary value of domestic water shortages	$0.12	$0.58	$0.72	$0.77	$0.81	$0.85
Lost utility revenues	$0.11	$0.14	$0.16	$0.17	$0.18	$0.19
Bell Milam WSC						
Monetary value of domestic water shortages	$0.00	$0.02	$0.05	$0.09	$0.38	$0.54
Lost utility revenues	$0.00	$0.04	$0.09	$0.13	$0.15	$0.17
Jarrell-Schwertner WSC						
Monetary value of domestic water shortages	$0.00	$0.11	$0.88	$1.89	$1.76	$2.39
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.17	$0.27	$0.41
Lost jobs due to reduced commercial business activity	0	0	0	5	8	13
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.02	$0.04	$0.06
Lost utility revenues	$0.00	$0.08	$0.14	$0.18	$0.20	$0.28
Little River Academy						
Monetary value of domestic water shortages	$0.012	$0.019	$0.024	$0.028	$0.033	$0.012
Lost utility revenues	$0.00	$0.02	$0.04	$0.04	$0.05	$0.05
Morgan's Point Resort						
Monetary value of domestic water shortages	$2.53	$5.20	$6.53	$5.99	$6.35	$6.72
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.71	$0.77	$0.84
Lost jobs due to reduced commercial business activity	0	0	0	22	24	26
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.10	$0.11	$0.12
Lost utility revenues	$0.36	$0.45	$0.54	$0.59	$0.63	$0.66
Temple						
Monetary value of domestic water shortages	$6.09	$10.90	$46.90	$61.17	$72.20	$100.80
Lost utility revenues	$9.38	$13.31	$17.58	$20.99	$24.77	$28.35
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$55.47	$64.86	$76.29	$90.24	$107.23
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$8.41	$9.84	$11.57	$13.69	$16.26
Lost jobs due to reduced electrical generation	0	255	298	351	415	493

Bosque County ($millions)						
	2010	2020	2030	2040	2050	2060
Valley Mills						
Monetary value of domestic water shortages	$0.000	$0.000	$0.002	$0.005	$0.009	$0.013
Lost utility revenues	$0.000	$0.000	$0.004	$0.010	$0.016	$0.024
Cross Country WSC						
Monetary value of domestic water shortages	$0.000	$0.000	$0.000	$0.033	$0.035	$0.029
Lost utility revenues	$0.000	$0.000	$0.000	$0.032	$0.034	$0.036
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$0.00	$19.07	$52.15	$92.50	$141.69
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$0.00	$2.74	$14.97	$26.55	$40.68
Lost jobs due to reduced electrical generation	0	0	65	177	629	963

Brazos County ($millions)						
	2010	2020	2030	2040	2050	2060
Bryan						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.26
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.62
College Station						
Monetary value of domestic water shortages	$0.00	$0.00	$0.06	$2.18	$5.41	$7.24
Lost utility revenues	$0.00	$0.00	$0.13	$4.22	$9.35	$11.15
Wickson Creek SUD						
Monetary value of domestic water shortages	$0.04	$2.05	$4.26	$12.26	$16.05	$20.69
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$2.14	$3.17	$3.57
Lost jobs due to reduced commercial business activity	0	0	0	67	100	113
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.30	$0.45	$0.51
Lost utility revenues	$0.06	$0.70	$1.20	$1.64	$2.20	$2.39

Burleson County ($millions)						
	2010	2020	2030	2040	2050	2060
Southwest Milam WSC						
Monetary value of domestic water shortages	$0.00	$0.009	$0.01	$0.02	$0.03	$0.04
Lost utility revenues	$0.000	$0.008	$0.02	$0.03	$0.03	$0.04

Callahan County ($millions)						
	2010	2020	2030	2040	2050	2060
Baird						
Monetary value of domestic water shortages	$4.48	$4.39	$4.30	$4.22	$4.15	$4.15
Lost income from reduced commercial business activity	$0.78	$0.76	$0.74	$0.72	$0.70	$0.70
Lost jobs due to reduced commercial business activity	25	24	23	23	22	22
Lost state and local taxes from reduced commercial business activity	$0.11	$0.11	$0.11	$0.10	$0.10	$0.10
Lost utility revenues	$0.50	$0.49	$0.48	$0.47	$0.46	$0.46

Coryell County ($millions)						
	2010	2020	2030	2040	2050	2060
Gatesville						
Monetary value of domestic water shortages	$0.00	$0.00	$0.06	$0.61	$1.35	$2.09
Lost utility revenues	$0.00	$0.00	$0.14	$1.19	$2.09	$2.87
Kempner WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.03	$0.38
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.07	$0.74

Eastland County ($millions)						
	2010	2020	2030	2040	2050	2060
County-other						
Monetary value of domestic water shortages	$1.46	$1.37	$0.37	$0.31	$0.23	$0.17
Irrigation						
Reduced income from reduced crop production	$2.77	$2.78	$2.78	$2.79	$2.79	$2.79
Reduced business taxes from reduced crop production	$0.16	$0.16	$0.16	$0.16	$0.16	$0.11
Reduced jobs from reduced crop production	36	36	36	36	36	36

Falls County ($millions)						
	2010	2020	2030	2040	2050	2060
Bell-Milam Falls WSC						
Monetary value of domestic water shortages	$0.00	$0.02	$0.07	$0.10	$0.39	$0.48
Lost utility revenues	$0.03	$0.13	$0.24	$0.33	$0.40	$0.49
Marlin						
Monetary value of domestic water shortages	$35.14	$36.72	$38.31	$39.62	$40.87	$42.52
Lost income from reduced commercial business activity	$5.99	$6.35	$6.70	$6.99	$7.27	$7.64
Lost jobs due to reduced commercial business activity	219	232	245	256	266	280
Lost state and local taxes from reduced commercial business activity	$0.85	$0.90	$0.95	$0.99	$1.03	$1.08
Lost utility revenues	$3.68	$3.86	$4.04	$4.18	$4.32	$4.51
West Brazos WSC						
Monetary value of domestic water shortages	$1.22	$3.21	$5.33	$4.26	$4.78	$5.61
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.35	$0.42	$0.53
Lost jobs due to reduced commercial business activity	0	0	0	13	15	19
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.05	$0.06	$0.08
Lost utility revenues	$0.12	$0.20	$0.28	$0.35	$0.40	$0.48

Grimes County ($millions)						
	2010	2020	2030	2040	2050	2060
Wickson Creek SUD						
Monetary value of domestic water shortages	$0.38	$3.16	$5.02	$12.50	$13.81	$18.29
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$2.18	$2.73	$3.16
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	69	86	100
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.31	$0.39	$0.45
Lost utility revenues	$0.58	$1.08	$1.41	$1.67	$1.89	$2.11
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$264.45	$288.65	$314.58	$349.15	$401.00
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$37.96	$41.43	$45.15	$50.11	$57.56
Lost jobs due to reduced electrical generation	0	899	981	1,069	1,187	1,363

Haskell County ($millions)						
	2010	2020	2030	2040	2050	2060
Haskell						
Monetary value of domestic water shortages	$12.94	$12.53	$11.86	$9.99	$9.74	$9.52
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$3.98	$3.90	$3.82
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	$0.57	$0.56	$0.54
Lost state and local taxes from reduced commercial business activity	0	0	0	126	123	121
Lost utility revenues	$1.07	$1.03	$1.00	$0.98	$0.96	$0.93
Irrigation						
Reduced income from reduced crop production	$12.93	$12.28	$11.65	$11.04	$10.45	$9.87
Reduced business taxes from reduced crop production	$0.66	$0.63	$0.60	$0.56	$0.53	$0.51
Reduced jobs from reduced crop production	290	275	261	247	234	221

Hill County ($millions)						
	2010	2020	2030	2040	2050	2060
Files Valley WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.98	$0.27
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.10	$0.30
White Bluff Community WSC						
Monetary value of domestic water shortages	$0.09	$1.51	$4.42	$4.45	$6.63	$8.41
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.79	$1.23	$1.70
Lost jobs due to reduced commercial business activity	0	0	0	25	39	54
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.11	$0.17	$0.24
Lost utility revenues	$0.10	$0.27	$0.47	$0.66	$0.87	$1.10
Woodrow-Osceola						
Monetary value of domestic water shortages	$0.17	$0.17	$0.16	$0.17	$0.19	$0.96
Lost utility revenues	$0.16	$0.16	$0.16	$0.17	$0.19	$0.23

Hood County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Oak Hill Trails Subdivision						
Monetary value of domestic water shortages	$6.32	$6.21	$6.02	$5.89	$5.82	$5.82
Lost income from reduced commercial business activity	$4.03	$3.94	$3.78	$3.67	$3.61	$3.61
Lost jobs due to reduced commercial business activity	117	114	109	106	105	105
Lost state and local taxes from reduced commercial business activity	$0.48	$0.47	$0.45	$0.43	$0.43	$0.43
Lost utility revenues	$0.72	$0.71	$0.68	$0.67	$0.66	$0.66
Granbury						
Monetary value of domestic water shortages	$20.69	$43.98	$56.53	$68.36	$85.05	$113.91
Lost income from reduced commercial business activity	$9.25	$27.35	$36.18	$45.65	$56.57	$69.44
Lost jobs due to reduced commercial business activity	268	792	1047	1321	1637	2010

Lost state and local taxes from reduced commercial business activity	$1.09	$3.23	$4.28	$5.39	$6.69	$8.21
Lost utility revenues	$3.58	$4.89	$6.16	$7.52	$9.14	$11.04
Lipan						
Monetary value of domestic water shortages	$0.00	$0.00	$0.80	$2.72	$6.14	$12.76
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.42	$2.10	$7.77

Johnson County ($millions)

	2010	2020	2030	2040	2050	2060
Alvarado						
Monetary value of domestic water shortages	$0.00	$0.00	$0.02	$0.08	$0.19	$1.46
Lost utility revenues	$0.00	$0.00	$0.04	$0.10	$0.19	$0.29
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$1.44	$1.95
Lost jobs due to reduced commercial business activity	0	0	0	0	42	57

Monetary value of domestic water shortages $3.46 $4.76 $6.81 $8.23 $8.30 $7.59

Johnson County (continued from previous page)						
Keene						
Monetary value of domestic water shortages	$0.00	$0.00	$0.09	$0.00	$0.00	$0.07
Monetary value of domestic water shortages	$0.00	$0.00	$0.12	$0.20	$0.34	$2.20
Lost utility revenues	$0.00	$0.00	$0.09	$0.00	$0.00	$0.09
Lost utility revenues	$0.00	$0.00	$0.14	$0.22	$0.33	$0.48
Parker WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.07	$0.18
Monetary value of domestic water shortages	$0.00	$0.00	$0.03	$3.16	$29.40	$47.33
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.07	$0.27
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$12.12
Lost jobs due to reduced commercial business activity	0	0	0	0	0	357
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$1.34
Lost utility revenues	$0.00	$0.00	$0.99	$2.54	$4.81	$7.25
Cleburne						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.49	$2.51
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$1.05	$3.87
Godley						
Monetary value of domestic water shortages	$1.39	$2.32	$3.14	$4.09	$5.44	$7.14
Lost income from reduced commercial business activity	$0.32	$0.54	$1.57	$2.07	$2.73	$3.55
Lost jobs due to reduced commercial business activity	10	16	46	61	80	105
Lost state and local taxes from reduced commercial business activity	$0.04	$0.06	$0.17	$0.23	$0.30	$0.39
Lost utility revenues	$0.18	$0.26	$0.34	$0.43	$0.55	$0.70
Johnson County SUD						
Monetary value of domestic water shortages	$0.00	$11.20	$43.29	$194.02	$118.69	$297.92
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$48.68	$74.01
Lost jobs due to reduced commercial business activity	0	0	0	0	1433	2179
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$5.37	$8.16
Lost utility revenues	$0.00	$4.20	$9.59	$16.01	$24.18	$33.08
Table continued on next page						

Manufacturing						
Reduced income from reduced manufacturing output	$455.93	$588.35	$717.75	$849.17	$966.84	$1,083.50
Reduced business taxes from reduced manufacturing output	$32.06	$41.38	$50.48	$59.72	$67.99	$76.20
Reduced jobs from reduced manufacturing output	5,820	7,511	9,163	10,840	12,342	13,831
Steam-electric						
Lost income due to reduced electrical generation	$221.37	$580.75	$580.75	$580.75	$580.75	$580.75
Lost state and local business tax revenues due to reduced electrical generation	$31.77	$83.36	$83.36	$83.36	$83.36	$83.36
Lost jobs due to reduced electrical generation	753	1,974	1,974	1,974	1,974	1,974

Jones County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Abilene						
Monetary value of domestic water shortages	$0.000	$0.156	$0.131	$0.077	$0.041	$0.001
Lost utility revenues	$0.00	$0.25	$0.21	$0.14	$0.08	$0.001
County-other						
Monetary value of domestic water shortages	$0.47	$0.45	$0.41	$0.06	$0.07	$0.06
Stamford						
Monetary value of domestic water shortages	$12.84	$12.90	$12.62	$12.18	$11.73	$11.29
Lost income from reduced commercial business activity	$2.24	$2.25	$2.21	$2.13	$2.05	$1.97
Lost jobs due to reduced commercial business activity	81	81	79	77	74	71
Lost state and local taxes from reduced commercial business activity	$0.26	$0.26	$0.25	$0.25	$0.24	$0.23
Lost utility revenues	$1.24	$1.25	$1.22	$1.18	$1.13	$1.09

Kent County ($millions)						
	2010	2020	2030	2040	2050	2060
Jayton						
Monetary value of domestic water shortages	$2.26	$2.18	$1.92	$1.51	$1.33	$1.15
Lost income from reduced commercial business activity	$0.31	$0.30	$0.26	$0.21	$0.18	$0.16
Lost jobs due to reduced commercial business activity	23	22	19	15	13	12
Lost state and local taxes from reduced commercial business activity	$0.04	$0.04	$0.03	$0.03	$0.02	$0.02
Lost utility revenues	$0.22	$0.21	$0.19	$0.15	$0.13	$0.11

Knox County ($millions)						
	2010	2020	2030	2040	2050	2060
Knox City						
Monetary value of domestic water shortages	$0.09	$0.17	$0.22	$0.26	$0.30	$0.33
Lost income from reduced commercial business activity	$0.38	$3.16	$5.02	$12.50	$13.81	$18.29
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	$2.18	$2.73	$3.16
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$68.79	$86.10	$99.58
Lost utility revenues	$0.43	$0.44	$0.44	$0.43	$0.43	$0.43
Munday						
Monetary value of domestic water shortages	$9.53	$9.50	$9.18	$5.09	$5.02	$5.04
Lost income from reduced commercial business activity	$1.06	$1.05	$1.02	$1.04	$1.03	$1.03
Lost jobs due to reduced commercial business activity	35	35	33	34	34	34
Lost state and local taxes from reduced commercial business activity	$0.14	$0.14	$0.14	$0.14	$0.14	$0.14
Lost utility revenues	$0.51	$0.51	$0.50	$0.50	$0.49	$0.50
Irrigation						
Reduced income from reduced crop production	$7.58	$7.07	$6.57	$6.08	$5.61	$5.15
Reduced business taxes from reduced crop production	$0.39	$0.37	$0.34	$0.31	$0.29	$0.27
Reduced jobs from reduced crop production	97	91	84	78	72	66

Lee County ($millions)						
	2010	2020	2030	2040	2050	2060
Aqua WSC						
Monetary value of domestic water shortages	$0.00	$0.06	$0.12	$0.22	$0.31	$1.48
Lost utility revenues	$0.00	$0.10	$0.17	$0.24	$0.30	$0.35
Lee County WSC						
Monetary value of domestic water shortages	$1.56	$3.98	$7.20	$7.41	$12.74	$7.93
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$1.46
Lost jobs due to reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.21
Lost state and local taxes from reduced commercial business activity	0	0	0	0	0	46
Lost utility revenues	$0.34	$0.57	$0.76	$0.92	$1.05	$1.18
Southwest Milam WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.02	$0.03	$0.04	$0.05
Lost utility revenues	$0.00	$0.01	$0.02	$0.03	$0.04	$0.05

Limestone County ($millions)						
	2010	2020	2030	2040	2050	2060
Biston MWSD						
Monetary value of domestic water shortages	$2.98	$2.94	$2.90	$2.86	$2.84	$2.84
Lost income from reduced commercial business activity	$0.46	$0.45	$0.45	$0.44	$0.44	$0.44
Lost jobs due to reduced commercial business activity	$0.07	$0.07	$0.07	$0.07	$0.07	$0.07
Lost state and local taxes from reduced commercial business activity	19	18	18	18	18	18
Lost utility revenues	$0.29	$0.29	$0.29	$0.28	$0.28	$0.28
Coolidge						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.01	$0.02	$0.07
Lost utility revenues	$0.00	$0.00	$0.00	$0.01	$0.04	$0.07
Groesbeck						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.01	$0.11
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.03	$0.22
Kosse						
Monetary value of domestic water shortages	$1.51	$1.51	$1.49	$1.47	$1.47	$1.49
Lost income from reduced commercial business activity	$0.11	$0.11	$0.10	$0.10	$0.10	$0.10
Lost jobs due to reduced commercial business activity	4	4	3	3	3	3
Lost state and local taxes from reduced commercial business activity	$0.02	$0.02	$0.02	$0.02	$0.02	$0.02
Lost utility revenues	$0.15	$0.15	$0.15	$0.14	$0.14	$0.15
Manufacturing						
Reduced income from reduced manufacturing output	$16.49	$4.54	$4.95	$5.36	$6.08	$7.11
Reduced business taxes from reduced manufacturing output	$1.56	$0.43	$0.47	$0.51	$0.57	$0.67
Reduced jobs from reduced manufacturing output	241	66	72	78	89	104
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$0.00	$0.00	$72.95	$163.34	$546.15
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$0.00	$0.00	$10.47	$23.44	$78.39
Lost jobs due to reduced electrical generation	0.00	0.00	0.00	247	555	1,856

McLennan County ($millions)						
	2010	2020	2030	2040	2050	2060
Chalk Bluff WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.08	$0.16	$0.34
Lost utility revenues	$0.00	$0.00	$0.00	$0.13	$0.23	$0.38
Cross Country WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.24	$0.30	$1.76
Lost utility revenues	$0.00	$0.00	$0.00	$0.24	$0.29	$0.39
Hallsburg						
Monetary value of domestic water shortages	$0.00	$0.02	$0.03	$0.04	$0.06	$0.08
Lost utility revenues	$0.00	$0.03	$0.04	$0.06	$0.07	$0.09
Lacy-Lakeview						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.14	$0.25	$0.51
Lost utility revenues	$0.00	$0.00	$0.00	$0.27	$0.43	$0.71
Mart						
Monetary value of domestic water shortages	$1.73	$1.90	$2.22	$1.26	$1.30	$2.61
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.66
Lost jobs due to reduced commercial business activity	0	0	0	0	0	26
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.10
Lost utility revenues	$0.38	$0.42	$0.44	$0.48	$0.50	$0.54
North Bosque WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.09	$0.20	$0.41
Lost utility revenues	$0.00	$0.00	$0.00	$0.15	$0.25	$0.39
Riesel						
Monetary value of domestic water shortages	$0.00	$0.01	$0.02	$0.03	$0.04	$0.06
Lost utility revenues	$0.01	$0.02	$0.03	$0.04	$0.05	$0.06
Robinson						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.12
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.22
Table cont. on n ext page.						

McLennan County cont. ($millions)						
	2010	2020	2030	2040	2050	2060
West Brazos Hills WSC						
Monetary value of domestic water shortages	$0.53	$1.28	$1.97	$1.55	$1.69	$1.97
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.13	$0.15	$0.19
Lost jobs due to reduced commercial business activity	0	0	0	5	5	7
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.02	$0.02	$0.03
Lost utility revenues	$0.10	$0.13	$0.16	$0.20	$0.22	$0.26
Western Hills WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.07	$0.15	$0.29
Lost utility revenues	$0.00	$0.00	$0.00	$0.11	$0.19	$0.32

Milam County						
Bell Milam Falls WSC						
Monetary value of domestic water shortages	$0.02	$0.08	$0.17	$0.27	$1.06	$1.42
Lost utility revenues	$0.01	$0.10	$0.15	$0.19	$0.20	$0.22
Southwest Milam WSC						
Monetary value of domestic water shortages	$0.17	$0.55	$0.83	$0.93	$0.99	$4.19
Lost utility revenues	$0.28	$0.61	$0.81	$0.91	$0.96	$1.01
Mining						
Reduced income from reduced mining output	$0.18	$0.18	$0.18	$0.00	$0.00	$0.00
Reduced business taxes from reduced mining output	$0.03	$0.03	$0.03	$0.00	$0.00	$0.00
Reduced jobs from reduced mining output	0.716	0.716	0.716	0.000	0.000	0.000
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$18.36	$18.36
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$2.63	$2.63
Lost jobs due to reduced electrical generation	$0.00	$0.00	$0.00	$0.00	62	62

Nolan County ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Sweetwater						
Monetary value of domestic water shortages	$60.74	$61.93	$62.11	$61.06	$58.46	$55.70
Lost income from reduced commercial business activity	$24.40	$24.87	$24.95	$24.52	$23.48	$22.37
Lost jobs due to reduced commercial business activity	769	784	787	773	740	705
Lost state and local taxes from reduced commercial business activity	$3.48	$3.54	$3.56	$3.50	$3.35	$3.19
Lost utility revenues	$5.97	$6.08	$6.10	$6.00	$5.74	$5.47
Irrigation						
Reduced income from reduced crop production	$0.59	$0.55	$0.50	$0.46	$0.42	$0.37
Reduced business taxes from reduced crop production	$0.03	$0.03	$0.03	$0.02	$0.02	$0.02
Reduced jobs from reduced crop production	7	6	6	5	5	4
Mining						
Reduced income from reduced mining output	$1.06	$1.06	$1.06	$1.06	$1.06	$1.06
Reduced business taxes from reduced mining output	$0.07	$0.07	$0.07	$0.07	$0.07	$0.07
Reduced jobs from reduced mining output	5	5	5	5	5	5
Manufacturing						
Reduced income from reduced manufacturing output	$0.00	$0.00	$0.00	$0.00	$0.00	$4.74
Reduced business taxes from reduced manufacturing output	$0.00	$0.00	$0.00	$0.00	$0.00	$0.32
Reduced jobs from reduced manufacturing output	0	0	0	0	0	40
Steam-electric						
Lost income due to reduced electrical generation	$82.86	$1,161.39	$2,053.56	$2,053.56	$2,053.56	$2,053.56
Lost state and local business tax revenues due to reduced electrical generation	$4.64	$64.98	$114.90	$114.90	$114.90	$114.90
Lost jobs due to reduced electrical generation	110	1,539	2,721	2,721	2,721	2,721

Palo Pinto ($millions)						
	2010	2020	2030	2040	2050	2060
Mineral Wells						
Monetary value of domestic water shortages	$0.00	$15.52	$37.99	$18.20	$25.16	$29.71
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$7.71	$10.22	$13.02
Lost jobs due to reduced commercial business activity	0	0	0	231	306	389
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.95	$1.25	$1.60
Lost utility revenues	$0.00	$2.54	$3.13	$3.69	$4.34	$5.08
Strawn						
Monetary value of domestic water shortages	$0.00	$0.00	$0.01	$0.01	$0.02	$0.03
Lost utility revenues	$0.00	$0.01	$0.01	$0.02	$0.03	$0.05

Robertson County ($millions)						
	2010	2020	2030	2040	2050	2060
Wickson Creek SUD						
Monetary value of domestic water shortages	$0.01	$0.12	$0.18	$0.44	$0.43	$0.52
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.08	$0.09	$0.09
Lost jobs due to reduced commercial business activity	0	0	0	2	3	3
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.01	$0.01	$0.01
Lost utility revenues	$0.02	$0.04	$0.05	$0.06	$0.06	$0.06
Steam-electric						
Lost income due to reduced electrical generation	$0.00	$0.00	$0.00	$25.20	$285.71	$329.92
Lost state and local business tax revenues due to reduced electrical generation	$0.00	$0.00	$0.00	$3.62	$41.01	$47.36
Lost jobs due to reduced electrical generation	0	0	0	86	971	1,122

Somervell County ($millions)						
	2010	2020	2030	2040	2050	2060
Glen Rose						
Monetary value of domestic water shortages	$0.00	$0.00	$0.29	$0.07	$0.09	$0.09
Lost utility revenues	$0.00	$0.00	$0.05	$0.11	$0.14	$0.15
Steam-electric						
Lost income due to reduced electrical generation	$724.34	$723.58	$722.81	$722.06	$721.28	$720.53
Lost state and local business tax revenues due to reduced electrical generation	$103.97	$103.86	$103.75	$103.64	$103.53	$103.42
Lost jobs due to reduced electrical generation	2,462	2,460	2,457	2,455	2,452	2,449

Stephens County ($millions)						
	2010	2020	2030	2040	2050	2060
Mining						
Reduced income from reduced mining output	$99.44	$107.44	$110.55	$113.57	$116.52	$120.73
Reduced business taxes from reduced mining output	$6.95	$7.51	$7.73	$7.94	$8.15	$8.44
Reduced jobs from reduced mining output	285	308	317	326	334	346

Taylor County ($millions)						
	2010	2020	2030	2040	2050	2060
Abilene						
Monetary value of domestic water shortages	$18.11	$336.31	$338.02	$333.79	$324.83	$314.38
Lost income from reduced commercial business activity	$0.00	$539.58	$544.59	$538.51	$523.38	$506.13
Lost jobs due to reduced commercial business activity	0	12426	12542	12402	12053	11656
Lost state and local taxes from reduced commercial business activity	$0.00	$48.47	$48.92	$48.37	$47.01	$45.47
Lost utility revenues	$9.38	$37.44	$37.72	$37.33	$36.38	$35.27
Merkel						
Monetary value of domestic water shortages	$0.17	$0.21	$0.21	$0.98	$0.15	$0.13
Lost utility revenues	$0.21	$0.23	$0.23	$0.22	$0.19	$0.16
Potosi WSC						
Monetary value of domestic water shortages	$0.23	$0.25	$0.25	$0.22	$0.18	$0.14
Lost utility revenues	$0.23	$0.24	$0.24	$0.21	$0.19	$0.16
Steamboat Mountain WSC						
Monetary value of domestic water shortages	$0.05	$0.05	$0.05	$0.03	$0.01	$0.00
Lost utility revenues	$0.08	$0.07	$0.07	$0.05	$0.03	$0.01

Throckmorton County ($millions)						
	2010	2020	2030	2040	2050	2060
Irrigation						
Reduced income from reduced crop production	$0.78	$0.78	$0.78	$0.78	$0.78	$0.78
Reduced business taxes from reduced crop production	$0.11	$0.11	$0.11	$0.11	$0.11	$0.11
Reduced jobs from reduced crop production	32	32	32	32	32	32

Williamson County ($millions)						
	2010	2020	2030	2040	2050	2060
Aqua WSC						
Monetary value of domestic water shortages	$0.00	$0.02	$0.05	$0.41	$0.63	$0.93
Lost utility revenues	$0.00	$0.02	$0.05	$0.09	$0.13	$0.17
Bartlett						
Monetary value of domestic water shortages	$0.08	$0.10	$0.11	$0.13	$0.60	$0.77
Lost utility revenues	$0.09	$0.10	$0.11	$0.12	$0.14	$0.17
Bell-Milam Falls WSC						
Monetary value of domestic water shortages	$0.01	$0.05	$0.11	$0.16	$0.54	$0.63
Lost utility revenues	$0.01	$0.04	$0.07	$0.10	$0.14	$0.19
Blockhouse MUD						
Monetary value of domestic water shortages	$0.00	$0.00	$2.41	$5.59	$11.84	$20.00
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.69	$3.62	$6.02
Lost jobs due to reduced commercial business activity	0	0	0	22	114	190
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.10	$0.52	$0.86
Lost utility revenues	$0.00	$0.00	$0.83	$1.80	$2.90	$4.08

Table cont. on next page.

Williamson County cont. ($millions)						
	2010	2020	2030	2040	2050	2060
Brushy Creek MUD						
Monetary value of domestic water shortages	$0.00	$0.19	$0.49	$0.49	$0.49	$0.49
Lost utility revenues	$0.00	$0.41	$0.95	$0.95	$0.95	$0.95
Cedar Park						
Monetary value of domestic water shortages	$1.20	$7.57	$32.23	$63.28	$64.06	$64.47
Lost utility revenues	$2.32	$9.24	$12.08	$19.74	$19.98	$20.11
Chisholm Trail SUD						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$1.83	$6.47
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$2.75	$7.50
Florence						
Monetary value of domestic water shortages	$0.78	$1.79	$3.86	$3.28	$4.15	$5.23
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.22	$0.32	$0.84
Lost jobs due to reduced commercial business activity	0	0	0	9	13	34
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.03	$0.05	$0.13
Lost utility revenues	$0.14	$0.22	$0.32	$0.43	$0.55	$0.68
Georgetown						
Monetary value of domestic water shortages	$0.00	$0.00	$0.70	$7.79	$60.92	$113.22
Lost utility revenues	$0.00	$0.00	$1.51	$10.70	$20.90	$31.85
Jarrell						
Monetary value of domestic water shortages	$3.96	$4.01	$4.06	$3.37	$3.42	$3.20
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.48	$0.49	$0.45
Lost jobs due to reduced commercial business activity	0	0	0	19	20	18
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.07	$0.08	$0.07
Lost utility revenues	$0.33	$0.33	$0.33	$0.34	$0.35	$0.32
Jarrell-Schwertner WSC						
Monetary value of domestic water shortages	$0.00	$0.14	$4.08	$8.23	$15.51	$20.43
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$1.29	$2.64	$4.02
Lost jobs due to reduced commercial business activity	$0.00	0	0	41	83	127
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.18	$0.38	$0.57
Lost utility revenues	$0.00	$0.17	$0.74	$1.33	$2.01	$2.69
Table cont. on next page.						

Williamson County cont. ($millions)						
	2010	2020	2030	2040	2050	2060
Jonah Water SUD						
Monetary value of domestic water shortages	$0.00	$0.00	$0.31	$1.48	$9.19	$16.51
Lost utility revenues	$0.00	$0.00	$0.60	$1.81	$3.15	$4.64
Leander						
Monetary value of domestic water shortages	$0.00	$0.00	$0.92	$18.50	$57.60	$106.32
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$34.51
Lost jobs due to reduced commercial business activity	0	0	0	0	0	601
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$4.02
Lost utility revenues	$0.00	$0.00	$1.42	$5.20	$9.42	$13.94
Liberty Hill						
Monetary value of domestic water shortages	$4.95	$12.14	$17.52	$23.23	$29.56	$36.35
Lost income from reduced commercial business activity	$0.73	$4.56	$6.72	$9.01	$11.55	$14.28
Lost jobs due to reduced commercial business activity	23	144	212	284	364	450
Lost state and local taxes from reduced commercial business activity	$0.10	$0.65	$0.96	$1.28	$1.65	$2.04
Lost utility revenues	$0.52	$1.18	$1.71	$2.27	$2.89	$3.56
Round Rock						
Monetary value of domestic water shortages	$3.73	$105.31	$220.03	$384.75	$834.12	$1,084.19
Lost utility revenues	$0.00	$0.00	$115.43	$422.03	$634.36	$861.87
Monetary value of domestic water shortages	0	0	2011	7353	11052	15016
Lost utility revenues	$0.00	$0.00	$13.44	$49.14	$73.87	$100.36
Monetary value of domestic water shortages	$5.75	$23.32	$44.10	$66.82	$92.05	$119.08
Southwest Milam WSC						
Monetary value of domestic water shortages	$0.00	$0.05	$0.21	$1.45	$2.8	$4.38
Lost utility revenues	$0.00	$0.07	$0.21	$0.35	$0.52	$0.71
Thrall						
Monetary value of domestic water shortages	$4.71	$5.63	$6.78	$4.39	$5.10	$5.92
Lost income from reduced commercial business activity	$0.39	$0.47	$0.56	$0.66	$0.77	$0.90
Lost jobs due to reduced commercial business activity	16	19	23	27	31	36
Lost state and local taxes from reduced commercial business activity	$0.06	$0.07	$0.09	$0.10	$0.12	$0.14
Lost utility revenues	$0.26	$0.30	$0.37	$0.43	$0.50	$0.58
Table cont. on next page.						

Williamson County cont. ($millions)						
	2010	2020	2030	2040	2050	2060
Weir						
Monetary value of domestic water shortages	$2.90	$4.25	$5.83	$7.54	$9.44	$11.47
Lost income from reduced commercial business activity	$0.43	$0.64	$0.88	$1.14	$1.44	$1.75
Lost jobs due to reduced commercial business activity	17	26	35	46	58	70
Lost state and local taxes from reduced commercial business activity	$0.07	$0.10	$0.14	$0.18	$0.22	$0.27
Lost utility revenues	$0.28	$0.42	$0.57	$0.74	$0.92	$1.12
Williamson-Travis County MUD #1						
Monetary value of domestic water shortages	$0.00	$2.37	$10.23	$14.01	$31.01	$42.02
Lost income from reduced commercial business activity	$0.00	$0.00	$2.00	$7.73	$11.97	$16.48
Lost jobs due to reduced commercial business activity	0	0	63	244	378	520
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.28	$1.10	$1.71	$2.35
Lost utility revenues	$0.00	$0.67	$1.55	$2.43	$3.43	$4.49
Manufacturing						
Reduced income from reduced manufacturing output	$126.18	$153.14	$179.99	$207.04	$231.47	$254.28
Reduced business taxes from reduced manufacturing output	$8.67	$10.52	$12.36	$14.22	$15.90	$17.46
Reduced jobs from reduced manufacturing output	1,847	2,241	2,634	3,030	3,388	3,722
Mining						
Reduced income from reduced crop production	$40.20	$45.82	$49.69	$53.50	$57.31	$60.12
Reduced business taxes from reduced crop production	$4.91	$5.60	$6.07	$6.54	$7.00	$7.35
Reduced jobs from reduced crop production	392	446	484	521	558	586

Appendix Q

TWDB Report: Socioeconomic Impacts of Projected Water Shortages for the Region H Water Planning Area Prepared in Support of the 2011 Region H Regional Water Plan

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May 19, 2010

The Honorable Mark Evans
Chairman, Region H Regional Water Planning Group
Trinity County Judge
P.O. Box 457
Groveton, Texas 75845-0457

Re: Socioeconomic Impact Analysis of Not Meeting Water Needs for the 2011 Region H Regional Water Plan

Dear Judge Evans:

We have received your request for technical assistance to complete the socioeconomic impact analysis of not meeting water needs. In response, enclosed is a report that describes our methodology and presents the results. Section 1 provides an overview of the methodology, and Section 2 presents results for at the regional level, and Appendix 2 show results for individual water user groups.

If you have any questions or comments, please feel free to contact me at (512) 463-7928 or by email at stuart.norvell@twdb.state.tx.us.

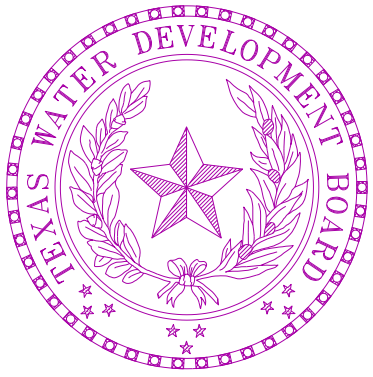
Sincerely,

Stuart Norvell
Manager, Water Planning Research and Analysis
Water Resources Planning Division

SN/ao

Enclosure

c: Temple McKinnon, TWDB
S. Doug Shaw, TWDB



Socioeconomic Impacts of Projected Water Shortages for the Region H Regional Water Planning Area

Prepared in Support of the 2011 Region H Regional Water Plan

Stuart D. Norvell, Managing Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

S. Doug Shaw, Agricultural Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

May 2010

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Introduction

Water shortages during drought would likely curtail or eliminate economic activity in business and industries reliant on water. For example, without water farmers cannot irrigate; refineries cannot produce gasoline, and paper mills cannot make paper. Unreliable water supplies would not only have an immediate and real impact on existing businesses and industry, but they could also adversely affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages would disrupt activity in homes, schools and government and could adversely affect public health and safety. For all of the above reasons, it is important to analyze and understand how restricted water supplies during drought could affect communities throughout the state.

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance: "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs*" [(§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted this report in support of the Region H Regional Water Planning Group (Region H).

This document summarizes the results of our analysis and discusses the methodology used to generate the results. Section 1 outlines the overall methodology and discusses approaches and assumptions specific to each water use category (i.e., irrigation, livestock, mining, steam-electric, municipal and manufacturing). Section 2 presents the results for each category where shortages are reported at the regional planning area level and river basin level. Results for individual water user groups are not presented, but are available upon request.

1. Methodology

Section 1 provides a general overview of how economic and social impacts were measured. In addition, it summarizes important clarifications, assumptions and limitations of the study.

1.1 Economic Impacts of Water Shortages

1.1.1 General Approach

Economic analysis as it relates to water resources planning generally falls into two broad areas. Supply side analysis focuses on costs and alternatives of developing new water supplies or implementing programs that provide additional water from current supplies. Demand side analysis concentrates on impacts or benefits of providing water to people, businesses and the environment. Analysis in this report focuses strictly on demand side impacts. When analyzing the economic impacts of water shortages as defined in Texas water planning, three potential scenarios are possible:

1) Scenario 1 involves situations where there are physical shortages of raw surface or groundwater due to drought of record conditions. For example, City A relies on a reservoir with average conservation storage of 500 acre-feet per year and a firm yield of 100 acre feet. In 2010, the city uses about 50 acre-feet per year, but by 2030 their demands are expected to increase to 200

acre-feet. Thus, in 2030 the reservoir would not have enough water to meet the city's demands, and people would experience a shortage of 100 acre-feet assuming drought of record conditions. Under normal or average climatic conditions, the reservoir would likely be able to provide reliable water supplies well beyond 2030.

2) Scenario 2 is a situation where despite drought of record conditions, water supply sources can meet existing use requirements; however, limitations in water infrastructure would preclude future water user groups from accessing these water supplies. For example, City B relies on a river that can provide 500 acre-feet per year during drought of record conditions and other constraints as dictated by planning assumptions. In 2010, the city is expected to use an estimated 100 acre-feet per year and by 2060 it would require no more than 400 acre-feet. But the intake and pipeline that currently transfers water from the river to the city's treatment plant has a capacity of only 200 acre-feet of water per year. Thus, the city's water supplies are adequate even under the most restrictive planning assumptions, but their conveyance system is too small. This implies that at some point – perhaps around 2030 - infrastructure limitations would constrain future population growth and any associated economic activity or impacts.

3) Scenario 3 involves water user groups that rely primarily on aquifers that are being depleted. In this scenario, projected and in some cases existing demands may be unsustainable as groundwater levels decline. Areas that rely on the Ogallala aquifer are a good example. In some communities in the region, irrigated agriculture forms a major base of the regional economy. With less irrigation water from the Ogallala, population and economic activity in the region could decline significantly assuming there are no offsetting developments.

Assessing the social and economic effects of each of the above scenarios requires various levels and methods of analysis and would generate substantially different results for a number of reasons; the most important of which has to do with the time frame of each scenario. Scenario 1 falls into the general category of static analysis. This means that models would measure impacts for a small interval of time such as a drought. Scenarios 2 and 3, on the other hand imply a dynamic analysis meaning that models are concerned with changes over a much longer time period.

Since administrative rules specify that planning analysis be evaluated under drought of record conditions (a static and random event), socioeconomic impact analysis developed by the TWDB for the state water plan is based on assumptions of Scenario 1. Estimated impacts under scenario 1 are point estimates for years in which needs are reported (2010, 2020, 2030, 2040, 2050 and 2060). They are independent and distinct "what if" scenarios for a particular year and shortages are assumed to be temporary events resulting from drought of record conditions. Estimated impacts measure what would happen if water user groups experience water shortages for a period of one year.

The TWDB recognize that dynamic models may be more appropriate for some water user groups; however, combining approaches on a statewide basis poses several problems. For one, it would require a complex array of analyses and models, and might require developing supply and demand forecasts under "normal" climatic conditions as opposed to drought of record conditions. Equally important is the notion that combining the approaches would produce inconsistent results across regions resulting in a so-called "apples to oranges" comparison.

A variety tools are available to estimate economic impacts, but by far, the most widely used today are input-output models (IO models) combined with social accounting matrices (SAMs). Referred to as IO/SAM models, these tools formed the basis for estimating economic impacts for agriculture (irrigation and livestock water uses) and industry (manufacturing, mining, steam-electric and commercial business activity for municipal water uses).

Since the planning horizon extends through 2060, economic variables in the baseline are adjusted in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Future values for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category.

The following steps outline the overall process.

Step 1*: Generate IO/SAM Models and Develop Economic Baseline*

IO/SAM models were estimated using propriety software known as IMPLAN PRO™ (Impact for Planning Analysis). IMPLAN is a modeling system originally developed by the U.S. Forestry Service in the late 1970s. Today, the Minnesota IMPLAN Group (MIG Inc.) owns the copyright and distributes data and software. It is probably the most widely used economic impact model in existence. IMPLAN comes with databases containing the most recently available economic data from a variety of sources.[1] Using IMPLAN software and data, transaction tables conceptually similar to the one discussed previously were estimated for each county in the region and for the region as a whole. Each transaction table contains 528 economic sectors and allows one to estimate a variety of economic statistics including:

- **total sales -** total production measured by sales revenues;
- **intermediate sales -** sales to other businesses and industries within a given region;
- **final sales –** sales to end users in a region and exports out of a region**;**
- **employment -** number of full and part-time jobs (annual average) required by a given industry including self-employment;
- **regional income -** total payroll costs (wages and salaries plus benefits) paid by industries, corporate income, rental income and interest payments; and
- **business taxes -** sales, excise, fees, licenses and other taxes paid during normal operation of an industry (does not include income taxes).

TWDB analysts developed an economic baseline containing each of the above variables using year 2000 data. Since the planning horizon extends through 2060, economic variables in the baseline were allowed to change in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Projections for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category. Monetary impacts in future years are reported in constant year 2006 dollars.

It is important to stress that employment, income and business taxes are the most useful variables when comparing the relative contribution of an economic sector to a regional economy. Total sales as reported in IO/SAM models are less desirable and can be misleading because they include sales to other industries in the region for use in the production of other goods. For example, if a mill buys grain from local farmers and uses it to produce feed, sales of both the processed feed and raw corn are counted

[1]The IMPLAN database consists of national level technology matrices based on benchmark input-output accounts generated by the U.S. Bureau of Economic Analysis and estimates of final demand, final payments, industry output and employment for various economic sectors. IMPLAN regional data (i.e. states, a counties or groups of counties within a state) are divided into two basic categories: 1) data on an industry basis including value-added, output and employment, and 2) data on a commodity basis including final demands and institutional sales. State-level data are balanced to national totals using a matrix ratio allocation system and county data are balanced to state totals.

as "output" in an IO model. Thus, total sales double-count or overstate the true economic value of goods and services produced in an economy. They are not consistent with commonly used measures of output such as Gross National Product (GNP), which counts only final sales.

Another important distinction relates to terminology. Throughout this report, the term *sector* refers to economic subdivisions used in the IMPLAN database and resultant input-output models (528 individual sectors based on Standard Industrial Classification Codes). In contrast, the phrase *water use category* refers to water user groups employed in state and regional water planning including irrigation, livestock, mining, municipal, manufacturing and steam electric. Each IMPLAN sector was assigned to a specific water use category.

Step 2: *Estimate Direct and Indirect Economic Impacts of Water Needs*

Direct impacts are reductions in output by sectors experiencing water shortages. For example, without adequate cooling and process water a refinery would have to curtail or cease operation, car washes may close, or farmers may not be able to irrigate and sales revenues fall. Indirect impacts involve changes in inter-industry transactions as supplying industries respond to decreased demands for their services, and how seemingly non-related businesses are affected by decreased incomes and spending due to direct impacts. For example, if a farmer ceases operations due to a lack of irrigation water, they would likely reduce expenditures on supplies such as fertilizer, labor and equipment, and businesses that provide these goods would suffer as well.

Direct impacts accrue to immediate businesses and industries that rely on water and without water industrial processes could suffer. However, output responses may vary depending upon the severity of shortages. A small shortage relative to total water use would likely have a minimal impact, but large shortages could be critical. For example, farmers facing small shortages might fallow marginally productive acreage to save water for more valuable crops. Livestock producers might employ emergency culling strategies, or they may consider hauling water by truck to fill stock tanks. In the case of manufacturing, a good example occurred in the summer of 1999 when Toyota Motor Manufacturing experienced water shortages at a facility near Georgetown, Kentucky.[2] As water levels in the Kentucky River fell to historic lows due to drought, plant managers sought ways to curtail water use such as reducing rinse operations to a bare minimum and recycling water by funneling it from paint shops to boilers. They even considered trucking in water at a cost of 10 times what they were paying. Fortunately, rains at the end of the summer restored river levels, and Toyota managed to implement cutbacks without affecting production, but it was a close call. If rains had not replenished the river, shortages could have severely reduced output.[3]

To account for uncertainty regarding the relative magnitude of impacts to farm and business operations, the following analysis employs the concept of elasticity. Elasticity is a number that shows how a change in one variable will affect another. In this case, it measures the relationship between a percentage reduction in water availability and a percentage reduction in output. For example, an elasticity of 1.0 indicates that a 1.0 percent reduction in water availability would result in a 1.0 percent reduction in

[2] Royal, W. "*High And Dry - Industrial Centers Face Water Shortages*." in Industry Week, Sept, 2000.

[3] The efforts described above are not planned programmatic or long-term operational changes. They are emergency measures that individuals might pursue to alleviate what they consider a temporary condition. Thus, they are not characteristic of long-term management strategies designed to ensure more dependable water supplies such as capital investments in conservation technology or development of new water supplies.

economic output. An elasticity of 0.50 would indicate that for every 1.0 percent of unavailable water, output is reduced by 0.50 percent and so on. Output elasticities used in this study are:[4]

- if water needs are 0 to 5 percent of total water demand, no corresponding reduction in output is assumed;
- if water needs are 5 to 30 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.50 percent reduction in output;
- if water needs are 30 to 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.75 percent reduction in output; and
- if water needs are greater than 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 1.0 percent (i.e., a proportional reduction).

In some cases, elasticities are adjusted depending upon conditions specific to a given water user group.

Once output responses to water shortages were estimated, direct impacts to total sales, employment, regional income and business taxes were derived using regional level economic multipliers estimating using IO/SAM models. The formula for a given IMPLAN sector is:

$$D_{i,t} = Q_{i,t} *, S_{i,t} * E_Q * RFD_i * DM_{i(Q, L, I, T)}$$

where:

$D_{i,t}$ = direct economic impact to sector *i* in period *t*

$Q_{i,t}$ = total sales for sector *i* in period *t* in an affected county

$RFD_{i,}$ = ratio of final demand to total sales for sector *i* for a given region

$S_{i,t}$ = water shortage as percentage of total water use in period *t*

E_Q = elasticity of output and water use

$DM_{i(L, I, T)}$ = direct output multiplier coefficients for labor (L), income (I) and taxes (T) for sector *i*.

Secondary impacts were derived using the same formula used to estimate direct impacts; however, indirect multiplier coefficients are used. Methods and assumptions specific to each water use sector are discussed in Sections 1.1.2 through 1.1.4.

[4] Elasticities are based on one of the few empirical studies that analyze potential relationships between economic output and water shortages in the United States. The study, conducted in California, showed that a significant number of industries would suffer reduced output during water shortages. Using a survey based approach researchers posed two scenarios to different industries. In the first scenario, they asked how a 15 percent cutback in water supply lasting one year would affect operations. In the second scenario, they asked how a 30 percent reduction lasting one year would affect plant operations. In the case of a 15 percent shortage, reported output elasticities ranged from 0.00 to 0.76 with an average value of 0.25. For a 30 percent shortage, elasticities ranged from 0.00 to 1.39 with average of 0.47. For further information, see, California Urban Water Agencies, "*Cost of Industrial Water Shortages,*" Spectrum Economics, Inc. November, 1991.

General Assumptions and Clarification of the Methodology

As with any attempt to measure and quantify human activities at a societal level, assumptions are necessary and every model has limitations. Assumptions are needed to maintain a level of generality and simplicity such that models can be applied on several geographic levels and across different economic sectors. In terms of the general approach used here several clarifications and cautions are warranted:

1. Shortages as reported by regional planning groups are the starting point for socioeconomic analyses.

2. Estimated impacts are point estimates for years in which needs are reported (i.e., 2010, 2020, 2030, 2040, 2050 and 2060).They are independent and distinct "what if" scenarios for each particular year and water shortages are assumed to be temporary events resulting from severe drought conditions combined with infrastructure limitations. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals and resultant impacts are measured. Given, that reported figures are not cumulative in nature, it is inappropriate to sum impacts over the entire planning horizon. Doing so, would imply that the analysis predicts that drought of record conditions will occur every ten years in the future, which is not the case. Similarly, authors of this report recognize that in many communities needs are driven by population growth, and in the future total population will exceed the amount of water available due to infrastructure limitations, regardless of whether or not there is a drought. This implies that infrastructure limitations would constrain economic growth. However, since needs as defined by planning rules are based upon water supply and demand under the assumption of drought of record conditions, it improper to conduct economic analysis that focuses on growth related impacts over the planning horizon. Figures generated from such an analysis would presume a 50-year drought of record, which is unrealistic. Estimating lost economic activity related to constraints on population and commercial growth due to lack of water would require developing water supply and demand forecasts under "normal" or "most likely" future climatic conditions.

3. While useful for planning purposes, this study is not a benefit-cost analysis. Benefit cost analysis is a tool widely used to evaluate the economic feasibility of specific policies or projects as opposed to estimating economic impacts of unmet water needs. Nevertheless, one could include some impacts measured in this study as part of a benefit cost study if done so properly. Since this is not a benefit cost analysis, future impacts are not weighted differently. In other words, estimates are not discounted. If used as a measure of economic benefits, one should incorporate a measure of uncertainty into the analysis. In this type of analysis, a typical method of discounting future values is to assign probabilities of the drought of record recurring again in a given year, and weight monetary impacts accordingly. This analysis assumes a probability of one.

4. IO multipliers measure the strength of backward linkages to supporting industries (i.e., those who sell inputs to an affected sector). However, multipliers say nothing about forward linkages consisting of businesses that purchase goods from an affected sector for further processing. For example, ranchers in many areas sell most of their animals to local meat packers who process animals into a form that consumers ultimately see in grocery stores and restaurants. Multipliers do not capture forward linkages to meat packers, and since meat packers sell livestock purchased from ranchers as "final sales," multipliers for the ranching sector do fully account for all losses to a region's economy. Thus, as mentioned previously, in some cases closely linked sectors were moved from one water use category to another.

5. Cautions regarding interpretations of direct and secondary impacts are warranted. IO/SAM multipliers are based on "fixed-proportion production functions," which basically means that input use - including labor - moves in lockstep fashion with changes in levels of output. In a

scenario where output (i.e., sales) declines, losses in the immediate sector or supporting sectors could be much less than predicted by an IO/SAM model for several reasons. For one, businesses will likely expect to continue operating so they might maintain spending on inputs for future use; or they may be under contractual obligations to purchase inputs for an extended period regardless of external conditions. Also, employers may not lay-off workers given that experienced labor is sometimes scarce and skilled personnel may not be readily available when water shortages subside. Lastly people who lose jobs might find other employment in the region. As a result, direct losses for employment and secondary losses in sales and employment should be considered an upper bound. Similarly, since projected population losses are based on reduced employment in the region, they should be considered an upper bound as well.

6. IO models are static. Models and resultant multipliers are based upon the structure of the U.S. and regional economies in 2006. In contrast, water shortages are projected to occur well into the future. Thus, the analysis assumes that the general structure of the economy remains the same over the planning horizon, and the farther out into the future we go, this assumption becomes less reliable.

7. Impacts are annual estimates. If one were to assume that conditions persisted for more than one year, figures should be adjusted to reflect the extended duration. The drought of record in most regions of Texas lasted several years.

8. Monetary figures are reported in constant year 2006 dollars.

1.1.2 Impacts to Agriculture

Irrigated Crop Production

The first step in estimating impacts to irrigation required calculating gross sales for IMPLAN crop sectors. Default IMPLAN data do not distinguish irrigated production from dry-land production. Once gross sales were known other statistics such as employment and income were derived using IMPLAN direct multiplier coefficients. Gross sales for a given crop are based on two data sources:

1) county-level statistics collected and maintained by the TWDB and the USDA Farm Services Agency (FSA) including the number of irrigated acres by crop type and water application per acre, and

2) regional-level data published by the Texas Agricultural Statistics Service (TASS) including prices received for crops (marketing year averages), crop yields and crop acreages.

Crop categories used by the TWDB differ from those used in IMPLAN datasets. To maintain consistency, sales and other statistics are reported using IMPLAN crop classifications. Table 1 shows the TWDB crops included in corresponding IMPLAN sectors, and Table 2 summarizes acreage and estimated annual water use for each crop classification (five-year average from 2003-2007). As shown in Table 2, the overwhelming majority of irrigation in Region H is for rice. Thus, in our analysis we disregard other crop types. Table 3 displays average (2003-2007) gross revenues per acre for rice production applied in the analysis.

Table 1: Crop Classifications Used in TWDB Water Use Survey and Corresponding IMPLAN Crop Sectors	
IMPLAN Category	**TWDB Category**
Oilseeds	Soybeans and "other oil crops"
Grains	Grain sorghum, corn, wheat and "other grain crops"
Vegetable and melons	"Vegetables" and potatoes
Tree nuts	Pecans
Fruits	Citrus, vineyard and other orchard
Cotton	Cotton
Sugarcane and sugar beets	Sugarcane and sugar beets
All "other" crops	"Forage crops", peanuts, alfalfa, hay and pasture, rice and "all other crops"

Table 2: Summary of Irrigated Crop Acreage and Water Demand for the Region H Regional Water Planning Area (average 2003-2007)				
Sector	Acres (1000s)	Distribution of Acres	Water Use (1000s of AF)	Distribution of Water Use
Oilseeds	1.0	2%	<1	<1%
Grains	<1	<1%	<1	<1%
Vegetable and melons	<1	<1%	<1	<1%
Tree nuts	<1	<1%	<1	<1%
Fruits	<1	<1%	<1	<1%
Cotton	0	0%	0	0%
Sugarcane and sugar beets	0	0%	0	0%
Rice	53	97%	291	99%
Total	55	100%	292	100%

Source: Water demand figures are a 5- year average (2003-2007) of the TWDB's annual Irrigation Water Use Estimates. Statistics for irrigated crop acreage are based upon annual survey data collected by the TWDB and the Farm Service Agency. Values do not include acreage or water use for the TWDB categories classified by the Farm Services Agency as "failed acres," "golf course" or "waste water."

Table 3: Average Gross Sales Revenues per Acre for Irrigated Crops for the Region H Regional Water Planning Area (2003-2007)		
IMPLAN Sector	**Gross Revenues per Acre**	**Crops Included in Estimates**
All Other Crops	$570	Based on five-year (2003-2007) average weighted by acreage for "rice."
*Figures are rounded. Source: Based on data from the Texas Agricultural Statistics Service, Texas Water Development Board, and Texas A&M University.		

The following steps outline the overall process used to estimate direct impacts to irrigated agriculture:

1. *Distribute shortages across predominant crop types in the region*. Again, unmet water needs were distributed equally across crop sectors that constitute one percent or more of irrigated acreage.

2. *Estimate associated reductions in output for affected crop sectors*. Output reductions are based on elasticities discussed previously and on estimated values per acre for different crops. Values per acre stem from the same data used to estimate output for the year 2006 baseline. Using multipliers, we then generate estimates of forgone income, jobs, and tax revenues based on reductions in gross sales and final demand.

3. *Reduce sales revenues for forward processers in proportion to lost rice production*. As discussed in Section 1.1, input output models capture indirect losses to suppliers and other businesses that depend upon rice farming, but only those providing inputs to rice production. Multipliers do not capture potential impacts to forward processors, in this case rice mills, which add considerable value to the product and hence income and jobs to the state. For example, Texas rice farming directly generates about $60 to $80 in gross state product. Once the rice harvested it is sold to rice mills that process and resell the crop. This added value generates an additional $60 to $80 million in direct gross state product. Impacts measured in the study capture this additional value added.

Livestock

The approach used for the livestock sector is basically the same as that used for crop production. As is the case with crops, livestock categorizations used by the TWDB differ from those used in IMPLAN datasets, and TWDB groupings were assigned to a given IMPLAN sector (Table 4). Then we:

1) *Distribute projected water needs equally among predominant livestock sectors and estimate lost output*: As is the case with irrigation, shortages are assumed to affect all livestock sectors equally; however, the category of "other" is not included given its small size. If water needs were

small relative to total demands, we assume that producers would haul in water by truck to fill stock tanks. The cost per acre-foot ($24,000) is based on 2008 rates charged by various water haulers in Texas, and assumes that the average truck load is 6,500 gallons at a hauling distance of 60 miles.

3) *Estimate reduced output in forward processors for livestock sectors*. Reductions in output for livestock sectors are assumed to have a proportional impact on forward processors in the region such as meat packers. In other words, if the cows were gone, meat-packing plants or fluid milk manufacturers) would likely have little to process. This is not an unreasonable premise. Since the 1950s, there has been a major trend towards specialized cattle feedlots, which in turn has decentralized cattle purchasing from livestock terminal markets to direct sales between producers and slaughterhouses. Today, the meat packing industry often operates large processing facilities near high concentrations of feedlots to increase capacity utilization.[5] As a result, packers are heavily dependent upon nearby feedlots. For example, a recent study by the USDA shows that on average meat packers obtain 64 percent of cattle from within 75 miles of their plant, 82 percent from within 150 miles and 92 percent from within 250 miles.[6]

Table 4: Description of Livestock Sectors

IMPLAN Category	TWDB Category
Cattle ranching	Cattle, cow calf, feedlots and dairies
Poultry and egg production	Poultry production.
Other livestock	Livestock other than cattle and poultry (i.e., horses, goats, sheep, hogs)
Milk manufacturing	Fluid milk manufacturing, cheese manufacturing, ice cream manufacturing etc.
Meat packing	Meat processing present in the region from slaughter to final processing

1.1.3 Impacts to Municipal Water User Groups

Disaggregation of Municipal Water Demands

Estimating the economic impacts for the municipal water user groups is complicated for a number of reasons. For one, municipal use comprises a range of consumers including commercial businesses, institutions such as schools and government and households. However, reported water needs are not distributed among different municipal water users. In other words, how much of a municipal need is commercial and how much is residential (domestic)?

[5] Ferreira, W.N. "*Analysis of the Meat Processing Industry in the United States*." Clemson University Extension Economics Report ER211, January 2003.

[6] Ward, C.E. "*Summary of Results from USDA's Meatpacking Concentration Study*." Oklahoma Cooperative Extension Service, OSU Extension Facts WF-562.

The amount of commercial water use as a percentage of total municipal demand was estimated based on "GED" coefficients (gallons per employee per day) published in secondary sources.[7] For example, if year 2006 baseline data for a given economic sector (e.g., amusement and recreation services) shows employment at 30 jobs and the GED coefficient is 200, then average daily water use by that sector is (30 x 200 = 6,000 gallons) or 6.7 acre-feet per year. Water not attributed to commercial use is considered domestic, which includes single and multi-family residential consumption, institutional uses and all use designated as "county-other." Based on our analysis, commercial water use is about 5 to 35 percent of municipal demand. Less populated rural counties occupy the lower end of the spectrum, while larger metropolitan counties are at the higher end.

After determining the distribution of domestic versus commercial water use, we developed methods for estimating impacts to the two groups.

Domestic Water Uses

Input output models are not well suited for measuring impacts of shortages for domestic water uses, which make up the majority of the municipal water use category. To estimate impacts associated with domestic water uses, municipal water demand and needs are subdivided into residential, and commercial and institutional use. Shortages associated with residential water uses are valued by estimating proxy demand functions for different water user groups allowing us to estimate the marginal value of water, which would vary depending upon the level of water shortages. The more severe the water shortage, the more costly it becomes. For instance, a 2 acre-foot shortage for a group of households that use 10 acre-feet per year would not be as severe as a shortage that amounted to 8 acre-feet. In the case of a 2 acre-foot shortage, households would probably have to eliminate some or all outdoor water use, which could have implicit and explicit economic costs including losses to the horticultural and landscaping industry. In the case of an 8 acre-foot shortage, people would have to forgo all outdoor water use and most indoor water consumption. Economic impacts would be much higher in the latter case because people, and would be forced to find emergency alternatives assuming alternatives were available.

To estimate the value of domestic water uses, TWDB staff developed marginal loss functions based on constant elasticity demand curves. This is a standard and well-established method used by economists to value resources such as water that have an explicit monetary cost.

A constant price elasticity of demand is estimated using a standard equation:

$$w = kc^{(-\varepsilon)}$$

where:

- w is equal to average monthly residential water use for a given water user group measured in thousands of gallons;
- k is a constant intercept;

[7] Sources for GED coefficients include: Gleick, P.H., Haasz, D., Henges-Jeck, C., Srinivasan, V., Wolff, G. Cushing, K.K., and Mann, A. "*Waste Not, Want Not*: *The Potential for Urban Water Conservation in California*." Pacific Institute. November 2003. U.S. Bureau of the Census. 1982 Census of Manufacturers: Water Use in Manufacturing. USGPO, Washington D.C. See also: "*U.S. Army Engineer Institute for Water Resources, IWR Report 88-R-6.*," Fort Belvoir, VA. See also, Joseph, E. S., 1982, "*Municipal and Industrial Water Demands of the Western United States*." Journal of the Water Resources Planning and Management Division, Proceedings of the American Society of Civil Engineers, v. 108, no. WR2, p. 204-216. See also, Baumann, D. D., Boland, J. J., and Sims, J. H., 1981, "*Evaluation of Water Conservation for Municipal and Industrial Water Supply*." U.S. Army Corps of Engineers, Institute for Water Resources, Contract no. 82-C1.

- c is the average cost of water per 1,000 gallons; and
- ε is the price elasticity of demand.

Price elasticities (-0.30 for indoor water use and -0.50 for outdoor use) are based on a study by Bell et al.[8] that surveyed 1,400 water utilities in Texas that serve at least 1,000 people to estimate demand elasticity for several variables including price, income, weather etc. Costs of water and average use per month per household are based on data from the Texas Municipal League's annual water and wastewater rate surveys - specifically average monthly household expenditures on water and wastewater in different communities across the state. After examining variance in costs and usage, three different categories of water user groups based on population (population less than 5,000, cities with populations ranging from 5,000 to 99,999 and cities with populations exceeding 100,000) were selected to serve as proxy values for municipal water groups that meet the criteria (Table 5).[9]

Table 5: Water Use and Costs Parameters Used to Estimated Water Demand Functions (average monthly costs per acre-foot for delivered water and average monthly use per household)

Community Population	Water	Wastewater	Total Monthly Cost	Avg. Monthly Use (gallons)
Less than or equal to 5,000	$1,335	$1,228	$2,563	6,204
5,000 to 100,000	$1,047	$1,162	$2,209	7,950
Great than or equal to 100,000	$718	$457	$1,190	8,409

Source: Based on annual water and wastewater rate surveys published by the Texas Municipal League.

As an example, Table 6 shows the economic impact per acre-foot of domestic water needs for municipal water user groups with population exceeding 100,000 people. There are several important assumptions incorporated in the calculations:

1) Reported values are net of the variable costs of treatment and distribution such as expenses for chemicals and electricity since using less water involves some savings to consumers and utilities alike; and for outdoor uses we do not include any value for wastewater.

2) Outdoor and "non-essential" water uses would be eliminated before indoor water consumption was affected, which is logical because most water utilities in Texas have drought contingency plans that generally specify curtailment or elimination of outdoor water use during droughts.[10] Determining how much water is used for outdoor purposes

[8] Bell, D.R. and Griffin, R.C. "*Community Water Demand in Texas as a Century is Turned*." Research contract report prepared for the Texas Water Development Board. May 2006.

[9] Ideally, one would want to estimate demand functions for each individual utility in the state. However, this would require an enormous amount of time and resources. For planning purposes, we believe the values generated from aggregate data are more than sufficient.

[10] In Texas, state law requires retail and wholesale water providers to prepare and submit plans to the Texas Commission on Environmental Quality (TCEQ). Plans must specify demand management measures for use during drought including curtailment of

is based on several secondary sources. The first is a major study sponsored by the American Water Works Association, which surveyed cities in states including Colorado, Oregon, Washington, California, Florida and Arizona. On average across all cities surveyed 58 percent of single family residential water use was for outdoor activities. In cities with climates comparable to large metropolitan areas of Texas, the average was 40 percent.[11] Earlier findings of the U.S. Water Resources Council showed a national average of 33 percent. Similarly, the United States Environmental Protection Agency (USEPA) estimated that landscape watering accounts for 32 percent of total residential and commercial water use on annual basis.[12] A study conducted for the California Urban Water Agencies (CUWA) calculated average annual values ranging from 25 to 35 percent.[13] Unfortunately, there does not appear to be any comprehensive research that has estimated non-agricultural outdoor water use in Texas. As an approximation, an average annual value of 30 percent based on the above references was selected to serve as a rough estimate in this study.

3) As shortages approach 100 percent values become immense and theoretically infinite at 100 percent because at that point death would result, and willingness to pay for water is immeasurable. Thus, as shortages approach 80 percent of monthly consumption, we assume that households and non-water intensive commercial businesses (those that use water only for drinking and sanitation would have water delivered by tanker truck or commercial water delivery companies. Based on reports from water companies throughout the state, we estimate that the cost of trucking in water is around $21,000 to $27,000 per acre-feet assuming a hauling distance of between 20 to 60 miles. This is not an unreasonable assumption. The practice was widespread during the 1950s drought and recently during droughts in this decade. For example, in 2000 at the heels of three consecutive drought years Electra - a small town in North Texas - was down to its last 45 days worth of reservoir water when rain replenished the lake, and the city was able to refurbish old wells to provide supplemental groundwater. At the time, residents were forced to limit water use to 1,000 gallons per person per month - less than half of what most people use - and many were having water delivered to their homes by private contractors.[14] In 2003 citizens of Ballinger, Texas, were also faced with a dwindling water supply due to prolonged drought. After three years of drought, Lake Ballinger, which supplies water to more than 4,300 residents in Ballinger and to 600 residents in nearby Rowena, was almost dry. Each day, people lined up to get water from a well in nearby City Park. Trucks hauling trailers outfitted with large plastic and metal tanks hauled water to and from City Park to Ballinger.[15]

"non-essential water uses." Non-essential uses include, but are not limited to, landscape irrigation and water for swimming pools or fountains. For further information see the Texas Environmental Quality Code §288.20.

[11] See, Mayer, P.W., DeOreo, W.B., Opitz, E.M., Kiefer, J.C., Davis, W., Dziegielewski, D., Nelson, J.O. "*Residential End Uses of Water*." Research sponsored by the American Water Works Association and completed by Aquacraft, Inc. and Planning and Management Consultants, Ltd. (PMCL@CDM).

[12] U.S. Environmental Protection Agency. *"Cleaner Water through Conservation*." USEPA Report no. 841-B-95-002. April, 1995.

[13] Planning and Management Consultants, Ltd. "*Evaluating Urban Water Conservation Programs: A Procedures Manual*." Prepared for the California Urban Water Agencies. February 1992.

[14] Zewe, C. "*Tap Threatens to Run Dry in Texas Town*." July 11, 2000. CNN Cable News Network.

[15] Associated Press, "*Ballinger Scrambles to Finish Pipeline before Lake Dries Up*." May 19, 2003.

Table 6: Economic Losses Associated with Domestic Water Shortages in Communities with Populations Exceeding 100,000 people

Water shortages as a percentage of total monthly household demands	No. of gallons remaining per household per day	No of gallons remaining per person per day	Economic loss (per acre-foot)	Economic loss (per gallon)
1%	278	93	$748	$0.00005
5%	266	89	$812	$0.0002
10%	252	84	$900	$0.0005
15%	238	79	$999	$0.0008
20%	224	75	$1,110	$0.0012
25%	210	70	$1,235	$0.0015
30%[a]	196	65	$1,699	$0.0020
35%	182	61	$3,825	$0.0085
40%	168	56	$4,181	$0.0096
45%	154	51	$4,603	$0.011
50%	140	47	$5,109	$0.012
55%	126	42	$5,727	$0.014
60%	112	37	$6,500	$0.017
65%	98	33	$7,493	$0.02
70%	84	28	$8,818	$0.02
75%	70	23	$10,672	$0.03
80%	56	19	$13,454	$0.04
85%	42	14	$18,091 ($24,000)[b]	$0.05 ($0.07)[b]
90%	28	9	$27,363 ($24,000)	$0.08 ($0.07)
95%	14	5	$55,182 ($24,000)	$0.17 ($0.07)
99%	3	0.9	$277,728 ($24,000)	$0.85 ($0.07)
99.9%	1	0.5	$2,781,377 ($24,000)	$8.53 ($0.07)
100%	0	0	Infinite ($24,000)	Infinite ($0.07)

[a] The first 30 percent of needs are assumed to be restrictions of outdoor water use; when needs reach 30 percent of total demands all outdoor water uses would be restricted. Needs greater than 30 percent include indoor use.

[b] As shortages approach 100 percent the value approaches infinity assuming there are not alternatives available; however, we assume that communities would begin to have water delivered by tanker truck at an estimated cost of $24,000 per acre-foot when shortages breached 85 percent.

Commercial Businesses

Effects of water shortages on commercial sectors were estimated in a fashion similar to other business sectors meaning that water shortages would affect the ability of these businesses to operate. This is particularly true for "water intensive" commercial sectors that are need large amounts of water (in addition to potable and sanitary water) to provide their services. These include:

- car-washes,
- laundry and cleaning facilities,
- sports and recreation clubs and facilities including race tracks,
- amusement and recreation services,
- hospitals and medical facilities,
- hotels and lodging places, and
- eating and drinking establishments.

A key assumption is that commercial operations would not be affected until water shortages were at least 50 percent of total municipal demand. In other words, we assume that residential water consumers would reduce water use including all non-essential uses before businesses were affected.

An example will illustrate the breakdown of municipal water needs and the overall approach to estimating impacts of municipal needs. Assume City A experiences an unexpected shortage of 50 acre-feet per year when their demands are 200 acre-feet per year. Thus, shortages are only 25 percent of total municipal use and residents of City A could eliminate needs by restricting landscape irrigation. City B, on the other hand, has a deficit of 150 acre-feet in 2020 and a projected demand of 200 acre-feet. Thus, total shortages are 75 percent of total demand. Emergency outdoor and some indoor conservation measures could eliminate 50 acre-feet of projected needs, yet 50 acre-feet would still remain. To eliminate" the remaining 50 acre-feet water intensive commercial businesses would have to curtail operations or shut down completely.

Three other areas were considered when analyzing municipal water shortages: 1) lost revenues to water utilities, 2) losses to the horticultural and landscaping industries stemming for reduction in water available for landscape irrigation, and 3) lost revenues and related economic impacts associated with reduced water related recreation.

Water Utility Revenues

Estimating lost water utility revenues was straightforward. We relied on annual data from the "*Water and Wastewater Rate Survey*" published annually by the Texas Municipal League to calculate an average value per acre-foot for water and sewer. For water revenues, average retail water and sewer rates multiplied by total water needs served as a proxy. For lost wastewater, total unmet needs were adjusted for return flow factor of 0.60 and multiplied by average sewer rates for the region. Needs reported as "county-other" were excluded under the presumption that these consist primarily of self-supplied water uses. In addition, 15 percent of water demand and needs are considered non-billed or "unaccountable" water that comprises things such as leakages and water for municipal government functions (e.g., fire departments). Lost tax receipts are based on current rates for the "miscellaneous gross receipts tax, "which the state collects from utilities located in most incorporated cities or towns in Texas. We do not include lost water utility revenues when aggregating impacts of municipal water shortages to regional and state levels to prevent double counting.

Horticultural and Landscaping Industry

The horticultural and landscaping industry, also referred to as the "green Industry," consists of businesses that produce, distribute and provide services associated with ornamental plants, landscape and garden supplies and equipment. Horticultural industries often face big losses during drought. For example, the recent drought in the Southeast affecting the Carolinas and Georgia horticultural and landscaping businesses had a harsh year. Plant sales were down, plant mortality increased, and watering costs increased. Many businesses were forced to close locations, lay off employees, and even file for bankruptcy. University of Georgia economists put statewide losses for the industry at around $3.2 billion during the 3-year drought that ended in 2008.[16] Municipal restrictions on outdoor watering play a significant role. During drought, water restrictions coupled with persistent heat has a psychological effect on homeowners that reduces demands for landscaping products and services. Simply put, people were afraid to spend any money on new plants and landscaping.

In Texas, there do not appear to be readily available studies that analyze the economic effects of water shortages on the industry. However, authors of this report believe negative impacts do and would result in restricting landscape irrigation to municipal water consumers. The difficulty in measuring them is two-fold. First, as noted above, data and research for these types of impacts that focus on Texas are limited; and second, economic data provided by IMPLAN do not disaggregate different sectors of the green industry to a level that would allow for meaningful and defensible analysis.[17]

Recreational Impacts

Recreational businesses often suffer when water levels and flows in rivers, springs and reservoirs fall significantly during drought. During droughts, many boat docks and lake beaches are forced to close, leading to big losses for lakeside business owners and local communities. Communities adjacent to popular river and stream destinations such as Comal Springs and the Guadalupe River also see their business plummet when springs and rivers dry up. Although there are many examples of businesses that have suffered due to drought, dollar figures for drought-related losses to the recreation and tourism industry are not readily available, and very difficult to measure without extensive local surveys. Thus, while they are important, economic impacts are not measured in this study.

Table 7 summarizes impacts of municipal water shortages at differing levels of magnitude, and shows the ranges of economic costs or losses per acre-foot of shortage for each level.

[16] Williams, D. *"Georgia landscapers eye rebound from Southeast drought."* Atlanta Business Chronicle, Friday, June 19, 2009

[17] Economic impact analyses prepared by the TWDB for 2006 regional water plans did include estimates for the horticultural industry. However, year 2000 and prior IMPLAN data were disaggregated to a finer level. In the current dataset (2006), the sector previously listed as "Landscaping and Horticultural Services" (IMPLAN Sector 27) is aggregated into "Services to Buildings and Dwellings" (IMPLAN Sector 458).

Table 7: Impacts of Municipal Water Shortages at Different Magnitudes of Shortages		
Water shortages as percent of total municipal demands	Impacts	Economic costs per acre-foot*
0-30%	✓ Lost water utility revenues ✓ Restricted landscape irrigation and non-essential water uses	$730 - $2,040
30-50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use	$2,040 - $10,970
>50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use ✓ Restriction or elimination of commercial water use ✓ Importing water by tanker truck	$10,970 - varies
*Figures are rounded		

1.1.4 Industrial Water User Groups

Manufacturing

Impacts to manufacturing were estimated by distributing water shortages among industrial sectors at the county level. For example, if a planning group estimates that during a drought of record water supplies in County A would only meet 50 percent of total annual demands for manufactures in the county, we reduced output for each sector by 50 percent. Since projected manufacturing demands are based on TWDB Water Uses Survey data for each county, we only include IMPLAN sectors represented in the TWBD survey database. Some sectors in IMPLAN databases are not part of the TWDB database given that they use relatively small amounts of water - primarily for on-site sanitation and potable purposes. To maintain consistency between IMPLAN and TWDB databases, Standard Industrial Classification (SIC) codes both databases were cross referenced in county with shortages. Non-matches were excluded when calculating direct impacts.

Mining

The process of mining is very similar to that of manufacturing. We assume that within a given county, shortages would apply equally to relevant mining sectors, and IMPLAN sectors are cross referenced with TWDB data to ensure consistency.

In Texas, oil and gas extraction and sand and gravel (aggregates) operations are the primary mining industries that rely on large volumes of water. For sand and gravel, estimated output reductions are straightforward; however, oil and gas is more complicated for a number of reasons. IMPLAN does not necessarily report the physical extraction of minerals by geographic local, but rather the sales revenues reported by a particular corporation.

For example, at the state level revenues for IMPLAN sector 19 (oil and gas extraction) and sector 27 (drilling oil and gas wells) totals $257 billion. Of this, nearly $85 billion is attributed to Harris County. However, only a very small fraction (less than one percent) of actual production takes place in the county. To measure actual potential losses in well head capacity due to water shortages, we relied on county level production data from the Texas Railroad Commission (TRC) and average well-head market prices for crude and gas to estimate lost revenues in a given county. After which, we used to IMPLAN ratios to estimate resultant losses in income and employment.

Other considerations with respect to mining include:

1) Petroleum and gas extraction industry only uses water in significant amounts for secondary recovery. Known in the industry as enhanced or water flood extraction, secondary recovery involves pumping water down injection wells to increase underground pressure thereby pushing oil or gas into other wells. IMPLAN output numbers do not distinguish between secondary and non-secondary recovery. To account for the discrepancy, county-level TRC data that show the proportion of barrels produced using secondary methods were used to adjust IMPLAN data to reflect only the portion of sales attributed to secondary recovery.

2) A substantial portion of output from mining operations goes directly to businesses that are classified as manufacturing in our schema. Thus, multipliers measuring backward linkages for a given manufacturer might include impacts to a supplying mining operation. Care was taken not to double count in such situations if both a mining operation and a manufacturer were reported as having water shortages.

Steam-electric

At minimum without adequate cooling water, power plants cannot safely operate. As water availability falls below projected demands, water levels in lakes and rivers that provide cooling water would also decline. Low water levels could affect raw water intakes and outfalls at electrical generating units in several ways. For one, power plants are regulated by thermal emission guidelines that specify the maximum amount of heat that can go back into a river or lake via discharged cooling water. Low water levels could result in permit compliance issues due to reduced dilution and dispersion of heat and subsequent impacts on aquatic biota near outfalls.[18] However, the primary concern would be a loss of head (i.e., pressure) over intake structures that would decrease flows through intake tunnels. This would affect safety related pumps, increase operating costs and/or result in sustained shut-downs. Assuming plants did shutdown, they would not be able to generate electricity.

[18] Section 316 (b) of the Clean Water Act requires that thermal wastewater discharges do not harm fish and other wildlife.

Among all water use categories steam-electric is unique and cautions are needed when applying methods used in this study. Measured changes to an economy using input-output models stem directly from changes in sales revenues. In the case of water shortages, one assumes that businesses will suffer lost output if process water is in short supply. For power generation facilities this is true as well. However, the electric services sector in IMPLAN represents a corporate entity that may own and operate several electrical generating units in a given region. If one unit became inoperable due to water shortages, plants in other areas or generation facilities that do not rely heavily on water such as gas powered turbines might be able to compensate for lost generating capacity. Utilities could also offset lost production via purchases on the spot market.[19] Thus, depending upon the severity of the shortages and conditions at a given electrical generating unit, energy supplies for local and regional communities could be maintained. But in general, without enough cooling water, utilities would have to throttle back plant operations, forcing them to buy or generate more costly power to meet customer demands.

Measuring impacts end users of electricity is not part of this study as it would require extensive local and regional level analysis of energy production and demand. To maintain consistency with other water user groups, impacts of steam-electric water shortages are measured in terms of lost revenues (and hence income) and jobs associated with shutting down electrical generating units.

1.2 Social Impacts of Water Shortages

As the name implies, the effects of water shortages can be social or economic. Distinctions between the two are both semantic and analytical in nature – more so analytic in the sense that social impacts are harder to quantify. Nevertheless, social effects associated with drought and water shortages are closely tied to economic impacts. For example, they might include:

- demographic effects such as changes in population,
- disruptions in institutional settings including activity in schools and government,
- conflicts between water users such as farmers and urban consumers,
- health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations),
- mental and physical stress (e.g., anxiety, depression, domestic violence),
- public safety issues from forest and range fires and reduced fire fighting capability,
- increased disease caused by wildlife concentrations,
- loss of aesthetic and property values, and
- reduced recreational opportunities.[20]

[19] Today, most utilities participate in large interstate "power pools" and can buy or sell electricity "on the grid" from other utilities or power marketers. Thus, assuming power was available to buy, and assuming that no contractual or physical limitations were in place such as transmission constraints; utilities could offset lost power that resulted from waters shortages with purchases via the power grid.

[20] Based on information from the website of the National Drought Mitigation Center at the University of Nebraska Lincoln. Available online at: http://www.drought.unl.edu/risk/impacts.htm. See also, Vanclay, F. "*Social Impact Assessment*." in Petts, J. (ed) International Handbook of Environmental Impact Assessment. 1999.

Social impacts measured in this study focus strictly on demographic effects including changes in population and school enrollment. Methods are based on demographic projection models developed by the Texas State Data Center and used by the TWDB for state and regional water planning. Basically, the social impact model uses results from the economic component of the study and assesses how changes in labor demand would affect migration patterns in a region. Declines in labor demand as measured using adjusted IMPLAN data are assumed to affect net economic migration in a given regional water planning area. Employment losses are adjusted to reflect the notion that some people would not relocate but would seek employment in the region and/or public assistance and wait for conditions to improve. Changes in school enrollment are simply the proportion of lost population between the ages of 5 and 17.

2. Results

Section 2 presents the results of the analysis at the regional level. Included are baseline economic data for each water use category, and estimated economics impacts of water shortages for water user groups with reported deficits. According to the 2011 *Region H Regional Water Plan*, during severe drought irrigation, municipal, manufacturing, mining and steam-electric water user groups would experience water shortages in the absence of new water management strategies.

2.1 Overview of Regional Economy

On an annual basis, the Region H economy generates slightly more than $373 billion in gross state product for Texas ($342 billion in income and $31 billion in state and local business taxes) and supports 3,386,000 jobs (Table 8). Generating nearly $79 billion worth of income per year manufacturing (particularly petrochemical refining) is the primary base economic sector in the region and state.[21] Municipal sectors also generate substantial amounts of activity, nearly $212 billion per year in gross state product, and are major employers in the region. While municipal sectors are the largest employer and source of wealth, many businesses that make up the municipal category such as restaurants and retail stores are non-basic industries meaning they exist to provide services to people who work would in base industries such as manufacturing, agriculture and mining. In other words, without base industries such agriculture, many municipal jobs in the region would not exist.

[21] Base industries are those that supply markets outside of a region. These industries are crucial to the local economy and are called the economic base of a region. Appendix A shows how IMPLAN's 529 sectors were allocated to water use category, and shows economic data for each sector.

Table 8: The Region H Economy by Water User Group ($millions)[a]						
Water Use Category	**Total sales**	**Intermediate sales**	**Final sales**	**Jobs**	**Income**	**Business taxes**
Irrigation[b]	$401.01	$46.25	$354.76	966	$69.22	$3.73
Livestock	$1,812.22	$772.84	$1,039.38	15,033	$210.98	$17.29
Manufacturing	$377,287.75	$120,954.26	$256,333.49	493,526	$75,600.29	$2,527.00
Mining	$100,671.55	$69,837.10	$30,834.44	124,166	$56,104.32	$6,280.56
Steam-electric	$25,548.42	$7,187.34	$18,361.09	12,412	$17,800.89	$2,967.22
Municipal	$333,733.23	$116,264.88	$217,468.36	2,740,308	$192,557.01	$19,069.36
Regional total	$839,461.58	$315,061.19	$524,048.55	3,386,006	$342,302.00	$30,862.53

[a] Appendix 1 displays data for individual IMPLAN sectors that make up each water use category. Based on data from the Texas Water Development Board, and year 2006 data from the Minnesota IMPLAN Group, Inc.

[b] Irrigation includes activity for both rice farms and rice mills.

2.2 Impacts of Agricultural Water Shortages

According to the 2011 *Region H Regional Water Plan*, during severe drought the counties of Brazoria, Chambers, Galveston, Liberty, and Waller would experiences shortages of irrigation water without new management strategies. In 2010, shortages range from about 15 to 90 percent of annual irrigation demands. Shortages of these magnitudes would reduce gross state product (income plus state and local business taxes) by an estimated $68 million in 2010 and $61 million in 2060 with potential job losses ranging from 849 to 730. These figures include impacts to rice mills.

Table 9: Economic Impacts of Water Shortages for Irrigation Water User Groups ($millions)			
Decade	**Lost income from reduced rice production and milling activity [a]**	**Lost state and local tax revenues from reduced rice production and milling activity**	**Lost jobs from rice production and milling activity**
2010	$68.19	$7.89	849
2020	$62.37	$7.22	769
2030	$59.88	$6.93	739
2040	$58.65	$6.79	722
2050	$59.82	$6.92	726
2060	$61.15	$7.08	730

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.3 Impacts of Municipal Water Shortages

Water shortages are projected to occur in a significant number of communities in Region H. At the regional level, the estimated economic value of domestic water shortages totals $97 million in 2010 and $4,798 million in 2060 (Table 10). Municipal shortages would also restrict the operation of many commercial businesses reducing gross state product by an estimated $30 million in 2010 and $2,738 million in 2060.

Table 10: Economic Impacts of Water Shortages for Municipal Water User Groups ($millions)

Decade	Monetary value of domestic water shortages	Lost income from reduced commercial business activity*	Lost state and local taxes from reduced commercial business activity	Lost jobs from reduced commercial business activity	Lost water utility revenues
2010	$96.95	$26.40	$3.57	813	$78.89
2020	$312.58	$364.24	$40.51	8,583	$349.72
2030	$847.63	$1,297.19	$143.13	30,419	$535.20
2040	$1,581.98	$1,439.98	$162.99	34,850	$618.95
2050	$2,948.37	$2,089.60	$226.17	48,039	$726.54
2060	$4,810.50	$2,520.56	$272.38	57,821	$905.55

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.4 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the region are projected to occur in Brazoria, Chambers, Fort Bend, Harris, Leon, Liberty, Madison, Montgomery, San Jacinto, Walker, and Waller. The Region H planning group estimates that these manufacturers would be short nearly 75,000 acre-feet of water in 2010 and 253,000 acre-feet in 2060. Shortages of these magnitudes would reduce gross state product (income plus taxes) by an estimated $2,939 million in 2010 and $12,199 million in 2060 (Table 11).

Table 11: Economic Impacts of Water Shortages for Manufacturing Water User Groups ($millions)			
Decade	**Lost income due to reduced manufacturing output**	**Lost state and local business tax revenues due to reduced manufacturing output**	**Lost jobs due to reduced manufacturing output**
2010	$2,732.37	$263.52	16,765
2020	$4,049.18	$388.78	25,236
2030	$7,425.93	$701.18	46,038
2040	$8,772.39	$831.23	54,765
2050	$9,992.81	$946.84	62,577
2060	$11,240.68	$1,076.53	71,341
*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.			

2.5 Impacts of Mining Water Shortages

Ming water shortages in the region are projected to occur in Harris, Liberty, Montgomery and Polk counties, and would primarily affect the oil and gas and aggregates operations. In total, shortages would reduce gross state product by $35 million in 2010 and $233 million in 2060 (Table 12).

Table 12: Economic Impacts of Water Shortages for Mining Water User Groups ($millions)			
Decade	**Lost income due to reduced mining output**	**Lost state and local business tax revenues due to reduced mining output**	**Lost jobs due to reduced mining output**
2010	$35.39	$3.42	619
2020	$61.78	$5.94	1,048
2030	$84.50	$8.15	1,390
2040	$101.86	$9.79	1,659
2050	$204.68	$19.78	3,472
2060	$233.81	$22.46	3,916
*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.			

2.6 Impacts of Steam-electric Water Shortages

Water shortages for steam-electric water user groups are projected to occur in Fort Bend, Galveston, Harris, Liberty, and Montgomery counties, and would reduce gross state product by $380 million dollars in 2010, and $5,238 million 2060 (Table 13).

Table 13: Economic Impacts of Water Shortages for Steam-electric Water User Groups ($millions)

Decade	Lost income due to reduced electrical generation	Lost state and local business tax revenues due to reduced electrical generation	Lost jobs due to reduced electrical generation
2010	$332.33	$47.70	1,130
2020	$650.93	$93.43	2,213
2030	$1,144.78	$164.32	3,892
2040	$2,537.55	$364.23	8,626
2050	$3,411.75	$489.70	11,598
2060	$4,580.79	$657.50	15,572

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to Gross Domestic Product measured at the state rather than national level.

2.7 Social Impacts of Water Shortages

As discussed previously, estimated social impacts focus on changes in population and school enrollment. In 2010, estimated population losses total 24,433 with corresponding reductions in school enrollment of 6,891 students (Table 14). In 2060, population in the region would decline by 175,389 people and school enrollment would fall by 32,522 students.

Table 14: Social Impacts of Water Shortages (2010-2060)

Year	Population Losses	Declines in School Enrollment
2010	24,433	6,891
2020	45,514	12,913
2030	99,071	26,242
2040	122,686	22,674
2050	152,028	28,078
2060	175,839	32,522

2.8 Distribution of Impacts by Major River Basin

Administrative rules require that impacts are presented by both planning region and major river basin. To meet rule requirements, impacts were allocated among basins based on the distribution of water shortages in relevant basins. For example, if 50 percent of water shortages in River Basin A and 50 percent occur in River Basin B, then impacts were split equally among the two basins. Table 15 displays the results.

Table 15: Distribution of Impacts by Major River Basin (2010-2060)

Water Use	2010	2020	2030	2040	2050	2060
Irrigation						
Brazos	2%	1%	1%	1%	1%	1%
Brazos-Colorado	1%	1%	1%	1%	1%	1%
Neches	1%	1%	1%	1%	1%	1%
San Jacinto	0%	<1%	0%	<1%	1%	2%
San Jacinto-Brazos	72%	70%	68%	67%	65%	63%
Trinity	18%	19%	21%	23%	24%	24%
Trinity-San Jacinto	7%	8%	8%	8%	8%	8%
Manufacturing						
Brazos	52%	61%	60%	60%	60%	63%
Brazos-Colorado	0%	<1%	<1%	<1%	<1%	<1%
San Jacinto	1%	1%	2%	2%	2%	2%
San Jacinto-Brazos	6%	8%	12%	14%	15%	14%
Trinity	0%	1%	1%	1%	1%	1%
Trinity-San Jacinto	42%	29%	26%	24%	23%	20%
Mining						
Brazos	0%	3%	4%	3%	3%	3%
Brazos-Colorado	0%	5%	5%	6%	6%	6%
Neches Trinity	2%	2%	2%	2%	2%	2%
San Jacinto	4%	5%	6%	6%	6%	6%
San Jacinto-Brazos	<1%	2%	6%	6%	6%	5%
Trinity	72%	64%	59%	60%	59%	59%
Trinity-San Jacinto	21%	19%	17%	18%	19%	19%
Municipal						
Brazos	<1%	2%	4%	6%	7%	8%
Brazos-Colorado	4%	1%	1%	1%	1%	<1%
Colorado	0%	<1%	<1%	<1%	<1%	<1%
Neches	0%	<1%	<1%	<1%	<1%	<1%
Neches-Trinity	<1%	<1%	<1%	<1%	<1%	<1%
San Jacinto	71%	85%	81%	77%	74%	73%
San Jacinto-Brazos	23%	10%	13%	15%	17%	17%
Trinity	2%	1%	1%	1%	1%	1%
Trinity-San Jacinto	<1%	<1%	<1%	<1%	<1%	<1%

Table continued on following page.

Table 15: Distribution of Impacts by Major River Basin (continued from previous page)						
Water Use	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Steam-electric power						
Brazos	88%	14%	14%	13%	12%	10%
San Jacinto-Brazos	12%	11%	9%	7%	6%	5%
San Jacinto	0%	65%	67%	68%	70%	61%
Trinity	0%	10%	11%	12%	11%	9%

Appendix 1: Economic Data for Individual IMPLAN Sectors

Economic Data for Agricultural Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Irrigation	Rice milling	49	$351.85	$2.69	$349.15	577	$45.17	$2.78
Irrigation	Rice ("all other crop farming")	10	$49.16	$43.55	$5.61	389	$24.06	$0.95
Irrigation	Fruit farming	5	$4.10	0.87	3.23	92	$2.33	$0.09
Irrigation	Vegetable and melon farming	3	$1.28	0.05	1.23	21	$0.94	$0.01
Irrigation	Tree nut farming	4	$1.03	0.05	0.98	16	$0.72	$0.03
Irrigation	Grain farming	6	$0.99	0.25	0.74	43	$0.46	$0.02
Irrigation	Total irrigation	NA	$56.56	$44.77	$11.79	561	$28.51	$1.10
Irrigation	Non-irrigated crops	various	$342.84	$90.91	$251.93	7,723	$239.52	$65.69
Irrigation	Total crop production	NA	$455.97	$180.46	$275.51	8,845	$296.53	$67.89
Livestock	Meat processed from carcasses	68	$646.65	$190.77	$455.88	1,473	$71.87	$3.77
Livestock	Cattle ranching and farming	11	$408.82	$283.48	$125.35	9,382	$32.30	$8.60
Livestock	Fluid milk manufacturing	62	$330.75	$79.57	$251.18	576	$27.71	$1.69
Livestock	Cheese manufacturing	64	$174.09	$72.10	$101.99	236	$12.04	$1.09
Livestock	Poultry and egg production	12	$78.31	$61.37	$16.94	453	$26.39	$0.27
Livestock	Animal- except poultry- slaughtering	67	$57.66	$15.42	$42.25	139	$9.83	$0.39
Livestock	Animal production- except cattle and poultry	13	$53.43	$45.31	$8.13	2,622	$5.19	$0.83
Livestock	Poultry processing	70	$40.62	$12.93	$27.70	123	$16.62	$0.44
Livestock	Rendering and meat byproduct processing	69	$21.32	$11.83	$9.49	28	$8.82	$0.23
Livestock	Creamery butter manufacturing	63	$0.56	$0.06	$0.50	1	$0.23	$0.001
Total livestock		NA	$1,812.22	$772.84	$1,039.38	15,033	$210.98	$17.29
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Mining and Steam-electric Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Mining	Oil and gas extraction	19	$71,360.84	$66,271.93	$5,088.91	80,231	$41,061.13	$4,313.45
Mining	Drilling oil and gas wells	27	$15,338.84	$76.56	$15,262.27	19,088	$5,682.63	$749.02
Mining	Support activities for oil and gas operations	28	$7,764.77	$1,078.50	$6,686.27	19,751	$7,042.02	$316.89
Mining	Natural gas distribution	31	$5,774.59	$2,314.45	$3,460.14	3,524	$2,105.92	$873.61
Mining	Coal mining	20	$170.63	$63.94	$106.69	440	$66.31	$20.40
Mining	Sand- gravel- clay- and refractory mining	25	$143.01	$15.09	$127.92	719	$84.81	$4.14
Mining	Other nonmetallic mineral mining	26	$89.78	$8.98	$80.80	351	$44.69	$2.51
Mining	Support activities for other mining	29	$13.64	$0.20	$13.44	17	$9.69	$0.08
Mining	Gold- silver- and other metal ore mining	23	$10.48	$5.85	$4.63	30	$4.44	$0.36
Mining	Stone mining and quarrying	24	$3.20	$0.33	$2.87	10	$1.89	$0.02
Mining	Copper- nickel- lead- and zinc mining	22	$1.36	$1.26	$0.10	4	$0.65	$0.07
	Total mining		$100,671.55	$69,837.10	$30,834.44	124,166	$56,104.32	$6,280.56
Steam-electric	Power generation and supply	30	$25,548.42	$7,187.34	$18,361.09	12,412	$17,800.89	$2,967.22
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Manufacturing Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	Petrochemical manufacturing	147	$130,689.99	$59,878.02	$70,811.97	16,007	$15,106.03	$858.08
Manufacturing	Petroleum refineries	142	$111,335.06	$41,383.30	$69,951.75	11,584	$16,861.18	$645.91
Manufacturing	Electronic computer manufacturing	302	$17,825.77	$4,149.41	$13,676.36	7,073	$1,215.14	$95.08
Manufacturing	New residential 1-unit structures- all	33	$14,072.59	$0.02	$14,072.57	86,401	$5,311.90	$83.61
Manufacturing	Oil and gas field machinery and equipment	261	$9,925.65	$369.64	$9,556.01	24,970	$3,065.70	$62.70
Manufacturing	Commercial and institutional buildings	38	$8,348.60	$0.00	$8,348.59	75,325	$4,552.64	$56.09
Manufacturing	Other basic organic chemical manufacturing	151	$7,337.98	$1,368.11	$5,969.86	5,934	$1,492.89	$60.26
Manufacturing	Plastics material and resin manufacturing	152	$7,252.15	$287.19	$6,964.96	4,644	$1,755.50	$56.96
Manufacturing	Other new construction	41	$3,676.19	$0.01	$3,676.20	34,557	$2,111.29	$16.61
Manufacturing	Pesticide and other agricultural chemical man	159	$2,696.36	$451.80	$2,244.56	1,361	$1,020.88	$17.86
Manufacturing	New residential additions and alterations-all	35	$2,040.72	$0.02	$2,040.70	10,284	$842.21	$11.88
Manufacturing	Industrial gas manufacturing	148	$1,899.82	$998.97	$900.84	1,682	$809.22	$12.23
Manufacturing	Metal valve manufacturing	248	$1,852.57	$200.63	$1,651.95	5,927	$892.57	$11.56
Manufacturing	Highway- street- bridge- and tunnel construct	39	$1,800.58	$0.00	$1,800.59	14,585	$975.02	$12.42
Manufacturing	Other miscellaneous chemical product manufacturing	171	$1,657.38	$867.12	$790.26	2,996	$512.28	$13.09
Manufacturing	New multifamily housing structures- all	34	$1,606.21	$0.00	$1,606.20	12,556	$819.77	$4.74
Manufacturing	Automobile and light truck manufacturing	344	$1,588.93	$1.70	$1,587.23	1,130	$141.73	$4.59
Manufacturing	Guided missile and space vehicle manufacturing	354	$1,543.80	$75.00	$1,468.80	3,564	$534.45	$6.38
Manufacturing	Pharmaceutical and medicine manufacturing	160	$1,451.15	$265.20	$1,185.95	1,700	$355.77	$8.11
Manufacturing	Water- sewer- and pipeline construction	40	$1,285.08	$0.01	$1,285.10	9,543	$625.45	$9.03
Manufacturing	Soft drink and ice manufacturing	85	$1,251.40	$69.90	$1,181.50	1,836	$253.95	$11.25
Manufacturing	Other basic inorganic chemical manufacturing	150	$1,230.88	$271.19	$959.69	1,873	$493.21	$5.39
Manufacturing	Plate work manufacturing	234	$1,173.25	$73.85	$1,099.40	4,225	$516.20	$6.72
Manufacturing	Plastics pipe- fittings- and profile shapes	173	$1,114.96	$685.80	$429.16	2,673	$397.37	$9.02
Manufacturing	Machine shops	243	$1,103.43	$266.31	$837.12	7,136	$567.99	$9.09
Manufacturing	Paint and coating manufacturing	161	$1,079.49	$13.73	$1,065.76	1,683	$256.74	$6.18
Manufacturing	Semiconductors and related device manufacturing	311	$1,035.36	$551.05	$484.31	1,142	$225.39	$6.37
Manufacturing	Fabricated pipe and pipe fitting manufacturing	252	$1,032.18	$116.61	$915.57	4,508	$444.76	$6.14
Manufacturing	All other manufacturing		$38,380.24	$8,609.73	$29,770.51	136,627	$13,443.08	$419.66
Manufacturing	Total manufacturing		$377,287.75	$120,954.26	$256,333.49	493526	$75,600.29	$2,527.00

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Economic Data for Municipal Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Municipal	Wholesale trade	390	$33,539.00	$16,057.24	$17,481.76	160,611	$17,653.96	$4,964.22
Municipal	Real estate	431	$25,137.80	$9,950.90	$15,186.91	121,747	$14,545.48	$3,095.94
Municipal	Owner-occupied dwellings	509	$21,656.85	-$0.01	$21,656.86	0	$16,776.87	$2,560.80
Municipal	Architectural and engineering services	439	$14,855.13	$9,364.16	$5,490.97	106,669	$8,524.77	$70.68
Municipal	State & Local Education	503	$11,107.95	$0.01	$11,107.94	236,560	$11,107.95	$0.00
Municipal	Food services and drinking places	481	$9,823.10	$1,254.40	$8,568.71	185,919	$4,340.10	$507.03
Municipal	Pipeline transportation	396	$9,578.11	$4,188.82	$5,389.29	6,791	$3,971.45	$849.62
Municipal	Monetary authorities and depository credit in	430	$9,078.09	$2,989.90	$6,088.19	33,849	$6,374.76	$116.14
Municipal	Offices of physicians- dentists- and other he	465	$8,010.08	$0.00	$8,010.08	64,239	$5,711.95	$50.07
Municipal	Hospitals	467	$7,955.92	$0.00	$7,955.92	65,074	$4,408.69	$56.20
Municipal	Telecommunications	422	$6,823.45	$2,343.73	$4,479.72	18,481	$2,848.73	$474.82
Municipal	Legal services	437	$6,720.69	$4,265.34	$2,455.35	43,458	$4,334.35	$134.97
Municipal	Air transportation	391	$5,966.11	$664.50	$5,301.61	24,528	$2,034.40	$256.18
Municipal	Truck transportation	394	$5,714.00	$3,093.97	$2,620.04	49,614	$2,346.61	$53.82
Municipal	Insurance carriers	427	$5,645.46	$1,646.20	$3,999.26	22,867	$1,994.24	$247.20
Municipal	State & Local Non-Education	504	$5,631.04	$0.00	$5,631.05	81,782	$5,631.04	$0.00
Municipal	Office administrative services	452	$5,538.55	$2,463.92	$3,074.63	22,568	$3,263.33	$56.26
Municipal	Motor vehicle and parts dealers	401	$5,042.54	$548.32	$4,494.22	41,078	$2,626.84	$743.26
Municipal	Cable networks and program distribution	421	$4,748.61	$1,127.36	$3,621.25	5,132	$1,587.48	$87.12
Municipal	All other miscellaneous professional and tech	450	$4,657.77	$4,158.57	$499.20	8,112	$1,884.06	$37.77
Municipal	Management of companies and enterprises	451	$4,541.85	$4,271.19	$270.66	27,749	$2,386.75	$38.10
Municipal	Securities- commodity contracts- investments	426	$4,341.56	$2,883.19	$1,458.36	25,729	$2,234.36	$65.37
Municipal	Management consulting services	444	$4,224.70	$3,252.06	$972.64	29,572	$2,251.86	$17.49
Municipal	Scenic and sightseeing transportation and sup	397	$3,844.57	$1,442.33	$2,402.24	26,914	$2,610.03	$443.86
Municipal	Insurance agencies and brokerages	428	$3,642.87	$2,137.73	$1,505.14	24,528	$3,089.52	$19.51
Municipal	All other municipal	NA	$105,907.43	$38,161.04	$67,746.39	1,306,737	$58,017.46	$4,122.92
Municipal	Total municipal	NA	$333,733.23	$116,264.88	$217,468.36	2,740,308	$192,557.01	$19,069.36
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Appendix 2: Impacts by Water User Group

Irrigation ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Brazoria County						
Reduced income from curtailed rice production and milling activity	$57.80	$51.41	$48.95	$47.48	$47.48	$47.48
Reduced business taxes from curtailed rice production and milling activity	$6.69	$5.95	$5.67	$5.50	$5.50	$5.50
Reduced jobs from curtailed rice production and milling activity	762	678	646	626	626	626
Chambers County						
Reduced income from curtailed rice production and milling activity	$3.79	$3.82	$3.84	$3.85	$3.87	$3.88
Reduced business taxes from curtailed rice production and milling activity	$0.44	$0.44	$0.44	$0.45	$0.45	$0.45
Reduced jobs from curtailed rice production and milling activity	0	0	0	0	0	0
Galveston County						
Reduced income from curtailed rice production and milling activity	$5.14	$5.14	$5.14	$5.14	$5.14	$5.14
Reduced business taxes from curtailed rice production and milling activity	$0.59	$0.59	$0.59	$0.59	$0.59	$0.59
Reduced jobs from curtailed rice production and milling activity	68	68	68	68	68	68
Liberty County						
Reduced income from curtailed rice production and milling activity	$1.46	$1.74	$1.95	$2.18	$2.45	$2.75
Reduced business taxes from curtailed rice production and milling activity	$0.17	$0.20	$0.23	$0.25	$0.28	$0.32
Reduced jobs from curtailed rice production and milling activity	19	23	26	29	32	36
Waller County						
Reduced income from curtailed rice production and milling activity	$0.00	$0.27	$0.00	$0.01	$0.89	$1.90
Reduced business taxes from curtailed rice production and milling activity	$0.00	$0.03	$0.00	$0.00	$0.10	$0.22
Reduced jobs from curtailed rice production and milling activity	0	0	0	0	0	0

Manufacturing ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Austin County						
Reduced income from reduced manufacturing output	$0.00	$11.86	$22.17	$31.96	$40.21	$106.20
Reduced business taxes from reduced manufacturing output	$0.00	$1.07	$2.00	$2.89	$3.63	$9.59
Reduced jobs from reduced manufacturing output	0	139	260	375	472	1,246
Brazoria County						
Reduced income from reduced manufacturing output	$700.34	$1,470.14	$3,790.98	$4,648.20	$5,408.39	$6,327.48
Reduced business taxes from reduced manufacturing output	$74.51	$156.40	$403.31	$494.51	$575.38	$673.16
Reduced jobs from reduced manufacturing output	4,548	9,546	24,616	30,183	35,119	41,087
Chambers County						
Reduced income from reduced manufacturing output	$1,705.29	$1,944.04	$2,156.17	$2,367.47	$2,557.52	$2,803.08
Reduced business taxes from reduced manufacturing output	$162.69	$185.46	$205.70	$225.86	$243.99	$267.42
Reduced jobs from reduced manufacturing output	9,989	11,388	12,630	13,868	14,981	16,420
Fort Bend County						
Reduced income from reduced manufacturing output	$0.00	$74.25	$593.24	$635.04	$662.78	$583.42
Reduced business taxes from reduced manufacturing output	$0.00	$2.98	$23.83	$25.51	$26.63	$23.44
Reduced jobs from reduced manufacturing output	0	242	1,935	2,071	2,162	1,903
Harris County						
Reduced income from reduced manufacturing output	$301.80	$413.05	$507.94	$591.82	$654.59	$623.10
Reduced business taxes from reduced manufacturing output	$24.43	$33.44	$41.12	$47.91	$52.99	$50.44
Reduced jobs from reduced manufacturing output	1,978	2,707	3,329	3,879	4,290	4,084
Leon County						
Reduced income from reduced manufacturing output	$0.00	$10.18	$20.12	$60.27	$78.40	$95.25
Reduced business taxes from reduced manufacturing output	$0.00	$0.62	$1.22	$3.66	$4.76	$5.78
Reduced jobs from reduced manufacturing output	0	51	101	304	395	480
Liberty County						
Reduced income from reduced manufacturing output	$0.00	$13.93	$27.86	$42.18	$110.29	$132.73
Reduced business taxes from reduced manufacturing output	$0.00	$0.45	$0.91	$1.37	$3.59	$4.32
Reduced jobs from reduced manufacturing output	0	45	91	138	360	433

Manufacturing (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Madison County						
Reduced income from reduced manufacturing activity	$0.00	$0.52	$1.00	$1.48	$1.91	$4.93
Reduced business taxes from reduced manufacturing activity	$0.00	$0.02	$0.04	$0.07	$0.09	$0.22
Reduced jobs from reduced manufacturing activity	0	6	12	18	23	59
Montgomery County						
Reduced income from reduced manufacturing activity	$24.95	$105.12	$294.50	$373.66	$453.03	$532.83
Reduced business taxes from reduced manufacturing activity	$1.90	$8.00	$22.42	$28.44	$34.48	$40.56
Reduced jobs from reduced manufacturing activity	250	1,054	2,952	3,745	4,541	5,341
San Jacinto County						
Reduced income from reduced manufacturing activity	$0.00	$0.04	$0.08	$0.12	$0.15	$0.20
Reduced business taxes from reduced manufacturing activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Reduced jobs from reduced manufacturing activity	0	0	0	1	1	1
Walker Bend County						
Reduced income from reduced manufacturing activity	$0.00	$1.42	$2.97	$7.03	$8.52	$10.17
Reduced business taxes from reduced manufacturing activity	$0.00	$0.05	$0.10	$0.23	$0.28	$0.34
Reduced jobs from reduced manufacturing activity	0	11	24	56	68	82
Waller County						
Reduced income from reduced manufacturing activity	$0.00	$4.64	$8.90	$13.16	$17.03	$21.28
Reduced business taxes from reduced manufacturing activity	$0.00	$0.28	$0.53	$0.78	$1.01	$1.27
Reduced jobs from reduced manufacturing activity	0	45	87	128	166	207

Mining ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Harris County						
Reduced income from reduced mining activity	$0.68	$1.41	$1.86	$4.63	$5.55	$6.36
Reduced business taxes from reduced mining activity	$0.05	$0.11	$0.14	$0.35	$0.41	$0.47
Reduced jobs from reduced mining activity	4	9	11	28	34	39
Liberty County						
Reduced income from reduced mining activity	$0.00	$1.23	$2.28	$3.25	$4.35	$5.51
Reduced business taxes from reduced mining activity	$0.00	$0.16	$0.30	$0.43	$0.58	$0.74
Reduced jobs from reduced mining activity	0	45	83	118	159	201
Montgomery County						
Reduced income from reduced mining activity	$0.65	$2.55	$6.59	$7.82	$9.03	$10.04
Reduced business taxes from reduced mining activity	$0.06	$0.25	$0.64	$0.76	$0.87	$0.97
Reduced jobs from reduced mining activity	11	22	29	34	40	44
Polk County						
Reduced income from reduced mining activity	$0.00	$0.001	$0.002	$0.002	$0.003	$0.003
Reduced business taxes from reduced mining activity	$0.00	$0.0001	$0.0001	$0.0001	$0.0002	$0.0002
Reduced jobs from reduced mining activity	0	0	0	0	0	0

Steam-electric ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Fort Bend County						
Reduced income from reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$0.00	$103.48
Reduced business taxes from reduced electrical generation	$0.00	$0.00	$0.00	$0.00	$0.00	$14.85
Reduced jobs from reduced electrical generation	0	0	0	0	0	352
Galveston County						
Reduced income from reduced electrical generation	$321.83	$102.30	$282.56	$377.52	$493.37	$634.48
Reduced business taxes from reduced electrical generation	$46.19	$14.68	$40.56	$54.19	$70.82	$91.07
Reduced jobs from reduced electrical generation	1,094	348	961	1,283	1,677	2,157
Harris County						
Reduced income from reduced electrical generation	$10.49	$501.07	$713.74	$1,945.92	$2,577.91	$3,348.21
Reduced business taxes from reduced electrical generation	$1.51	$71.92	$102.45	$279.31	$370.02	$480.58
Reduced jobs from reduced electrical generation	36	1,703	2,426	6,615	8,763	11,382
Liberty County						
Reduced income from reduced electrical generation	$0.00	$47.56	$148.48	$213.53	$292.79	$389.47
Reduced business taxes from reduced electrical generation	$0.00	$6.83	$21.31	$30.65	$42.03	$55.90
Reduced jobs from reduced electrical generation	0	162	505	726	995	1,324
Montgomery County						
Reduced income from reduced electrical generation	$0.00	$0.00	$0.00	$0.59	$47.69	$105.16
Reduced business taxes from reduced electrical generation	$0.00	$0.00	$0.00	$0.08	$6.85	$15.09
Reduced jobs from reduced electrical generation	0	0	0	2	162	357

Municipal ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Alvin						
Monetary value of domestic water shortages	$0.00	$0.16	$0.32	$0.44	$0.80	$1.09
Lost utility revenues	$0.00	$0.31	$0.58	$0.79	$1.14	$1.55
Ames						
Monetary value of domestic water shortages	$0.00	$0.03	$0.07	$0.12	$0.76	$1.12
Lost utility revenues	$0.00	$0.04	$0.08	$0.12	$0.17	$0.22
Angleton						
Monetary value of domestic water shortages	$0.32	$0.33	$0.35	$0.35	$0.42	$0.58
Lost utility revenues	$0.51	$0.52	$0.55	$0.57	$0.67	$0.83
Arcola						
Monetary value of domestic water shortages	$0.00	$1.17	$4.90	$5.56	$6.43	$8.83
Lost income from reduced commercial business activity	$0.00	$0.00	$0.12	$0.15	$0.19	$0.24
Lost jobs due to reduced commercial business activity	0	0	5	6	8	10
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.02	$0.02	$0.03	$0.04
Lost utility revenues	$0.00	$0.26	$0.56	$0.64	$0.74	$0.86
Bailey's Prairie						
Monetary value of domestic water shortages	$0.00	$0.01	$0.07	$0.13	$0.23	$0.02
Lost utility revenues	$0.00	$0.01	$0.01	$0.02	$0.02	$0.03
Beach City						
Monetary value of domestic water shortages	$3.82	$7.01	$8.99	$10.87	$12.77	$14.64
Lost income from reduced commercial business activity	$0.26	$0.41	$0.55	$0.67	$0.80	$0.93
Lost jobs due to reduced commercial business activity	10	17	22	27	32	38
Lost state and local taxes from reduced commercial business activity	$0.04	$0.06	$0.09	$0.10	$0.12	$0.14
Lost utility revenues	$0.45	$0.64	$0.82	$0.97	$1.13	$1.30
Beasley						
Monetary value of domestic water shortages	$0.00	$0.01	$0.04	$0.09	$0.58	$0.99
Lost utility revenues	$0.00	$0.02	$0.05	$0.08	$0.13	$0.18

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Bellaire						
Monetary value of domestic water shortages	$0.35	$7.38	$8.64	$8.50	$8.41	$8.41
Lost income from reduced commercial business activity	$0.00	$2.60	$3.21	$3.16	$3.12	$3.12
Lost jobs due to reduced commercial business activity	0	82	101	100	98	98
Lost state and local taxes from reduced commercial business activity	$0.00	$0.37	$0.46	$0.45	$0.45	$0.45
Lost utility revenues	$3.07	$3.55	$4.02	$4.52	$5.05	$5.63
Belleville						
Monetary value of domestic water shortages	$0.00	$0.37	$0.77	$0.92	$3.27	$4.02
Lost utility revenues	$0.00	$0.52	$0.86	$1.04	$1.13	$1.28
Blue Manor Utility Co.						
Monetary value of domestic water shortages	$0.35	$7.38	$8.64	$8.50	$8.41	$8.41
Lost income from reduced commercial business activity	$0.00	$2.60	$3.21	$3.16	$3.12	$3.12
Lost jobs due to reduced commercial business activity	0	82	101	100	98	98
Lost state and local taxes from reduced commercial business activity	$0.00	$0.37	$0.46	$0.45	$0.45	$0.45
Lost utility revenues	$0.34	$0.78	$0.88	$0.87	$0.86	$0.86
Brazoria MUD #1						
Monetary value of domestic water shortages	$0.00	$4.08	$16.92	$16.17	$25.56	$33.73
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$2.87	$4.32	$11.70
Lost jobs due to reduced commercial business activity	0	0	0	90	136	369
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.41	$0.62	$1.67
Lost utility revenues	$0.00	$0.68	$1.36	$1.96	$2.62	$3.31
Brazoria MUD #2						
Monetary value of domestic water shortages	$0.00	$3.34	$13.70	$13.21	$17.36	$26.05
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$3.52	$5.33	$14.44
Lost jobs due to reduced commercial business activity	0	0	0	111	168	455
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.50	$0.76	$2.06
Lost utility revenues	$0.00	$0.94	$1.85	$2.67	$3.55	$4.48

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Brazoria MUD #3						
Monetary value of domestic water shortages	$0.00	$2.95	$6.46	$11.72	$18.38	$22.79
Lost income from reduced commercial business activity	$0.00	$0.00	$0.56	$2.07	$3.12	$8.43
Lost jobs due to reduced commercial business activity	0	0	18	65	98	266
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.08	$0.29	$0.44	$1.20
Lost utility revenues	$0.00	$0.53	$1.06	$1.52	$2.04	$2.57
Britmoore Utility						
Monetary value of domestic water shortages	$1.55	$7.15	$9.75	$11.74	$13.47	$15.10
Lost income from reduced commercial business activity	$0.00	$2.54	$3.62	$4.26	$4.89	$5.55
Lost jobs due to reduced commercial business activity	0	80	114	134	154	175
Lost state and local taxes from reduced commercial business activity	$0.00	$0.36	$0.52	$0.61	$0.70	$0.79
Lost utility revenues	$0.28	$0.76	$0.99	$1.15	$1.30	$1.46
Brookshire						
Monetary value of domestic water shortages	$0.00	$1.44	$5.09	$13.19	$12.89	$20.70
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$2.25	$3.52
Lost jobs due to reduced commercial business activity	0	0	0	0	71	111
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.32	$0.50
Lost utility revenues	$0.00	$0.34	$0.72	$1.15	$1.67	$2.30
Brookside Village						
Monetary value of domestic water shortages	$0.00	$0.04	$0.09	$0.15	$0.23	$1.21
Lost utility revenues	$0.00	$0.06	$0.11	$0.16	$0.22	$0.29
Buffalo						
Monetary value of domestic water shortages	$0.00	$0.04	$0.07	$0.06	$0.05	$0.06
Lost utility revenues	$0.00	$0.07	$0.10	$0.10	$0.09	$0.09
Bunker Village						
Monetary value of domestic water shortages	$0.90	$1.14	$4.52	$4.44	$4.42	$4.42
Lost utility revenues	$1.12	$1.10	$1.09	$1.07	$1.06	$1.06

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Candlelight Hills Sub.						
Monetary value of domestic water shortages	$1.48	$7.01	$9.49	$11.03	$12.52	$14.09
Lost income from reduced commercial business activity	$0.00	$0.94	$1.36	$1.61	$1.86	$2.11
Lost jobs due to reduced commercial business activity	0	38	55	65	75	85
Lost state and local taxes from reduced commercial business activity	$0.00	$0.15	$0.21	$0.25	$0.29	$0.33
Lost utility revenues	$0.27	$0.73	$0.97	$1.13	$1.28	$1.45
Centerville						
Monetary value of domestic water shortages	$0.00	$0.02	$0.03	$0.02	$0.02	$0.02
Lost utility revenues	$0.00	$0.03	$0.04	$0.04	$0.03	$0.03
Central Harris Co. Regional Water Authority						
Monetary value of domestic water shortages	$0.00	$4.33	$27.43	$27.43	$27.43	$27.43
Lost utility revenues	$0.00	$3.90	$5.08	$5.08	$5.08	$5.08
Chimney Hill MUD						
Monetary value of domestic water shortages	$0.00	$0.03	$0.09	$0.08	$0.08	$0.08
Lost utility revenues	$0.00	$0.05	$0.14	$0.12	$0.12	$0.12
Clear Lake Shores						
Monetary value of domestic water shortages	$0.82	$0.86	$0.88	$0.86	$0.86	$0.96
Lost utility revenues	$0.20	$0.21	$0.21	$0.21	$0.21	$0.21
Cleveland						
Monetary value of domestic water shortages	$0.00	$0.02	$0.05	$0.07	$0.13	$0.19
Lost utility revenues	$0.00	$0.04	$0.09	$0.14	$0.23	$0.34
Clute						
Monetary value of domestic water shortages	$0.03	$0.06	$0.12	$0.15	$0.23	$0.36
Lost utility revenues	$0.06	$0.12	$0.22	$0.26	$0.37	$0.51
Coldspring						
Monetary value of domestic water shortages	$0.00	$0.04	$0.09	$0.12	$0.15	$0.16
Lost utility revenues	$0.00	$0.06	$0.11	$0.13	$0.15	$0.16

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Conroe						
Monetary value of domestic water shortages	$14.91	$74.86	$234.26	$199.42	$303.76	$423.28
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$102.70	$170.72
Lost jobs due to reduced commercial business activity	0	0	0	0	2,289	3,806
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$10.93	$18.17
Lost utility revenues	$4.73	$11.32	$17.88	$18.67	$30.19	$43.52
Consumers Water Inc.						
Monetary value of domestic water shortages	$1.78	$8.87	$12.63	$15.72	$20.45	$26.13
Lost income from reduced commercial business activity	$0.00	$0.93	$1.61	$2.06	$3.00	$3.75
Lost jobs due to reduced commercial business activity	0	38	65	83	121	151
Lost state and local taxes from reduced commercial business activity	$0.00	$0.14	$0.25	$0.32	$0.47	$0.58
Lost utility revenues	$0.34	$0.93	$1.35	$1.71	$2.15	$2.62
County-other (Austin)						
Monetary value of domestic water shortages	$0.00	$0.02	$0.05	$0.05	$0.06	$0.07
County-other (Brazoria)						
Monetary value of domestic water shortages	$51.27	$60.68	$79.48	$100.95	$113.90	$128.36
County-other (Chambers)						
Monetary value of domestic water shortages	$6.07	$5.88	$5.71	$5.53	$5.39	$5.38
County-other (Fort Bend)						
Monetary value of domestic water shortages	$0.00	$0.35	$5.08	$19.74	$220.50	$646.50
County-other (Harris)						
Monetary value of domestic water shortages	$3.25	$0.00	$99.80	$405.59	$826.26	$1,270.87

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
County-other (Leon)						
Monetary value of domestic water shortages	$0.00	$0.06	$0.07	$0.03	$0.01	$0.02
County-other (Liberty)						
Monetary value of domestic water shortages	$0.00	$0.61	$1.52	$2.91	$12.96	$20.82
County-other (Madison)						
Monetary value of domestic water shortages	$0.00	$0.06	$0.12	$0.08	$0.11	$0.21
County-other (Montgomery)						
Monetary value of domestic water shortages	$9.42	$103.75	$255.07	$532.19	$950.21	$1,625.12
County-other (Polk)						
Monetary value of domestic water shortages	$0.00	$0.08	$0.15	$0.20	$0.32	$0.48
County-other (San Jacinto)						
Monetary value of domestic water shortages	$0.00	$0.11	$0.19	$0.26	$0.28	$0.34
County-other (Waller)						
Monetary value of domestic water shortages	$0.00	$0.24	$0.59	$1.14	$6.19	$10.52
Crosby MUD						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.02

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Crystal Springs Water Co.						
Monetary value of domestic water shortages	$1.26	$5.98	$8.23	$11.94	$22.06	$29.45
Lost income from reduced commercial business activity	$0.00	$0.00	$1.24	$2.20	$7.47	$11.06
Lost jobs due to reduced commercial business activity	0	0	39	69	236	349
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.18	$0.31	$1.07	$1.58
Lost utility revenues	$0.27	$0.59	$0.96	$1.42	$2.13	$2.95
Cut and Shoot						
Monetary value of domestic water shortages	$0.43	$1.86	$2.82	$2.80	$3.59	$6.02
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.24	$0.40
Lost jobs due to reduced commercial business activity	0	0	0	0	10	16
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.04	$0.06
Lost utility revenues	$0.10	$0.20	$0.30	$0.30	$0.47	$0.67
Daisetta						
Monetary value of domestic water shortages	$0.00	$0.00	$0.01	$0.01	$0.01	$0.02
Lost utility revenues	$0.00	$0.01	$0.01	$0.01	$0.02	$0.04
Danbury						
Monetary value of domestic water shortages	$0.00	$0.01	$0.02	$0.03	$0.05	$0.09
Lost utility revenues	$0.00	$0.02	$0.04	$0.05	$0.08	$0.11
Dayton						
Monetary value of domestic water shortages	$0.00	$0.69	$6.43	$0.00	$0.00	$20.74
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$12.62
Lost jobs due to reduced commercial business activity	0	0	0	0	0	281
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$1.34
Lost utility revenues	$0.00	$0.78	$1.49	$2.17	$2.96	$3.88
Deer Park						
Monetary value of domestic water shortages	$0.00	$0.00	$0.03	$0.04	$0.13	$0.27
Lost utility revenues	$0.00	$0.00	$0.05	$0.08	$0.22	$0.46

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Dickinson						
Monetary value of domestic water shortages	$1.08	$2.07	$9.79	$10.07	$10.38	$10.73
Lost utility revenues	$1.25	$1.86	$2.17	$2.23	$2.30	$2.38
East Plantation UD						
Monetary value of domestic water shortages	$0.97	$4.40	$7.24	$7.86	$10.79	$19.08
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.77	$2.65
Lost jobs due to reduced commercial business activity	0	0	0	0	31	106
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.12	$0.41
Lost utility revenues	$0.21	$0.46	$0.76	$0.83	$1.43	$2.12
El Dorado UD						
Monetary value of domestic water shortages	$1.52	$6.70	$8.46	$9.22	$10.03	$10.94
Lost income from reduced commercial business activity	$0.00	$0.90	$1.21	$1.33	$1.47	$1.62
Lost jobs due to reduced commercial business activity	0	36	49	54	59	65
Lost state and local taxes from reduced commercial business activity	$0.00	$0.14	$0.19	$0.21	$0.23	$0.25
Lost utility revenues	$0.28	$0.70	$0.86	$0.94	$1.03	$1.12
EL Lago						
Monetary value of domestic water shortages	$4.02	$4.53	$4.69	$4.82	$4.89	$6.30
Lost income from reduced commercial business activity	$0.26	$0.32	$0.35	$0.37	$0.39	$0.42
Lost jobs due to reduced commercial business activity	11	13	14	15	16	17
Lost state and local taxes from reduced commercial business activity	$0.04	$0.05	$0.05	$0.06	$0.06	$0.06
Lost utility revenues	$0.55	$0.59	$0.62	$0.63	$0.65	$0.67
Fairchilds						
Monetary value of domestic water shortages	$0.00	$1.39	$6.73	$9.00	$15.27	$19.78
Lost income from reduced commercial business activity	$0.00	$0.00	$0.17	$0.28	$0.84	$1.17
Lost jobs due to reduced commercial business activity	0	0	7	11	34	47
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.03	$0.04	$0.13	$0.18
Lost utility revenues	$0.00	$0.30	$0.77	$1.04	$1.41	$1.83

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
First Colony MUD #9						
Monetary value of domestic water shortages	$0.00	$0.69	$10.05	$10.40	$10.99	$11.53
Lost income from reduced commercial business activity	$0.00	$0.00	$0.38	$0.41	$0.45	$0.49
Lost jobs due to reduced commercial business activity	0	0	15	17	18	20
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.06	$0.06	$0.07	$0.08
Lost utility revenues	$0.00	$0.78	$1.61	$1.69	$1.78	$1.87
Flo Community WSC						
Monetary value of domestic water shortages	$0.00	$0.17	$0.33	$0.22	$0.20	$0.21
Lost utility revenues	$0.00	$0.20	$0.29	$0.29	$0.26	$0.27
Fort Bend County MUD #106						
Monetary value of domestic water shortages	$0.00	$0.17	$0.33	$0.22	$0.20	$0.21
Lost income from reduced commercial business activity	$0.00	$0.00	$0.25	$0.25	$0.25	$0.25
Lost jobs due to reduced commercial business activity	0	0	10	10	10	10
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.04	$0.04	$0.04	$0.04
Lost utility revenues	$0.00	$0.57	$1.14	$1.14	$1.14	$1.14
Fort Bend County MUD #108						
Monetary value of domestic water shortages	$0.00	$1.43	$5.08	$5.07	$5.07	$5.07
Lost income from reduced commercial business activity	$0.00	$0.00	$0.15	$0.15	$0.15	$0.15
Lost jobs due to reduced commercial business activity	0	0	6	6	6	6
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.02	$0.02	$0.02	$0.02
Lost utility revenues	$0.00	$0.34	$0.68	$0.68	$0.68	$0.68
Fort Bend County MUD #23						
Monetary value of domestic water shortages	$0.00	$4.26	$12.47	$12.47	$12.48	$12.48
Lost income from reduced commercial business activity	$0.00	$0.00	$1.35	$1.35	$1.35	$1.35
Lost jobs due to reduced commercial business activity	0	0	54	54	54	54
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.21	$0.21	$0.21	$0.21
Lost utility revenues	$0.00	$1.11	$2.22	$2.22	$2.22	$2.22

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Fort Bend County MUD #25						
Monetary value of domestic water shortages	$0.00	$4.70	$17.59	$29.86	$65.65	$88.26
Lost income from reduced commercial business activity	$0.00	$0.00	$2.01	$3.24	$4.92	$6.83
Lost jobs due to reduced commercial business activity	0	0	81	130	198	275
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.31	$0.50	$0.76	$1.06
Lost utility revenues	$0.00	$1.22	$3.31	$4.76	$6.73	$8.97
Fort Bend County MUD #67						
Monetary value of domestic water shortages	$0.00	$2.70	$7.33	$7.30	$7.30	$7.30
Lost income from reduced commercial business activity	$0.00	$0.00	$0.55	$0.54	$0.54	$0.54
Lost jobs due to reduced commercial business activity	0	0	22	22	22	22
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.08	$0.08	$0.08	$0.08
Lost utility revenues	$0.00	$0.49	$0.97	$0.97	$0.97	$0.97
Fort Bend County MUD #69						
Monetary value of domestic water shortages	$0.00	$1.58	$4.28	$4.28	$4.28	$4.28
Lost income from reduced commercial business activity	$0.00	$0.00	$0.32	$0.32	$0.32	$0.32
Lost jobs due to reduced commercial business activity	0	0	13	13	13	13
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.05	$0.05	$0.05	$0.05
Lost utility revenues	$0.00	$0.29	$0.57	$0.57	$0.57	$0.57
Fort Bend County MUD #81						
Monetary value of domestic water shortages	$0.00	$3.40	$12.11	$16.49	$22.31	$28.95
Lost income from reduced commercial business activity	$0.00	$0.00	$0.90	$1.41	$4.16	$5.70
Lost jobs due to reduced commercial business activity	0	0	36	57	167	229
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.14	$0.22	$0.65	$0.88
Lost utility revenues	$0.00	$0.61	$1.60	$2.25	$3.10	$4.08

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Fountain View Sub.						
Monetary value of domestic water shortages	$2.25	$11.60	$17.27	$12.02	$17.55	$28.36
Lost income from reduced commercial business activity	$0.00	$0.69	$0.97	$1.11	$1.27	$1.43
Lost jobs due to reduced commercial business activity	0	28	39	45	51	58
Lost state and local taxes from reduced commercial business activity	$0.00	$0.11	$0.15	$0.17	$0.20	$0.22
Lost utility revenues	$0.20	$0.54	$0.69	$0.78	$0.88	$0.98
Freeport						
Monetary value of domestic water shortages	$0.00	$0.33	$0.86	$1.39	$6.70	$9.56
Lost utility revenues	$0.00	$0.53	$1.09	$1.57	$2.13	$2.76
Fulshear						
Monetary value of domestic water shortages	$0.00	$1.45	$4.97	$7.87	$11.18	$15.14
Lost income from reduced commercial business activity	$0.00	$0.00	$0.37	$1.09	$1.56	$2.12
Lost jobs due to reduced commercial business activity	0	0	15	44	63	85
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.06	$0.17	$0.24	$0.33
Lost utility revenues	$0.00	$0.26	$0.66	$0.88	$1.18	$1.53
Galena Park						
Monetary value of domestic water shortages	$0.10	$0.10	$0.11	$0.12	$0.16	$0.22
Lost utility revenues	$0.18	$0.19	$0.21	$0.22	$0.28	$0.37
Green Trails MUD						
Monetary value of domestic water shortages	$0.56	$9.26	$13.11	$17.12	$19.10	$21.07
Lost income from reduced commercial business activity	$0.00	$0.18	$0.60	$0.70	$0.81	$0.91
Lost jobs due to reduced commercial business activity	0	7	48	57	65	73
Lost state and local taxes from reduced commercial business activity	$0.56	$8.80	$12.35	$16.23	$17.98	$19.80
Lost utility revenues	$0.00	$0.03	$0.09	$0.11	$0.13	$0.14

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
HMW SUD						
Monetary value of domestic water shortages	$2.25	$11.57	$17.50	$12.10	$18.48	$30.92
Lost income from reduced commercial business activity	$0.00	$0.00	$2.98	$2.06	$4.96	$8.27
Lost jobs due to reduced commercial business activity	0	0	94	65	156	261
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.42	$0.29	$0.71	$1.18
Lost utility revenues	$0.71	$1.45	$2.20	$2.17	$3.46	$4.93
Hardin						
Monetary value of domestic water shortages	$0.00	$0.02	$0.06	$0.11	$0.62	$0.89
Lost utility revenues	$0.00	$0.04	$0.07	$0.11	$0.15	$0.20
Hardin WSC						
Monetary value of domestic water shortages	$0.00	$0.14	$0.36	$2.46	$3.66	$5.83
Lost utility revenues	$0.00	$0.20	$0.40	$0.59	$0.80	$1.05
Harris Co. FWSD #47						
Monetary value of domestic water shortages	$0.05	$0.04	$0.03	$0.02	$0.01	$0.01
Lost utility revenues	$0.10	$0.08	$0.05	$0.03	$0.02	$0.02
Harris Co. FWSD #51						
Monetary value of domestic water shortages	$0.77	$0.69	$0.48	$0.44	$0.44	$0.44
Lost utility revenues	$0.90	$0.80	$0.77	$0.70	$0.70	$0.70
Harris Co. FWSD #6						
Monetary value of domestic water shortages	$1.72	$3.27	$5.26	$4.13	$4.84	$6.78
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.28	$0.35	$0.44
Lost jobs due to reduced commercial business activity	0	0	0	22	28	36
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.04	$0.05	$0.07
Lost utility revenues	$0.25	$0.34	$0.43	$0.54	$0.64	$0.75

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Harris Co. MUD #11						
Monetary value of domestic water shortages	$1.37	$6.21	$8.13	$9.50	$10.55	$11.53
Lost income from reduced commercial business activity	$0.00	$0.84	$1.16	$1.32	$1.49	$1.42
Lost jobs due to reduced commercial business activity	0	34	47	53	60	57
Lost state and local taxes from reduced commercial business activity	$0.00	$0.13	$0.18	$0.20	$0.23	$0.22
Lost utility revenues	$0.25	$0.65	$0.83	$0.93	$1.03	$1.15
Harris Co. MUD #119						
Monetary value of domestic water shortages	$1.85	$11.52	$12.96	$12.69	$12.54	$12.54
Lost income from reduced commercial business activity	$0.00	$1.63	$2.00	$1.96	$1.94	$1.94
Lost jobs due to reduced commercial business activity	0	66	80	79	78	78
Lost state and local taxes from reduced commercial business activity	$0.00	$0.25	$0.31	$0.30	$0.30	$0.30
Lost utility revenues	$0.48	$1.18	$1.32	$1.29	$1.27	$1.27
Harris Co. MUD #132						
Monetary value of domestic water shortages	$3.70	$27.29	$37.18	$45.60	$58.69	$67.07
Lost income from reduced commercial business activity	$0.00	$3.87	$5.74	$7.01	$8.25	$9.55
Lost jobs due to reduced commercial business activity	0	156	231	282	332	384
Lost state and local taxes from reduced commercial business activity	$0.00	$0.60	$0.89	$1.09	$1.28	$1.48
Lost utility revenues	$0.96	$2.79	$3.78	$4.52	$5.25	$6.02
Harris Co. MUD #151						
Monetary value of domestic water shortages	$2.69	$16.75	$19.59	$19.46	$19.46	$19.46
Lost income from reduced commercial business activity	$0.00	$2.26	$2.80	$2.78	$2.78	$2.78
Lost jobs due to reduced commercial business activity	0	91	113	112	112	112
Lost state and local taxes from reduced commercial business activity	$0.00	$0.35	$0.43	$0.43	$0.43	$0.43
Lost utility revenues	$0.70	$1.62	$1.84	$1.83	$1.83	$1.83

* MUDs are not necessarily listed in numerical order.

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Harris Co. MUD #152						
Monetary value of domestic water shortages	$1.66	$12.72	$17.70	$22.11	$29.11	$33.65
Lost income from reduced commercial business activity	$0.00	$1.81	$2.73	$3.40	$4.11	$4.81
Lost jobs due to reduced commercial business activity	0	73	110	137	165	193
Lost state and local taxes from reduced commercial business activity	$0.00	$0.28	$0.42	$0.53	$0.64	$0.75
Lost utility revenues	$0.43	$1.30	$1.80	$2.19	$2.61	$3.02
Harris Co. MUD #154						
Monetary value of domestic water shortages	$0.67	$61.56	$90.21	$109.53	$128.25	$148.59
Lost income from reduced commercial business activity	$0.00	$1.02	$2.02	$2.97	$5.68	$6.58
Lost jobs due to reduced commercial business activity	$0.00	$1.48	$2.17	$2.63	$3.07	$3.56
Lost state and local taxes from reduced commercial business activity	$0.00	$0.23	$0.34	$0.41	$0.48	$0.55
Lost utility revenues	$0.37	$1.06	$1.43	$1.70	$1.96	$2.25
Harris Co. MUD #158						
Monetary value of domestic water shortages	$0.00	$0.01	$0.06	$0.05	$0.05	$0.05
Lost utility revenues	$0.00	$0.01	$0.11	$0.09	$0.09	$0.09
Harris Co. MUD #180						
Monetary value of domestic water shortages	$1.30	$9.30	$12.46	$15.09	$19.24	$21.90
Lost income from reduced commercial business activity	$0.00	$1.32	$1.92	$2.31	$2.70	$3.11
Lost jobs due to reduced commercial business activity	0	53	77	93	108	125
Lost state and local taxes from reduced commercial business activity	$0.00	$0.20	$0.30	$0.36	$0.42	$0.48
Lost utility revenues	$0.34	$0.95	$1.27	$1.50	$1.72	$1.96
Harris Co. MUD #189						
Monetary value of domestic water shortages	$0.39	$6.73	$16.33	$19.80	$25.27	$28.78
Lost income from reduced commercial business activity	$0.00	$1.73	$2.52	$3.04	$3.54	$4.09
Lost jobs due to reduced commercial business activity	0	69	101	122	143	164
Lost state and local taxes from reduced commercial business activity	$0.00	$0.27	$0.39	$0.47	$0.55	$0.63
Lost utility revenues	$0.44	$1.24	$1.66	$1.96	$2.26	$2.58

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Harris Co. MUD #261						
Monetary value of domestic water shortages	$0.30	$7.55	$14.28	$11.78	$11.78	$11.78
Lost utility revenues	$0.37	$1.08	$1.25	$1.24	$1.24	$1.24
Harris Co. MUD #345						
Monetary value of domestic water shortages	$2.99	$17.59	$20.22	$20.76	$23.00	$23.00
Lost income from reduced commercial business activity	$0.00	$2.50	$3.12	$3.11	$3.11	$3.11
Lost jobs due to reduced commercial business activity	0	100	125	125	125	125
Lost state and local taxes from reduced commercial business activity	$0.00	$0.39	$0.48	$0.48	$0.48	$0.48
Lost utility revenues	$0.78	$1.80	$2.05	$2.05	$2.05	$2.05
Harris Co. MUD #46						
Monetary value of domestic water shortages	$1.77	$10.30	$11.64	$11.91	$13.19	$13.19
Lost income from reduced commercial business activity	$0.00	$1.46	$1.80	$1.78	$1.78	$1.78
Lost jobs due to reduced commercial business activity	0	59	72	72	72	72
Lost state and local taxes from reduced commercial business activity	$0.00	$0.23	$0.28	$0.28	$0.28	$0.28
Lost utility revenues	$0.46	$1.05	$1.18	$1.17	$1.17	$1.17
Harris Co. MUD #5						
Monetary value of domestic water shortages	$1.38	$8.05	$16.58	$9.12	$9.96	$9.96
Lost income from reduced commercial business activity	$0.00	$1.14	$1.40	$1.37	$1.35	$1.35
Lost jobs due to reduced commercial business activity	0	46	56	55	54	54
Lost state and local taxes from reduced commercial business activity	$0.00	$0.18	$0.22	$0.21	$0.21	$0.21
Lost utility revenues	$0.39	$0.89	$0.99	$0.97	$0.96	$0.96
Harris Co. MUD #50						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.03	$0.09	$0.17
Lost utility revenues	$0.00	$0.00	$0.00	$0.06	$0.15	$0.24

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Harris Co. WCID #133						
Monetary value of domestic water shortages	$0.46	$9.92	$10.78	$10.63	$10.71	$10.71
Lost income from reduced commercial business activity	$0.00	$1.34	$1.66	$1.64	$1.65	$1.65
Lost jobs due to reduced commercial business activity	0	54	67	66	66	66
Lost state and local taxes from reduced commercial business activity	$0.00	$0.21	$0.26	$0.25	$0.26	$0.26
Lost utility revenues	$0.45	$1.04	$1.18	$1.17	$1.18	$1.18
Harris Co. WCID #21						
Monetary value of domestic water shortages	$0.65	$0.67	$0.74	$0.80	$2.93	$3.63
Lost utility revenues	$0.66	$0.75	$0.83	$0.90	$1.01	$1.15
Harris Co. WCID #36						
Monetary value of domestic water shortages	$0.35	$0.63	$0.77	$3.06	$3.99	$5.21
Lost utility revenues	$0.50	$0.71	$0.87	$1.06	$1.27	$1.50
Harris Co. WCID #50						
Monetary value of domestic water shortages	$19.77	$21.91	$23.83	$14.39	$15.60	$16.95
Lost income from reduced commercial business activity	$1.61	$1.79	$1.96	$2.13	$2.31	$2.52
Lost jobs due to reduced commercial business activity	65	72	79	86	93	101
Lost state and local taxes from reduced commercial business activity	$1.08	$1.19	$1.30	$1.40	$1.52	$1.66
Lost utility revenues	$0.18	$3.82	$5.45	$5.33	$5.26	$5.26
Harris Co. WCID #76						
Monetary value of domestic water shortages	$0.18	$3.82	$5.45	$5.33	$5.26	$5.26
Lost utility revenues	$0.18	$0.40	$0.45	$0.44	$0.43	$0.43
Harris Co. WCID #84						
Monetary value of domestic water shortages	$2.09	$2.11	$2.13	$2.11	$2.17	$2.26
Lost utility revenues	$0.46	$0.46	$0.47	$0.46	$0.48	$0.50

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Hedwig Village						
Monetary value of domestic water shortages	$7.60	$7.60	$8.99	$8.98	$9.10	$9.18
Lost income from reduced commercial business activity	$1.47	$1.49	$1.51	$1.53	$1.56	$1.59
Lost jobs due to reduced commercial business activity	46	47	48	48	49	50
Lost state and local taxes from reduced commercial business activity	$0.21	$0.21	$0.22	$0.22	$0.22	$0.23
Lost utility revenues	$1.00	$1.00	$1.00	$1.00	$1.01	$1.02
Hempstead						
Monetary value of domestic water shortages	$0.00	$4.19	$18.12	$19.21	$32.33	$68.46
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$5.45	$17.91	$26.16
Lost jobs due to reduced commercial business activity	0	0	0	172	565	825
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.78	$2.55	$3.73
Lost utility revenues	$0.00	$1.09	$2.27	$3.61	$5.20	$7.06
Hill Crest Village						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.01	$0.01
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.01	$0.02
Hillshire Village						
Monetary value of domestic water shortages	$0.00	$0.02	$0.05	$0.04	$0.04	$0.04
Lost utility revenues	$0.00	$0.03	$0.06	$0.06	$0.06	$0.06
Houston						
Monetary value of domestic water shortages	$0.01	$6.51	$12.01	$16.38	$20.20	$60.15
Lost utility revenues	$0.02	$11.66	$19.76	$20.04	$20.41	$77.37
Humble						
Monetary value of domestic water shortages	$7.41	$49.74	$63.56	$70.50	$77.72	$85.35
Lost income from reduced commercial business activity	$0.00	$18.25	$25.22	$28.46	$31.84	$35.41
Lost jobs due to reduced commercial business activity	0	575	795	898	1,004	1,117
Lost state and local taxes from reduced commercial business activity	$0.00	$2.60	$3.59	$4.06	$4.54	$5.05
Lost utility revenues	$1.93	$5.12	$6.44	$7.18	$7.94	$8.75

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Hunters Creek Village						
Monetary value of domestic water shortages	$25.38	$28.35	$39.28	$24.59	$26.43	$28.67
Lost income from reduced commercial business activity	$3.09	$3.52	$3.94	$8.68	$9.57	$10.53
Lost jobs due to reduced commercial business activity	98	111	124	274	302	332
Lost state and local taxes from reduced commercial business activity	$0.44	$0.50	$0.56	$1.24	$1.36	$1.50
Lost utility revenues	$2.10	$2.31	$2.53	$2.73	$2.95	$3.19
Iowa Colony						
Monetary value of domestic water shortages	$0.00	$0.01	$0.02	$0.04	$0.37	$0.59
Lost utility revenues	$0.00	$0.02	$0.04	$0.05	$0.07	$0.10
Jacinto City						
Monetary value of domestic water shortages	$0.00	$0.00	$0.02	$0.07	$0.15	$0.27
Lost utility revenues	$0.00	$0.00	$0.05	$0.14	$0.27	$0.42
Jersey Village						
Monetary value of domestic water shortages	$0.00	$2.75	$10.85	$10.42	$14.58	$17.31
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$2.61	$3.78	$5.00
Lost jobs due to reduced commercial business activity	0	0	0	82	119	158
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.37	$0.54	$0.71
Lost utility revenues	$0.00	$0.87	$1.64	$2.18	$2.71	$3.26
Jewett						
Monetary value of domestic water shortages	$0.00	$0.05	$0.09	$0.08	$0.08	$0.08
Lost utility revenues	$0.00	$0.07	$0.11	$0.10	$0.10	$0.10
Katy						
Monetary value of domestic water shortages	$7.93	$58.27	$80.49	$101.51	$131.87	$154.21
Lost income from reduced commercial business activity	$0.00	$49.14	$73.83	$91.80	$110.75	$131.41
Lost jobs due to reduced commercial business activity	0	1,033	1,543	1,905	2,281	2,686
Lost state and local taxes from reduced commercial business activity	$0.00	$5.00	$7.47	$9.24	$11.08	$13.07
Lost utility revenues	$2.09	$6.04	$8.30	$10.12	$12.03	$14.12

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Kemah						
Monetary value of domestic water shortages	$3.28	$4.33	$4.79	$4.93	$5.00	$5.11
Lost income from reduced commercial business activity	$1.19	$1.54	$1.75	$1.82	$1.85	$1.90
Lost jobs due to reduced commercial business activity	37	49	55	57	58	60
Lost state and local taxes from reduced commercial business activity	$0.17	$0.22	$0.25	$0.26	$0.26	$0.27
Lost utility revenues	$0.37	$0.46	$0.51	$0.52	$0.53	$0.54
Kendleton						
Monetary value of domestic water shortages	$0.00	$0.07	$0.90	$1.64	$4.76	$7.29
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.17	$0.32	$1.01
Lost jobs due to reduced commercial business activity	0	0	0	7	13	41
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.03	$0.05	$0.16
Lost utility revenues	$0.00	$0.09	$0.20	$0.34	$0.53	$0.77
Kenefick						
Monetary value of domestic water shortages	$0.00	$0.02	$0.06	$0.41	$0.61	$0.98
Lost utility revenues	$0.00	$0.04	$0.07	$0.10	$0.13	$0.18
Lake Jackson						
Monetary value of domestic water shortages	$1.44	$1.90	$8.43	$10.78	$12.66	$16.37
Lost utility revenues	$1.83	$2.41	$2.92	$3.42	$4.02	$4.72
Lake Livingston Water Supply and Sewer Co.						
Monetary value of domestic water shortages	$0.00	$0.06	$0.12	$0.15	$0.23	$0.36
Lost utility revenues	$0.00	$0.11	$0.21	$0.25	$0.35	$0.47
Longhorn Town UD						
Monetary value of domestic water shortages	$1.96	$11.33	$17.31	$23.47	$28.59	$33.69
Lost income from reduced commercial business activity	$0.00	$3.97	$6.44	$8.51	$10.56	$12.61
Lost jobs due to reduced commercial business activity	0	125	203	268	333	398
Lost state and local taxes from reduced commercial business activity	$0.00	$0.57	$0.92	$1.21	$1.51	$1.80
Lost utility revenues	$0.35	$1.19	$1.76	$2.27	$2.77	$3.27

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Madison						
Monetary value of domestic water shortages	$0.00	$0.04	$0.07	$0.09	$0.12	$0.18
Lost utility revenues	$0.00	$0.07	$0.11	$0.15	$0.20	$0.25
Magnolia						
Monetary value of domestic water shortages	$8.85	$12.18	$16.13	$20.46	$26.25	$33.12
Lost income from reduced commercial business activity	$3.55	$4.89	$6.48	$8.22	$10.54	$13.30
Lost jobs due to reduced commercial business activity	112	154	204	259	332	419
Lost state and local taxes from reduced commercial business activity	$0.51	$0.70	$0.92	$1.17	$1.50	$1.90
Lost utility revenues	$0.20	$0.53	$0.92	$1.34	$1.91	$2.59
Manvel						
Monetary value of domestic water shortages	$0.00	$0.16	$0.16	$0.15	$0.15	$0.15
Lost utility revenues	$0.00	$0.20	$0.20	$0.19	$0.19	$0.19
Mason Creek UD						
Monetary value of domestic water shortages	$4.97	$29.11	$33.04	$32.75	$32.60	$32.60
Lost income from reduced commercial business activity	$0.00	$10.74	$13.25	$13.14	$13.08	$13.08
Lost jobs due to reduced commercial business activity	0	339	418	414	412	412
Lost state and local taxes from reduced commercial business activity	$0.00	$1.53	$1.89	$1.87	$1.86	$1.86
Lost utility revenues	$1.29	$2.98	$3.36	$3.33	$3.31	$3.31
Meadows						
Monetary value of domestic water shortages	$0.00	$4.32	$11.82	$11.68	$11.63	$11.63
Lost income from reduced commercial business activity	$0.00	$0.00	$3.51	$3.47	$3.45	$3.45
Lost jobs due to reduced commercial business activity	0	0	111	109	109	109
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.50	$0.49	$0.49	$0.49
Lost utility revenues	$0.00	$1.12	$2.22	$2.20	$2.18	$2.18
Mercy WSC						
Monetary value of domestic water shortages	$0.00	$0.11	$0.25	$0.62	$1.83	$2.18
Lost utility revenues	$0.00	$0.16	$0.28	$0.37	$0.43	$0.48
Missouri City						
Monetary value of domestic water shortages	$0.00	$0.00	$6.76	$16.42	$95.68	$121.77
Lost utility revenues	$0.00	$0.00	$7.97	$15.07	$20.49	$32.02

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Mont Belvieu						
Monetary value of domestic water shortages	$16.73	$23.27	$29.83	$35.04	$40.45	$46.00
Lost income from reduced commercial business activity	$2.56	$3.76	$4.85	$5.81	$6.80	$7.82
Lost jobs due to reduced commercial business activity	81	118	153	183	214	247
Lost state and local taxes from reduced commercial business activity	$0.37	$0.54	$0.69	$0.83	$0.97	$1.11
Lost utility revenues	$1.53	$2.11	$2.65	$3.12	$3.60	$4.10
Montgomery						
Monetary value of domestic water shortages	$0.51	$16.06	$26.64	$36.18	$39.77	$50.18
Lost income from reduced commercial business activity	$0.00	$6.03	$9.91	$13.74	$13.86	$18.18
Lost jobs due to reduced commercial business activity	0	190	313	433	437	573
Lost state and local taxes from reduced commercial business activity	$0.00	$0.86	$1.41	$1.96	$1.98	$2.59
Lost utility revenues	$0.11	$1.64	$2.59	$3.52	$3.82	$4.85
Montgomery MUD #18						
Monetary value of domestic water shortages	$2.48	$12.20	$20.13	$25.33	$49.72	$115.72
Lost income from reduced commercial business activity	$0.00	$0.00	$2.28	$2.43	$10.49	$17.04
Lost jobs due to reduced commercial business activity	0	0	91	97	420	683
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.35	$0.38	$1.63	$2.64
Lost utility revenues	$0.79	$1.84	$3.81	$4.67	$7.97	$11.81
Montgomery MUD #19						
Monetary value of domestic water shortages	$0.95	$3.61	$3.63	$2.35	$3.63	$5.07
Lost income from reduced commercial business activity	$0.00	$0.00	$0.23	$0.13	$0.25	$0.34
Lost jobs due to reduced commercial business activity	0	0	9	5	10	14
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.04	$0.02	$0.04	$0.05
Lost utility revenues	$0.21	$0.38	$0.47	$0.38	$0.49	$0.56
Montgomery MUD #8						
Monetary value of domestic water shortages	$1.74	$8.72	$10.80	$10.85	$12.51	$16.52
Lost income from reduced commercial business activity	$0.00	$0.00	$0.68	$0.61	$0.92	$1.15
Lost jobs due to reduced commercial business activity	0	0	27	24	37	46
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.11	$0.09	$0.14	$0.18
Lost utility revenues	$0.38	$0.92	$1.39	$1.37	$1.64	$1.84

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Montgomery MUD #9						
Monetary value of domestic water shortages	$1.64	$8.66	$11.58	$11.73	$13.67	$18.67
Lost income from reduced commercial business activity	$0.00	$0.00	$0.77	$0.65	$1.01	$1.29
Lost jobs due to reduced commercial business activity	0	0	31	26	40	52
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.12	$0.10	$0.16	$0.20
Lost utility revenues	$0.36	$0.91	$1.50	$1.47	$1.81	$2.06
Montgomery MUD #2						
Monetary value of domestic water shortages	$1.15	$4.40	$4.47	$4.94	$5.55	$7.11
Lost income from reduced commercial business activity	$0.00	$0.00	$0.28	$0.37	$0.46	$0.53
Lost jobs due to reduced commercial business activity	0	0	11	15	18	21
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.04	$0.06	$0.07	$0.08
Lost utility revenues	$0.25	$0.46	$0.57	$0.65	$0.73	$0.79
Montgomery MUD #3						
Monetary value of domestic water shortages	$1.00	$4.02	$4.60	$4.48	$6.34	$9.69
Lost income from reduced commercial business activity	$0.00	$0.00	$0.29	$0.18	$0.41	$0.64
Lost jobs due to reduced commercial business activity	0	0	11	7	16	26
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.04	$0.03	$0.06	$0.10
Lost utility revenues	$0.22	$0.42	$0.59	$0.53	$0.79	$1.08
Montgomery MUD #4						
Monetary value of domestic water shortages	$2.03	$7.72	$7.87	$6.75	$8.27	$10.85
Lost income from reduced commercial business activity	$0.00	$0.00	$0.49	$0.27	$0.53	$0.73
Lost jobs due to reduced commercial business activity	0	0	20	11	21	29
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.08	$0.04	$0.08	$0.11
Lost utility revenues	$0.45	$0.81	$1.01	$0.81	$1.04	$1.21
Montgomery County WCID #1						
Monetary value of domestic water shortages	$1.03	$4.13	$4.73	$5.98	$7.80	$12.48
Lost income from reduced commercial business activity	$0.00	$0.00	$0.30	$0.45	$1.28	$1.72
Lost jobs due to reduced commercial business activity	0	0	12	18	51	69
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.05	$0.07	$0.20	$0.27
Lost utility revenues	$0.23	$0.44	$0.61	$0.79	$1.02	$1.29

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Needville						
Monetary value of domestic water shortages	$0.00	$0.20	$2.36	$6.33	$6.26	$10.66
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$1.26	$2.07
Lost jobs due to reduced commercial business activity	0	0	0	0	40	65
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.18	$0.29
Lost utility revenues	$0.00	$0.19	$0.43	$0.67	$1.00	$1.40
New Caney MUD						
Monetary value of domestic water shortages	$1.93	$8.47	$11.32	$16.01	$27.42	$29.52
Lost income from reduced commercial business activity	$0.00	$0.00	$2.88	$4.83	$15.46	$23.02
Lost jobs due to reduced commercial business activity	0	0	91	152	488	726
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.41	$0.69	$2.20	$3.28
Lost utility revenues	$0.61	$1.28	$2.10	$3.02	$4.38	$6.08
New Waverly						
Monetary value of domestic water shortages	$0.00	$0.02	$0.03	$0.02	$0.02	$0.02
Lost utility revenues	$0.00	$0.03	$0.05	$0.04	$0.03	$0.03
Normangee						
Monetary value of domestic water shortages	$0.00	$0.02	$0.04	$0.03	$0.03	$0.04
Lost utility revenues	$0.00	$0.03	$0.05	$0.05	$0.04	$0.05
North Belt UD						
Monetary value of domestic water shortages	$0.28	$7.93	$11.38	$12.76	$17.50	$20.28
Lost income from reduced commercial business activity	$0.00	$1.07	$1.63	$2.04	$2.47	$2.90
Lost jobs due to reduced commercial business activity	0	43	65	82	99	116
Lost state and local taxes from reduced commercial business activity	$0.00	$0.17	$0.25	$0.32	$0.38	$0.45
Lost utility revenues	$0.28	$0.83	$1.16	$1.42	$1.70	$1.97
North Fort Bend Water Authority						
Monetary value of domestic water shortages	$0.00	$8.10	$169.31	$178.63	$330.72	$413.42
Lost income from reduced commercial business activity	$0.00	$0.09	$1.88	$2.51	$303.68	$405.39
Lost jobs due to reduced commercial business activity	0	3	59	79	4,676	6,229
Lost state and local taxes from reduced commercial business activity	$0.00	$0.01	$0.27	$0.36	$24.28	$32.36
Lost utility revenues	$0.00	$7.34	$39.28	$61.96	$80.05	$96.19

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
North Green MUD						
Monetary value of domestic water shortages	$1.15	$5.01	$6.30	$6.75	$7.26	$7.82
Lost income from reduced commercial business activity	$0.00	$0.67	$0.90	$0.96	$1.04	$1.12
Lost jobs due to reduced commercial business activity	0	27	36	39	42	45
Lost state and local taxes from reduced commercial business activity	$0.00	$0.10	$0.14	$0.15	$0.16	$0.17
Lost utility revenues	$0.21	$0.52	$0.64	$0.69	$0.74	$0.80
North Harris County Regional Water Authority						
Monetary value of domestic water shortages	$0.00	$500.43	$581.32	$632.60	$660.64	$685.97
Lost income from reduced commercial business activity	$0.00	$0.00	$547.06	$626.69	$658.95	$697.63
Lost jobs due to reduced commercial business activity	0	0	12,171	13,942	14,660	15,521
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$58.22	$66.69	$70.13	$74.24
Lost utility revenues	$0.16	$92.49	$132.44	$145.56	$150.87	$157.24
Northwest Harris County MUD #23						
Monetary value of domestic water shortages	$1.93	$9.63	$13.58	$17.02	$19.98	$22.93
Lost income from reduced commercial business activity	$0.00	$1.30	$1.94	$2.35	$2.81	$3.27
Lost jobs due to reduced commercial business activity	0	52	78	94	113	131
Lost state and local taxes from reduced commercial business activity	$0.00	$0.20	$0.30	$0.36	$0.44	$0.51
Lost utility revenues	$0.35	$1.01	$1.38	$1.64	$1.93	$2.22
Northwest Park MUD						
Monetary value of domestic water shortages	$5.96	$42.93	$49.42	$48.43	$47.96	$47.96
Lost income from reduced commercial business activity	$0.00	$15.84	$19.82	$19.42	$19.24	$19.24
Lost jobs due to reduced commercial business activity	0	499	625	613	607	607
Lost state and local taxes from reduced commercial business activity	$0.00	$2.26	$2.83	$2.77	$2.74	$2.74
Lost utility revenues	$1.55	$4.39	$5.02	$4.92	$4.87	$4.87
Oak Ridge North						
Monetary value of domestic water shortages	$1.41	$5.96	$7.26	$7.50	$10.85	$17.91
Lost income from reduced commercial business activity	$0.00	$0.00	$1.17	$0.79	$1.88	$3.08
Lost jobs due to reduced commercial business activity	0	0	37	25	59	97
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.17	$0.11	$0.27	$0.44
Lost utility revenues	$0.31	$0.63	$0.93	$0.90	$1.41	$1.99

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Old River-Winfree						
Monetary value of domestic water shortages	$3.89	$4.26	$4.53	$4.75	$5.08	$5.45
Lost income from reduced commercial business activity	$0.24	$0.26	$0.28	$0.30	$0.32	$0.35
Lost jobs due to reduced commercial business activity	9	11	11	12	13	14
Lost state and local taxes from reduced commercial business activity	$0.04	$0.04	$0.04	$0.05	$0.05	$0.05
Lost utility revenues	$0.34	$0.38	$0.40	$0.42	$0.45	$0.49
Onalaska						
Monetary value of domestic water shortages	$0.00	$0.06	$0.14	$0.76	$1.02	$1.23
Lost utility revenues	$0.00	$0.08	$0.14	$0.18	$0.22	$0.27
Orbit Systems, Inc.						
Monetary value of domestic water shortages	$0.00	$0.11	$0.41	$1.97	$2.84	$3.97
Lost utility revenues	$0.00	$0.15	$0.31	$0.45	$0.59	$0.76
Oyster Creek						
Monetary value of domestic water shortages	$0.28	$0.61	$1.08	$0.26	$0.33	$1.93
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.14
Lost jobs due to reduced commercial business activity	0	0	0	0	0	6
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.02
Lost utility revenues	$0.07	$0.11	$0.15	$0.19	$0.24	$0.29
Panorama Village						
Monetary value of domestic water shortages	$1.35	$5.43	$8.75	$5.22	$6.49	$9.26
Lost income from reduced commercial business activity	$0.00	$0.00	$0.93	$0.55	$1.12	$1.60
Lost jobs due to reduced commercial business activity	0	0	29	17	35	50
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.13	$0.08	$0.16	$0.23
Lost utility revenues	$0.30	$0.57	$0.74	$0.63	$0.85	$1.03
Parkway UD						
Monetary value of domestic water shortages	$4.71	$4.61	$4.48	$4.36	$4.28	$4.32
Lost income from reduced commercial business activity	$0.67	$0.66	$0.64	$0.62	$0.61	$0.62
Lost jobs due to reduced commercial business activity	27	26	26	25	25	25
Lost state and local taxes from reduced commercial business activity	$0.10	$0.10	$0.10	$0.10	$0.09	$0.10
Lost utility revenues	$0.48	$0.47	$0.46	$0.44	$0.44	$0.44

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Patton Village						
Monetary value of domestic water shortages	$0.18	$0.70	$0.82	$1.05	$1.39	$2.33
Lost income from reduced commercial business activity	$0.00	$0.00	$0.05	$0.08	$0.23	$0.32
Lost jobs due to reduced commercial business activity	0	0	2	3	9	13
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.01	$0.01	$0.04	$0.05
Lost utility revenues	$0.04	$0.07	$0.10	$0.14	$0.18	$0.24
Pearland						
Monetary value of domestic water shortages	$0.00	$0.00	$1.83	$5.45	$11.37	$56.64
Lost utility revenues	$0.00	$0.00	$3.28	$7.78	$12.92	$18.27
Pine Island						
Monetary value of domestic water shortages	$0.00	$0.24	$0.83	$2.11	$2.49	$3.34
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.35	$0.56
Lost jobs due to reduced commercial business activity	0	0	0	0	11	18
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.05	$0.08
Lost utility revenues	$0.00	$0.06	$0.12	$0.18	$0.27	$0.37
Pine Trails Utility						
Monetary value of domestic water shortages	$0.44	$1.80	$2.32	$2.71	$3.44	$4.39
Lost utility revenues	$0.50	$0.62	$0.74	$0.86	$0.99	$1.14
Piney Point Village						
Monetary value of domestic water shortages	$8.91	$9.36	$9.91	$10.35	$10.88	$11.46
Lost income from reduced commercial business activity	$2.26	$2.44	$2.62	$2.79	$5.99	$6.44
Lost jobs due to reduced commercial business activity	71	77	83	88	189	203
Lost state and local taxes from reduced commercial business activity	$0.32	$0.35	$0.37	$0.40	$0.85	$0.92
Lost utility revenues	$1.53	$1.62	$1.70	$1.79	$1.89	$2.00
Plantation MUD						
Monetary value of domestic water shortages	$0.00	$1.82	$4.88	$4.79	$4.76	$4.76
Lost income from reduced commercial business activity	$0.00	$0.00	$0.94	$0.92	$0.92	$0.92
Lost jobs due to reduced commercial business activity	0	0	30	29	29	29
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.13	$0.13	$0.13	$0.13
Lost utility revenues	$0.00	$0.33	$0.65	$0.63	$0.63	$0.63

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Pleak						
Monetary value of domestic water shortages	$0.00	$0.14	$0.45	$3.14	$5.66	$8.70
Lost utility revenues	$0.00	$0.20	$0.44	$0.69	$1.02	$1.40
Plum Grove						
Monetary value of domestic water shortages	$0.00	$0.06	$0.72	$0.79	$0.91	$1.43
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.48
Lost jobs due to reduced commercial business activity	0	0	0	0	0	15
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.07
Lost utility revenues	$0.00	$0.07	$0.13	$0.20	$0.27	$0.35
Point Aquarius MUD						
Monetary value of domestic water shortages	$1.51	$7.24	$11.23	$18.14	$32.34	$51.26
Lost income from reduced commercial business activity	$0.00	$0.00	$0.77	$2.98	$4.90	$7.14
Lost jobs due to reduced commercial business activity	0	0	31	119	196	286
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.12	$0.46	$0.76	$1.11
Lost utility revenues	$0.33	$0.76	$1.46	$2.37	$3.59	$5.01
Point Blank						
Monetary value of domestic water shortages	$0.00	$0.01	$0.03	$0.04	$0.05	$0.05
Lost utility revenues	$0.00	$0.02	$0.04	$0.05	$0.05	$0.05
Porter WSC						
Monetary value of domestic water shortages	$2.57	$11.07	$13.03	$19.78	$40.27	$43.97
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$11.96	$14.60	$16.82
Lost jobs due to reduced commercial business activity	0	0	0	189	460	530
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$1.70	$2.08	$2.40
Lost utility revenues	$0.82	$1.67	$2.62	$3.73	$4.13	$4.49
Prairie View						
Monetary value of domestic water shortages	$0.00	$0.11	$0.27	$0.51	$0.97	$5.47
Lost utility revenues	$0.00	$0.18	$0.39	$0.64	$0.94	$1.31

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Rayford Road MUD						
Monetary value of domestic water shortages	$4.78	$18.25	$22.44	$18.33	$19.03	$25.68
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$1.28	$1.73
Lost jobs due to reduced commercial business activity	0	0	0	0	51	69
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.20	$0.27
Lost utility revenues	$0.97	$1.78	$2.19	$1.79	$2.30	$2.67
Richmond						
Monetary value of domestic water shortages	$0.08	$0.11	$0.12	$0.15	$0.18	$0.95
Lost utility revenues	$0.11	$0.14	$0.15	$0.17	$0.20	$1.36
River Plantation MUD						
Monetary value of domestic water shortages	$1.72	$6.56	$6.59	$5.65	$6.69	$9.14
Lost income from reduced commercial business activity	$0.00	$0.00	$1.07	$0.60	$1.17	$1.59
Lost jobs due to reduced commercial business activity	0	0	34	19	37	50
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.15	$0.09	$0.17	$0.23
Lost utility revenues	$0.38	$0.69	$0.85	$0.68	$0.87	$1.02
Riverside WSC						
Monetary value of domestic water shortages	$0.00	$0.05	$0.70	$2.32	$2.97	$2.79
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.50
Lost jobs due to reduced commercial business activity	0	0	0	0	0	16
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.07
Lost utility revenues	$0.00	$0.06	$0.13	$0.33	$0.44	$0.59
Rolling Fork MUD						
Monetary value of domestic water shortages	$14.23	$14.70	$15.18	$15.66	$16.25	$16.91
Lost income from reduced commercial business activity	$2.20	$2.27	$2.35	$2.42	$2.51	$2.61
Lost jobs due to reduced commercial business activity	88	91	94	97	101	105
Lost state and local taxes from reduced commercial business activity	$0.34	$0.35	$0.36	$0.38	$0.39	$0.41
Lost utility revenues	$0.42	$1.01	$1.19	$1.24	$1.30	$1.36

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Roman Forest						
Monetary value of domestic water shortages	$1.13	$9.56	$13.74	$21.53	$32.24	$46.28
Lost income from reduced commercial business activity	$0.00	$0.00	$2.41	$7.87	$11.97	$16.87
Lost jobs due to reduced commercial business activity	0	0	76	248	378	532
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.34	$1.12	$1.71	$2.41
Lost utility revenues	$0.25	$0.83	$1.53	$2.28	$3.28	$4.48
Rosenberg						
Monetary value of domestic water shortages	$0.00	$0.00	$0.41	$3.72	$35.71	$7.45
Lost utility revenues	$0.00	$0.00	$0.47	$3.35	$7.26	$11.90
San Felipe						
Monetary value of domestic water shortages	$0.00	$0.03	$0.06	$0.08	$0.09	$0.11
Lost utility revenues	$0.00	$0.04	$0.07	$0.09	$0.09	$0.10
Seabrook						
Monetary value of domestic water shortages	$9.85	$9.91	$21.30	$25.08	$47.21	$53.63
Lost income from reduced commercial business activity	$7.03	$10.74	$14.31	$18.15	$21.96	$25.99
Lost jobs due to reduced commercial business activity	157	239	319	405	490	579
Lost state and local taxes from reduced commercial business activity	$0.75	$1.14	$1.52	$1.93	$2.34	$2.77
Lost utility revenues	$2.31	$3.07	$3.80	$4.58	$5.35	$6.16
Sealy						
Monetary value of domestic water shortages	$0.00	$0.46	$0.99	$3.83	$4.53	$5.13
Lost utility revenues	$0.00	$0.66	$1.11	$1.33	$1.44	$1.63
Shenandoah						
Monetary value of domestic water shortages	$2.31	$10.39	$12.29	$12.32	$17.24	$27.09
Lost income from reduced commercial business activity	$0.00	$0.00	$3.07	$2.01	$4.62	$7.45
Lost jobs due to reduced commercial business activity	0	0	97	63	146	235
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.44	$0.29	$0.66	$1.06
Lost utility revenues	$0.73	$1.57	$2.27	$2.13	$3.23	$4.44

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Shephard						
Monetary value of domestic water shortages	$0.00	$0.07	$0.17	$0.22	$0.25	$0.26
Lost utility revenues	$0.00	$0.11	$0.18	$0.22	$0.24	$0.26
Sienna Plantation MUD #2						
Monetary value of domestic water shortages	$0.00	$3.99	$10.88	$10.82	$10.82	$10.82
Lost income from reduced commercial business activity	$0.00	$0.00	$2.10	$2.09	$2.09	$2.09
Lost jobs due to reduced commercial business activity	0	0	66	66	66	66
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.30	$0.30	$0.30	$0.30
Lost utility revenues	$0.00	$0.67	$1.33	$1.32	$1.32	$1.32
Simonton						
Monetary value of domestic water shortages	$0.00	$0.14	$1.90	$0.00	$0.00	$10.41
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$1.49
Lost jobs due to reduced commercial business activity	0	0	0	0	0	47
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.21
Lost utility revenues	$0.00	$0.15	$0.34	$0.53	$0.79	$1.09
Southern Montgomery County MUD						
Monetary value of domestic water shortages	$2.52	$12.33	$12.61	$11.31	$13.61	$18.48
Lost income from reduced commercial business activity	$0.00	$0.00	$1.21	$0.71	$1.41	$1.96
Lost jobs due to reduced commercial business activity	0	0	49	29	57	79
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.19	$0.11	$0.22	$0.30
Lost utility revenues	$0.80	$1.86	$2.33	$1.96	$2.55	$3.03
Southside Place						
Monetary value of domestic water shortages	$0.01	$0.27	$0.08	$0.13	$0.17	$0.25
Lost utility revenues	$0.01	$0.07	$0.11	$0.16	$0.22	$0.28
Southwest Utilities						
Monetary value of domestic water shortages	$2.86	$12.74	$16.62	$19.90	$24.88	$29.29
Lost income from reduced commercial business activity	$0.00	$3.67	$5.29	$6.05	$7.38	$8.56
Lost jobs due to reduced commercial business activity	0	116	168	193	241	281
Lost state and local taxes from reduced commercial business activity	$0.00	$0.52	$0.76	$0.87	$1.06	$1.24
Lost utility revenues	$0.50	$1.26	$1.68	$1.98	$2.36	$2.81

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Splendora						
Monetary value of domestic water shortages	$0.39	$1.79	$2.41	$3.58	$6.74	$9.69
Lost income from reduced commercial business activity	$0.00	$0.00	$0.15	$0.28	$0.92	$1.35
Lost jobs due to reduced commercial business activity	0	0	6	11	37	54
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.02	$0.04	$0.14	$0.21
Lost utility revenues	$0.09	$0.19	$0.31	$0.47	$0.71	$0.98
Spring Creek UD						
Monetary value of domestic water shortages	$1.11	$4.89	$6.47	$7.27	$11.42	$19.80
Lost income from reduced commercial business activity	$0.00	$0.00	$0.40	$0.29	$0.78	$2.72
Lost jobs due to reduced commercial business activity	0	0	16	12	31	109
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.06	$0.05	$0.12	$0.42
Lost utility revenues	$0.23	$0.48	$0.77	$0.80	$1.37	$2.05
Spring Valley						
Monetary value of domestic water shortages	$2.89	$13.65	$18.14	$18.89	$19.86	$21.43
Lost income from reduced commercial business activity	$0.00	$4.23	$5.46	$5.68	$5.98	$6.31
Lost jobs due to reduced commercial business activity	0	133	172	179	188	199
Lost state and local taxes from reduced commercial business activity	$0.00	$0.60	$0.78	$0.81	$0.85	$0.90
Lost utility revenues	$0.53	$1.27	$1.50	$1.55	$1.62	$1.70
Stagecoach						
Monetary value of domestic water shortages	$0.16	$0.85	$1.99	$2.01	$3.99	$6.25
Lost income from reduced commercial business activity	$0.00	$0.00	$0.09	$0.33	$0.55	$0.87
Lost jobs due to reduced commercial business activity	0	0	4	13	22	35
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.01	$0.05	$0.09	$0.13
Lost utility revenues	$0.04	$0.09	$0.16	$0.26	$0.40	$0.60
Stanley Lake MUD						
Monetary value of domestic water shortages	$1.53	$7.20	$10.64	$6.27	$7.47	$10.73
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.25	$0.50	$0.68
Lost jobs due to reduced commercial business activity	0	0	0	10	20	27
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.04	$0.08	$0.11
Lost utility revenues	$0.34	$0.76	$0.94	$0.76	$0.97	$1.14

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Sugarland						
Monetary value of domestic water shortages	$0.00	$0.00	$2.46	$2.38	$2.38	$3.70
Lost utility revenues	$0.00	$0.00	$4.40	$4.26	$4.26	$5.91
Sunbelt FWSD						
Monetary value of domestic water shortages	$1.40	$30.82	$75.69	$89.34	$103.77	$117.01
Lost income from reduced commercial business activity	$0.00	$3.57	$11.02	$13.33	$15.59	$17.97
Lost jobs due to reduced commercial business activity	0	143	441	534	624	720
Lost state and local taxes from reduced commercial business activity	$0.00	$0.55	$1.71	$2.07	$2.42	$2.79
Lost utility revenues	$1.58	$5.81	$7.79	$9.14	$10.47	$11.88
Surfside Beach						
Monetary value of domestic water shortages	$0.00	$0.03	$0.06	$0.11	$0.16	$0.93
Lost utility revenues	$0.00	$0.04	$0.08	$0.12	$0.16	$0.20
Sweeney						
Monetary value of domestic water shortages	$0.00	$0.04	$0.07	$0.10	$0.15	$0.24
Lost utility revenues	$0.00	$0.06	$0.11	$0.15	$0.22	$0.30
Tomball						
Monetary value of domestic water shortages	$1.27	$41.40	$55.40	$83.23	$97.91	$119.44
Lost income from reduced commercial business activity	$0.00	$34.67	$50.44	$68.67	$82.04	$101.67
Lost jobs due to reduced commercial business activity	0	773	1,124	1,531	1,829	2,266
Lost state and local taxes from reduced commercial business activity	$0.00	$3.69	$5.37	$7.31	$8.73	$10.82
Lost utility revenues	$1.44	$4.23	$5.63	$7.45	$8.78	$10.74
Trail of the Lakes MUD						
Monetary value of domestic water shortages	$2.98	$17.25	$19.66	$22.03	$22.03	$22.03
Lost income from reduced commercial business activity	$0.00	$2.45	$3.03	$2.98	$2.98	$2.98
Lost jobs due to reduced commercial business activity	0	98	122	119	119	119
Lost state and local taxes from reduced commercial business activity	$0.00	$0.38	$0.47	$0.46	$0.46	$0.46
Lost utility revenues	$0.78	$1.76	$2.00	$1.96	$1.96	$1.96
Walker County Rural WSC						
Monetary value of domestic water shortages	$0.00	$0.10	$0.14	$0.14	$0.15	$0.19
Lost utility revenues	$0.00	$0.14	$0.22	$0.22	$0.24	$0.27

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Waller						
Monetary value of domestic water shortages	$0.01	$0.23	$1.69	$3.70	$8.58	$7.99
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$1.31
Lost jobs due to reduced commercial business activity	0	0	0	0	0	41
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.19
Lost utility revenues	$0.01	$0.30	$0.55	$0.81	$1.11	$1.45
Wallis						
Monetary value of domestic water shortages	$0.00	$0.02	$0.03	$0.04	$0.04	$0.06
Lost utility revenues	$0.00	$0.03	$0.05	$0.06	$0.06	$0.07
West Hardin WSC						
Monetary value of domestic water shortages	$0.00	$0.01	$0.03	$0.16	$0.25	$0.42
Lost utility revenues	$0.00	$0.01	$0.03	$0.04	$0.05	$0.07
West Harris County MUD #6						
Monetary value of domestic water shortages	$1.85	$12.81	$15.47	$8.54	$8.42	$8.42
Lost income from reduced commercial business activity	$0.00	$1.00	$1.25	$1.22	$1.20	$1.20
Lost jobs due to reduced commercial business activity	0	40	50	49	48	48
Lost state and local taxes from reduced commercial business activity	$0.00	$0.16	$0.19	$0.19	$0.19	$0.19
Lost utility revenues	$0.33	$0.78	$0.89	$0.87	$0.86	$0.86
West Harris County Regional Water Authority						
Monetary value of domestic water shortages	$0.00	$179.39	$294.01	$329.57	$344.12	$352.42
Lost income from reduced commercial business activity	$0.00	$0.00	$228.89	$271.73	$286.11	$293.75
Lost jobs due to reduced commercial business activity	0	0	5,102	6,057	6,378	6,548
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$24.36	$28.92	$30.45	$31.26
Lost utility revenues	$0.00	$42.61	$63.03	$71.05	$74.30	$76.41
West University Place						
Monetary value of domestic water shortages	$0.49	$0.77	$0.98	$1.32	$1.80	$6.95
Lost utility revenues	$0.78	$1.10	$1.40	$1.68	$2.03	$2.41

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Willis						
Monetary value of domestic water shortages	$0.75	$3.33	$4.25	$4.64	$6.97	$6.42
Lost income from reduced commercial business activity	$0.00	$0.00	$1.07	$0.76	$1.87	$3.18
Lost jobs due to reduced commercial business activity	0	0	34	24	59	100
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.15	$0.11	$0.27	$0.45
Lost utility revenues	$0.24	$0.50	$0.79	$0.80	$1.30	$1.90
Willow Run Subdivision						
Monetary value of domestic water shortages	$2.18	$8.61	$9.96	$9.77	$9.65	$9.65
Lost income from reduced commercial business activity	$0.00	$1.16	$1.42	$1.40	$1.38	$1.38
Lost jobs due to reduced commercial business activity	0	46	57	56	55	55
Lost state and local taxes from reduced commercial business activity	$0.00	$0.18	$0.22	$0.22	$0.21	$0.21
Lost utility revenues	$0.39	$0.90	$1.01	$0.99	$0.98	$0.98
Windfern Forest UD						
Monetary value of domestic water shortages	$0.92	$11.79	$13.88	$13.73	$13.73	$13.73
Lost income from reduced commercial business activity	$0.00	$1.53	$1.94	$1.92	$1.92	$1.92
Lost jobs due to reduced commercial business activity	0	61	78	77	77	77
Lost state and local taxes from reduced commercial business activity	$0.00	$0.24	$0.30	$0.30	$0.30	$0.30
Lost utility revenues	$0.32	$1.20	$1.36	$1.34	$1.34	$1.34
Wood Branch						
Monetary value of domestic water shortages	$0.38	$1.60	$1.83	$2.29	$3.61	$4.54
Lost income from reduced commercial business activity	$0.00	$0.00	$0.30	$0.45	$1.25	$1.67
Lost jobs due to reduced commercial business activity	0	0	9	14	39	53
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.04	$0.06	$0.18	$0.24
Lost utility revenues	$0.08	$0.17	$0.24	$0.30	$0.38	$0.48
Wood Creek MUN						
Monetary value of domestic water shortages	$2.05	$10.77	$15.55	$19.89	$24.00	$27.83
Lost income from reduced commercial business activity	$0.00	$1.45	$2.22	$2.80	$3.39	$3.98
Lost jobs due to reduced commercial business activity	0	58	89	112	136	160
Lost state and local taxes from reduced commercial business activity	$0.00	$0.22	$0.34	$0.43	$0.53	$0.62
Lost utility revenues	$0.37	$1.13	$1.58	$1.95	$2.32	$2.70

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
The Woodlands						
Monetary value of domestic water shortages	$19.44	$149.15	$162.28	$96.11	$152.29	$206.39
Lost income from reduced commercial business activity	$0.00	$134.57	$152.10	$66.22	$128.96	$175.60
Lost jobs due to reduced commercial business activity	0	1,872	2,115	921	1,794	2,442
Lost state and local taxes from reduced commercial business activity	$0.00	$10.83	$12.24	$5.33	$10.38	$14.14
Lost utility revenues	$6.17	$28.03	$30.73	$22.09	$28.27	$32.92

Appendix R

TWDB Report: Socioeconomic Impacts of Projected Water Shortages for the East Texas Regional Water Planning Area (Region I) Prepared in Support of the 2011 East Texas Regional Water Plan

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June 1, 2010

Mr. Kelley Holcomb
Chairman, East Texas Regional Water Planning Group
c/o General Manager, Angelina & Neches River Authority
P.O. Box 387
Lufkin, Texas 75902-0387

Re: Socioeconomic Impact Analysis of Not Meeting Water Needs for the 2011 East Texas Regional Water Plan

Dear Chairman Holcomb:

We have received your request for technical assistance to complete the socioeconomic impact analysis of not meeting water needs. In response, enclosed is a report that describes our methodology and presents the results. Section 1 provides an overview of the methodology, and Section 2 presents results for at the regional level, and Appendix 2 show results for individual water user groups.

If you have any questions or comments, please feel free to contact me at (512) 463-7928 or by email at stuart.norvell@twdb.state.tx.us.

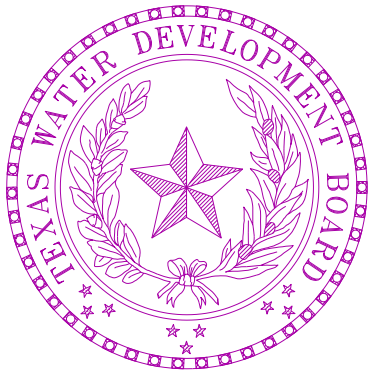
Sincerely,

Stuart D. Norvell
Manager, Water Planning Research and Analysis
Water Resources Planning Division

SN/ao

Enclosure

c. Temple Mckinnon, TWDB
S. Doug Shaw, TWDB



Socioeconomic Impacts of Projected Water Shortages for the East Texas Regional Water Planning Area (Region I)

Prepared in Support of the 2011 East Texas Regional Water Plan

Stuart D. Norvell, Managing Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

S. Doug Shaw, Agricultural Economist
Water Resources Planning Division
Texas Water Development Board
Austin, Texas

May 2010

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Introduction

Water shortages during drought would likely curtail or eliminate economic activity in business and industries reliant on water. For example, without water farmers cannot irrigate; refineries cannot produce gasoline, and paper mills cannot make paper. Unreliable water supplies would not only have an immediate and real impact on existing businesses and industry, but they could also adversely affect economic development in Texas. From a social perspective, water supply reliability is critical as well. Shortages would disrupt activity in homes, schools and government and could adversely affect public health and safety. For all of the above reasons, it is important to analyze and understand how restricted water supplies during drought could affect communities throughout the state.

Administrative rules require that regional water planning groups evaluate the impacts of not meeting water needs as part of the regional water planning process, and rules direct TWDB staff to provide technical assistance: "*The executive administrator shall provide available technical assistance to the regional water planning groups, upon request, on water supply and demand analysis, including methods to evaluate the social and economic impacts of not meeting needs*" [(§357.7 (4)(A)]. Staff of the TWDB's Water Resources Planning Division designed and conducted this report in support of the Northeast Texas Regional Water Planning Group (Region I).

This document summarizes the results of our analysis and discusses the methodology used to generate the results. Section 1 outlines the overall methodology and discusses approaches and assumptions specific to each water use category (i.e., irrigation, livestock, mining, steam-electric, municipal and manufacturing). Section 2 presents the results for each category where shortages are reported at the regional planning area level and river basin level. Results for individual water user groups are not presented, but are available upon request.

1. Methodology

Section 1 provides a general overview of how economic and social impacts were measured. In addition, it summarizes important clarifications, assumptions and limitations of the study.

1.1 Economic Impacts of Water Shortages

1.1.1 General Approach

Economic analysis as it relates to water resources planning generally falls into two broad areas. Supply side analysis focuses on costs and alternatives of developing new water supplies or implementing programs that provide additional water from current supplies. Demand side analysis concentrates on impacts or benefits of providing water to people, businesses and the environment. Analysis in this report focuses strictly on demand side impacts. When analyzing the economic impacts of water shortages as defined in Texas water planning, three potential scenarios are possible:

1) Scenario 1 involves situations where there are physical shortages of raw surface or groundwater due to drought of record conditions. For example, City A relies on a reservoir with average conservation storage of 500 acre-feet per year and a firm yield of 100 acre feet. In 2010, the city uses about 50 acre-feet per year, but by 2030 their demands are expected to increase to 200 acre-feet. Thus, in 2030 the reservoir would not have enough water to meet the city's demands,

and people would experience a shortage of 100 acre-feet assuming drought of record conditions. Under normal or average climatic conditions, the reservoir would likely be able to provide reliable water supplies well beyond 2030.

2) Scenario 2 is a situation where despite drought of record conditions, water supply sources can meet existing use requirements; however, limitations in water infrastructure would preclude future water user groups from accessing these water supplies. For example, City B relies on a river that can provide 500 acre-feet per year during drought of record conditions and other constraints as dictated by planning assumptions. In 2010, the city is expected to use an estimated 100 acre-feet per year and by 2060 it would require no more than 400 acre-feet. But the intake and pipeline that currently transfers water from the river to the city's treatment plant has a capacity of only 200 acre-feet of water per year. Thus, the city's water supplies are adequate even under the most restrictive planning assumptions, but their conveyance system is too small. This implies that at some point – perhaps around 2030 - infrastructure limitations would constrain future population growth and any associated economic activity or impacts.

3) Scenario 3 involves water user groups that rely primarily on aquifers that are being depleted. In this scenario, projected and in some cases existing demands may be unsustainable as groundwater levels decline. Areas that rely on the Ogallala aquifer are a good example. In some communities in the region, irrigated agriculture forms a major base of the regional economy. With less irrigation water from the Ogallala, population and economic activity in the region could decline significantly assuming there are no offsetting developments.

Assessing the social and economic effects of each of the above scenarios requires various levels and methods of analysis and would generate substantially different results for a number of reasons; the most important of which has to do with the time frame of each scenario. Scenario 1 falls into the general category of static analysis. This means that models would measure impacts for a small interval of time such as a drought. Scenarios 2 and 3, on the other hand imply a dynamic analysis meaning that models are concerned with changes over a much longer time period.

Since administrative rules specify that planning analysis be evaluated under drought of record conditions (a static and random event), socioeconomic impact analysis developed by the TWDB for the state water plan is based on assumptions of Scenario 1. Estimated impacts under scenario 1 are point estimates for years in which needs are reported (2010, 2020, 2030, 2040, 2050 and 2060). They are independent and distinct "what if" scenarios for a particular year and shortages are assumed to be temporary events resulting from drought of record conditions. Estimated impacts measure what would happen if water user groups experience water shortages for a period of one year.

The TWDB recognize that dynamic models may be more appropriate for some water user groups; however, combining approaches on a statewide basis poses several problems. For one, it would require a complex array of analyses and models, and might require developing supply and demand forecasts under "normal" climatic conditions as opposed to drought of record conditions. Equally important is the notion that combining the approaches would produce inconsistent results across regions resulting in a so-called "apples to oranges" comparison.

A variety tools are available to estimate economic impacts, but by far, the most widely used today are input-output models (IO models) combined with social accounting matrices (SAMs). Referred to as IO/SAM models, these tools formed the basis for estimating economic impacts for agriculture (irrigation and livestock water uses) and industry (manufacturing, mining, steam-electric and commercial business activity for municipal water uses).

Since the planning horizon extends through 2060, economic variables in the baseline are adjusted in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Future values for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category.

The following steps outline the overall process.

Step 1*: Generate IO/SAM Models and Develop Economic Baseline*

IO/SAM models were estimated using propriety software known as IMPLAN PRO™ (Impact for Planning Analysis). IMPLAN is a modeling system originally developed by the U.S. Forestry Service in the late 1970s. Today, the Minnesota IMPLAN Group (MIG Inc.) owns the copyright and distributes data and software. It is probably the most widely used economic impact model in existence. IMPLAN comes with databases containing the most recently available economic data from a variety of sources.[1] Using IMPLAN software and data, transaction tables conceptually similar to the one discussed previously were estimated for each county in the region and for the region as a whole. Each transaction table contains 528 economic sectors and allows one to estimate a variety of economic statistics including:

- **total sales -** total production measured by sales revenues;
- **intermediate sales -** sales to other businesses and industries within a given region;
- **final sales –** sales to end users in a region and exports out of a region**;**
- **employment -** number of full and part-time jobs (annual average) required by a given industry including self-employment;
- **regional income -** total payroll costs (wages and salaries plus benefits) paid by industries, corporate income, rental income and interest payments; and
- **business taxes -** sales, excise, fees, licenses and other taxes paid during normal operation of an industry (does not include income taxes).

TWDB analysts developed an economic baseline containing each of the above variables using year 2000 data. Since the planning horizon extends through 2060, economic variables in the baseline were allowed to change in accordance with projected changes in demographic and economic activity. Growth rates for municipal water use sectors (i.e., commercial, residential and institutional) are based on TWDB population forecasts. Projections for manufacturing, agriculture, and mining and steam-electric activity are based on the same underlying economic forecasts used to estimate future water use for each category. Monetary impacts in future years are reported in constant year 2006 dollars.

It is important to stress that employment, income and business taxes are the most useful variables when comparing the relative contribution of an economic sector to a regional economy. Total sales as reported in IO/SAM models are less desirable and can be misleading because they include sales to other industries in the region for use in the production of other goods. For example, if a mill buys grain from local farmers and uses it to produce feed, sales of both the processed feed and raw corn are counted as “output” in an IO model. Thus, total sales double-count or overstate the true economic value of goods

[1]The IMPLAN database consists of national level technology matrices based on benchmark input-output accounts generated by the U.S. Bureau of Economic Analysis and estimates of final demand, final payments, industry output and employment for various economic sectors. IMPLAN regional data (i.e. states, a counties or groups of counties within a state) are divided into two basic categories: 1) data on an industry basis including value-added, output and employment, and 2) data on a commodity basis including final demands and institutional sales. State-level data are balanced to national totals using a matrix ratio allocation system and county data are balanced to state totals.

and services produced in an economy. They are not consistent with commonly used measures of output such as Gross National Product (GNP), which counts only final sales.

Another important distinction relates to terminology. Throughout this report, the term *sector* refers to economic subdivisions used in the IMPLAN database and resultant input-output models (528 individual sectors based on Standard Industrial Classification Codes). In contrast, the phrase *water use category* refers to water user groups employed in state and regional water planning including irrigation, livestock, mining, municipal, manufacturing and steam electric. Each IMPLAN sector was assigned to a specific water use category.

Step 2: *Estimate Direct and Indirect Economic Impacts of Water Needs*

Direct impacts are reductions in output by sectors experiencing water shortages. For example, without adequate cooling and process water a refinery would have to curtail or cease operation, car washes may close, or farmers may not be able to irrigate and sales revenues fall. Indirect impacts involve changes in inter-industry transactions as supplying industries respond to decreased demands for their services, and how seemingly non-related businesses are affected by decreased incomes and spending due to direct impacts. For example, if a farmer ceases operations due to a lack of irrigation water, they would likely reduce expenditures on supplies such as fertilizer, labor and equipment, and businesses that provide these goods would suffer as well.

Direct impacts accrue to immediate businesses and industries that rely on water and without water industrial processes could suffer. However, output responses may vary depending upon the severity of shortages. A small shortage relative to total water use would likely have a minimal impact, but large shortages could be critical. For example, farmers facing small shortages might fallow marginally productive acreage to save water for more valuable crops. Livestock producers might employ emergency culling strategies, or they may consider hauling water by truck to fill stock tanks. In the case of manufacturing, a good example occurred in the summer of 1999 when Toyota Motor Manufacturing experienced water shortages at a facility near Georgetown, Kentucky.[2] As water levels in the Kentucky River fell to historic lows due to drought, plant managers sought ways to curtail water use such as reducing rinse operations to a bare minimum and recycling water by funneling it from paint shops to boilers. They even considered trucking in water at a cost of 10 times what they were paying. Fortunately, rains at the end of the summer restored river levels, and Toyota managed to implement cutbacks without affecting production, but it was a close call. If rains had not replenished the river, shortages could have severely reduced output.[3]

To account for uncertainty regarding the relative magnitude of impacts to farm and business operations, the following analysis employs the concept of elasticity. Elasticity is a number that shows how a change in one variable will affect another. In this case, it measures the relationship between a percentage reduction in water availability and a percentage reduction in output. For example, an elasticity of 1.0 indicates that a 1.0 percent reduction in water availability would result in a 1.0 percent reduction in economic output. An elasticity of 0.50 would indicate that for every 1.0 percent of unavailable water, output is reduced by 0.50 percent and so on. Output elasticities used in this study are:[4]

[2] Royal, W. "*High And Dry - Industrial Centers Face Water Shortages*." in Industry Week, Sept, 2000.

[3] The efforts described above are not planned programmatic or long-term operational changes. They are emergency measures that individuals might pursue to alleviate what they consider a temporary condition. Thus, they are not characteristic of long-term management strategies designed to ensure more dependable water supplies such as capital investments in conservation technology or development of new water supplies.

[4] Elasticities are based on one of the few empirical studies that analyze potential relationships between economic output and water shortages in the United States. The study, conducted in California, showed that a significant number of industries would suffer reduced output during water shortages. Using a survey based approach researchers posed two scenarios to different industries. In

- if water needs are 0 to 5 percent of total water demand, no corresponding reduction in output is assumed;

- if water needs are 5 to 30 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.50 percent reduction in output;

- if water needs are 30 to 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 0.75 percent reduction in output; and

- if water needs are greater than 50 percent of total water demand, for each additional one percent of water need that is not met, there is a corresponding 1.0 percent (i.e., a proportional reduction).

In some cases, elasticities are adjusted depending upon conditions specific to a given water user group.

Once output responses to water shortages were estimated, direct impacts to total sales, employment, regional income and business taxes were derived using regional level economic multipliers estimating using IO/SAM models. The formula for a given IMPLAN sector is:

$$D_{i,t} = Q_{i,t} *, S_{i,t} * E_Q * RFD_i * DM_{i(Q, L, I, T)}$$

where:

$D_{i,t}$ = direct economic impact to sector *i* in period *t*

$Q_{i,t}$ = total sales for sector *i* in period *t* in an affected county

$RFD_{i,}$ = ratio of final demand to total sales for sector *i* for a given region

$S_{i,t}$ = water shortage as percentage of total water use in period *t*

E_Q = elasticity of output and water use

$DM_{i(L, I, T)}$ = direct output multiplier coefficients for labor (L), income (I) and taxes (T) for sector *i*.

Secondary impacts were derived using the same formula used to estimate direct impacts; however, indirect multiplier coefficients are used. Methods and assumptions specific to each water use sector are discussed in Sections 1.1.2 through 1.1.4.

---

the first scenario, they asked how a 15 percent cutback in water supply lasting one year would affect operations. In the second scenario, they asked how a 30 percent reduction lasting one year would affect plant operations. In the case of a 15 percent shortage, reported output elasticities ranged from 0.00 to 0.76 with an average value of 0.25. For a 30 percent shortage, elasticities ranged from 0.00 to 1.39 with average of 0.47. For further information, see, California Urban Water Agencies, "*Cost of Industrial Water Shortages,*" Spectrum Economics, Inc. November, 1991.

General Assumptions and Clarification of the Methodology

As with any attempt to measure and quantify human activities at a societal level, assumptions are necessary and every model has limitations. Assumptions are needed to maintain a level of generality and simplicity such that models can be applied on several geographic levels and across different economic sectors. In terms of the general approach used here several clarifications and cautions are warranted:

1. Shortages as reported by regional planning groups are the starting point for socioeconomic analyses.

2. Estimated impacts are point estimates for years in which needs are reported (i.e., 2010, 2020, 2030, 2040, 2050 and 2060).They are independent and distinct "what if" scenarios for each particular year and water shortages are assumed to be temporary events resulting from severe drought conditions combined with infrastructure limitations. In other words, growth occurs and future shocks are imposed on an economy at 10-year intervals and resultant impacts are measured. Given, that reported figures are not cumulative in nature, it is inappropriate to sum impacts over the entire planning horizon. Doing so, would imply that the analysis predicts that drought of record conditions will occur every ten years in the future, which is not the case. Similarly, authors of this report recognize that in many communities needs are driven by population growth, and in the future total population will exceed the amount of water available due to infrastructure limitations, regardless of whether or not there is a drought. This implies that infrastructure limitations would constrain economic growth. However, since needs as defined by planning rules are based upon water supply and demand under the assumption of drought of record conditions, it improper to conduct economic analysis that focuses on growth related impacts over the planning horizon. Figures generated from such an analysis would presume a 50-year drought of record, which is unrealistic. Estimating lost economic activity related to constraints on population and commercial growth due to lack of water would require developing water supply and demand forecasts under "normal" or "most likely" future climatic conditions.

3. While useful for planning purposes, this study is not a benefit-cost analysis. Benefit cost analysis is a tool widely used to evaluate the economic feasibility of specific policies or projects as opposed to estimating economic impacts of unmet water needs. Nevertheless, one could include some impacts measured in this study as part of a benefit cost study if done so properly. Since this is not a benefit cost analysis, future impacts are not weighted differently. In other words, estimates are not discounted. If used as a measure of economic benefits, one should incorporate a measure of uncertainty into the analysis. In this type of analysis, a typical method of discounting future values is to assign probabilities of the drought of record recurring again in a given year, and weight monetary impacts accordingly. This analysis assumes a probability of one.

4. IO multipliers measure the strength of backward linkages to supporting industries (i.e., those who sell inputs to an affected sector). However, multipliers say nothing about forward linkages consisting of businesses that purchase goods from an affected sector for further processing. For example, ranchers in many areas sell most of their animals to local meat packers who process animals into a form that consumers ultimately see in grocery stores and restaurants. Multipliers do not capture forward linkages to meat packers, and since meat packers sell livestock purchased from ranchers as "final sales," multipliers for the ranching sector do fully account for all losses to a region's economy. Thus, as mentioned previously, in some cases closely linked sectors were moved from one water use category to another.

5. Cautions regarding interpretations of direct and secondary impacts are warranted. IO/SAM multipliers are based on "fixed-proportion production functions," which basically means that input use - including labor - moves in lockstep fashion with changes in levels of output. In a

scenario where output (i.e., sales) declines, losses in the immediate sector or supporting sectors could be much less than predicted by an IO/SAM model for several reasons. For one, businesses will likely expect to continue operating so they might maintain spending on inputs for future use; or they may be under contractual obligations to purchase inputs for an extended period regardless of external conditions. Also, employers may not lay-off workers given that experienced labor is sometimes scarce and skilled personnel may not be readily available when water shortages subside. Lastly people who lose jobs might find other employment in the region. As a result, direct losses for employment and secondary losses in sales and employment should be considered an upper bound. Similarly, since projected population losses are based on reduced employment in the region, they should be considered an upper bound as well.

6. IO models are static. Models and resultant multipliers are based upon the structure of the U.S. and regional economies in 2006. In contrast, water shortages are projected to occur well into the future. Thus, the analysis assumes that the general structure of the economy remains the same over the planning horizon, and the farther out into the future we go, this assumption becomes less reliable.

7. Impacts are annual estimates. If one were to assume that conditions persisted for more than one year, figures should be adjusted to reflect the extended duration. The drought of record in most regions of Texas lasted several years.

8. Monetary figures are reported in constant year 2006 dollars.

1.1.2 Impacts to Agriculture

Irrigated Crop Production

The first step in estimating impacts to irrigation required calculating gross sales for IMPLAN crop sectors. Default IMPLAN data do not distinguish irrigated production from dry-land production. Once gross sales were known other statistics such as employment and income were derived using IMPLAN direct multiplier coefficients. Gross sales for a given crop are based on two data sources:

1) county-level statistics collected and maintained by the TWDB and the USDA Farm Services Agency (FSA) including the number of irrigated acres by crop type and water application per acre, and

2) regional-level data published by the Texas Agricultural Statistics Service (TASS) including prices received for crops (marketing year averages), crop yields and crop acreages.

Crop categories used by the TWDB differ from those used in IMPLAN datasets. To maintain consistency, sales and other statistics are reported using IMPLAN crop classifications. Table 1 shows the TWDB crops included in corresponding IMPLAN sectors, and Table 2 summarizes acreage and estimated annual water use for each crop classification (five-year average from 2003-2007). Table 3 displays average (2003-2007) gross revenues per acre for IMPLAN crop categories.

Table 1: Crop Classifications Used in TWDB Water Use Survey and Corresponding IMPLAN Crop Sectors	
IMPLAN Category	**TWDB Category**
Oilseeds	Soybeans and "other oil crops"
Grains	Grain sorghum, corn, wheat and "other grain crops"
Vegetable and melons	"Vegetables" and potatoes
Tree nuts	Pecans
Fruits	Citrus, vineyard and other orchard
Cotton	Cotton
Sugarcane and sugar beets	Sugarcane and sugar beets
All "other" crops	"Forage crops", peanuts, alfalfa, hay and pasture, rice and "all other crops"

Table 2: Summary of Irrigated Crop Acreage and Water Demand for the East Texas Regional Water Planning Area (average 2003-2007)				
Sector	Acres (1000s)	Distribution of acres	Water use (1000s of AF)	Distribution of water use
Grains	<1	<1%	<1	<1%
Vegetable and melons	<1	3%	<1	<1%
Fruits	<1	<1%	<1%	<1%
Cotton	<1	2%	0.58	1%
Rice	22	93%	108	99%
Total	23	100%	109	100%

Source: Water demand figures are a 5- year average (2003-2007) of the TWDB's annual Irrigation Water Use Estimates. Statistics for irrigated crop acreage are based upon annual survey data collected by the TWDB and the Farm Service Agency. Values do not include acreage or water use for the TWDB categories classified by the Farm Services Agency as "failed acres," "golf course" or "waste water."

Table 3: Average Gross Sales Revenues per Acre for Irrigated Crops for the East Texas Regional Water Planning Area (2003-2007)		
IMPLAN Sector	**Gross revenues per acre**	**Crops included in estimates**
Grains	$442	Based on five-year (2003-2007) average weighted by acreage for "irrigated grain sorghum," "irrigated corn", "irrigated wheat" and "irrigated 'other' grain crops."
Vegetable and melons	$6,184	Based on five-year (2003-2007) average weighted by acreage for "irrigated shallow and deep root vegetables", "irrigated Irish potatoes" and "irrigated melons."
Fruits	$3,502	Based on five-year (2003-2007) average weighted by acreage for "irrigated citrus", "irrigated vineyards" and "irrigated 'other' orchard."
Cotton	$400	Based on five-year (2003-2007) average weighted by acreage for "irrigated cotton."
All Other Crops	$500	Irrigated figure is based on five-year (2003-2007) average weighted by acreage for "irrigated 'forage' crops", "irrigated peanuts", "irrigated alfalfa", "irrigated 'hay' and pasture" and "irrigated 'all other' crops."
*Figures are rounded. Source: Based on data from the Texas Agricultural Statistics Service, Texas Water Development Board, and Texas A&M University.		

An important consideration when estimating impacts to irrigation was determining which crops are affected by water shortages. One approach is the so-called rationing model, which assumes that farmers respond to water supply cutbacks by fallowing the lowest value crops in the region first and the highest valued crops last until the amount of water saved equals the shortage.[5] For example, if farmer A grows vegetables (higher value) and farmer B grows wheat (lower value) and they both face a proportionate cutback in irrigation water, then farmer B will sell water to farmer A. Farmer B will fallow her irrigated acreage before farmer A fallows anything. Of course, this assumes that farmers can and do transfer enough water to allow this to happen. A different approach involves constructing farm-level profit maximization models that conform to widely-accepted economic theory that farmers make decisions based on marginal net returns. Such models have good predictive capability, but data requirements and complexity are high. Given that a detailed analysis for each region would require a substantial amount of farm-level data and analysis, the following investigation assumes that projected shortages are distributed equally across predominant crops in the region. Predominant in this case are crops that comprise at least one percent of total acreage in the region.

The following steps outline the overall process used to estimate direct impacts to irrigated agriculture:

1. *Distribute shortages across predominant crop types in the region*. Again, unmet water needs were distributed equally across crop sectors that constitute one percent or more of irrigated acreage.

2. *Estimate associated reductions in output for affected crop sectors*. Output reductions are based on elasticities discussed previously and on estimated values per acre for different crops. Values per acre stem from the same data used to estimate output for the year 2006 baseline. Using multipliers, we then generate estimates of forgone income, jobs, and tax revenues based on reductions in gross sales and final demand.

Livestock

The approach used for the livestock sector is basically the same as that used for crop production. As is the case with crops, livestock categorizations used by the TWDB differ from those used in IMPLAN datasets, and TWDB groupings were assigned to a given IMPLAN sector (Table 4). Then we:

1) *Distribute projected water needs equally among predominant livestock sectors and estimate lost output*: As is the case with irrigation, shortages are assumed to affect all livestock sectors equally; however, the category of "other" is not included given its small size. If water needs were small relative to total demands, we assume that producers would haul in water by truck to fill stock tanks. The cost per acre-foot ($24,000) is based on 2008 rates charged by various water haulers in Texas, and assumes that the average truck load is 6,500 gallons at a hauling distance of 60 miles.

3) *Estimate reduced output in forward processors for livestock sectors*. Reductions in output for livestock sectors are assumed to have a proportional impact on forward processors in the region such as meat packers. In other words, if the cows were gone, meat-packing plants or fluid milk manufacturers) would likely have little to process. This is not an unreasonable premise. Since the

[5] The rationing model was initially proposed by researchers at the University of California at Berkeley, and was then modified for use in a study conducted by the U.S. Environmental Protection Agency that evaluated how proposed water supply cutbacks recommended to protect water quality in the Bay/Delta complex in California would affect farmers in the Central Valley. See, Zilberman, D., Howitt, R. and Sunding, D. "*Economic Impacts of Water Quality Regulations in the San Francisco Bay and Delt*a." Western Consortium for Public Health. May 1993.

1950s, there has been a major trend towards specialized cattle feedlots, which in turn has decentralized cattle purchasing from livestock terminal markets to direct sales between producers and slaughterhouses. Today, the meat packing industry often operates large processing facilities near high concentrations of feedlots to increase capacity utilization.[6] As a result, packers are heavily dependent upon nearby feedlots. For example, a recent study by the USDA shows that on average meat packers obtain 64 percent of cattle from within 75 miles of their plant, 82 percent from within 150 miles and 92 percent from within 250 miles.[7]

Table 4: Description of Livestock Sectors

IMPLAN Category	TWDB Category
Cattle ranching and farming	Cattle, cow calf, feedlots and dairies
Poultry and egg production	Poultry production.
Other livestock	Livestock other than cattle and poultry (i.e., horses, goats, sheep, hogs)
Milk manufacturing	Fluid milk manufacturing, cheese manufacturing, ice cream manufacturing etc.
Meat packing	Meat processing present in the region from slaughter to final processing

1.1.3 Impacts to Municipal Water User Groups

Disaggregation of Municipal Water Demands

Estimating the economic impacts for the municipal water user groups is complicated for a number of reasons. For one, municipal use comprises a range of consumers including commercial businesses, institutions such as schools and government and households. However, reported water needs are not distributed among different municipal water users. In other words, how much of a municipal need is commercial and how much is residential (domestic)?

The amount of commercial water use as a percentage of total municipal demand was estimated based on "GED" coefficients (gallons per employee per day) published in secondary sources.[8] For example, if year 2006 baseline data for a given economic sector (e.g., amusement and recreation services) shows employment at 30 jobs and the GED coefficient is 200, then average daily water use by that sector is (30 x

[6] Ferreira, W.N. "*Analysis of the Meat Processing Industry in the United States*." Clemson University Extension Economics Report ER211, January 2003.

[7] Ward, C.E. "*Summary of Results from USDA's Meatpacking Concentration Study*." Oklahoma Cooperative Extension Service, OSU Extension Facts WF-562.

[8] Sources for GED coefficients include: Gleick, P.H., Haasz, D., Henges-Jeck, C., Srinivasan, V., Wolff, G. Cushing, K.K., and Mann, A. "*Waste Not, Want Not*: *The Potential for Urban Water Conservation in California*." Pacific Institute. November 2003. U.S. Bureau of the Census. 1982 Census of Manufacturers: Water Use in Manufacturing. USGPO, Washington D.C. See also: "*U.S. Army Engineer Institute for Water Resources, IWR Report 88-R-6.*," Fort Belvoir, VA. See also, Joseph, E. S., 1982, "*Municipal and Industrial Water Demands of the Western United States*." Journal of the Water Resources Planning and Management Division, Proceedings of the American Society of Civil Engineers, v. 108, no. WR2, p. 204-216. See also, Baumann, D. D., Boland, J. J., and Sims, J. H., 1981, "*Evaluation of Water Conservation for Municipal and Industrial Water Supply*." U.S. Army Corps of Engineers, Institute for Water Resources, Contract no. 82-C1.

200 = 6,000 gallons) or 6.7 acre-feet per year. Water not attributed to commercial use is considered domestic, which includes single and multi-family residential consumption, institutional uses and all use designated as "county-other." Based on our analysis, commercial water use is about 5 to 35 percent of municipal demand. Less populated rural counties occupy the lower end of the spectrum, while larger metropolitan counties are at the higher end.

After determining the distribution of domestic versus commercial water use, we developed methods for estimating impacts to the two groups.

Domestic Water Uses

Input output models are not well suited for measuring impacts of shortages for domestic water uses, which make up the majority of the municipal water use category. To estimate impacts associated with domestic water uses, municipal water demand and needs are subdivided into residential, and commercial and institutional use. Shortages associated with residential water uses are valued by estimating proxy demand functions for different water user groups allowing us to estimate the marginal value of water, which would vary depending upon the level of water shortages. The more severe the water shortage, the more costly it becomes. For instance, a 2 acre-foot shortage for a group of households that use 10 acre-feet per year would not be as severe as a shortage that amounted to 8 acre-feet. In the case of a 2 acre-foot shortage, households would probably have to eliminate some or all outdoor water use, which could have implicit and explicit economic costs including losses to the horticultural and landscaping industry. In the case of an 8 acre-foot shortage, people would have to forgo all outdoor water use and most indoor water consumption. Economic impacts would be much higher in the latter case because people, and would be forced to find emergency alternatives assuming alternatives were available.

To estimate the value of domestic water uses, TWDB staff developed marginal loss functions based on constant elasticity demand curves. This is a standard and well-established method used by economists to value resources such as water that have an explicit monetary cost.

A constant price elasticity of demand is estimated using a standard equation:

$$w = kc^{(-\varepsilon)}$$

where:

- w is equal to average monthly residential water use for a given water user group measured in thousands of gallons;
- k is a constant intercept;
- c is the average cost of water per 1,000 gallons; and
- ε is the price elasticity of demand.

Price elasticities (-0.30 for indoor water use and -0.50 for outdoor use) are based on a study by Bell et al.[9] that surveyed 1,400 water utilities in Texas that serve at least 1,000 people to estimate demand elasticity for several variables including price, income, weather etc. Costs of water and average use per month per household are based on data from the Texas Municipal League's annual water and

[9] Bell, D.R. and Griffin, R.C. "*Community Water Demand in Texas as a Century is Turned*." Research contract report prepared for the Texas Water Development Board. May 2006.

wastewater rate surveys - specifically average monthly household expenditures on water and wastewater in different communities across the state. After examining variance in costs and usage, three different categories of water user groups based on population (population less than 5,000, cities with populations ranging from 5,000 to 99,999 and cities with populations exceeding 100,000) were selected to serve as proxy values for municipal water groups that meet the criteria (Table 5).[10]

Table 5: Water Use and Costs Parameters Used to Estimated Water Demand Functions (average monthly costs per acre-foot for delivered water and average monthly use per household)

Community Population	Water	Wastewater	Total monthly cost	Avg. monthly use (gallons)
Less than or equal to 5,000	$1,335	$1,228	$2,563	6,204
5,000 to 100,000	$1,047	$1,162	$2,209	7,950
Great than or equal to 100,000	$718	$457	$1,190	8,409

Source: Based on annual water and wastewater rate surveys published by the Texas Municipal League.

As an example, Table 6 shows the economic impact per acre-foot of domestic water needs for municipal water user groups with population exceeding 100,000 people. There are several important assumptions incorporated in the calculations:

1) Reported values are net of the variable costs of treatment and distribution such as expenses for chemicals and electricity since using less water involves some savings to consumers and utilities alike; and for outdoor uses we do not include any value for wastewater.

2) Outdoor and "non-essential" water uses would be eliminated before indoor water consumption was affected, which is logical because most water utilities in Texas have drought contingency plans that generally specify curtailment or elimination of outdoor water use during droughts.[11] Determining how much water is used for outdoor purposes is based on several secondary sources. The first is a major study sponsored by the American Water Works Association, which surveyed cities in states including Colorado, Oregon, Washington, California, Florida and Arizona. On average across all cities surveyed 58 percent of single family residential water use was for outdoor activities. In cities with climates comparable to large metropolitan areas of Texas, the average was 40 percent.[12] Earlier findings of the U.S. Water Resources Council showed a national

[10] Ideally, one would want to estimate demand functions for each individual utility in the state. However, this would require an enormous amount of time and resources. For planning purposes, we believe the values generated from aggregate data are more than sufficient.

[11] In Texas, state law requires retail and wholesale water providers to prepare and submit plans to the Texas Commission on Environmental Quality (TCEQ). Plans must specify demand management measures for use during drought including curtailment of "non-essential water uses." Non-essential uses include, but are not limited to, landscape irrigation and water for swimming pools or fountains. For further information see the Texas Environmental Quality Code §288.20.

[12] See, Mayer, P.W., DeOreo, W.B., Opitz, E.M., Kiefer, J.C., Davis, W., Dziegielewski, D., Nelson, J.O. "*Residential End Uses of Water*." Research sponsored by the American Water Works Association and completed by Aquacraft, Inc. and Planning and Management Consultants, Ltd. (PMCL@CDM).

average of 33 percent. Similarly, the United States Environmental Protection Agency (USEPA) estimated that landscape watering accounts for 32 percent of total residential and commercial water use on annual basis.[13] A study conducted for the California Urban Water Agencies (CUWA) calculated average annual values ranging from 25 to 35 percent.[14] Unfortunately, there does not appear to be any comprehensive research that has estimated non-agricultural outdoor water use in Texas. As an approximation, an average annual value of 30 percent based on the above references was selected to serve as a rough estimate in this study.

3) As shortages approach 100 percent values become immense and theoretically infinite at 100 percent because at that point death would result, and willingness to pay for water is immeasurable. Thus, as shortages approach 80 percent of monthly consumption, we assume that households and non-water intensive commercial businesses (those that use water only for drinking and sanitation would have water delivered by tanker truck or commercial water delivery companies. Based on reports from water companies throughout the state, we estimate that the cost of trucking in water is around $21,000 to $27,000 per acre-feet assuming a hauling distance of between 20 to 60 miles. This is not an unreasonable assumption. The practice was widespread during the 1950s drought and recently during droughts in this decade. For example, in 2000 at the heels of three consecutive drought years Electra - a small town in North Texas - was down to its last 45 days worth of reservoir water when rain replenished the lake, and the city was able to refurbish old wells to provide supplemental groundwater. At the time, residents were forced to limit water use to 1,000 gallons per person per month - less than half of what most people use - and many were having water delivered to their homes by private contractors.[15] In 2003 citizens of Ballinger, Texas, were also faced with a dwindling water supply due to prolonged drought. After three years of drought, Lake Ballinger, which supplies water to more than 4,300 residents in Ballinger and to 600 residents in nearby Rowena, was almost dry. Each day, people lined up to get water from a well in nearby City Park. Trucks hauling trailers outfitted with large plastic and metal tanks hauled water to and from City Park to Ballinger.[16]

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[13] U.S. Environmental Protection Agency. *"Cleaner Water through Conservation*." USEPA Report no. 841-B-95-002. April, 1995.

[14] Planning and Management Consultants, Ltd. "*Evaluating Urban Water Conservation Programs: A Procedures Manual*." Prepared for the California Urban Water Agencies. February 1992.

[15] Zewe, C. "*Tap Threatens to Run Dry in Texas Town*." July 11, 2000. CNN Cable News Network.

[16] Associated Press, "*Ballinger Scrambles to Finish Pipeline before Lake Dries Up*." May 19, 2003.

Table 6: Economic Losses Associated with Domestic Water Shortages in Communities with Populations Exceeding 100,000 people

Water shortages as a percentage of total monthly household demands	No. of gallons remaining per household per day	No of gallons remaining per person per day	Economic loss (per acre-foot)	Economic loss (per gallon)
1%	278	93	$748	$0.00005
5%	266	89	$812	$0.0002
10%	252	84	$900	$0.0005
15%	238	79	$999	$0.0008
20%	224	75	$1,110	$0.0012
25%	210	70	$1,235	$0.0015
30%[a]	196	65	$1,699	$0.0020
35%	182	61	$3,825	$0.0085
40%	168	56	$4,181	$0.0096
45%	154	51	$4,603	$0.011
50%	140	47	$5,109	$0.012
55%	126	42	$5,727	$0.014
60%	112	37	$6,500	$0.017
65%	98	33	$7,493	$0.02
70%	84	28	$8,818	$0.02
75%	70	23	$10,672	$0.03
80%	56	19	$13,454	$0.04
85%	42	14	$18,091 ($24,000)[b]	$0.05 ($0.07)[b]
90%	28	9	$27,363 ($24,000)	$0.08 ($0.07)
95%	14	5	$55,182 ($24,000)	$0.17 ($0.07)
99%	3	0.9	$277,728 ($24,000)	$0.85 ($0.07)
99.9%	1	0.5	$2,781,377 ($24,000)	$8.53 ($0.07)
100%	0	0	Infinite ($24,000)	Infinite ($0.07)

[a] The first 30 percent of needs are assumed to be restrictions of outdoor water use; when needs reach 30 percent of total demands all outdoor water uses would be restricted. Needs greater than 30 percent include indoor use

[b] As shortages approach 100 percent the value approaches infinity assuming there are not alternatives available; however, we assume that communities would begin to have water delivered by tanker truck at an estimated cost of $24,000 per acre-foot when shortages breached 85 percent.

Commercial Businesses

Effects of water shortages on commercial sectors were estimated in a fashion similar to other business sectors meaning that water shortages would affect the ability of these businesses to operate. This is particularly true for "water intensive" commercial sectors that are need large amounts of water (in addition to potable and sanitary water) to provide their services. These include:

- car-washes,
- laundry and cleaning facilities,
- sports and recreation clubs and facilities including race tracks,
- amusement and recreation services,
- hospitals and medical facilities,
- hotels and lodging places, and
- eating and drinking establishments.

A key assumption is that commercial operations would not be affected until water shortages were at least 50 percent of total municipal demand. In other words, we assume that residential water consumers would reduce water use including all non-essential uses before businesses were affected.

An example will illustrate the breakdown of municipal water needs and the overall approach to estimating impacts of municipal needs. Assume City A experiences an unexpected shortage of 50 acre-feet per year when their demands are 200 acre-feet per year. Thus, shortages are only 25 percent of total municipal use and residents of City A could eliminate needs by restricting landscape irrigation. City B, on the other hand, has a deficit of 150 acre-feet in 2020 and a projected demand of 200 acre-feet. Thus, total shortages are 75 percent of total demand. Emergency outdoor and some indoor conservation measures could eliminate 50 acre-feet of projected needs, yet 50 acre-feet would still remain. To eliminate" the remaining 50 acre-feet water intensive commercial businesses would have to curtail operations or shut down completely.

Three other areas were considered when analyzing municipal water shortages: 1) lost revenues to water utilities, 2) losses to the horticultural and landscaping industries stemming for reduction in water available for landscape irrigation, and 3) lost revenues and related economic impacts associated with reduced water related recreation.

Water Utility Revenues

Estimating lost water utility revenues was straightforward. We relied on annual data from the "*Water and Wastewater Rate Survey*" published annually by the Texas Municipal League to calculate an average value per acre-foot for water and sewer. For water revenues, average retail water and sewer rates multiplied by total water needs served as a proxy. For lost wastewater, total unmet needs were adjusted for return flow factor of 0.60 and multiplied by average sewer rates for the region. Needs reported as "county-other" were excluded under the presumption that these consist primarily of self-supplied water uses. In addition, 15 percent of water demand and needs are considered non-billed or "unaccountable" water that comprises things such as leakages and water for municipal government functions (e.g., fire departments). Lost tax receipts are based on current rates for the "miscellaneous gross receipts tax, "which the state collects from utilities located in most incorporated cities or towns in Texas. We do not include lost water utility revenues when aggregating impacts of municipal water shortages to regional and state levels to prevent double counting.

Horticultural and Landscaping Industry

The horticultural and landscaping industry, also referred to as the "green Industry," consists of businesses that produce, distribute and provide services associated with ornamental plants, landscape and garden supplies and equipment. Horticultural industries often face big losses during drought. For example, the recent drought in the Southeast affecting the Carolinas and Georgia horticultural and landscaping businesses had a harsh year. Plant sales were down, plant mortality increased, and watering costs increased. Many businesses were forced to close locations, lay off employees, and even file for bankruptcy. University of Georgia economists put statewide losses for the industry at around $3.2 billion during the 3-year drought that ended in 2008.[17] Municipal restrictions on outdoor watering play a significant role. During drought, water restrictions coupled with persistent heat has a psychological effect on homeowners that reduces demands for landscaping products and services. Simply put, people were afraid to spend any money on new plants and landscaping.

In Texas, there do not appear to be readily available studies that analyze the economic effects of water shortages on the industry. However, authors of this report believe negative impacts do and would result in restricting landscape irrigation to municipal water consumers. The difficulty in measuring them is two-fold. First, as noted above, data and research for these types of impacts that focus on Texas are limited; and second, economic data provided by IMPLAN do not disaggregate different sectors of the green industry to a level that would allow for meaningful and defensible analysis.[18]

Recreational Impacts

Recreational businesses often suffer when water levels and flows in rivers, springs and reservoirs fall significantly during drought. During droughts, many boat docks and lake beaches are forced to close, leading to big losses for lakeside business owners and local communities. Communities adjacent to popular river and stream destinations such as Comal Springs and the Guadalupe River also see their business plummet when springs and rivers dry up. Although there are many examples of businesses that have suffered due to drought, dollar figures for drought-related losses to the recreation and tourism industry are not readily available, and very difficult to measure without extensive local surveys. Thus, while they are important, economic impacts are not measured in this study.

Table 7 summarizes impacts of municipal water shortages at differing levels of magnitude, and shows the ranges of economic costs or losses per acre-foot of shortage for each level.

[17] Williams, D. *"Georgia landscapers eye rebound from Southeast drought."* Atlanta Business Chronicle, Friday, June 19, 2009

[18] Economic impact analyses prepared by the TWDB for 2006 regional water plans did include estimates for the horticultural industry. However, year 2000 and prior IMPLAN data were disaggregated to a finer level. In the current dataset (2006), the sector previously listed as "Landscaping and Horticultural Services" (IMPLAN Sector 27) is aggregated into "Services to Buildings and Dwellings" (IMPLAN Sector 458).

Table 7: Impacts of Municipal Water Shortages at Different Magnitudes of Shortages		
Water shortages as percent of total municipal demands	Impacts	Economic costs per acre-foot*
0-30%	✓ Lost water utility revenues ✓ Restricted landscape irrigation and non-essential water uses	$730 - $2,040
30-50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use	$2,040 - $10,970
>50%	✓ Lost water utility revenues ✓ Elimination of landscape irrigation and non-essential water uses ✓ Rationing of indoor use ✓ Restriction or elimination of commercial water use ✓ Importing water by tanker truck	$10,970 - varies
*Figures are rounded		

1.1.4 Industrial Water User Groups

Manufacturing

Impacts to manufacturing were estimated by distributing water shortages among industrial sectors at the county level. For example, if a planning group estimates that during a drought of record water supplies in County A would only meet 50 percent of total annual demands for manufactures in the county, we reduced output for each sector by 50 percent. Since projected manufacturing demands are based on TWDB Water Uses Survey data for each county, we only include IMPLAN sectors represented in the TWBD survey database. Some sectors in IMPLAN databases are not part of the TWDB database given that they use relatively small amounts of water - primarily for on-site sanitation and potable purposes. To maintain consistency between IMPLAN and TWDB databases, Standard Industrial Classification (SIC) codes both databases were cross referenced in county with shortages. Non-matches were excluded when calculating direct impacts.

Mining

The process of mining is very similar to that of manufacturing. We assume that within a given county, shortages would apply equally to relevant mining sectors, and IMPLAN sectors are cross referenced with TWDB data to ensure consistency.

In Texas, oil and gas extraction and sand and gravel (aggregates) operations are the primary mining industries that rely on large volumes of water. For sand and gravel, estimated output reductions are straightforward; however, oil and gas is more complicated for a number of reasons. IMPLAN does not necessarily report the physical extraction of minerals by geographic local, but rather the sales revenues reported by a particular corporation.

For example, at the state level revenues for IMPLAN sector 19 (oil and gas extraction) and sector 27 (drilling oil and gas wells) totals $257 billion. Of this, nearly $85 billion is attributed to Harris County. However, only a very small fraction (less than one percent) of actual production takes place in the county. To measure actual potential losses in well head capacity due to water shortages, we relied on county level production data from the Texas Railroad Commission (TRC) and average well-head market prices for crude and gas to estimate lost revenues in a given county. After which, we used to IMPLAN ratios to estimate resultant losses in income and employment.

Other considerations with respect to mining include:

1) Petroleum and gas extraction industry only uses water in significant amounts for secondary recovery. Known in the industry as enhanced or water flood extraction, secondary recovery involves pumping water down injection wells to increase underground pressure thereby pushing oil or gas into other wells. IMPLAN output numbers do not distinguish between secondary and non-secondary recovery. To account for the discrepancy, county-level TRC data that show the proportion of barrels produced using secondary methods were used to adjust IMPLAN data to reflect only the portion of sales attributed to secondary recovery.

2) A substantial portion of output from mining operations goes directly to businesses that are classified as manufacturing in our schema. Thus, multipliers measuring backward linkages for a given manufacturer might include impacts to a supplying mining operation. Care was taken not to double count in such situations if both a mining operation and a manufacturer were reported as having water shortages.

Steam-electric

At minimum without adequate cooling water, power plants cannot safely operate. As water availability falls below projected demands, water levels in lakes and rivers that provide cooling water would also decline. Low water levels could affect raw water intakes and outfalls at electrical generating units in several ways. For one, power plants are regulated by thermal emission guidelines that specify the maximum amount of heat that can go back into a river or lake via discharged cooling water. Low water levels could result in permit compliance issues due to reduced dilution and dispersion of heat and subsequent impacts on aquatic biota near outfalls.[19] However, the primary concern would be a loss of head (i.e., pressure) over intake structures that would decrease flows through intake tunnels. This would affect safety related pumps, increase operating costs and/or result in sustained shut-downs. Assuming plants did shutdown, they would not be able to generate electricity.

[19] Section 316 (b) of the Clean Water Act requires that thermal wastewater discharges do not harm fish and other wildlife.

Among all water use categories steam-electric is unique and cautions are needed when applying methods used in this study. Measured changes to an economy using input-output models stem directly from changes in sales revenues. In the case of water shortages, one assumes that businesses will suffer lost output if process water is in short supply. For power generation facilities this is true as well. However, the electric services sector in IMPLAN represents a corporate entity that may own and operate several electrical generating units in a given region. If one unit became inoperable due to water shortages, plants in other areas or generation facilities that do not rely heavily on water such as gas powered turbines might be able to compensate for lost generating capacity. Utilities could also offset lost production via purchases on the spot market.[20] Thus, depending upon the severity of the shortages and conditions at a given electrical generating unit, energy supplies for local and regional communities could be maintained. But in general, without enough cooling water, utilities would have to throttle back plant operations, forcing them to buy or generate more costly power to meet customer demands.

Measuring impacts end users of electricity is not part of this study as it would require extensive local and regional level analysis of energy production and demand. To maintain consistency with other water user groups, impacts of steam-electric water shortages are measured in terms of lost revenues (and hence income) and jobs associated with shutting down electrical generating units.

1.2 Social Impacts of Water Shortages

As the name implies, the effects of water shortages can be social or economic. Distinctions between the two are both semantic and analytical in nature – more so analytic in the sense that social impacts are harder to quantify. Nevertheless, social effects associated with drought and water shortages are closely tied to economic impacts. For example, they might include:

- demographic effects such as changes in population,
- disruptions in institutional settings including activity in schools and government,
- conflicts between water users such as farmers and urban consumers,
- health-related low-flow problems (e.g., cross-connection contamination, diminished sewage flows, increased pollutant concentrations),
- mental and physical stress (e.g., anxiety, depression, domestic violence),
- public safety issues from forest and range fires and reduced fire fighting capability,
- increased disease caused by wildlife concentrations,
- loss of aesthetic and property values, and
- reduced recreational opportunities.[21]

[20] Today, most utilities participate in large interstate "power pools" and can buy or sell electricity "on the grid" from other utilities or power marketers. Thus, assuming power was available to buy, and assuming that no contractual or physical limitations were in place such as transmission constraints; utilities could offset lost power that resulted from waters shortages with purchases via the power grid.

[21] Based on information from the website of the National Drought Mitigation Center at the University of Nebraska Lincoln. Available online at: http://www.drought.unl.edu/risk/impacts.htm. See also, Vanclay, F. "*Social Impact Assessment*." in Petts, J. (ed) International Handbook of Environmental Impact Assessment. 1999.

Social impacts measured in this study focus strictly on demographic effects including changes in population and school enrollment. Methods are based on demographic projection models developed by the Texas State Data Center and used by the TWDB for state and regional water planning. Basically, the social impact model uses results from the economic component of the study and assesses how changes in labor demand would affect migration patterns in a region. Declines in labor demand as measured using adjusted IMPLAN data are assumed to affect net economic migration in a given regional water planning area. Employment losses are adjusted to reflect the notion that some people would not relocate but would seek employment in the region and/or public assistance and wait for conditions to improve. Changes in school enrollment are simply the proportion of lost population between the ages of 5 and 17.

2. Results

Section 2 presents the results of the analysis at the regional level. Included are baseline economic data for each water use category, and estimated economics impacts of water shortages for water user groups with reported deficits. According to the 2011 *Rio Grande Regional Water Plan*, during severe drought irrigation, livestock, municipal, manufacturing, mining and steam-electric water user groups would experience water shortages in the absence of new water management strategies.

2.1 Overview of Regional Economy

On an annual basis, the East Texas regional economy generates $34 billion in gross state product for Texas ($32 billion in income and $2 billion worth of business taxes) and supports 481,393 jobs (Table 8). Generating about $12 billion worth of income per year, agriculture, manufacturing, and mining are the primary base economic sectors in the region.[22] Municipal sectors also generate substantial amounts of income and are major employers. However, while municipal sectors are the largest employer and source of wealth, many businesses that make up the municipal category such as restaurants and retail stores are non-basic industries meaning they exist to provide services to people who work would in base industries such as manufacturing, agriculture and mining. In other words, without base industries such agriculture, many municipal jobs in the region would not exist.

[22] Base industries are those that supply markets outside of the region. These industries are crucial to the local economy and are called the economic base of a region. Appendix A shows how IMPLAN's 529 sectors were allocated to water use category, and shows economic data for each sector.

Table 8: The East Texas Regional Economy by Water User Group ($millions)*						
Water Use Category	**Total sales**	**Intermediate sales**	**Final sales**	**Jobs**	**Income**	**Business taxes**
Irrigation	$78.03	$8.73	$69.30	618	$20.24	$0.85
Livestock	$2,637.85	$1,339.95	$1,297.90	16,521	$499.23	$21.09
Manufacturing	$62,475.81	$19,826.73	$42,649.08	80,609	$9,096.38	$255.38
Mining	$3,693.95	$1,475.81	$2,218.13	7,862	$1,831.54	$200.96
Steam-electric	$990.40	$278.62	$711.78	1,893	$687.65	$117.45
Municipal	$33,562.37	$9,053.48	$24,508.89	373,890	$19,618.82	$1,723.75
Regional total	$103,438.41	$31,983.32	$71,455.08	481,393	$31,753.86	$2,319.48

[a] Appendix 1 displays data for individual IMPLAN sectors that make up each water use category. Based on data from the Texas Water Development Board, and year 2006 data from the Minnesota IMPLAN Group, Inc.

2.2 Impacts of Agricultural Water Shortages

According to the 2011 *East Texas Regional Water Plan*, during severe drought the counties of Hardin, Houston, San Augustine and Smith would experiences shortages of irrigation water. In 2010, shortages range from about 1 to 48 percent of annual irrigation demands, and farmers would be short nearly 1,675 acre-feet in 2010 and nearly 3,420 acre-feet in 2060. Shortages of these magnitudes would reduce gross state product (income plus state and local business taxes) by less than $1 million per year in each decade.

Table 9: Economic Impacts of Water Shortages for Irrigation Water User Groups ($millions)			
Decade	**Lost income from reduced crop production [a]**	**Lost state and local tax revenues from reduced crop production**	**Lost jobs from reduced crop production**
2010	$0.18	$0.03	2
2020	$0.19	$0.03	2
2030	$0.23	$0.03	2
2040	$0.40	$0.04	2
2050	$0.48	$0.05	2
2060	$0.57	$0.05	3

*Changes to income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

Shortages for livestock producers are reported for Angelina, Henderson, Houston, Nacogdoches, Sabine, San Augustine, and Shelby counties. Shortages of these magnitudes would reduce gross state product (income plus state and local business taxes) by $14 million per year in 2010, and $551 million in 2060 (Table 10).

Table 10: Economic Impacts of Water Shortages for Livestock Water User Groups ($millions)[a]

Decade	Lost income from reduced livestock production[b]	Lost state and local tax revenues from reduced livestock production	Lost jobs from reduced livestock crop production
2010	$13.22	$0.60	124
2020	$53.29	$2.43	500
2030	$92.78	$4.23	873
2040	$266.31	$12.12	2,495
2050	$390.77	$17.79	3,660
2060	$527.74	$24.02	4,942

[a] Includes impacts to forward processors (meat packing and poultry processing).

[b] Changes to income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.3 Impacts of Municipal Water Shortages

Water shortages are projected to occur in a significant number of communities in the region. Deficits range from approximately 1 to roughly 75 percent of total annual water use. At the regional level, the estimated economic value of domestic water shortages totals $19 million in 2010 and $157 million in 2060 (Table 11). Due to curtailment of commercial business activity operation, municipal shortages would reduce gross state product (income plus taxes) by an estimated $34 million in 2020 and $162 million in 2060.

Table 11: Economic Impacts of Water Shortages for Municipal Water User Groups ($millions)					
Decade	Monetary value of domestic water shortages	Lost income from reduced commercial business activity*	Lost state and local taxes from reduced commercial business activity	Lost jobs from reduced commercial business activity	Lost water utility revenues
2010	$19.03	$0.00	$0.00	0	$6.16
2020	$65.60	$33.91	$3.61	754	$10.21
2030	$84.52	$42.30	$4.50	941	$12.92
2040	$102.76	$51.89	$5.53	1,156	$16.54
2050	$193.14	$129.22	$13.84	2,898	$22.23
2060	$162.16	$162.23	$17.55	3,683	$29.75

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.4 Impacts of Manufacturing Water Shortages

Manufacturing water shortages in the region are projected to occur in Angelina, Henderson, Houston, Nacogdoches, Sabine, San Augustine, and Shelby counties. In 2010, the East Texas planning group estimates that these manufacturers would be short about 3,400 acre-feet; and by 2060, this figure increases to nearly 50,000 acre-feet. Shortages of these magnitudes would reduce gross state product (income plus taxes) by an estimated $41 million in 2010 and $1.2 billion in 2060 (Table 12).

Table 12: Economic Impacts of Water Shortages for Manufacturing Water User Groups ($millions)			
Decade	Lost income due to reduced manufacturing output	Lost state and local business tax revenues due to reduced manufacturing output	Lost jobs due to reduced manufacturing output
2010	$40.43	$1.28	79
2020	$292.52	$9.01	651
2030	$397.41	$12.09	1,114
2040	$878.32	$26.94	2,038
2050	$1,026.90	$31.44	2,516
2060	$1,188.24	$36.33	3,046

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.5 Impacts of Mining Water Shortages

Ming water shortages in Region I are projected to occur in San Augustine, Angelina, Jefferson, Nacogdoches, Newton and Rusk counties, and would primarily affect extraction of gas in the Haynesville shale formation. Combined shortages for each county would result in estimated losses in gross state product totaling $1.2 billion dollars in 2010, and about $900 million 2060 (Table 13).

Table 13: Economic Impacts of Water Shortages for Mining Water User Groups ($millions)

Decade	Lost income due to reduced mining output	Lost state and local business tax revenues due to reduced mining output	Lost jobs due to reduced mining output
2010	$1,105.82	$99.40	8,178
2020	$2,226.70	$222.67	16,468
2030	$701.19	$70.12	5,186
2040	$749.60	$74.96	5,544
2050	$797.20	$79.72	5,896
2060	$834.13	$83.41	6,169

*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.

2.6 Impacts of Steam-electric Water Shortages

Water shortages for electrical generating units are projected to occur in Anderson, Angelina, Jefferson, Nacogdoches, Newton, and Rusk counties, and would result in estimated losses of gross state product totaling $119 million dollars in 2020, and $3.7 billion 2060 (Table 14).

Table 14: Economic Impacts of Water Shortages for Steam-electric Water User Groups ($millions)			
Decade	**Lost income due to reduced electrical generation**	**Lost state and local business tax revenues due to reduced electrical generation**	**Lost jobs due to reduced electrical generation**
2010	$104.61	$15.01	356
2020	$640.67	$91.96	2,178
2030	$853.57	$122.52	2,902
2040	$1,662.28	$238.59	5,651
2050	$2,682.62	$385.05	9,119
2060	$3,244.45	$465.69	11,029
*Changes to Income and business taxes are collectively equivalent to a decrease in gross state product, which is analogous to gross domestic product measured at the state rather than national level. Appendix 2 shows results by water user group.			

2.7 Social Impacts of Water Shortages

As discussed previously, estimated social impacts focus on changes in population and school enrollment in the region. In 2010, estimated population losses total 10,511 with corresponding reductions in school enrollment of 2,965 students (Table 15). In 2060, population in the region would decline by 34,773 and school enrollment would fall by 9,865.

Table 15: Social Impacts of Water Shortages (2010-2060)		
Year	**Population Losses**	**Declines in School Enrollment**
2010	10,511	2,965
2020	24,754	7,023
2030	13,269	3,764
2040	20,337	5,770
2050	29,015	8,232
2060	34,773	9,865

2.8 Distribution of Impacts by Major River Basin

Administrative rules require that impacts are presented by both planning region and major river basin. To meet rule requirements, impacts were allocated among basins based on the distribution of water shortages in relevant basins. For example, if 50 percent of water shortages in River Basin A and 50 percent occur in River Basin B, then impacts were split equally among the two basins. Table 16 displays the results.

Table 16: Distribution of Impacts by Major River Basin (2010-2060)						
Water Use	**2010**	**2020**	**2030**	**2040**	**2050**	**2060**
Irrigation						
Neches	100%	100%	90%	82%	76%	70%
Trinity	0%	0%	10%	18%	24%	30%
Livestock						
Neches	48%	36%	38%	38%	39%	38%
Sabine	52%	61%	57%	56%	56%	56%
Trinity	<1%	4%	5%	5%	6%	5%
Manufacturing						
Neches	93%	66%	54%	48%	45%	42%
Sabine	6%	33%	45%	51%	54%	57%
Trinity	<1%	<1%	<1%	<1%	<1%	<1%
Mining						
Neches	>99%	>99%	>99%	>99%	99%	99%
Neches-Trinity	0%	0%	0%	0%	<1%	<1%
Sabine	0%	0%	0%	<1%	1%	1%
Trinity	<1%	<1%	<1%	<1%	<1%	<1%
Municipal						
Neches	96%	96%	96%	96%	97%	97%
Sabine	4%	4%	4%	4%	3%	3%
Trinity	<1%	<1%	<1%	<1%	<1%	<1%
Steam-electric						
Neches	100%	100%	93%	88%	84%	73%
Sabine	0%	0%	7%	12%	16%	27%

Appendix 1: Economic Data for Individual IMPLAN Sectors for the East Texas Regional Water Planning Area

Economic Data for Agricultural Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Irrigation	Rice milling	49	$52.89	$0.40	$52.48	88	$6.26	$0.38
Irrigation	Rice	10	$11.49	$7.41	$4.08	164	$5.62	$0.22
Irrigation	Fruit Farming	5	$9.66	$0.81	$8.86	269	$5.53	$0.21
Irrigation	Vegetable and Melon Farming	3	$3.72	$0.10	$3.62	92	$2.73	$0.04
Irrigation	Cotton Farming	8	$0.22	$0	$0.22	3	$0.08	$0.00
Irrigation	Grain Farming	2	$0.05	$0.01	$0.04	2	$0.02	$0.00
	Total irrigation		**$78.03**	**$8.73**	**$69.30**	**618**	**$20.24**	**$0.85**
Livestock	Poultry processing	70	$1,085.13	$345.26	$739.86	4,772	$171.09	$7.77
Livestock	Poultry and egg production	12	$746.27	$584.87	$161.39	2,459	$251.12	$2.53
Livestock	Meat processed from carcasses	68	$380.67	$112.30	$268.36	867	$42.62	$2.18
Livestock	Cattle ranching and farming	11	$378.89	$262.72	$116.17	6,997	$29.93	$7.96
Livestock	Animal production- except cattle and poultry	13	$38.71	$32.82	$5.89	1,412	$3.76	$0.60
Livestock	Fluid milk manufacturing	62	$8.19	$1.97	$6.22	14	$0.71	$0.04
	Total livestock		**$2,637.85**	**$1,339.95**	**$1,297.90**	**16,521**	**$499.23**	**$21.09**
	Total agriculture		**$2,715.88**	**$1,348.69**	**$1,367.20**	**17,139**	**$519.46**	**$21.93**
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Mining and Steam-electric Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Mining	Drilling oil and gas wells	27	$1,443.30	$7.20	$1,436.09	2,304	$419.03	$55.25
Mining	Oil and gas extraction	19	$1,377.01	$1,278.81	$98.20	1,902	$791.16	$84.41
Mining	Support activities for oil and gas operations	28	$532.90	$74.02	$458.88	2,706	$482.88	$22.17
Mining	Coal mining	20	$298.50	$111.86	$186.64	734	$115.80	$37.78
Mining	Sand- gravel- clay- and refractory mining	25	$20.75	$2.19	$18.56	138	$12.09	$0.62
Mining	Other nonmetallic mineral mining	26	$11.66	$1.17	$10.50	36	$6.17	$0.44
Mining	Stone mining and quarrying	24	$5.57	$0.57	$5.00	29	$3.07	$0.07
Mining	Iron ore mining	21	$4.26	-$0.01	$4.27	13	$1.34	$0.23
	Total mining		**$3,693.95**	**$1,475.81**	**$2,218.13**	**7,862**	**$1,831.54**	**$200.96**
Steam-electric	**Power generation and supply**	**30**	**$990.40**	**$278.62**	**$711.78**	**1,893**	**$687.65**	**$117.45**
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Manufacturing Water User Groups ($millions)								
Water Use Category	**IMPLAN Sector**	**IMPLAN Code**	**Total Sales**	**Intermediate Sales**	**Final Sales**	**Jobs**	**Income**	**Business Taxes**
Manufacturing	Petroleum refineries	142	$35,420.78	$13,165.92	$22,254.85	4,227	$1,693.35	$71.73
Manufacturing	Petrochemical manufacturing	147	$7,340.32	$3,363.10	$3,977.22	903	$823.05	$46.91
Manufacturing	New residential 1-unit structures- all	33	$1,488.13	$0.00	$1,488.13	9,677	$519.58	$8.18
Manufacturing	Plastics material and resin manufacturing	152	$1,297.60	$51.39	$1,246.21	902	$248.53	$8.15
Manufacturing	Paper and paperboard mills	125	$1,199.74	$0.28	$1,199.46	1,922	$394.51	$10.43
Manufacturing	AC- refrigeration- and forced air heating	278	$947.25	$0.00	$947.24	2,853	$234.89	$5.77
Manufacturing	Synthetic rubber manufacturing	153	$899.08	$22.05	$877.03	1,061	$263.14	$6.33
Manufacturing	Commercial and institutional buildings	38	$855.47	$0.00	$855.47	8,436	$445.87	$5.48
Manufacturing	Pesticide and other agricultural chemical man	159	$724.82	$121.45	$603.37	460	$218.41	$3.81
Manufacturing	Other basic organic chemical manufacturing	151	$706.58	$131.74	$574.84	621	$103.32	$4.05
Manufacturing	Other basic inorganic chemical manufacturing	150	$662.12	$145.88	$516.24	1,201	$213.52	$2.43
Manufacturing	Reconstituted wood product manufacturing	114	$578.60	$242.21	$336.39	1,216	$312.29	$2.90
Manufacturing	Sawmills	112	$524.45	$465.15	$59.30	1,810	$173.11	$3.00
Manufacturing	Industrial gas manufacturing	148	$489.53	$257.41	$232.12	490	$193.08	$2.93
Manufacturing	Sheet metal work manufacturing	236	$460.57	$25.10	$435.47	1,924	$225.10	$2.97
Manufacturing	Logging	14	$448.42	$335.08	$113.34	1,805	$117.91	$3.97
Manufacturing	Iron and steel mills	203	$443.31	$31.93	$411.38	519	$92.33	$3.50
Manufacturing	Ferrous metal foundries	221	$384.48	$0.38	$384.10	1,900	$148.93	$2.96
Manufacturing	Other new construction	41	$374.53	$0.00	$374.53	3,869	$206.68	$1.62
Manufacturing	Fabricated structural metal manufacturing	233	$335.65	$17.38	$318.27	1,183	$132.54	$2.13
Manufacturing	Tire manufacturing	179	$325.28	$0.07	$325.21	1,148	$104.18	$10.68
Manufacturing	Ship building and repairing	357	$320.54	$1.86	$318.69	1,673	$129.83	$1.45
Manufacturing	New residential additions and alterations-all	35	$213.35	$0.00	$213.35	1,151	$82.45	$1.16
Manufacturing	Forest nurseries- forest products- and timber	15	$209.23	$3.23	$206.01	260	$62.29	$9.46
Manufacturing	Metal valve manufacturing	248	$199.73	$21.63	$178.10	698	$91.21	$1.18
Manufacturing	Plastics plumbing fixtures and all other plastics	177	$194.82	$141.13	$53.68	1,068	$66.44	$1.14
Manufacturing	**All other manufacturing**		**$4,280.97**	**$1,186.11**	**$3,094.87**	**22,438**	**$1,451.56**	**$26.15**
Manufacturing	**Total manufacturing**		**$62,475.81**	**$19,826.73**	**$42,649.08**	**80,609**	**$9,096.38**	**$255.38**
Based on year 2006 data from the Minnesota IMPLAN Group, Inc.								

Economic Data for Municipal Water User Groups ($millions)

Water Use Category	IMPLAN Sector	IMPLAN Code	Total Sales	Intermediate Sales	Final Sales	Jobs	Income	Business Taxes
Manufacturing	Owner-occupied dwellings	509	$2,769.76	$0.00	$2,769.76	0	$2,145.64	$327.51
Manufacturing	Wholesale trade	390	$1,979.48	$947.70	$1,031.78	12,668	$1,042.46	$292.48
Manufacturing	State & Local Education	503	$1,884.71	$0.00	$1,884.70	46,257	$1,884.71	$0.00
Manufacturing	Hospitals	467	$1,727.97	$0.00	$1,727.96	15,876	$892.06	$11.37
Manufacturing	Offices of physicians- dentists- and other he	465	$1,682.35	$0.00	$1,682.35	12,751	$1,205.26	$10.56
Manufacturing	Food services and drinking places	481	$1,324.54	$169.14	$1,155.40	27,969	$537.72	$62.79
Manufacturing	Monetary authorities and depository credit in	430	$1,099.85	$362.24	$737.61	5,913	$772.33	$14.07
Manufacturing	Architectural and engineering services	439	$1,009.63	$636.44	$373.19	8,507	$531.11	$4.42
Manufacturing	State & Local Non-Education	504	$958.83	$0.00	$958.83	17,038	$958.83	$0.00
Manufacturing	Telecommunications	422	$942.90	$323.87	$619.03	2,611	$390.63	$65.05
Manufacturing	Motor vehicle and parts dealers	401	$866.67	$94.24	$772.43	7,972	$447.32	$126.86
Manufacturing	Legal services	437	$771.37	$489.56	$281.81	5,986	$486.47	$15.24
Manufacturing	Real estate	431	$737.30	$291.86	$445.44	4,444	$426.85	$90.59
Manufacturing	General merchandise stores	410	$729.87	$76.93	$652.94	12,607	$335.61	$106.88
Manufacturing	Lessors of nonfinancial intangible assets	436	$688.93	$375.69	$313.23	39	$323.18	$31.68
Manufacturing	Truck transportation	394	$676.79	$366.46	$310.33	5,415	$299.17	$6.80
Manufacturing	Pipeline transportation	396	$582.34	$254.68	$327.66	925	$168.62	$35.48
Manufacturing	Other State and local government enterprises	499	$490.03	$159.57	$330.46	2,341	$179.70	$0.06
Manufacturing	Food and beverage stores	405	$478.57	$63.98	$414.58	8,897	$240.01	$52.64
Manufacturing	Nursing and residential care facilities	468	$448.72	$0.00	$448.72	10,615	$265.53	$6.25
Manufacturing	Building material and garden supply stores	404	$435.38	$67.52	$367.86	5,102	$205.30	$62.45
Manufacturing	Home health care services	464	$390.02	$0.00	$390.02	11,031	$236.27	$1.39
Manufacturing	Management of companies and enterprises	451	$388.18	$365.05	$23.13	1,671	$243.23	$3.88
Manufacturing	Securities- commodity contracts- investments	426	$373.14	$247.80	$125.34	3,209	$128.28	$3.80
Manufacturing	Automotive repair and maintenance- except car	483	$344.16	$81.75	$262.41	4,607	$127.97	$25.40
Manufacturing	Waste management and remediation services	460	$320.28	$180.02	$140.26	1,915	$152.72	$12.34
Manufacturing	All other municipal		$9,460.62	$3,498.97	$5,961.65	137,524	$4,991.87	$353.80
Manufacturing	**Total**		**$33,562.37**	**$9,053.48**	**$24,508.89**	**373,890**	**$19,618.82**	**$1,723.75**

Based on year 2006 data from the Minnesota IMPLAN Group, Inc.

Appendix 2: Impacts by Water User Group

Irrigation ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Hardin County						
Reduced income from lost crop production	$0.10	$0.10	$0.10	$0.10	$0.10	$0.10
Reduced business taxes from lost crop production	$0.03	$0.03	$0.03	$0.03	$0.03	$0.03
Reduced jobs from lost crop production	2	2	2	2	2	2
Houston County						
Reduced income from lost crop production	$0.058	$0.068	$0.100	$0.271	$0.349	$0.436
Reduced business taxes from lost crop production	$0.004	$0.004	$0.006	$0.017	$0.022	$0.027
Reduced jobs from lost crop production	0	0	0	0	0	0
San Augustine County						
Reduced income from lost crop production	$0.020	$0.020	$0.020	$0.020	$0.020	$0.020
Reduced business taxes from lost crop production	$0.001	$0.001	$0.001	$0.001	$0.001	$0.001
Reduced jobs from lost crop production	0	0	0	0	0	0
Smith						
Reduced income from lost crop production	$0.001	$0.004	$0.007	$0.010	$0.013	$0.017
Reduced business taxes from lost crop production	$0.000	$0.000	$0.000	$0.001	$0.001	$0.001
Reduced jobs from lost crop production	0	0	0	0	0	0

Livestock ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Angelina County						
Reduced income from lost livestock production	$0.00	$0.00	$0.00	$0.08	$0.23	$0.40
Reduced business taxes from lost livestock production	$0.00	$0.00	$0.00	$0.00	$0.01	$0.02
Reduced jobs from lost crop livestock production	0	0	0	1	3	5
Henderson County						
Reduced income from lost livestock production	$0.00	$0.13	$0.98	$1.75	$2.53	$3.27
Reduced business taxes from lost livestock production	$0.00	$0.01	$0.05	$0.09	$0.13	$0.17
Reduced jobs from lost crop livestock production	0	2	12	22	31	40
Houston County						
Reduced income from lost livestock production	$0.33	$0.95	$1.82	$2.76	$3.77	$4.87
Reduced business taxes from lost livestock production	$0.02	$0.05	$0.09	$0.14	$0.19	$0.25
Reduced jobs from lost crop livestock production	4	12	22	34	46	60
Nacogdoches County						
Reduced income from lost livestock production	$0.00	$0.00	$3.45	$7.97	$26.40	$38.40
Reduced business taxes from lost livestock production	$0.00	$0.00	$0.16	$0.36	$1.20	$1.74
Reduced jobs from lost crop livestock production	0	0	32	74	246	358
Sabine County						
Reduced income from lost livestock production	$0.53	$1.14	$1.84	$2.65	$7.18	$9.24
Reduced business taxes from lost livestock production	$0.02	$0.05	$0.08	$0.12	$0.33	$0.42
Reduced jobs from lost crop livestock production	5	11	17	25	67	86
San Augustine County						
Reduced income from lost livestock production	$1.30	$2.41	$3.71	$10.40	$13.88	$17.70
Reduced business taxes from lost livestock production	$0.06	$0.11	$0.17	$0.47	$0.63	$0.80
Reduced jobs from lost crop livestock production	12	22	35	97	129	165
Shelby County						
Reduced income from lost livestock production	$11.07	$48.66	$80.98	$240.70	$336.76	$453.86
Reduced business taxes from lost livestock production	$0.50	$2.21	$3.68	$10.93	$15.30	$20.62
Reduced jobs from lost crop livestock production	103	453	754	2,243	3,137	4,228

Manufacturing ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Angelina County						
Reduced income from lost manufacturing	$37.70	$254.28	$314.02	$749.13	$858.12	$975.28
Reduced business taxes from lost manufacturing	$1.18	$7.93	$9.79	$23.36	$26.75	$30.41
Reduced jobs from lost crop livestock manufacturing	45	305	376	898	1,028	1,169
Hardin County						
Reduced income from lost manufacturing	$0.38	$0.65	$1.78	$2.29	$2.74	$3.22
Reduced business taxes from lost manufacturing	$0.02	$0.03	$0.08	$0.10	$0.12	$0.14
Reduced jobs from lost crop livestock manufacturing	4	6	17	22	26	31
Houston County						
Reduced income from lost manufacturing	$0.10	$0.16	$0.23	$0.29	$0.39	$0.49
Reduced business taxes from lost manufacturing	$0.00	$0.01	$0.01	$0.01	$0.02	$0.02
Reduced jobs from lost crop livestock manufacturing	1	2	2	3	4	5
Newton County						
Reduced income from lost manufacturing	$1.16	$2.06	$5.76	$7.43	$8.94	$10.39
Reduced business taxes from lost manufacturing	$0.01	$0.02	$0.06	$0.08	$0.09	$0.11
Reduced jobs from lost crop livestock manufacturing	7	13	36	47	56	65
Orange County						
Reduced income from lost manufacturing	$0.00	$33.43	$72.49	$111.43	$146.00	$184.89
Reduced business taxes from lost manufacturing	$0.00	$0.92	$1.99	$3.06	$4.01	$5.07
Reduced jobs from lost crop livestock manufacturing	0	294	637	979	1,282	1,624
Panola County						
Reduced income from lost manufacturing	$1.10	$1.33	$1.51	$1.68	$1.84	$2.14
Reduced business taxes from lost manufacturing	$0.07	$0.09	$0.10	$0.11	$0.12	$0.14
Reduced jobs from lost crop livestock manufacturing	22	27	30	34	37	43
Polk County						
Reduced income from lost manufacturing	$0.00	$0.61	$1.56	$5.11	$6.93	$8.53
Reduced business taxes from lost manufacturing	$0.00	$0.02	$0.06	$0.19	$0.26	$0.32
Reduced jobs from lost crop livestock manufacturing	0	6	14	47	64	79
San Augustine County						
Reduced income from lost manufacturing	$0.00	$0.00	$0.00	$0.00	$0.01	$0.04
Reduced business taxes from lost manufacturing	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Reduced jobs from lost crop livestock manufacturing	0	0	0	0	0	0

Manufacturing cont. ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Shelby County						
Reduced income from lost manufacturing	$0.00	$0.00	$0.00	$0.00	$0.19	$0.46
Reduced business taxes from lost manufacturing	$0.00	$0.00	$0.00	$0.00	$0.01	$0.02
Reduced jobs from lost crop livestock manufacturing	0	0	0	0	2	4
Smith County						
Reduced income from lost manufacturing	$0.00	$0.00	$0.06	$0.96	$1.73	$2.80
Reduced business taxes from lost manufacturing	$0.00	$0.00	$0.00	$0.04	$0.06	$0.10
Reduced jobs from lost crop livestock manufacturing	0	0	1	9	16	26

Mining ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Anderson County						
Reduced income from lost mining output	$0.34	$0.41	$0.84	$1.31	$1.78	$2.23
Reduced business taxes from lost mining output	$0.03	$0.04	$0.08	$0.13	$0.18	$0.22
Reduced jobs from lost mining output	2	3	6	10	13	16
Angelina County						
Reduced income from lost mining output	$149.06	$298.79	$0.00	$0.56	$1.12	$1.65
Reduced business taxes from lost mining output	$3.73	$29.88	$0.00	$0.06	$0.11	$0.16
Reduced jobs from lost mining output	1,102	2,210	0	4	8	12
Cherokee County						
Reduced income from lost mining output	$36.70	$111.91	$0.00	$0.00	$0.00	$0.15
Reduced business taxes from lost mining output	$3.67	$11.19	$0.00	$0.00	$0.00	$0.01
Reduced jobs from lost mining output	271	828	0	0	0	1
Hardin County						
Reduced income from lost mining output	$582.15	$645.67	$688.44	$731.06	$773.98	$806.71
Reduced business taxes from lost mining output	$58.22	$64.57	$68.84	$73.11	$77.40	$80.67
Reduced jobs from lost mining output	4,305	4,775	5,091	5,407	5,724	5,966
Jefferson County						
Reduced income from lost mining output	$0.00	$0.00	$0.00	$0.00	$0.09	$0.17
Reduced business taxes from lost mining output	$0.00	$0.00	$0.00	$0.00	$0.01	$0.02
Reduced jobs from lost mining output	0	0	0	0	1	1
Nacogdoches County						
Reduced income from lost mining output	$186.88	$523.80	$0.00	$0.00	$0.00	$0.00
Reduced business taxes from lost mining output	$18.69	$52.38	$0.00	$0.00	$0.00	$0.00
Reduced jobs from lost mining output	1,382	3,874	0	0	0	0
Rusk County						
Reduced income from lost mining output	$0.00	$0.00	$0.00	$0.56	$1.12	$1.65
Reduced business taxes from lost mining output	$0.00	$0.00	$0.00	$0.06	$0.11	$0.16
Reduced jobs from lost mining output	0	0	0	4	8	12
Shelby County						
Reduced income from lost mining output	$112.36	$524.33	$0.00	$0.00	$0.00	$0.00
Reduced business taxes from lost mining output	$11.24	$52.43	$0.00	$0.00	$0.00	$0.00
Reduced jobs from lost mining output	831	3,878	0	0	0	0

Mining cont. ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Smith County						
Reduced income from lost manufacturing	$0.88	$9.44	$11.91	$16.10	$19.10	$21.57
Reduced business taxes from lost manufacturing	$0.09	$0.94	$1.19	$1.61	$1.91	$2.16
Reduced jobs from lost crop livestock manufacturing	7	70	88	119	141	160

Steam-electric ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Anderson County						
Reduced income from lost electrical generation	$0.00	$179.52	$209.88	$246.90	$292.01	$347.00
Reduced business taxes from lost electrical generation	$0.00	$25.77	$30.13	$35.44	$41.91	$49.81
Reduced jobs from lost electrical generation	0	610	713	839	993	1,180
Angelina County						
Reduced income from lost electrical generation	$63.51	$31.76	$63.51	$63.51	$63.51	$63.51
Reduced business taxes from lost electrical generation	$9.12	$4.56	$9.12	$9.12	$9.12	$9.12
Reduced jobs from lost electrical generation	216	108	216	216	216	216
Jefferson County						
Reduced income from lost electrical generation	$0.00	$426.37	$498.46	$1,172.73	$1,387.03	$1,648.27
Reduced business taxes from lost electrical generation	$0.00	$61.20	$71.55	$168.33	$199.09	$236.58
Reduced jobs from lost electrical generation	0	1,449	1,694	3,987	4,715	5,603
Nacogdoches County						
Reduced income from lost electrical generation	$41.09	$3.02	$21.56	$44.19	$713.97	$848.43
Reduced business taxes from lost electrical generation	$5.90	$0.43	$3.10	$6.34	$102.48	$121.78
Reduced jobs from lost electrical generation	140	10	73	150	2,427	2,884
Newton County						
Reduced income from lost electrical generation	$0.00	$0.00	$60.14	$134.94	$226.10	$337.25
Reduced business taxes from lost electrical generation	$0.00	$0.00	$8.63	$19.37	$32.45	$48.41
Reduced jobs from lost electrical generation	0	0	204	459	769	1,146

Municipal ($millions)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Athens						
Monetary value of domestic water shortages	$0.00	$1.25	$1.68	$1.34	$1.76	$2.32
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.09	$0.13	$0.18
Lost jobs due to reduced commercial business activity	0	0	0	3	5	7
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.01	$0.02	$0.03
Lost utility revenues	$0.00	$0.09	$0.12	$0.15	$0.21	$0.27
Brownsboro						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.06
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01
Bullard						
Monetary value of domestic water shortages	$0.00	$0.01	$0.05	$0.11	$0.25	$0.40
Lost utility revenues	$0.00	$0.02	$0.07	$0.13	$0.22	$0.34
Community Water Company						
Monetary value of domestic water shortages	$0.08	$0.97	$1.22	$1.84	$2.74	$4.27
Lost utility revenues	$0.07	$0.15	$0.20	$0.23	$0.30	$0.40
County-other (Anderson)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.07
County-other (Angelina)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.11
County-other (Hardin)						
Monetary value of domestic water shortages	$0.16	$0.30	$0.33	$0.35	$0.41	$0.55
County-other (Henderson)						
Monetary value of domestic water shortages	$0.11	$0.26	$0.44	$0.59	$0.93	$1.62
County-other (Jasper)						
Monetary value of domestic water shortages	$0.10	$0.19	$0.23	$0.15	$0.13	$0.13
County-other (Orange)						
Monetary value of domestic water shortages	$0.12	$0.08	$0.04	$0.01	$0.00	$0.00

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
County-other (Polk)						
Monetary value of domestic water shortages	$0.27	$0.68	$5.21	$3.93	$4.73	$5.83
County-other (Sabine)						
Monetary value of domestic water shortages	$1.26	$1.34	$1.39	$1.44	$1.49	$1.74
County-other (San Augustine)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.01
County-other (Shelby)						
Monetary value of domestic water shortages	$0.31	$0.40	$0.53	$0.55	$0.61	$0.69
County-other (Trinity)						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.01	$0.03	$0.07
County-other (Tyler)						
Monetary value of domestic water shortages	$0.00	$0.15	$0.27	$0.29	$0.27	$0.27
D&M WSC						
Monetary value of domestic water shortages	$0.00	$0.02	$0.07	$0.14	$0.29	$1.89
Lost utility revenues	$0.00	$0.00	$0.04	$0.12	$0.32	$0.55
Diboll						
Monetary value of domestic water shortages	$0.03	$0.24	$0.61	$3.57	$5.99	$10.75
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$2.28	$4.21
Lost jobs due to reduced commercial business activity	0	0	0	0	72	133
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.33	$0.60
Lost utility revenues	$0.06	$0.33	$0.66	$1.09	$1.70	$2.54
Four Way WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.31
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.40
Frankston						
Monetary value of domestic water shortages	$0.00	$0.00	$0.01	$0.03	$0.05	$0.07
Lost utility revenues	$0.00	$0.00	$0.01	$0.04	$0.07	$0.10

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
Hudson						
Monetary value of domestic water shortages	$0.00	$0.00	$0.14	$0.58	$5.00	$9.31
Lost income from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$3.35
Lost jobs due to reduced commercial business activity	0	0	0	0	0	106
Lost state and local taxes from reduced commercial business activity	$0.00	$0.00	$0.00	$0.00	$0.00	$0.48
Lost utility revenues	$0.00	$0.00	$0.22	$0.63	$1.25	$2.07
Hudson WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.11	$0.60	$4.67
Lost utility revenues	$0.00	$0.00	$0.00	$0.18	$0.65	$1.29
Jackson WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.03	$0.09
Lost utility revenues	$0.00	$0.00	$0.07	$0.15	$0.21	$0.28
Lilly Grove SUD						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.24	$0.64
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.39	$0.82
Lindale Rural WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.00	$0.00	$0.09
Lost utility revenues	$0.00	$0.00	$0.00	$0.00	$0.00	$0.13
Lufkin						
Monetary value of domestic water shortages	$16.57	$59.57	$71.97	$86.30	$165.27	$112.62
Lost income from reduced commercial business activity	$0.00	$33.91	$42.30	$51.80	$126.81	$154.49
Lost jobs due to reduced commercial business activity	0	754	941	1,152	2,821	3,437
Lost state and local taxes from reduced commercial business activity	$0.00	$3.61	$4.50	$5.51	$13.49	$16.44
Lost utility revenues	$5.99	$9.45	$11.18	$13.14	$15.54	$18.40
Mauriceville SUD						
Monetary value of domestic water shortages	$0.00	$0.03	$0.08	$0.10	$0.18	$0.26
Lost utility revenues	$0.00	$0.07	$0.14	$0.17	$0.28	$0.36

Municipal (cont.)						
	2010	**2020**	**2030**	**2040**	**2050**	**2060**
New Summerfield WSC						
Monetary value of domestic water shortages	$0.00	$0.07	$0.18	$1.12	$1.63	$2.34
Lost utility revenues	$0.00	$0.00	$0.07	$0.13	$0.21	$0.29
Rusk WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.04	$0.12	$0.24
Lost utility revenues	$0.00	$0.00	$0.00	$0.07	$0.20	$0.37
Swift WSC						
Monetary value of domestic water shortages	$0.00	$0.00	$0.00	$0.06	$0.24	$0.49
Lost utility revenues	$0.00	$0.00	$0.00	$0.11	$0.42	$0.75
Whitehorse						
Monetary value of domestic water shortages	$0.02	$0.05	$0.07	$0.11	$0.16	$0.26
Lost utility revenues	$0.05	$0.10	$0.14	$0.18	$0.27	$0.39

Appendix S

Presentation materials related to consideration of private property rights

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Groundwater Management Area 14 Meeting

Lone Star Groundwater Conservation District Offices

Conroe, Texas

September 23, 2014

Today’s Considerations

- TWC Section 36.108 (d) (6) – socioeconomic impacts reasonably expected to occur
- **TWC Section 36.108 (d) (7) – impact on the interests and rights in private property**

Texas Water Code Section 36.108 (d) (7)

Consideration of the impact on the interests and rights in private property, including ownership and the rights of management area landowners and their lessees and assigns in groundwater, as recognized under Texas Water Code Section 36.002.

Texas Water Code Section 36.108 (d) (7)

For reference, Texas Water Code Section 36.002 states:

(a) The legislature recognizes that a landowner owns the groundwater below the surface of the landowner's land as real property.

(b) The groundwater ownership and rights described by this section:

(1) entitle the landowner, including a landowner's lessees, heirs, or assigns, to drill for and produce the groundwater below the surface of real property, subject to Subsection (d), without causing waste or malicious drainage of other property or negligently causing subsidence, but does not entitle a landowner, including a landowner's lessees, heirs, or assigns, to the right to capture a specific amount of groundwater below the surface of that landowner's land; and

Texas Water Code Section 36.108 (d) (7)

For your reference, Texas Water Code Section 36.002 states (cont.):

(2) do not affect the existence of common law defenses or other defenses to liability under the rule of capture.

(c) Nothing in this code shall be construed as granting the authority to deprive or divest a landowner, including a landowner's lessees, heirs, or assigns, of the groundwater ownership and rights described by this section.

Texas Water Code 36.002

- *(d) This section does not:*
- *(1) prohibit a district from limiting or prohibiting the drilling of a well by a landowner for failure or inability to comply with minimum well spacing or tract size requirements adopted by the district;*
- *(2) affect the ability of a district to regulate groundwater production as authorized under Section 36.113, 36.116, or 36.122 or otherwise under this chapter or a special law governing a district; or*
- *(3) require that a rule adopted by a district allocate to each landowner a proportionate share of available groundwater for production from the aquifer based on the number of acres owned by the landowner.*

Texas Water Code 36.002

- *(e) This section does not affect the ability to regulate groundwater in any manner authorized under:*
- *(1) Chapter 626, Acts of the 73rd Legislature, Regular Session, 1993, for the Edwards Aquifer Authority;*
- *(2) Chapter 8801, Special District Local Laws Code, for the Harris-Galveston Subsidence District; and*
- *(3) Chapter 8834, Special District Local Laws Code, for the Fort Bend Subsidence District.*

The protection of private property rights by GCDs in GMA 14

The procedural requirements for what should be considered in reviewing the private property rights factor are not prescribed in statute nor do TWDB rules provide any additional guidance. The following list of topics are suggested for discussion:

- Existing uses within the GCD
- Projected future uses within the GCD
- Investment-backed expectations of existing users and property owners within the GCD

The protection of private property rights by GCDs in GMA 14

(Continued)

- Long-term viability of groundwater resources in area
- Availability of water to all properties and ability to allocate MAG through rules after DFC adoption
- Whether immediate cutbacks would be required in setting a particular DFC or whether cutbacks, if any, would need to occur over a certain timeframe

The protection of private property rights by GCDs in GMA 14

(Continued)

- For outcrop areas, how the outcrop depletes rapidly in dry times, and whether drought rules or triggers based on the DFC/MAG for the outcrop could be beneficial to ensure viability of the resource during dry times

- Economic consequences to existing users (i.e., cost to drop pumps, reconfigure or drill new wells upon water table dropping, etc.). Also consider the reverse—economic consequences of less water available to protect the existing users from the economic consequences relevant to existing users—reaching a balance between these two dynamics.

The protection of private property rights by GCDs in GMA 14 (Continued)

- Those GCDs with existing rules developed based on the current DFC might find it helpful to review the rules that the GCD considers relevant as we work to adopt DFCs over the next year. For example, the rules and Management Plan in place based on the current DFCs can help determine how a GCD currently impacts private property rights and whether those same interests are important as we work to adopt DFCs over the next 2 years.

- Focusing on finding a balance, as that balance is defined by each GCD, between all of these considerations

Appendix T

Resolution establishing administrative procedures for the consideration, proposal, and adoption of desired future conditions for Groundwater Management Area 14

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RESOLUTION ESTABLISHING ADMINISTRATIVE PROCEDURES FOR THE CONSIDERATION, PROPOSAL, AND ADOPTION OF DESIRED FUTURE CONDITIONS FOR GROUNDWATER MANAGEMENT AREA 14

WHEREAS, pursuant to Section 35.004 of the Texas Water Code, the Texas Water Development Board ("TWDB") has designated groundwater management areas, which together cover all major and minor aquifers in the state, for the objective of providing the most suitable area for the management of the groundwater resources; and

WHEREAS, through Title 31, Section 356.21 of the Texas Administrative Code, the TWDB has designated the area encompassing all of Austin, Brazoria, Chambers, Fort Bend, Galveston, Grimes, Hardin, Harris, Jasper, Jefferson, Liberty, Montgomery, Newton, Orange, Polk, San Jacinto, Tyler, Walker, Waller, and Washington counties as Groundwater Management Area No. 14 ("GMA 14"); and

WHEREAS, the Bluebonnet Groundwater Conservation District, Brazoria County Groundwater Conservation District, Lone Star Groundwater Conservation District, Lower Trinity Groundwater Conservation District, and Southeast Texas Groundwater Conservation District (the "Member Districts") are located wholly or partially within GMA 14; and

WHEREAS, the Member Districts are authorized by Chapter 36, Texas Water Code, to engage in joint planning activities for the coordinated management of the aquifers located in GMA 14, and in that regard, shall establish desired future conditions ("DFCs") for the relevant aquifers within GMA 14; and

WHEREAS, Section 36.108 of the Texas Water Code requires the Member District Representatives to hold joint planning meetings for the consideration of DFC options, the proposal of DFCs for adoption, and, after the contemplation of comments and suggested revisions provided by the public and Member Districts, the adoption of DFCs for each relevant aquifer in GMA 14 and the submission of an explanatory report to the TWDB for approval of the DFCs adopted; and

WHEREAS, Section 36.108(d-3) of the Texas Water Code provides that the explanatory report must include the following: (1) identification of each DFC; (3) the policy and technical justification for each DFC; (3) documentation that the Member Districts considered the nine statutory factors listed in 36.108(d)(1)-(9), Water Code, and how the DFC adopted impacts each factor, (4) a list of the other DFC options considered, if any, and the reasons why those options were not adopted, and (5) the reasons why recommendations made by advisory committees and relevant public comments received by the districts were or were not incorporated into the DFCs; and

WHEREAS, the DFC explanatory report serves as the administrative record in the DFC adoption process, and for this reason, the Member Districts recognize the importance of establishing a procedural record from the beginning of the DFC consideration, proposal, and

adoption process that contemplates each of the items to be addressed and included in the explanatory report under Section 36.108(d-3), Water Code; and

WHEREAS, Section 36.108 of the Texas Water Code provides a clear procedural process for DFCs that have been approved by a two-thirds vote by the Member District Representatives as the proposed DFCs for distribution to the Member Districts for public hearings and subject to a public comment period, but the statute is less clear as to the procedure applicable to the consideration of one or more DFC option(s), DFC options that may be discussed, evaluated, or considered but not adopted, the extent to which those DFC options must be addressed in the explanatory report, and the consideration of the nine statutory factors prior to the Member District Representatives' vote to approve a DFC option as the proposed DFC; and

WHEREAS, the Member Districts desire to adopt an administrative procedural process that is consistent with Chapter 36, including the procedural requirements currently in place under Texas Water Code Section 36.108, for the consideration, proposal, and adoption of DFCs to ensure the development of a clear administrative record that not only supports the DFCs ultimately adopted, but also addresses any DFCs considered but not adopted, in a manner that is sufficient for inclusion in the explanatory report as required by Texas Water Code Section 36.108(d-3); and

NOW, THEREFORE, it is agreed and understood among the Member Districts as follows:

SECTION ONE
INTENT AND PURPOSES

1.01 It is the intent and purpose of the Member Districts to carry out and fulfill the joint planning activities and requirements of Chapter 36, Texas Water Code, to establish DFCs by adopting administrative procedures for the consideration, proposal, and adoption of DFCs that promote the consideration of various DFC options, as necessary, to be included in the explanatory report, while preventing the lack of procedural guidance provided in Texas Water Code Chapter 36 from hindering the development of a defensible administrative record or explanatory report. The Member Districts intend for the administrative procedures herein to promote the ability of the Member Districts to openly identify, evaluate, and discuss multiple ideas, proposals, technical information, and policy options regarding the establishment of DFCs while simultaneously establishing some procedures to identify when a particular discussion or evaluation rises to the level of it being formally considered for inclusion in the DFC explanatory report.

SECTION TWO
PARTICIPATION IN JOINT PLANNING PROCESS TO ESTABLISH DFCs

2.01 Each Member District shall be subject to these administrative procedures.

2.02 Only a Member District Representative may vote or take action on GMA 14 activities. For any action, only one representative from each Member District may vote.

2.03 Each Member District of GMA 14 shall endeavor to participate and contribute in good faith in joint planning activities and to satisfy the joint planning requirements of Chapter 36, Water Code.

2.04 The GMA 14 Member Districts, as a group to engage in joint planning activities, shall have only the power granted by Chapter 36, Water Code, that relates to joint planning activities.

2.05 GMA 14 joint planning meetings must be held in accordance with the Texas Open Meetings Act, Chapter 551, Government Code. The Member Districts agree that notice of meetings shall be provided in accordance with the requirements of Chapter 36, Texas Water Code.

2.06 Each Member District shall comply with the Texas Public Information Act, Chapter 552, Government Code, with regard to joint planning activities.

SECTION THREE
PROCEDURE FOR THE CONSIDERATION, PROPOSAL, AND ADOPTTION OF DFCs

3.01 For a DFC option to be formally considered as a potential candidate for proposal and adoption by the Member Districts to be included in the explanatory report as a DFC that was adopted or a DFC that was considered but not adopted pursuant to Section 36.108(d-3), Water Code, the DFC option must be requested in writing and approved by the Member District Representatives for formal consideration at a GMA 14 joint planning meeting.

3.02 A Member District Representative shall request a DFC option to be approved for formal consideration by submitting, no less than 14 days before a GMA 14 joint planning meeting, a written request to each Member District and the Contracted Consultant, as defined in Section 4 below, describing with sufficient specificity the DFC option requested to be approved for formal consideration. The sufficiency of the written request shall be reviewed by the Contracted Consultant and, no later than 7 days after receiving the written request, the Contract Consultant shall notify the requesting party of any possible deficiencies in the written request in preparation for discussion of the request at the GMA 14 joint planning meeting.

3.03 Based on the information provided in the written request, including any supplemental information provided in writing and accepted by the Member District Representatives at or before the GMA 14 joint planning meeting, the Member District Representatives shall vote to determine whether the requested DFC option shall be formally considered. To be formally considered, the requested DFC option must be approved by a two-thirds vote of the total Member District Representatives. If through discussions at the GMA 14 joint planning meeting, the DFC option originally requested in writing is amended, the DFC option, as amended, may nonetheless be approved for formal consideration by a two-thirds vote of the total Member District Representatives without the submission of an additional, amended

written request. A DFC option approved for formal consideration under this section shall be included in the explanatory report pursuant to Texas Water Code Section 36.108(d-3).

3.04 Of the DFC options formally considered, at least one of the DFC options shall be approved by two-thirds vote of the total Member District Representatives to be further reviewed in consideration of the nine statutory factors listed in Section 36.108(d)(1)-(9), Water Code. For a DFC option approved for further review, the Member District Representatives shall discuss and consider the nine statutory factors and how the DFC option impacts each of the nine factors at a joint planning meeting. A written report shall be prepared to document the consideration of the nine statutory factors and the discussions relevant to the DFC option's impact to each factor, to the extent necessary for purposes of the explanatory report as required by Section 36.108(d-3)(3), Water Code.

3.05 Only after consideration of the nine statutory factors as stated in Section 3.04 may a DFC option become eligible for approval as the proposed DFC. For each relevant aquifer in GMA 14, the Member District Representatives shall approve by two-thirds vote of the total Member District Representatives one DFC option to serve as the proposed DFC as required by Sections 36.108(d) and (d-2), Water Code. The proposed DFC must provide a balance between the highest practicable level of groundwater production and the conservation, preservation, protection, recharging, and prevention of waste of groundwater and control of subsidence in GMA 14.

3.06 The proposed DFC approved by two-thirds vote of the total Member District Representatives shall be distributed to the Member Districts. A period of not less than 90 days for public comment begins on the day the proposed DFC is mailed to the Member Districts.

3.07 During the public comment period and after posting proper notice as required by Section 36.063, Water Code, each Member District shall hold a public hearing on the proposed DFCs relevant to that Member District pursuant to the requirements set forth in Section 36.108(d-2), Water Code. After the public hearing, each Member District shall compile for consideration at the next joint planning meeting a summary report of relevant comments received and any suggested revisions to the proposed DFC and the basis for the revisions.

3.08 Pursuant to Texas Water Code Section 36.108(d-3), after the earlier of the date on which all the Member District have submitted their district summaries or the expiration of the public comment period, the Member District Representatives shall reconvene to review the reports, consider any Member District's suggested revisions to the proposed DFCs, and vote to adopt the proposed DFCs. The DFCs must be adopted as a resolution by a two-thirds vote of all the Member District Representatives.

3.09 A record shall be prepared to address each relevant comment received during the public comment period or at the public hearing and any suggested revisions included in the Member Districts' summary reports submitted to and considered by the Member District Representatives at the joint planning meeting, as well as any recommendations made by advisory committees. The record shall identify those comments and revisions incorporated into the DFC, as well as those comments and revisions not incorporated, and provide the reasoning behind the

decision to incorporate or not to incorporate the comments or revisions, and the record shall be included in the explanatory report as required by Texas Water Code Section 36.108(d-3)(5).

3.10 Upon adoption of the DFCs, the Member District Representatives shall prepare an explanatory report as required by Texas Water Code Section 36.108(d-3). Consistent with the statutory requirements and the procedural requirements adopted by this resolution, the explanatory report shall:

a. identify each DFC adopted pursuant to Section 3.08;

b. provide the policy and technical justifications for each DFC adopted;

c. include the written reports required by Section 3.04, relevant to the DFCs adopted, that document the discussions of the Member District Representatives in consideration of the nine factors listed in Texas Water Code 36.108(d)(1)-(9) and how the adopted DFCs impact each factor, inclusive of any amendments or supplemental information deemed necessary and taken into consideration for the adopted DFCs after the vote to approve the proposed DFCs under Section 3.05;

d. list the other DFC options approved for formal consideration under Sections 3.03, but not adopted, and the reasons why those options were not adopted, based on the written reports prepared for each DFC option approved for formal consideration under Section 3.03 or further review under Section 3.04; and

e. discuss reasons why recommendations made by advisory committees, if any, and relevant public comments received by the Member Districts were or were not incorporated into the DFCs by inclusion of the record prepared pursuant to Section 3.09; and

f. describe how the DFCs provide a balance between the highest practicable level of groundwater production and the conservation, preservation, recharging, and prevention of waste of groundwater and control of subsidence in GMA 14.

3.11 The Member District Representatives shall submit to the TWDB and each Member District proof that notice was posted for the joint planning meeting to adopt the DFCs, a copy of the resolution adopting the DFCs, and a copy of the explanatory report.

3.12 As soon as possible after the Member Districts receives the DFCs resolution and explanatory report, the Member district shall adopt the DFCs in the resolution and explanatory report that applies to the Member District.

SECTION FOUR
DEFINITIONS

These terms shall have the following meaning when used herein:

Advisory Committee: A nonvoting advisory committee or subcommittee, appointed by the Member District Representatives during the joint planning process, who represent social, governmental, environmental, or economic interest to assist in the development of DFCs as provided by Texas Water Code Section 36.1081. The appointment of an advisory committee by the Member District Representatives during the joint planning process is permissible and not mandatory.

Contracted Consultant: The consultant retained by the Member Districts to assist in conducting joint planning activities, developing DFCs for the relevant aquifers in GMA 14, and preparing the explanatory report as required by Section 36.108(d-3) of the Texas Water Code.

Desired Future Condition or DFC: The desired future conditions for the relevant aquifers within GMA 14 established in accordance with Chapter 36, Texas Water Code.

Groundwater Management Area 14 or GMA 14: Groundwater Management Area 14 as designated by the Texas Water Development Board and as may be amended from time to time.

Member District: A groundwater conservation district subject to Texas Water Code Chapter 36 that is located in whole or in part inside GMA 14, including the Bluebonnet Groundwater Conservation District, Brazoria County Groundwater Conservation District, Lone Star Groundwater Conservation District, Lower Trinity Groundwater Conservation District, and Southeast Texas Groundwater Conservation District. If the creation of a particular district requires confirmation through an election, the district shall not be a Member District until it is confirmed.

Member District Representative: The presiding officer or the presiding officer's designee for any district located wholly or partly in GMA 14.

NOW, THEREFORE, BE IT RESOLVED BY THE MEMBER DISTRICTS OF GROUNDWATER MANAGEMENT AREA 14:

1) Each of the affirmations and recitals set forth herein are true and correct;

2) The authorized voting representatives of the GMA 14 Member Districts have approved by a two-thirds vote of the total number of Member Districts in GMA 14 the administrative procedures set forth herein; and

3) Any previous administrative procedure agreed to by the Member Districts that is in conflict with the administrative procedures set forth herein is superseded by the administrative procedures set forth in this resolution for future actions of the Member Districts.

AND IT IS SO ORDERED.

PASSED AND ADOPTED on this 18 day of November, 2014.

ATTEST:

Bluebonnet Groundwater Conservation District

Brazoria Country Groundwater Conservation District

Lone Star Groundwater Conservation District

Lower Trinity Groundwater Conservation District

Southeast Texas Groundwater Conservation District