

# LOST PINES GROUNDWATER CONSERVATION DISTRICT

# MANAGEMENT PLAN

Adopted September 15, 2004;  
Revised August 10, 2010;  
Revised September 19, 2012;  
Revised September 30, 2017

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## ATTACHMENTS

Attachment A: GAM Run 16-014: Lost Pines GCD Groundwater Management Plan

Attachment B: Estimated Historical Water Use and 2017 State Water Plan Datasets: Lost Pines Groundwater Conservation District

## APPENDICES

Appendix A: Copy of GMA 12 Resolution and Submittal Adopting DFCs

Appendix B: Evidence of Coordination with Surface Water Management Entities

Appendix C: Certified Copy of District Resolution Adopting Management Plan

Appendix D: Evidence of Public Notice and Hearing on Management Plan

## **Section 1. THE DISTRICT**

The Lost Pines Groundwater Conservation District (District) was created in 1999 by Senate Bill 1911, 76th Texas legislature, pursuant to Section 59, Article 16 of the Texas Constitution and Article 7880-3c, Texas Civil Statutes (now Chapter 36, Texas Water Code); ratified by the 77th Texas Legislature in 2001; and confirmed by voters in Bastrop and Lee counties in November 2002.

The District includes all of Bastrop and Lee counties (**Map 1**).

For state water planning purposes, the District was designated by the Texas Water Development Board (TWDB) as part of Groundwater Management Area 12 (GMA 12) (**Map 2**). The District participates in GMA 12 along with Mid-East Texas Groundwater Conservation District, Brazos Valley Groundwater Conservation District, Post Oak Savannah Groundwater Conservation District, and Fayette County Groundwater Conservation District.

The District participates in two of the State's sixteen Regional Planning Areas: Bastrop County is in Lower Colorado Regional Planning Group or Region K and Lee County is in Brazos River Regional Planning Group or Region G (**Map 3**).

## **Section 2. DISTRICT MISSION AND GUIDING PRINCIPLES: Actions, Procedures, Performance and Avoidance Necessary to Effectuate the Management Plan**

***Mission.*** The District’s mission is to conserve, preserve and protect interests in groundwater in Bastrop and Lee counties, while addressing statutory goals and requirements. In fulfilling its mission, the District will endeavor to manage groundwater to meet demands on a sustainable basis, by which the District means development, use, and reasonable long-term management of groundwater resources so that those resources can continue to be used by future generations. The District will address applicable statutory management goals, including:

- Providing the most efficient use of groundwater
- Controlling and preventing waste of groundwater
- Addressing conjunctive surface water management issues
- Addressing natural resource issues that impact the use and availability of groundwater and are impacted by the use of groundwater
- Addressing drought conditions
- Addressing conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control, where appropriate and cost effective, and
- Addressing the desired future conditions (meaning a quantitative description, adopted in accordance with Chapter 36, Texas Water Code,<sup>1</sup> of the desired condition of the groundwater resources for relevant aquifers (DFCs)), as those DFCs may be amended from time to time.

Based on current conditions, the statutory goal of controlling and preventing subsidence is not applicable to the District.

***Guiding Principles.*** The District’s guiding principles derive from its mission statement. Groundwater resources within the District are of vital importance to the residents and businesses in Bastrop and Lee counties and effectively constitute the only source of water available for most of the District. The District was created to provide for the conservation, preservation, protection, recharging, and prevention of waste of groundwater within the two counties, while complying with statutory requirements. The District believes its groundwater resources can be managed in a prudent manner through education and conservation coupled with reasonable regulation, and based on increasing quantitative understanding of available groundwater resources, recharge, and current and future demand, including real-time information on aquifer conditions developed via a network of monitoring wells.

### ***Policy.***

1. District groundwater is to be conserved, preserved, and protected and waste prevented to maintain the viability of the groundwater supply for future generations in the two counties, while complying with statutory requirements, as amended from time to time, including those applicable to permits for transport of water out-of-District, and including without limitation certain

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<sup>1</sup> See §§ 36.001(30) (defining DFC) and 36.108 (joint planning process). References herein to “Chapter 36” are to Chapter 36, Texas Water Code. All references to a section of Chapter 36 are shown as “§ 36.[section number].”

provisions of Chapter 36 which are summarized in Appendix A (which may be supplemented when appropriate).

2. To the extent consistent with statutory goals and requirements and with its DFCs, the District will attempt to manage District aquifers on a sustainable basis. The District defines sustainability as development, use, and reasonable long-term management of groundwater resources so that those resources can continue to be used by future generations.

3. The District, in cooperation with local municipalities and water supply companies, has established a monitoring well network and an aquifer water level monitoring program (the “Monitoring Well Program”), and a system for reporting water levels. The District will measure and monitor water levels to detect declines, to allow the District to consider appropriate action to avoid or minimize depletion of the water supply and to maintain or achieve water levels which are consistent with the DFCs. For instance, it may be necessary for the District to reduce the amount of groundwater that non-exempt users pump to avoid or to minimize depletion of the groundwater supply in specified areas within the District and to achieve water levels which are consistent with the DFCs.

4. This Management Plan and the District rules, as amended from time to time, will be based on the best technical advice available to the District. The District will undertake investigations of the District’s groundwater resources, including through the Monitoring Well Program, and will cooperate with investigations of groundwater resources and the interaction of groundwater and surface water by TWDB, TCEQ, GMA 12 or other entities, and will make the results of such investigations available to the Board and to the public. The District recognizes that good long-term groundwater management is built on availability of high-quality data, improved understanding of groundwater flow systems, and increasingly better understanding of the interaction between groundwater and surface water. The District recognizes the uncertainties inherent in long-term management of groundwater resources created by such factors as climate, drought, changes in exempt uses such as mining and oil and gas development, socioeconomic change and population growth, and also recognizes the uncertainties created by the geology and other characteristics of relevant aquifers. The District believes that uncertainties affecting decision-making can be reduced to some extent by reliance on high-quality data.

5. The District will treat all citizens equally. The District may exercise its discretion to consider unique situations or local conditions and the potential for adverse economic and environmental consequences, guided by this Management Plan, and such exercise of discretion shall not be construed as limiting the power and authority of the District.

6. In implementing this Management Plan, the District will seek cooperation from municipalities, water supply companies, irrigators, and other groundwater users, and will also seek to cooperate and coordinate with state and regional water planning authorities and agencies as well as the districts of GMA 12.

7. In support of its mission of conserving, protecting and preserving interests in groundwater within Bastrop and Lee counties, while addressing statutory goals and requirements, the Board may, among other actions, after notice and hearing, amend or revoke any permit for non-compliance, or reduce the groundwater production authorized by permit for the purpose of managing District groundwater resources consistent with the DFCs. The District

may also enforce the terms and conditions of permits and District rules by fine and/or by enjoining the permit holder in a court of competent jurisdiction as provided by § 36.102.

The District's Board of Directors will implement this Management Plan and any necessary changes or modifications to adhere to the policy stated herein.

The rules are on the District website: <http://www.lostpineswater.org/Forms---Documents.aspx>.

### **Section 3. TIME PERIOD COVERED BY THE MANAGEMENT PLAN**

This Management Plan was originally adopted on September 15, 2004. The first revision was on August 10, 2010, which was found to be administratively complete by TWDB on October 25, 2010. The second revision was on September 19, 2012, and found administratively complete by the TWDB on DATE. This third revision was completed on DATE. The District may review the Management Plan annually, but at least once every five years, the District will review and re-adopt its Management Plan, with or without change, and submit it to TWDB pursuant to Chapter 36.<sup>2</sup>

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<sup>2</sup> See § 36.1072.

## **Section 4. GOVERNANCE**

**Board of Directors.** The District is governed by a ten-member Board of Directors, five appointed by the Bastrop County Judge and five appointed by the Lee County Judge, qualified and sworn as required by law. After the initial appointment of directors and the setting of staggered terms, each Director is appointed to a four-year term beginning in January. Thus, every second year, following the initial appointment of directors, two directors are appointed by the Bastrop County Judge and two Directors are appointed by the Lee County Judge. The succeeding second year, three Directors are appointed by the Lee County Judge and three Directors are appointed by the Bastrop County Judge.

Each year, in January, the Board selects one of its members to serve as president to preside over Board meetings and proceedings, a second member to serve as vice-president to preside over Board meetings and proceedings in the absence or recusal of the president, and a third to serve as secretary-treasurer to keep a true and correct account of all proceedings of the Board. The Board may appoint an assistant secretary to assist the secretary-treasurer. Unless a vacancy occurs, members of the Board and officers serve until their successors are appointed, qualified to hold office, and sworn in. In the event of a vacancy in any office, the Board shall select one of its members to fill out the term of office. In the absence of a General Manager, the president of the Board will serve as General Manager.

The president may establish committees for formulation of policy recommendations to the Board and may appoint the chair and membership of the committees, which may include members of the Board and/or non-board members. Committee members serve at the pleasure of the president.

The Board will hold regular meetings at least four times a year on a day and at a place that the Board may establish from time to time by Board resolution. At the request of the president, or by written request of at least three Board members, the Board may hold a special meeting. The business of the District will be conducted at regular or special Board meetings when a quorum is present. All Board meetings will be conducted in accordance with the Open Meetings Act.

**Daily Operations.** The Board may employ a person to be the General Manager, with full authority to manage and to operate the affairs of the District, subject only to direction provided by the Board through policies and orders adopted by the Board. The General Manager may, with Board approval, employ all persons necessary to carry out daily operations. The General Manager may delegate duties as may be necessary to efficiently and expeditiously accomplish those duties; provided that no delegation will relieve the General Manager from his or her responsibilities under the Texas Water Code, the District enabling act, District rules, or District policies, orders and permits.

The Board shall establish by resolution an official office of the District, and the office will maintain regular business hours.



## Section 5. DISTRICT DESIRED FUTURE CONDITIONS (DFCs)

On August 10, 2010, the GMA-12 DFCs were adopted for the relevant aquifers, i.e., the major and minor Aquifers within the District other than the Yegua-Jackson (the Sparta, Queen City, Carrizo, Calvert Bluff, Simsboro, and Hooper Aquifers) and submitted to TWDB. The Yegua-Jackson Aquifer was considered not relevant for the District and a DFC was not established for it. See **Appendix A**. On September 8, 2010, TWDB notified GMA 12 that the GMA-12 DFC submission was administratively complete.

On April 27, 2017, the second round of DFCs was formally adopted by GMA-12. At the time of the preparation of this Management Plan, the TWDB had not finished reviewing the GMA-12 DFC submittal packet.

In adopting and submitting the GMA-12 DFCs, the District stated that in its Management Plan it would further divide the recommended DFCs by county. The District's DFCs by county and by aquifer, are presented in Table 1.

**Table 1- Desired Future Conditions**

Aquifer	County	District-wide DFC in 2070 (Average drawdown in feet)	DFC in 2070 (County-wide average drawdown in feet)
Sparta	Bastrop Lee	5	-9
			10
Queen City	Bastrop Lee	15	16
			16
Carrizo	Bastrop Lee	62	74
			64
Calvert Bluff	Bastrop Lee	100	81
			142
Simsboro	Bastrop Lee	240	174
			350
Hooper	Bastrop Lee	165	153
			225

## Section 6. MODELED AVAILABLE GROUNDWATER

Pursuant to the 2011 amendment of § 36.1071(e)(3), TWDB provided estimates of modeled available groundwater totals for the District, based on the DFCs established by GMA 12 under § 36.108. They are presented below in Table 2.

**Table 2 - Modeled Available Groundwater Totals for the District**

All values are in acre-feet/year

<b>AQUIFER</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>
Sparta	2,405	2,236	5,315	1,980	1,885	1,877
Queen City	1,315	1,215	2,880	1,144	1,134	1,133
Carrizo	6,610	7,618	8,358	9,263	11,800	12,052
Calvert Bluff	1,785	2,226	2,633	3,183	3,912	3,985
Simsboro	29,556	32,731	31,362	34,916	36,544	37,249
Hooper	1,174	1,427	1,715	2,095	2,589	2,592
<b>TOTAL</b>	<b>42,845</b>	<b>47,453</b>	<b>52,263</b>	<b>52,581</b>	<b>57,864</b>	<b>58,888</b>

TWDB GAM Runs 10-044 MAG, 10-045 MAG, and 10-046 MAG.

## Section 7. DISTRICT GROUNDWATER RESOURCES

This section presents information on District groundwater and surface water resources. The estimated historical groundwater use in the District for the last five years is provided in Table 3. The estimates in Tables 4-6 are from TWDB GAM Run 16-014, March 6, 2017, which is provided in **Attachment A**. The estimates below in Tables 7-10 comprise data from the TWDB 2017 State Water Plan Dataset for the District, which is provided in **Attachment B**.

The District considered and used all information referenced in this Management Plan, including without limitation the information in Table 9 (water supply needs) and Table 10 (water supply management strategies).

**Table 3 - Estimated Historical Groundwater Use**

Year	County	Municipal	Manufacturing	Minining	Steam Electric (Power)	Irrigation	Livestock	Total
2011	Bastrop	12,129	81	2,110	0	3,861	260	18,441
2012	Bastrop	11,010	60	45	0	2,829	215	14,159
2013	Bastrop	10,611	81	44	0	2,533	191	13,460
2014	Bastrop	9,771	93	34	3,400	2,444	206	15,948
2015	Bastrop	10,466	98	44	5,519	3,204	211	19,542
2011	Lee	2,895	7	7,707	0	1,609	422	12,640
2012	Lee	2,503	6	5,677	0	1,017	357	9,560
2013	Lee	2,538	6	6,081	0	837	305	9,767
2014	Lee	2,327	6	439	0	802	316	3,890
2015	Lee	2,316	7	6,889	0	519	324	10,055

### A. GROUNDWATER RESOURCES

Except for a small area along the northwest border of Bastrop County south of the Colorado River that is not an aquifer, the geologic units exposed in Bastrop and Lee counties are Tertiary and Quaternary in age. All the Tertiary age geologic units dip or tilt to the southeast, and are composed of varying portions of sand, silt, and clay. From oldest (westernmost) to youngest (easternmost), these exposed Tertiary geologic units include the Midway Group, the Wilcox Group, the Carrizo Formation, the Reklaw Formation, the Queen City Sand, the Weches Formation, the Sparta Sand, the Cook Mountain Formation, the Yegua Formation, and the Jackson Group. Quaternary geologic units include river or stream alluvium, such as along the Colorado River and Middle Yegua Creek, as well as topographically higher terrace deposits.

## AQUIFERS

Most of these geologic formations found within the District will yield some quantity of water to wells, as shown by the stratigraphic section below.

**Figure 1 - Stratigraphic Section**

<b>Aquifer or Unit</b>	<b>Maximum Thickness (feet)</b>	<b>Description</b>	<b>Water-Bearing Properties</b>
Alluvium	100	Sand, gravel, silt, and clay	Yields small to moderate quantities of fresh to slightly saline water to wells
Yegua-Jackson	900	Medium to fine sand, silt, clay, some lignite	Yields small to moderate quantities of fresh to slightly saline water to wells
Cook Mountain Formation	400	Clay with some sand	Yields small quantities of fresh to slightly saline water to wells
Sparta Sand	170	Fine to medium sand with some clay and silt	Yields small to large quantities of fresh to slightly saline water to wells
Weches Greensand	100	Glauconitic clay and sand	Not known to yield significant quantities of water to wells
Queen City Sand	600	Fine to medium sand, clay, with some conglomerate	Yields small to large quantities of fresh to slightly saline water to wells
Reklaw Formation	100	Glauconitic sand and silt (lower) and clay with some sand (upper)	Yields very small water to wells in upper part of formation
Carrizo Sand	600	Fine to coarse sand with some sandstone and clay	Capable of yielding large quantities of water to wells
Calvert Bluff Formation (Wilcox Group)	1500	Fine to coarse grained sand and sandstone with some silt, mudstone, and lignite	Capable of yielding moderate quantities of water to wells
Simsboro Sand (Wilcox Group)	800	Massive, fine to medium, well sorted sand	Capable of yielding large quantities of water to wells

Hooper Formation (Wilcox Group)	1300	Predominantly mudstone, with some sand and lignite.	Capable of yielding small to moderate quantities of water to wells
Midway Group	?	Mostly shale	Not known to yield significant quantities of water to wells

However, only the Carrizo, Wilcox, Queen City, Sparta, and Colorado River alluvium aquifers yield sufficient quantities to have wells that have been permitted by the District. Each of these geologic units has different water-bearing characteristics and capabilities, and each is described separately below.

### **Carrizo-Wilcox Aquifer**

The Carrizo Formation and the Wilcox Group (which includes the Hooper Formation (lower), the Simsboro Formation (middle), and the Calvert Bluff Formation (upper)) form a single, hydrologically connected aquifer system recognized by the State as the Carrizo-Wilcox Aquifer. The Carrizo-Wilcox Aquifer is defined as a major aquifer by the state of Texas, and within Texas it stretches in a wide band from the Rio Grande in South Texas to Louisiana. The Carrizo-Wilcox crops out through the middle of Bastrop County and in the far northeastern portion of Lee County. Wells are completed in the Carrizo-Wilcox Aquifer in and near the outcrop of each of the four individual aquifer units.

*Hooper Formation* The lowermost aquifer within the Carrizo-Wilcox is the Hooper Formation, which is also generally the least productive of the three Wilcox Group aquifers. The Hooper is used by exempt wells in and near the outcrop area, as well as for municipal purposes by the City of Elgin, Aqua Water Supply Corporation, Manville Water Supply Corporation, and Lee County Water Supply Corporation.

The Hooper is comprised of predominantly mudstone, with varying amounts of sandstone, and some thin lignite beds in the upper part of the formation. The Hooper and the overlying Simsboro and Calvert Bluff Formations are no longer distinguishable as individual units much farther west than the Colorado River. Beyond this point the Wilcox Group aquifer is referred to as undifferentiated Wilcox.

The Hooper crops out in a band approximately 3 miles wide in northwestern Bastrop County near the Travis County line, as well as in far western Lee County. From the outcrop, the Hooper dips at a rate of 125 to 200 feet per mile, with the top of the Hooper reaching a maximum depth of more than 5,000 feet in southern Lee County, although wells completed in the Hooper in the District are generally less than 700 feet deep. The Hooper Formation can be up to 1,300 feet thick within the District.

The Hooper Formation produces a small to moderate amount of water to wells, mainly in the outcrop area. Well yields of larger, non-exempt wells are generally between 200 and 350 gpm, although some Hooper wells can yield more than 500 gpm. Water quality of groundwater produced from the Hooper is generally good, although water quality deteriorates farther down dip from the outcrop.

*Simsboro Formation* The middle aquifer within the Wilcox Group is the Simsboro Formation. This aquifer is identifiable only from the middle of Bastrop County and eastward, including all of Lee County, and is a highly productive unit. It is used by numerous exempt wells and by the City of Elgin, Aqua Water Supply Corporation, and Manville Water Supply Corporation for municipal supplies. Water is also produced by Alcoa from the Simsboro as part of its mining operations.

The Simsboro is primarily composed of a massive, fine to coarse-grained sand, with relatively small amounts of silt, clay, and mudstone. The Simsboro crops out in a band two to three miles wide across Bastrop and far northwestern Lee County. From the outcrop, the Simsboro dips at a rate of 125 to 200 feet per mile, with the top of the Simsboro reaching a maximum depth of nearly 4,500 feet in southern Lee County. Wells completed in the Simsboro in the District are generally less than 1,000 feet deep, although wells of more than 1,500 feet have been completed in the District. The Simsboro is up to 800 feet thick within the District, although it is generally less than 500 feet thick.

The Simsboro Formation produces large quantities of fresh to slightly saline groundwater to wells. Wells of over 2,000 gpm have been completed in the Simsboro Formation, and yields of 900 to 1,200 gpm in existing non-exempt wells are common. Water quality of groundwater produced from the Simsboro is good, although water quality deteriorates farther downdip from the outcrop.

*Calvert Bluff Formation* The uppermost aquifer within the Wilcox Group is the Calvert Bluff Formation. The Calvert Bluff is used by numerous exempt wells in and near the outcrop, as well as for irrigation by two non-exempt wells and for municipal purposes by Aqua Water Supply Corporation, Manville Water Supply Corporation, and Bastrop County Water Control Improvement District Nos. 1 and 2.

The Calvert Bluff Formation is comprised primarily of fine to coarse-grained sand and sandstone, interbedded with silt, mudstone, and some lignite. The Calvert Bluff crops out in a band six to eight miles wide in Bastrop and Lee counties, and from the outcrop the Calvert Bluff dips at a rate of 125 to 200 feet per mile. The top of the Calvert Bluff is more than 3,000 feet deep in southern Lee County, although wells completed in the Calvert Bluff within the District are generally less than 1,000 feet deep. The Calvert Bluff is up to 1,500 feet thick within the District.

The Calvert Bluff is more productive than the Hooper but not nearly as productive as the underlying Simsboro or overlying Carrizo aquifers. Typical non-exempt Calvert Bluff well yields within the District are 150 to 350 gpm, although several wells with yields of 500 to 1,000 gpm are present. Water quality in the Calvert Bluff is generally good, although water quality deteriorates farther downdip from the outcrop.

*Carrizo Formation* The uppermost aquifer within the “Carrizo-Wilcox” Aquifer is the Carrizo Formation. The Carrizo is a highly utilized aquifer within the District, with a large number of smaller, exempt wells producing from it in and near the outcrop. In addition, numerous non-exempt wells produce from the Carrizo for municipal purposes, including those operated by the Cities of Lexington, Smithville, and Giddings, as well as by Aqua Water Supply Corporation and Lee County Water Supply Corporation. Some water produced from the Carrizo is also used for irrigation purposes.

The Carrizo Formation is predominantly a fine to coarse-grained massive sand. It crops out in a band one to two miles wide though Bastrop and Lee counties. From the outcrop the Carrizo dips at a rate of about 140 feet per mile when not affected by faulting, with the top of the

Carrizo being found at more than 2,500 feet in southern Lee County. The Carrizo can be up to 600 feet thick within the District, but is generally between 300 and 500 feet thick. The Carrizo is a highly productive aquifer throughout much of its extent not only in the District but throughout much of Texas.

Yields of non-exempt Carrizo wells within the District are generally between 400 and 750 gpm, although well yields of up to 1,500 gpm have been observed. Water quality in the Carrizo is good, although, as with most aquifers in the District, water quality deteriorates farther downdip from the outcrop.

### **Queen City Aquifer**

The Queen City Aquifer is defined as a minor aquifer by the state of Texas. It is located stratigraphically above the Carrizo-Wilcox aquifer, between the Reklaw and Weches formations. The Queen City is used by a large number of exempt wells within the District, as well as for municipal purposes by the cities of Lincoln and Giddings, and the Lee County Water Supply Corporation.

The Queen City Formation is comprised of a massive to thin-bedded, fine to medium-grained sandstone with some silt, clay, shale, and lignite. It crops out in a band two to four miles wide across both Bastrop and Lee counties. From the outcrop the Queen City dips at a rate of 70 to 140 feet per mile, with the top of the formation being found at approximately 2,000 feet in southern Lee County. However, most Queen City wells are located in or near the outcrop area, with most being less than 1,400 feet deep. The Queen City is generally between 200 and 600 feet thick within the District.

The Queen City yields small to moderate quantities of fresh to slightly saline water to wells in and near the outcrop. Non-exempt Queen City wells in the District area typically yield between 130 and 250 gpm, although one Queen City well produced more than 450 gpm.

### **Sparta Aquifer**

The Sparta Aquifer is defined as a minor aquifer by the state of Texas. It is located stratigraphically above the Queen City aquifer, between the Weches and Cook Mountain formations. The Sparta is used by exempt wells within the District for domestic and livestock purposes, and for municipal purposes by the Lee County Fresh Water Supply District and Lee County Water Supply Corporation.

The Sparta is primarily a loosely cemented, sand-rich unit, with some interbedded silt and clay. The Sparta crops out in a band one to ten miles wide from southern Bastrop County to northeastern Lee County. From the outcrop the Sparta dips at a rate of approximately 100 feet per mile, with the top of the formation being found at approximately 1,500 feet in southern Lee County. Most Sparta wells are located in or near the outcrop and are less than approximately 500 feet deep. However, one well (59-50-706) is nearly 1,500 feet deep. The Sparta is up to 170 feet thick within the District, and yields small to moderate quantities of fresh to slightly saline water to wells. Yields of non-exempt wells in the District typically range from 100 to 250 gpm. Water quality of groundwater produced from the Sparta is generally good, although, as with other dipping aquifers in the District, water quality deteriorates farther downdip from the outcrop area.

## **Other Aquifers**

*Colorado River Alluvium Aquifer* In addition to the major and minor aquifers described above, the alluvium along the Colorado River also yields significant quantities of water to wells. The Colorado River Alluvium is not defined as a major or a minor aquifer by the State, and a DFC was not established for this aquifer. But this aquifer is used for water for municipal supply by the City of Bastrop, as well as for irrigation purposes, from several non-exempt wells.

The Colorado River Alluvium includes alluvial deposits in river bottom land along the Colorado River. The alluvium generally consists of sand, with some small gravel and disconnected layers of silt and clay. The alluvium can be on one side of the river or on both sides. It is not always connected beneath the river, and the maximum thickness is less than 100 feet. The alluvium along the Colorado River generally yields small to moderate quantities of fresh to slightly saline water.

In addition to the alluvium along the Colorado River, most other streams have some alluvium associated with them. Small, exempt wells may be installed in these very localized alluvial aquifers.

*Trinity Aquifer* The Trinity Aquifer, classified as a major aquifer by the state of Texas, underlies the District. However, it is virtually unused because of the extreme depth and poor water quality of this aquifer with the District. No known wells are completed in the Trinity Aquifer within the District.

*Yegua-Jackson Aquifer* The Yegua-Jackson Aquifer is classified as a minor aquifer by the state of Texas, and is found in the southeastern third of Lee County and a very small part of Bastrop County. The Yegua-Jackson Aquifer is comprised of the Yegua Formation and the Jackson Group. These units consist of interbedded sand, silt, and clay, with some lignite beds. The thickness of the Yegua-Jackson Aquifer in the District is as much as 900 feet. A few exempt wells are completed in the Yegua-Jackson Aquifer, primarily in Lee County. Within the District, no non-exempt wells are completed in this aquifer, and it is not expected to yield significant quantities of water to wells within the District.

*Midway Group* The Midway Group is located stratigraphically beneath the Wilcox Group. The Midway consists of clay, silt, glauconitic sand, and thin beds of limestone and sandstone and can be more than 800 feet thick. Wells drilled into the Midway outcrop may yield small quantities of slightly to moderately saline water, and a few wells within the District have been installed into the Midway.

*Reklaw Formation* The Reklaw Formation is located stratigraphically between the overlying Carrizo and underlying Queen City Formations. The Reklaw is composed primarily of glauconitic sand and silt, and is about 100 feet thick. It is not considered to be an aquifer by the state of Texas, however a few exempt wells have been completed in the Reklaw within the District, mostly in the outcrop area.

*Weches Formation* The Weches Formation, sometimes referred to as the Weches Greensand, is located between the Queen City and Sparta Formations. The Weches consists of glauconitic shale, some sandstone, and some thin limestone beds, and is about 100 feet thick. It is not considered to be an aquifer by the state of Texas, however a few exempt wells have been completed in the Weches within the District, mostly in the outcrop area.



*Cook Mountain Formation* The Cook Mountain Formation is located stratigraphically above the Sparta Formation and below the Yegua Formation. The Cook Mountain consists primarily of clay, with some lenses of sand, sandstone, limestone, glauconite, and gypsum, and can be as much as 400 feet thick within the District. It is not considered to be an aquifer by the state of Texas, however exempt wells producing very small quantities of fresh to moderately saline groundwater have been completed in the Cook Mountain within the District, mostly in the outcrop area.

## **RECHARGE, DISCHARGE, AND GROUNDWATER FLOW**

Recharge is the addition of water to an aquifer. Recharge to aquifers occurs from direct precipitation on aquifer outcrop at ground surface, from losses from surface water bodies to the underlying aquifer, and from inter-formational leakage between aquifers. Recharge estimates for the major and minor aquifers present within the District are included in **Table 4**.

The amount of recharge that occurs due to direct precipitation appears to be more a function of the specific soils in an area than the amount of precipitation. Recharge of direct precipitation where sandy aquifer units crop out is higher than where the soils and formations at ground surface are clay-dominated. Effective recharge from precipitation, i.e. recharge that moves down dip into the deeper portions of the aquifer and is not discharged to surface streams, is typically only a few percent of average annual rainfall. Leakage between formations accounts for a large component of total recharge to an individual aquifer. Losses from surface water bodies to the underlying aquifers appear to be a minimal source of recharge for most of the aquifers in the District.

Discharge is the loss of water from an aquifer. Before the development of aquifers for groundwater supply purposes, all discharge was natural. This includes discharge to surface water sources such as springs, streams, rivers, and lakes, as well as the removal of groundwater from an aquifer by evapotranspiration and inter-formational leakage. Discharge to surface water bodies is shown in **Table 5**. After the development of District aquifers for supply purposes, most discharge that occurs is to wells. Other sources of anthropogenic discharge may include gravel pits, mining operations, or other activities that intersect the water table.

Groundwater moves from areas of higher hydraulic head to areas of lower hydraulic head, which is from areas of recharge to areas of discharge. Under normal conditions within the District, the movement of water is in a downdip direction. However, these normal, undeveloped conditions are altered by pumpage that occurs in the aquifer. Because pumpage has become the dominant form of discharge from many of the aquifers in the District, groundwater tends to flow towards areas of pumpage. These natural and altered flow patterns result in not only the movement of groundwater across District boundaries, but also between aquifers within the District. **Tables 6 and 7** summarize the amount of water that flows laterally into and out of the District to adjacent districts or counties, and the amount of water that moves vertically between aquifers, respectively. These values do not distinguish between fresh, brackish, and saline water, and therefore all flows include all of these water types.

**Table 4 - Estimated precipitation recharge totals for major and minor aquifers**

	<b>Precipitation Recharge (acre-feet/year)</b>
Sparta	10,142
Queen City	7,255
Carrizo-Wilcox	29,602
Trinity	0
Yegua-Jackson	38,860
Total	85,859

Source: TWDB GAM Run 16-014

**Table 5 - Estimated discharge to surface water bodies from major and minor aquifers**

	<b>Surface Water Discharge (acre-feet/year)</b>
Sparta	4,564
Queen City	5,488
Carrizo-Wilcox	32,781
Trinity	0
Yegua-Jackson	35,781
Total	78,614

Source: TWDB GAM Run 16-014

**Table 6 - Estimated flow into and out of District in major and minor aquifers**

	<b>Flow Into District (acre-feet/year)</b>	<b>Flow Out Of District (acre-feet/year)</b>
Sparta	915	593
Queen City	516	2,610
Carrizo-Wilcox	12,660	17,538
Trinity	355	136
Yegua-Jackson	5,882	10,154
<b>Total</b>	<b>20,328</b>	<b>31,031</b>

Source: TWDB GAM Run 16-014

**Table 7 - Estimated flow between major/minor and adjacent aquifers**

Figure 1, Stratigraphic Section, lists overlying and underlying aquifers.

	<b>Flow to/from Overlying Aquifer (acre-feet/year)</b>	<b>Flow to/from Underlying Aquifer (acre-feet/year)</b>
Sparta	883	957
Queen City	934	167
Carrizo-Wilcox	1,313	NA
Trinity	2	NA
Yegua-Jackson	NA	NA
<b>Total</b>	<b>363</b>	<b>791</b>

Source: TWDB GAM Run 16-014. NA= Not applicable per GAM Run 16-014 report.

## **B. SURFACE WATER RESOURCES**

Bastrop and Lee counties lie along the inner edge of the Texas Gulf Coastal Plain. The topography is flat to gently rolling, with elevations ranging from slightly less than 400 feet where the Colorado River exits Bastrop County to slightly more than 650 feet along the Bastrop-Lee county line just north of the upper reaches of West Yegua Creek.

The District lies within three river basins: the Guadalupe, Colorado, and Brazos. The Colorado River bisects Bastrop County, and a majority of Bastrop County and the southern quarter of Lee

County lie within the Colorado River Basin and its tributaries, including Cummins, Rabbs, Pin Oak, Big Sandy, Wilbarger, and Cedar Creeks. The remainder of Lee County lies within the Brazos River basin, with the significant tributaries to the Brazos River within Lee County being the Middle and West Yegua Creeks. In addition to the Colorado and Brazos River basins, the extreme southern portion of Bastrop County lies within the Guadalupe River basin, an area drained by Peach Creek.

Currently surface water resources are little used in Bastrop and Lee counties because of lack of availability and because what is available has already been appropriated. Surface water from the Colorado River is used as make-up water for Lake Bastrop (which functions as a cooling pond for the LCRA Sim Gideon power plant), for cooling water for another privately owned power plant in Bastrop County, for some irrigation, and for livestock watering in Lee County. No other District uses of surface water are known. The current availability of surface water within Bastrop and Lee counties is summarized in **Table 8**.

**Table 8 - Projected Surface Water Supplies - 2017 State Water Plan**

All values are in acre-feet/year

<b>RWP G</b>	<b>Entity Name</b>	<b>Count y</b>	<b>Source Name</b>	<b>202 0</b>	<b>203 0</b>	<b>204 0</b>	<b>205 0</b>	<b>206 0</b>	<b>207 0</b>
K	COUNTY- OTHER	BASTR OP	HIGHLAND LAKES LAKE/RESERV OIR SYSTEM	744	744	744	744	744	744
K	IRRIGATION	BASTR OP	HIGHLAND LAKES LAKE/RESERV OIR SYSTEM	852	742	649	565	492	443
K	LIVESTOCK	BASTR OP	LOCAL SURFACE WATER SUPPLY	862	862	862	862	862	862
K	MANUFACTURI NG	BASTR OP	LOCAL SURFACE WATER SUPPLY	48	48	48	48	48	48
K	MINING	BASTR OP	LOCAL SURFACE WATER SUPPLY	8	7	7	9	9	9
K	STEAM ELECTRIC POWER	BASTR OP	HIGHLAND LAKES LAKE/RESERV OIR SYSTEM	12,2 20	11,8 34	11,0 26	10,5 71	10,5 71	10,5 71
G	IRRIGATION	LEE	BRAZOS RUN-OF-	20	20	20	20	20	20

			RIVER						
G	LIVESTOCK	Lee	LOCAL SURFACE WATER SUPPLY	1,93 5	1,93 5	1,93 5	1,93 5	1,93 5	1,93 5

### C. DISTRICT WATER DEMANDS, NEEDS AND STRATEGIES

Based on data from the 2017 State Water Plan, over the planning horizon, regional water planning data from Region G and Region K shows population is expected to increase from 95,487 in 2020 in Bastrop County to 382,244 in 2070 (an increase of 302%), and from 19,131 in 2020 in Lee County to 23,889 in 2070 (an increase of 25%). In addition, over the planning horizon, total water demands are projected to increase in Bastrop County from 35,184 acre-feet/year in 2020 to 89,084 acre-feet/year in 2070, and to increase in Lee County from 8,566 acre-feet/year in 2020 to 15,507 acre-feet/year in 2070. Demands within the District are shown in Table 9, and a summary by county is shown in Table 10. Needs within the District are shown in Table 11. Water management strategies included in the State Water Plan within the District are shown in Table 12.

Groundwater currently meets virtually all District demand for municipal, manufacturing, mining, livestock, and irrigation purposes, with surface water used principally to meet some irrigation and all steam-electric demand (cooling water). Currently, the two largest uses are mining and municipal purposes, including rural-domestic use. Almost all mining water use is from the Simsboro Aquifer.

It is important to note that the 2017 State Water Plan Projected Net Water Demands below:

- do not distinguish between projected demands met by surface water and those met by groundwater;
- do not include out-of-District demand for District groundwater;
- do not account for groundwater pumpage within the District that is exported out-of-District (such as demand represented by the District's current export of groundwater to Fayette County) (demand estimates from Regions G and K submitted to TWDB are for in-District demands only);
- do not account for demand in areas outside the District which are served by pumpage within the District by retail rural water sellers or other special utility districts whose "Certificate of Convenience and Necessity" (CCN) extends beyond District boundaries.

Such demands must be separately evaluated.

The District expects that improvements to the applicable GAM and expanded data from the Monitoring Well Program will allow better understanding of District groundwater resources and better future estimates of groundwater availability as the District seeks to manage the District's groundwater resources consistently with the DFCs and its mission.

**Table 9 - 2017 State Water Plan Projected Net Water Demands**

All values are in acre-feet/year

Region	Entity Name	County	WUG Type	2020	2030	2040	2050	2060	2070
K	AQUA WSC	Bastrap	MUNICIPAL	9,228	11,837	15,313	20,116	26,683	35,432
K	BASTROP	Bastrap	MUNICIPAL	1,957	2,598	3,446	4,612	6,201	8,317
K	BASTROP COUNTY WCID #2	Bastrap	MUNICIPAL	378	544	765	1,069	1,482	2,033
K	COUNTY-OTHER, BASTROP	Bastrap	MUNICIPAL	1,873	2,250	2,753	3,444	4,382	5,634
K	CREEDMOOR-MAHA WSC	Bastrap	MUNICIPAL	24	28	35	44	57	74
K	ELGIN	Bastrap	MUNICIPAL	1,298	1,651	2,125	2,782	3,681	4,880
K	IRRIGATION, BASTROP	Bastrap	IRRIGATION	852	742	649	565	492	443
K	LEE COUNTY WSC	Bastrap	MUNICIPAL	103	131	169	221	293	388
K	LIVESTOCK, BASTROP	Bastrap	LIVESTOCK	1,522	1,522	1,522	1,522	1,522	1,522
K	MANUFACTURING, BASTROP	Bastrap	MANUFACTURING	194	227	262	295	319	345
K	MINING, BASTROP	Bastrap	MINING	2,884	6,813	7,498	8,263	9,085	9,996
K	POLONIA WSC	Bastrap	MUNICIPAL	29	36	45	58	75	99
K	SMITHVILLE	Bastrap	MUNICIPAL	842	1,074	1,385	1,817	2,410	3,201
K	STEAM ELECTRIC POWER, BASTROP	Bastrap	STEAM ELECTRIC POWER	14,000	16,720	16,720	16,720	16,720	16,720
G	AQUA WSC	Lee	MUNICIPAL	466	511	536	544	551	555
G	COUNTY-OTHER, LEE	Lee	MUNICIPAL	195	207	218	222	224	226
G	GIDDINGS	Lee	MUNICIPAL	1,120	1,231	1,289	1,307	1,324	1,334
G	IRRIGATION, LEE	Lee	IRRIGATION	459	446	434	421	409	398
G	LEE COUNTY	Lee	MUNICIPAL	908	991	1,03	1,04	1,06	1,06

	WSC					5	8	0	7
G	LEXINGTON	Lee	MUNICIPAL	242	265	277	281	284	286
G	LIVESTOCK, LEE	Lee	LIVESTOCK	1,935	1,935	1,935	1,935	1,935	1,935
G	MANUFACTURING, LEE	Lee	MANUFACTURING	13	14	15	16	17	18
G	MINING, LEE	Lee	MINING	3,180	7,289	7,767	8,304	8,904	9,631
G	SOUTHWEST MILAM WSC	Lee	MUNICIPAL	48	53	55	56	56	57

**Table 10 - Projected Demands by County**

All values are in acre-feet/year

TYPE	County	2020	2030	2040	2050	2060	2070
MINING	Bastrop	2,884	6,813	7,498	8,263	9,085	9,996
STEAM-ELECTRIC	Bastrop	14,000	16,720	16,720	16,720	16,720	16,720
MANUFACTURING	Bastrop	194	227	262	295	319	345
MUNICIPAL	Bastrop	15,732	20,149	26,036	34,163	45,264	60,058
IRRIGATION	Bastrop	852	742	649	565	492	443
LIVESTOCK	Bastrop	1,522	1,522	1,522	1,522	1,522	1,522
MINING	Lee	3,180	7,289	7,767	8,304	8,904	9,631
STEAM-ELECTRIC	Lee	0	0	0	0	0	0
MANUFACTURING	Lee	13	14	15	16	17	18
MUNICIPAL	Lee	2,979	3,258	3,410	3,458	3,499	3,525
IRRIGATION	Lee	459	446	434	421	409	398
LIVESTOCK	Lee	1,935	1,935	1,935	1,935	1,935	1,935

Municipal demands are expected to nearly quadruple in Bastrop County by 2070. Mining demands are also expected to increase significantly in both Bastrop and Lee counties by 2070..



**Table 11 - 2017 State Water Plan Projected Water Needs**

All values are in acre-feet/year

<b>Region</b>	<b>Entity Name</b>	<b>County</b>	<b>WUG Type</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>	<b>2070</b>
K	AQUA WSC	Bastrop	MUNICIPAL	2,534	4,656	7,145	11,210	17,667	26,269
K	BASTROP	Bastrop	MUNICIPAL	30	671	1,519	2,685	4,274	6,390
K	BASTROP COUNTY WCID #2	Bastrop	MUNICIPAL	0	0	0	0	93	644
K	COUNTY-OTHER	Bastrop	MUNICIPAL	361	519	739	907	1,158	1,490
K	CREEDMOOR-MAHA WSC	Bastrop	MUNICIPAL	0	0	0	0	0	0
K	ELGIN	Bastrop	MUNICIPAL	472	732	1,013	1,533	2,432	3,631
K	IRRIGATION	Bastrop	IRRIGATION	0	0	0	0	0	0
K	LEE COUNTY WSC	Bastrop	MUNICIPAL	0	0	0	0	0	0
K	LIVESTOCK	Bastrop	LIVESTOCK	0	0	0	0	0	0
K	MANUFACTURING	Bastrop	MANUFACTURING	55	87	120	151	174	199
K	MINING	Bastrop	MINING	732	4,662	5,347	6,110	6,932	7,843
K	POLONIA WSC	Bastrop	MUNICIPAL	0	0	0	0	0	0
K	SMITHVILLE	Bastrop	MUNICIPAL	0	0	0	0	0	721
K	STEAM ELECTRIC POWER	Bastrop	STEAM ELECTRIC POWER	0	0	0	0	0	0
G	AQUA WSC	Lee	MUNICIPAL	0	0	0	0	0	0
G	COUNTY-OTHER	Lee	MUNICIPAL	0	0	0	0	0	0
G	GIDDINGS	Lee	MUNICIPAL	0	0	0	0	0	0
G	IRRIGATION	Lee	IRRIGATION	0	0	0	0	0	0
G	LEE COUNTY WSC	Lee	MUNICIPAL	0	0	0	0	0	0
G	LEXINGTON	Lee	MUNICIPAL	0	0	0	0	0	0
G	LIVESTOCK	Lee	LIVESTOCK	0	0	0	0	0	0
G	MANUFACTURING	Lee	MANUFACTURING	0	0	0	0	0	0
G	MINING	Lee	MINING	3,18	7,28	7,76	8,30	8,90	9,63

				0	9	7	4	4	1
G	SOUTHWEST MILAM WSC	Lee	MUNICIPAL	0	0	0	0	0	0

**Table 12 - Projected Water Management Strategies - 2012 State Water Plan Data**

All values are in acre-feet/year

<b>Water Management Strategy</b>	<b>Source Name</b>	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>	<b>2070</b>
<b>AQUA WSC, BASTROP COUNTY (K)</b>							
DROUGHT MANAGEMENT	DEMAND REDUCTION	1,385	1,775	2,297	3,018	4,002	5,366
MUNICIPAL CONSERVATION - AQUA WSC	DEMAND REDUCTION	630	911	978	1,148	1,526	2,026
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - CARRIZO-WILCOX AQUIFER	CARRIZO-WILCOX AQUIFER, BASTROP	2,500	2,500	4,000	4,000	4,000	4,000
LCRA - PRAIRIE SITE RESERVOIR	LCRA NEW OFF-CHANNEL RESERVOIR	0	0	5,000	5,000	10,000	15,000
<b>BASTROP, BASTROP COUNTY (K)</b>							
DROUGHT MANAGEMENT	DEMAND REDUCTION	294	390	517	692	930	1,248
MUNICIPAL CONSERVATION - BASTROP	DEMAND REDUCTION	195	440	688	1,084	1,459	1,958
DEVELOPMENT OF NEW GROUNDWATER SUPPLIES - CARRIZO-WILCOX AQUIFER	GROUNDWATER	300	300	300	300	300	0
DIRECT REUSE - BASTROP	REUSE	0	0	300	600	1,120	1,120
LCRA - LANE CITY RESERVOIR	SURFACE WATER	0	0	0	2,500	2,500	2,500
<b>BASTROP COUNTY WCID #2</b>							
DROUGHT MANAGEMENT	DEMAND REDUCTION	19	27	38	53	74	102
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - CARRIZO-WILCOX AQUIFER	GROUNDWATER	0	0	0	0	550	550
<b>COUNTY-OTHER, BASTROP COUNTY (K)</b>							
DROUGHT MANAGEMENT	DEMAND REDUCTION	281	338	413	517	657	845

MUNICIPAL CONSERVATION - BASTROP COUNTY- OTHER	DEMAND REDUCTION	92	196	344	414	527	677
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - CARRIZO-WILCOX AQUIFER	GROUNDWATER	60	60	60	60	60	0
<b>CREEDMOOR-MAHA WSC, BASTROP COUNTY (K)</b>							
DROUGHT MANAGEMENT	DEMAND REDUCTION	1	1	2	2	3	4
<b>ELGIN, BASTROP COUNTY (K)</b>							
DROUGHT MANAGEMENT	DEMAND REDUCTION	195	248	319	417	552	732
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - CARRIZO-WILCOX AQUIFER	GROUNDWATER	300	300	0	0	0	0
LCRA - LANE CITY RESERVOIR	SURFACE WATER	0	3,452	3,371	3,278	3,196	3,119
<b>MANUFACTURING, BASTROP COUNTY (K)</b>							
EXPANSION OF CURRENT GROUNDWATER SUPPLIES - CARRIZO-WILCOX AQUIFER	GROUNDWATER	55	87	120	151	174	199
<b>MINING, BASTROP COUNTY (K)</b>							
DEVELOPMENT OF NEW GROUNDWATER SUPPLIES - CARRIZO-WILCOX AQUIFER	GROUNDWATER	0	0	466	466	466	466
DEVELOPMENT OF NEW GROUNDWATER SUPPLIES - QUEEN CITY AQUIFER	GROUNDWATER	110	306	0	0	0	0
<b>POLONIA WSC, BASTROP COUNTY (K)</b>							
LOCAL CARRIZO AQUIFER WITH CONVERSION	GROUNDWATER	0	0	0	0	0	0
<b>SMITHVILLE, BASTROP COUNTY (K)</b>							
DROUGHT MANAGEMENT	DEMAND REDUCTION	126	161	208	273	362	480
MUNICIPAL CONSERVATION - SMITHVILLE	DEMAND REDUCTION	44	72	76	88	117	155
DEVELOPMENT OF NEW GROUNDWATER SUPPLIES - QUEEN CITY AQUIFER	GROUNDWATER	0	0	0	0	0	150
<b>STEAM ELECTRIC POWER, BASTROP COUNTY (K)</b>							
LCRA - EXPAND USE OF GROUNDWATER (CARRIZO-WILCOX AQUIFER)	GROUNDWATER	300	300	300	300	300	300

<b>GIDDINGS, LEE COUNTY (G)</b>							
MUNICIPAL WATER CONSERVATION (RURAL) - GIDDINGS	DEMAND REDUCTION	39	131	231	230	232	233
<b>LEXINGTON, LEE COUNTY (G)</b>							
MUNICIPAL WATER CONSERVATION (RURAL) - LEXINGTON	DEMAND REDUCTION	8	26	23	21	21	21
<b>MINING, LEE COUNTY (G)</b>							
INDUSTRIAL WATER CONSERVATION	DEMAND REDUCTION	95	364	544	581	623	674
<b>SOUTHWEST MILAM WSC, LEE COUNTY (G)</b>							
MUNICIPAL WATER CONSERVATION (RURAL) - SOUTHWEST MILAM WSC	DEMAND REDUCTION	1	0	0	0	0	0

## **Section 8. MANAGEMENT GOALS, OBJECTIVES, AND PERFORMANCE STANDARDS**

### **A. Statutory Goals.**

#### **GOAL 1: Provide the most efficient use of groundwater.**

Management Objective 1.1: The District will develop and evaluate a schedule for expanding the monitoring well network in the Monitoring Well Program and will measure and record water levels in the monitoring wells.

Performance Standard: The District will annually evaluate and report to the Board on the monitoring well network.

Management Objective 1.2: The District will make available to the public information on efficient use of groundwater, at the District office, on the District website, and/or by public workshops or other presentations.

Performance Standard: The General Manager will report annually to the Board, in the Annual Report or otherwise, on information on efficient use of groundwater which has been made available, identifying the publications and the number and dates of any public workshops or other presentations.

#### **GOAL 2: Controlling and preventing waste of groundwater.**

Management Objective 2.1: The District will make available to the public information on controlling and preventing waste of groundwater, at the District office, on the District website, or by public workshops or other presentations.

Performance Standard: The General Manager will report annually to the Board, in the Annual Report or otherwise, on information on efficient use of groundwater which has been made available, identifying the publications and the number and dates of any public workshops or other presentations.

Management Objective 2.2: The District will document and promptly report to the relevant water supply entity any water leaks from pipelines or distribution systems which are noted or reported to the District.

Performance Standard: The District will report annually to the Board, in the Annual Report or otherwise, any leaks noted and reported.

**GOAL 3: Controlling and preventing subsidence:** Under current conditions this goal is not applicable to the District.

**GOAL 4: Address conjunctive surface water management issues.**

Management Objective 4.1: The District will encourage the use of surface water supplies, where available and practical, to meet the needs of specific user groups within the District.

Performance Standard: The District will participate at least annually in the Region G and Region K Regional Water Planning processes, encourage the development of surface water supplies where appropriate, and document any such activity in the Annual Report.

**GOAL 5: Address natural resource issues that impact the use and availability of groundwater and which are impacted by the use of groundwater.**

Management Objective 5.1: The District will make available to the public at the District Office and/or on the District website or at public meetings or presentations information on issues that impact use and availability of groundwater and are impacted by groundwater use, which may include without limitation such issues as drought, mining, endangered species, District hydrologic data, out-of-District export of groundwater, protection of endangered species, and the spread of phreatophytic vegetation.

Performance Standard: The General Manager will report annually to the Board, in the Annual Report or otherwise, information made available on natural resource issues that impact the use and availability of groundwater and are impacted by the use of groundwater, identifying the publications and the number and dates of any public workshops or other presentations.

**GOAL 6: Address drought conditions.**

Management Objective 6.1: The District will monitor information on drought severity and provide a link to the drought information on the District website.

Performance Standard: The District will monitor a public source on local drought conditions, such as <https://waterdatafortexas.org/drought>, make the information available to the public on the District website, and report annually to the Board on the status of this objective in the Annual Report or otherwise.

Management Objective 6.2. The District will monitor District monitoring wells at specified intervals.

Performance Standard: A summary of water levels in District monitoring wells will be provided at least annually to the Board.

**GOAL 7: Address conservation, recharge enhancement, rainwater harvesting, precipitation enhancement, or brush control, where appropriate and cost-effective.**

Recharge enhancement: The District does not currently have the financial resources to buy property and construct recharge structures. Therefore, based on current conditions, this goal is not currently applicable.

Precipitation enhancement: The District does not know of any precipitation enhancement activity currently applicable to the District. Therefore, this goal is not currently applicable.

Management Objective 7.1: The District will make available to the public at the District office and/or on the District website information on water conservation on topics such as advances in plumbing fixtures that conserve water, xeriscaping, and other related subjects, where appropriate and cost-effective, identified by the District.

Performance Standard: The General Manager will report annually to the Board, in the Annual Report or otherwise, on information on conservation which has been made available, identifying the information and the number and dates of any public workshops or other presentations.

Management Objective 7.2. The District will make available to the public at the District office and/or on the District website information concerning rainwater harvesting where appropriate and cost effective, including one or more publications related to advances in rainwater harvesting or any other related subject identified by the District.

Performance Standard: The General Manager will report annually to the Board, in the Annual Report or otherwise, on information on rainwater harvesting which has been made available, identifying the information and the number and dates of any public workshops or other presentations.

Management Objective 7.3. The District will make available to the public information concerning brush control where appropriate and cost effective, including on topics related to brush control or any other related subject identified by the District.

Performance Standard: The General Manager will report annually to the Board, in the Annual Report or otherwise, on information on brush control which has been made available, identifying the information and the number and dates of any public workshops or other presentations.

**GOAL 8: Address desired future conditions (DFCs) of the groundwater resources established pursuant to § 36.108.**

Management Objective 8.1: The District will report information on the consistency of water levels with DFCs at least annually.

Performance Standard: Water levels will be reported at least annually to the Board by the General Manager, and will include information on the consistency of water levels with DFCs, including by county, and upon review and acceptance by the Board, made available to the public.

Management Objective 8.2: The District will regularly assess whether or not management zones should be established within its counties, or, if established, modified.

Performance Standard: The General Manager will at least every five years assess and report to the Board whether management zones should be established within its counties, or, if established, modified.

## **B. District-Specific Goals**

### **GOAL: Provide public education on groundwater resources.**

Management Objective: The District will make available to the public, with a focus on children, information related to the occurrence, distribution, behavior, and use of groundwater.

Performance Standard: At least once each year in each county of the District, the District will present a program dealing with the above matters at a public school.

### **GOAL: Register all wells within District boundaries.**

Management Objective: The District will register all exempt wells drilled since the District Rules became effective and work towards registering all pre-existing exempt wells.

Performance Standard: The District will encourage registration of newly drilled exempt wells by refunding the drilling permit fee upon submittal of completion reports, well logs, and well registration materials. Because registration of exempt wells existing prior to the effective date of District rules is voluntary, the General Manager or the General Manager's designated representative will note the existence of unregistered wells, locate such wells on a map as best possible, and visit with the landowner, if possible, to encourage registration of the wells. The District will document such attempts at the District office.

### **GOAL: Publicize operating permit requirements**

Management Objective: The District will publicize the requirement for operating permits for non-exempt wells, not otherwise excluded, and notify operating permit holders of the need to renew their operating permit at least sixty days prior to expiration.

Performance Standard: At least annually, the District will notify all known water-well drillers and pump installers operating in the District of the requirement for owners of non-exempt wells, not otherwise excluded, to obtain an operating permit and the requirement that the driller and/or pump installer insure that no non-exempt well, not otherwise excluded, is placed into service within the District without an operating permit. Such notice may be by publication in one or more newspapers of general circulation in Bastrop and Lee counties.

### **GOAL: Publicize transport permit requirements**

Management Objective: The District will publicize the requirement for transport permits and to notify holders of transport permits of the need to renew their transfer permit prior to expiration.

Performance Standard: At least annually, the District shall cause to be published in one or more newspapers of general circulation in Bastrop and Lee counties a publication



including or related to the requirement to obtain a transport permit to transport groundwater out of the District.

**GOAL: Timely process operating permits and transport permits.**

Management Objective: The District will endeavor to set an application on the agenda for a Board meeting within sixty (60) days of the date on which the General Manager determines that an application is Administratively Complete as defined by District rules.

Performance Standard: On an annual basis the District will track the dates on which applications and components of requested information are received, the dates on which (following technical review) an application is determined to be administratively complete, and the dates on which the Board considers applications. For any permit application taking longer than sixty days to process, the General Manager will cause a brief comment to be included in the files as to the reason for the delay. The General Manager will include an annual summary of permit application tracking in the Annual Report. Upon review and approval of the Annual Report, the District will make it available for public review at the District office.

**GOAL: Maintain a database of registration of exempt wells, operating permits of non-exempt wells, and transport permits, permitting development of spacing and completion information for District wells and other information which facilitates management of groundwater consistent with DFCs.**

Management Objective: The District will maintain a database of each registration of an exempt well, each operating permit for a non-exempt well, and each transport permit, such that the District can generate plots of the locations of each registered and permitted well, access available completion and other relevant information for wells, and compute distances between the wells.

Performance Standard: Data on each registration of an exempt well, each operating permit for a non-exempt well, and each transport permit shall be entered in the database within sixty (60) days of issuance of the operating permit or registration. A summary of exempt wells will be provided in the annual hydrological data report.

## **Section 9. DISTRICT CERTIFICATIONS**

### **A. Regional Cooperation and Coordination**

Evidence of coordination by the District with the relevant surface water entities in its boundaries is provided in Appendix B. In addition:

*Lower Colorado River Regional Planning Group (Region K).* The District regularly coordinates with Region K by participating at regional planning meetings and by written and verbal communication as needed.

*Brazos River Regional Planning Group (Region G).* The District regularly coordinates and communicates with Region G. A District representative commonly attends Region G planning meetings.

*Lower Colorado River Authority (LCRA).* The District communicates with LCRA through the Region K planning group and directly as needed. The District will participate when regular communication begins on conjunctive use of surface and groundwater (which has not occurred to date in Bastrop and Lee counties).

*Brazos River Authority (BRA).* The District communicates with BRA through the Region G planning group and directly as needed. BRA representatives commonly attend District Board meetings. The District will participate when regular communication begins on conjunctive use of surface and groundwater (which has not occurred to date in Bastrop and Lee counties).

### **B. District's Resolution Adopting Management Plan**

Appendix C contains a certified copy of the District resolution adopting this Management Plan.

### **C. Evidence of Public Notice and Hearing of Management Plan**

Appendix D contains evidence of public notice and hearing prior to adoption of this Management Plan.

### **D. Site-Specific Information Provided to the TWDB**

No site-specific information is available to provide to the Executive Administrator regarding the estimates required in subsections 31 TAC §356.52(a)(5)(C), (D), and (E).

**Attachment A**

**GAM Run 16-014: Lost Pines GCD Groundwater Management Plan**

**Attachment B**

**Estimated Historical Water Use and 2017 State Water Plan Datasets:  
Lost Pines Groundwater Conservation District**

## **Appendix A**

### **Copy of GMA 12 Resolution and Submittal Adopting DFCs**

**Appendix B**

**Evidence of Coordination with Surface Water Management Entities  
Appendix C**

**Certified Copy of District Resolution Adopting Management Plan**

## **Appendix D**

### **Evidence of Public Notice and Hearing on Management Plan**