

**APPLICATION OF THE
LOWER COLORADO RIVER
AUTHORITY FOR EMERGENCY
AUTHORIZATION**

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**BEFORE THE
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY**

AFFIDAVIT OF DAVID WHEELOCK

THE STATE OF TEXAS

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COUNTY OF TRAVIS

Before me, the undersigned authority, personally appeared David Wheelock, a person known by me to be competent and qualified in all respects to make this affidavit, who being by me first duly sworn, deposed as follows:

1. I am over 21 years of age, of sound mind, and have never been convicted of a felony or crime of moral turpitude. I am fully competent and qualified in all respects to make this affidavit.
2. The facts stated in this affidavit are within my personal knowledge and are true and correct. The tabs attached to this affidavit and referred to herein are incorporated by reference.
3. I, David Wheelock, am an individual residing in Travis County, Texas.
4. I have a Bachelor of Science in Civil Engineering from the University of Texas at Austin and a Master of Science in Civil Engineering with a water resources specialty from the University of Texas at Austin. I am a registered Professional Engineer in the State of Texas. A true and correct copy of my resume, detailing my prior work history and education, is attached hereto under Tab 1.
5. I have worked for the Lower Colorado River Authority ("LCRA") for more than four years. At LCRA, I have been responsible for the development and maintenance of various plans and permits directly affecting LCRA's water supply. I currently manage LCRA's water rights portfolio and active permit applications, Water Management Plan amendment process, groundwater development initiatives, and am the designated representative to the Region K Regional Water Planning Group. I am personally familiar with LCRA's raw water system, its water rights, and the TCEQ-approved LCRA Water Management Plan ("WMP"), which governs LCRA's operations of lakes Buchanan and Travis. In my position, I am responsible for understanding LCRA's raw water customer water needs now and in the future. In my position, I have also been involved in evaluating various alternative water supplies for LCRA's firm water customers.

6. My opinions stated herein are based on my over thirty years of experience in water supply development, water supply planning, and regulation of water rights in the state of Texas. I have also relied upon a variety of information provided to me by LCRA staff, which is of a nature typically relied upon in my profession, as described below and for which true and correct copies are attached and incorporated herein:
 - a. Map of LCRA Water Service Area, attached hereto under Tab 2;
 - b. Summary of Water Supply Alternatives, attached hereto under Tab 3, prepared by LCRA staff;
 - c. Excerpts of the 2010 LCRA Water Management Plan;
 - d. Affidavit of Ron Anderson, including attachments;
 - e. Affidavit of Bryan Cook, including attachments;
 - f. Affidavit of Ryan Rowney, including attachments;
 - g. Affidavit of Nora Mullarkey Miller, including attachments; and
 - h. Affidavit of Bob Rose, including attachments.

7. Based on the foregoing review and the reasons stated herein, my expert opinion on the following issues is set forth below:
 - a. LCRA Firm Customer Demands.
 - i. LCRA provides raw water from the firm water supply lakes Buchanan and Travis to over 60 retail and wholesale potable water suppliers that together serve over one million people. See Map of LCRA's Service Area, attached here under Tab 2. LCRA's municipal raw water customers include, but are not limited to, the Cities of Austin, Burnet, Cedar Park, Leander, Marble Falls, Pflugerville, Lakeway, Bee Cave, Horseshoe Bay, other Highland Lakes cities, water supply corporations, special districts, and investor-owned utilities. In addition, LCRA provides water to several electric utilities—LCRA, Bastrop Energy Partners, Austin Energy, Gen-Tex Corporation, and South Texas Project Nuclear Operating Company—from the firm water supply of lakes Buchanan and Travis. These electric utilities provide power into the electrical grid in Texas operated by the Electric Reliability Council of Texas (“ERCOT”) and provide electricity to customers in Texas. LCRA also provides firm raw water to several industries located downstream of the Highland Lakes, including Oxea Chemical and Underground Services Markham.
 - ii. The maximum historical annual amount of water use by firm water customers from lakes Buchanan and Travis during 2000 through 2011 was about 247,000 acre-feet in 2011. (*See* Affidavit of Ryan Rowney.)

b. Emergency Relief – Only Reasonable Alternative to Protect Firm Supply

- i. LCRA is seeking emergency relief to deviate from provisions of the 2010 WMP related to the supply of interruptible stored water from lakes Buchanan and Travis to the Gulf Coast and Lakeside agricultural divisions and Pierce Ranch. LCRA is also seeking emergency relief to deviate from provisions in the 2010 WMP that specify the amount of water that would be maintained in the river between Bastrop and Eagle Lake for the Blue Sucker fish.
- ii. LCRA's requested relief from provisions related to interruptible supply would suspend the supply of interruptible stored water to the Gulf Coast and Lakeside divisions and Pierce Ranch if TCEQ finds that water supply conditions have not improved significantly as compared to conditions in November 2014. In the absence of such requested relief, for January 1, 2015 storage levels similar to the December 1, 2014 combined storage, LCRA would be required to release—or start to release—quantities of water to make available for diversion up to 175,000 acre-feet of interruptible stored water from lakes Buchanan and Travis, only to face the very real chance that combined storage would fall to 600,000 acre-feet during first crop, prompting a declaration of Drought Worse than Drought of Record by the LCRA Board of Directors, the cutoff of interruptible stored water in the middle of the crop, and implementation of pro rata curtailment of firm water customers. Even if combined storage had increased to 1.0 million acre-feet or higher on March 1, 2015, if the 2010 WMP were followed, the combined storage could still fall to 600,000 acre-feet by the end of the year. (*See Affidavit of Ron Anderson.*)
- iii. LCRA's requested relief related to the instream flow requirement for the Blue Sucker fish would reduce the required flows over a six-week period from 500 cubic feet per second (cfs) to 300 cfs. This relief could save about 17,000 acre-feet from being released from lakes Buchanan and Travis. (*See Affidavit of Ryan Rowney.*)
- iv. There are no reasonably available and feasible practicable alternative water supplies or water management or conservation strategies that could be obtained or implemented at this time that would replace the volume of water that LCRA might otherwise have to release from the lakes if the requested relief is not granted that LCRA is not already pursuing. As demonstrated by the summary of alternatives attached hereto under Tab 3, most of the supplies identified would produce insufficient or uncertain quantities of supply, are constrained by existing contractual commitments, would create other operational issues for customers, and/or are subject to a high level of regulatory uncertainty and lengthy permitting process if not obtained on an

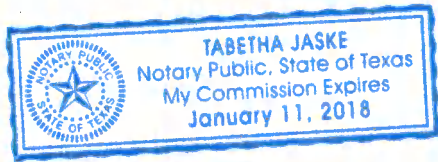
emergency basis. In most cases, these alternatives would take years to develop and transport to the area of use. In short, none of the additional strategies identified would allow LCRA to prevent the need for the relief requested in its application.

- v. For 2012, 2013 and 2014, LCRA has obtained permits that allowed LCRA to use its downstream Gulf Coast water right to meet some of the needs of firm water customers downstream of the Highland Lakes, to the extent that those supplies are not being used to meet agricultural needs in the four irrigation operations. LCRA is seeking similar authorization for its Lakeside water right for 2015. However, the amount of demand that can be met using downstream water rights is limited by the availability of run-of-river flows and subject to environmental flow requirements. Under the recent permits, LCRA was able to divert about 7,000, and 1,000 acre-feet in 2012 and 2013 respectively. (*See* Affidavit of Ryan Rowney.) In addition, in 2011 LCRA obtained a permanent amendment to its Gulf Coast water right (14-5476) that allows use for industrial purposes. In 2012 and 2013, about 9,800 and 10,200 acre-feet of industrial demands were met respectively with that amended water right. (*See* Affidavit of Ryan Rowney.) These authorizations have the potential to conserve water in the Highland Lakes, but as demonstrated by the amounts used in 2012 and 2013, the amounts are limited when compared to the amount of interruptible stored water that might be released under the 2010 WMP for interruptible agricultural customers and the potential savings from a reduction in the streamflow requirement for the Blue Sucker fish.
 - vi. LCRA and its customers are taking action to bring on some additional supplies. In 2013, LCRA obtained groundwater production permits in Bastrop County and, since that time, has been installing wells that have already begun meeting a portion of the demand at the Lost Pines Power Park. In response to the drought, the City of Burnet has turned to its groundwater wells to meet a portion of the city's demand. These additional supplies, while important, are not of the scale to offset potential shortages under worsening drought conditions.
- c. Adequacy of Emergency Relief. It is my opinion that strict adherence to the 2010 WMP provisions related to the supply of interruptible stored water to the Gulf Coast and Lakeside divisions and Pierce Ranch, and related to the instream flow requirement associated with the Blue Sucker fish presents too great of a risk that LCRA will have to make a Drought Worse than Drought of Record declaration in 2014. Even with emergency relief in place in 2012, 2013 and 2014, the combined storage in lakes Buchanan and Travis has not recovered. Departing from the 2010 WMP in the manner presented above is a prudent drought response that would help maintain the overall supply of water available to all of LCRA's firm water customers.

Further affiant sayeth not.

David Wheelock
DAVID WHEELOCK, AFFIANT

SWORN TO AND SUBSCRIBED before me on the 19th day of December, 2014.



Tabetha Jaske
Notary Public in and for the State of Texas

My Commission Expires: 1-11-2018

David C. Wheelock, PE
Manager, Water Supply and Conservation
Lower Colorado River Authority

David Wheelock is a key member of LCRA’s water resources planning and management team.

He is an experienced water resources engineer and manager in water planning with river authorities and in consulting. He has been in responsible charge of managing wholesale raw water systems, contract administration, hydrologic modeling, water rights modeling, water supply planning, acquisition of water supplies, reservoir management, dam safety and hydroelectric generation development. Mr. Wheelock has participated in the development and implementation of strategic plans, setting direction and goals, advising senior management, and working with local entities, governments, and engineering firms to create solutions to water resource problems.

EXPERIENCE

Manager, Water Supply and Conservation, Lower Colorado River Authority Austin, TX
2010-2014

From 2010-2011, supervised the Water Resources Planning and Management Department and the Water Conservation Department. As such, he was responsible for the development and maintenance of various plans and permits directly affecting LCRA’s wholesale water supply. He obtained a number of important water right amendments, including changes to senior water rights to better manage the resource.

Currently, Mr. Wheelock is managing LCRA’s water rights portfolio and active permit applications, Water Management Plan amendment process, groundwater development initiatives, and is the designated representative to the Region K Regional Water Planning Group.

Water Services Manager, Brazos River Authority Waco, TX
2004 - 2010

Supervised the Water Services Department in the day-to-day management of eleven water supply reservoirs to meet contractual commitments and permit requirements. Was responsible for the administration of water supply contracts, compliance with state water right permits, controlling releases for water supply and during flood events, support for water rights applications (i.e. System Operations Permit application), and water supply planning.

Principal Engineer, Brazos River Authority Waco, TX
2002 - 2004

In-house consultant to the General Manager, Regional Managers, and the Planning & Development Department in performing and implementing the goals of the Authority, as well as support for on-going operations. Provided leadership for planning, permitting, and design functions throughout the Authority’s area of operations; communicating technical aspects of the vision and goals of the Authority; working closely with Authority technical staff; reviewing plans/specifications for new work and rehabilitation of existing projects; and, carrying out duties in accordance with the Authority’s Strategic Plan.

Vice President, HDR Engineering, Inc. Austin, TX
1993-2002

Project management, marketing, and leadership responsibilities for major water resource planning efforts of river authorities and state government, including: Brazos G Regional Water Planning Area (Texas Water Development Board SB 1 and SB 2 initiatives); Trans-Texas Water Program, including Austin, San Antonio, and Williamson County study areas (LCRA, BRA, SARA, SAWS); Williamson County Water Supply Facilities Plan (BRA); Western Canyon Regional

Water System (GBRA); and, Tarrant County Water Management Plan (TRWD). Other projects include planning and conceptual engineering for the Corpus Christi area (NRA, City of Corpus Christi); project management for rehabilitation of DeCordova Bend Dam flood control gates (Lake Granbury - BRA), rehabilitation of critical components of the flood control gates Morris Sheppard Dam (Possum Kingdom Reservoir - BRA), hydroelectric evaluation and assessment at Morris Sheppard Dam, and resident engineer for outlet works replacement at Red Bluff Dam on the Pecos River (Red Bluff Water District).

Self-Employed Consulting Engineer

Annapolis, MD
1992-1993

Self-employed consulting engineer providing services to construction and government clients. Services included construction management, scheduling, structural design, and estimating for dam rehabilitation and water resource projects.

Chief Engineer, Synergics, Inc.

Annapolis, MD
1990-1992

In responsible charge of technical and management duties for design and construction of dam rehabilitation and hydroelectric projects. .

Vice President, Gebhard Engineers

Austin, TX
1984-1990

Project manager and engineer for a number of water resource projects, including two hydroelectric plants in New Hampshire; waterline projects; feasibility assessment of numerous hydroelectric sites; major wastewater interceptor and tunnel; hydrology studies in New Mexico and Arizona; and, general civil and water resource projects.

Project Manager, Meyer-Lytton-Allen, Inc.

Austin, TX
1983-1984

Responsible for the engineering and construction of a number of land development and commercial development projects in Central Texas, including water and wastewater pumping stations, water pipelines, and stormwater drainage facilities.

Project Engineer, Turner Collie & Braden, Inc.

Austin, TX
1979-1983

Responsible for the design and construction of a variety of municipal water and wastewater treatment projects, including floating water intakes; water transmission pipelines; wastewater treatment plant rehabilitations; well systems; sludge handling and digestion facilities; and regional treated water system; resident project engineer for construction of water and wastewater treatment plants.

EDUCATION and REGISTRATIONS

BSCE, University of Texas at Austin, 1979.

MSCE – Water Resources, University of Texas at Austin, 1986.

Registered Professional Engineer: Texas (#54303); inactive registrations: Arizona; Arkansas; Maryland; New Hampshire; Pennsylvania; Virginia.

PROFESSIONAL ASSOCIATIONS

American Water Works Association – past Chair of Standards Committee on Slide Gates.

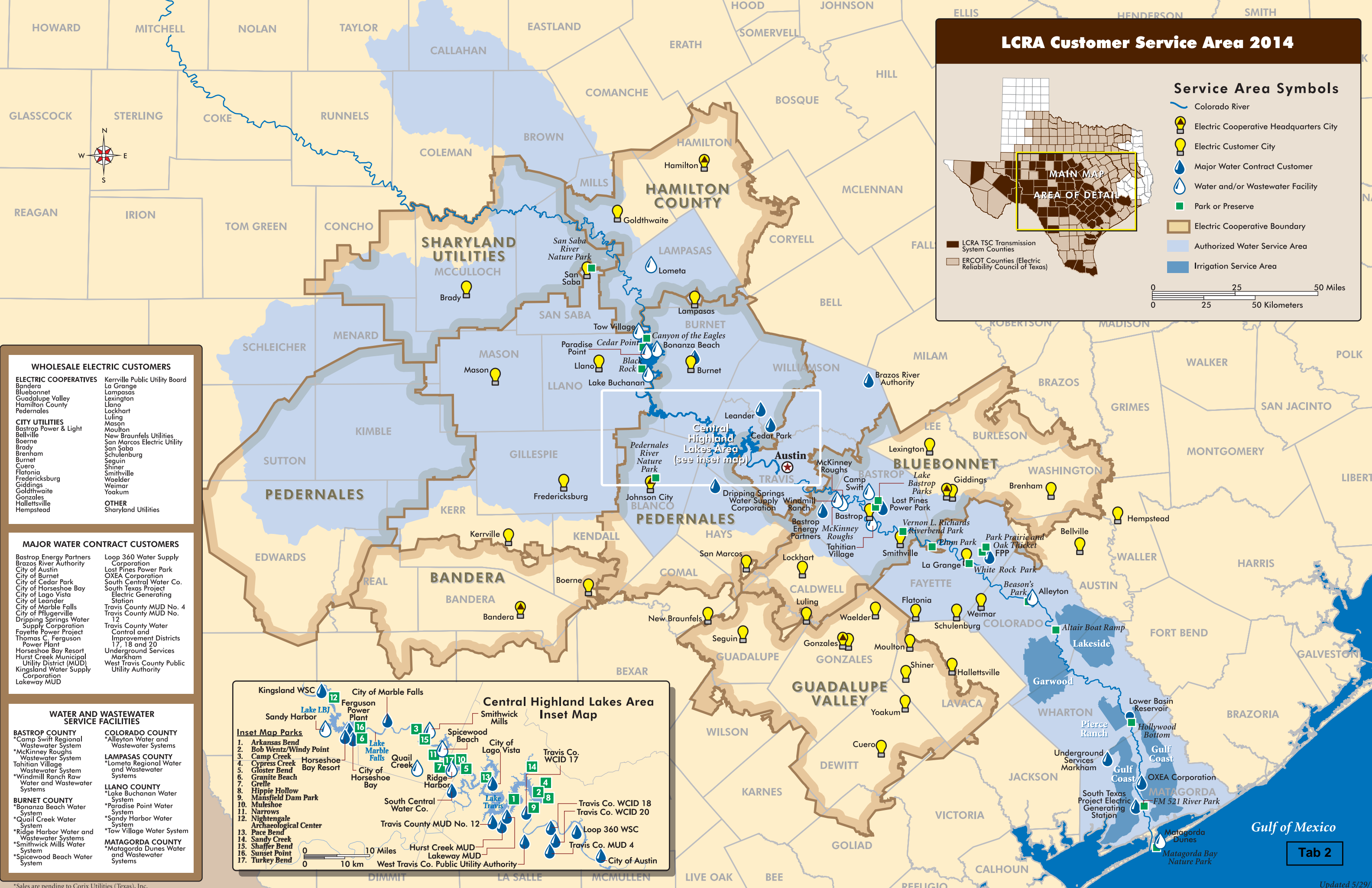
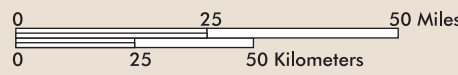
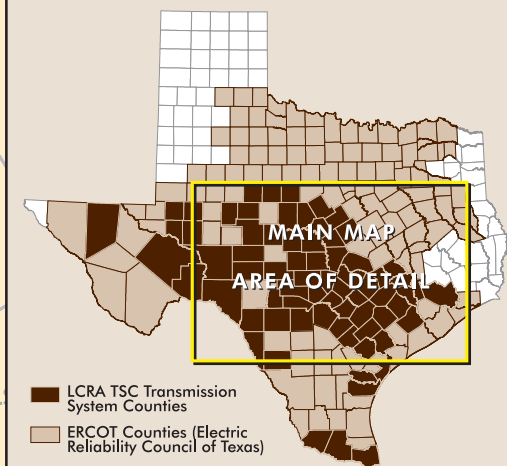
American Society of Civil Engineers – past Director – Texas Section.

Member, SB 1094 State-wide Water Conservation Implementation Task Force.

LCRA Customer Service Area 2014

Service Area Symbols

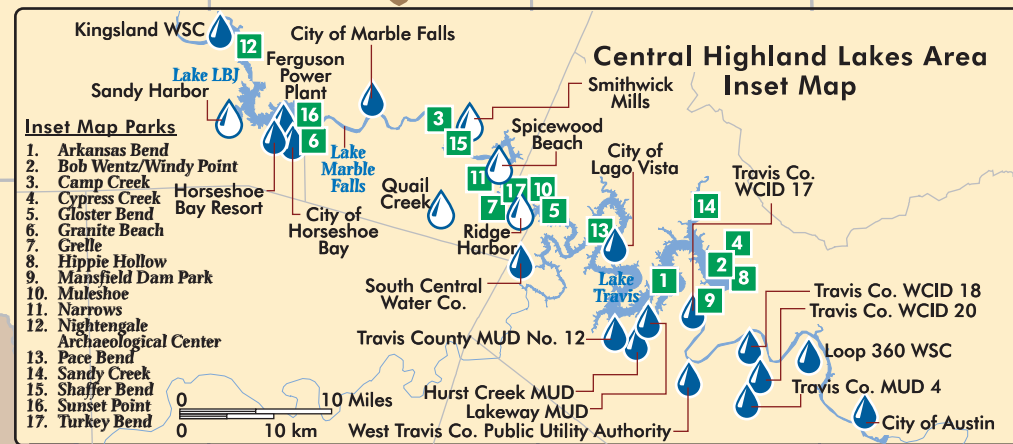
- Colorado River
- Electric Cooperative Headquarters City
- Electric Customer City
- Major Water Contract Customer
- Water and/or Wastewater Facility
- Park or Preserve
- Electric Cooperative Boundary
- Authorized Water Service Area
- Irrigation Service Area



- ### WHOLESALE ELECTRIC CUSTOMERS
- | | |
|------------------------------|--|
| ELECTRIC COOPERATIVES | Kerrville Public Utility Board
Bandera
Bluebonnet
Guadalupe Valley
Hamilton County
Pedernales |
| CITY UTILITIES | Mason
Moulton
New Braunfels Utilities
San Marcos Electric Utility
San Saba
Schulenburg
Seguin
Shiner
Smithville
Waelder
Weimar
Yoakum |
| OTHER | Sharyland Utilities |

- ### MAJOR WATER CONTRACT CUSTOMERS
- | | |
|--|--|
| Bastrop Energy Partners
Brazos River Authority
City of Austin
City of Burnet
City of Cedar Park
City of Horseshoe Bay
City of Lago Vista
City of Leander
City of Marble Falls
City of Pflugerville
Dripping Springs Water Supply Corporation
Fayette Power Project
Thomas C. Ferguson Power Plant
Horseshoe Bay Resort
Hurst Creek Municipal Utility District (MUD)
Kingsland Water Supply Corporation
Lakeway MUD | Loop 360 Water Supply Corporation
Lost Pines Power Park
OXA Corporation
South Central Water Co.
South Texas Project Electric Generating Station
Travis County MUD No. 4
Travis County MUD No. 12
Travis County Water Control and Improvement Districts 17, 18 and 20
Underground Services Markham
West Travis County Public Utility Authority |
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- ### WATER AND WASTEWATER SERVICE FACILITIES
- | | |
|--|---|
| BASTROP COUNTY
*Camp Swift Regional Wastewater System
*McKinney Roughs Wastewater System
*Tahitian Village Wastewater System
*Windmill Ranch Raw Water and Wastewater Systems | COLORADO COUNTY
*Alleyton Water and Wastewater Systems |
| BURNET COUNTY
*Bonanza Beach Water System
*Quail Creek Water System
*Ridge Harbor Water and Wastewater Systems
*Smithwick Mills Water System
*Spicewood Beach Water System | LAMPASAS COUNTY
*Lometa Regional Water and Wastewater Systems |
| MATAGORDA COUNTY
*Matagorda Dunes Water and Wastewater Systems | LLANO COUNTY
*Lake Buchanan Water System
*Paradise Point Water System
*Sandy Harbor Water System
*Tow Village Water System |



*Sales are pending to Corix Utilities (Texas), Inc.

Potential Alternatives to the Emergency Relief Requested by LCRA's Emergency Applications

LCRA has explored several alternative water supplies that might be available to alleviate strain on LCRA's water supply reservoirs, lakes Buchanan and Travis, caused by the persistent drought conditions. These alternatives are generally described below.

None of these alternatives could be obtained in sufficient supply or on a schedule that could serve to eliminate the need for immediate relief that LCRA seeks in its applications.

Moreover, it is important to note that LCRA lacks readily available funding to acquire or implement many of these alternatives, which means that rate increases for firm customers would be required to pay for these supplies at the same time LCRA may be significantly curtailing their access to water from lakes Buchanan and Travis.

- 1. Utilize water from LCRA's Lakes Inks, LBJ, and Marble Falls.** These lakes are not currently authorized for municipal use, so amendments may be required to make full use of these supplies on a more permanent basis – a process that could take several years. If LCRA were to simply stop exercising its right to refill these lakes, but still allow the lakes to be maintained at levels that would not have significant impacts to cities and industries around them, it estimates that perhaps a one-time supply of about 34,000 acre-feet (AF) could be made available. Reduction in storage could also have significant impacts on hydroelectric generation capabilities.
- 2. Conservation incentives and customer buyouts of nonessential uses (irrigation, recreation firm contracts).** LCRA has approximately 11,000 AFY under contract for firm irrigation and recreational use. LCRA may consider providing further financial incentives to these customers to reduce water use, but given the nominal amount of supply that might be made available, such alternatives would not be sufficient to alleviate the need for emergency relief.
- 3. Aggressive municipal conservation.** This would include identifying and addressing water loss areas (i.e., toilets, shower heads, leaking pipes, etc.). In LCRA's experience, this requires solid partnerships with customers, a good method for calculating water savings (which is elusive) and a strong education and enforcement program (which is costly to the customers and requires time to become effective). Benchmarking and experience tells us that to achieve meaningful water savings, it often takes 1-2 years or more. While LCRA will continue to encourage water conservation, this alternative does not eliminate the need for emergency relief requested to avert the very near-term prospect of reducing storage levels beyond a protective level. The estimated cost of this long term program to achieve a 20% demand reduction is \$220,000,000.

4. Groundwater. Many areas within LCRA's water service area have local groundwater conservation districts that regulate the use and permitting of groundwater supplies. Although groundwater appears to be available in many areas, the uncertainty associated with the long-term availability of such groundwater supplies in light of an unsettled regulatory environment renders any significant reliance on groundwater as an alternative supply a relatively high risk option. Within Matagorda County, which is governed by the Coastal Plains Groundwater Conservation District, LCRA estimates that it might be able to obtain agreements to lease up to 10,000 AFY of groundwater from existing wells or drill new wells to serve existing industrial customers in Matagorda County. Further, it might be able to do the same in and around Fayette County for purposes of securing supplies to meet some or all of the existing power plant water demands in that area. Groundwater development in Fayette County is regulated by the Fayette County Groundwater Conservation District. Similarly, LCRA has explored options for obtaining groundwater from the Carrizo-Wilcox aquifer to the east of Austin. Both the Lost Pines and Post Oak Savannah Groundwater Conservation districts have jurisdiction over large parts of the aquifer close to LCRA's service area. In 2013, LCRA obtained groundwater permits in the Lost Pines Groundwater Conservation District for up to 10,000 AFY to use at LCRA's power facilities in Bastrop County. LCRA has installed groundwater wells and is supplying the majority of water demand at the power facilities from groundwater .

It takes approximately 9-12 months to secure written agreements with landowners and often takes several years to obtain new groundwater permits or permit amendments from local groundwater conservation districts, the need for emergency relief is not diminished. Further, to secure and develop any such supplies would take several years and thus would not avert the need for emergency relief.

LCRA is negotiating the purchase of groundwater pumping rights under 5000 acres of land in central Bastrop County. LCRA plans to execute the contract on the pumping rights in early 2015. Currently, there is no permit for pumping the groundwater.

5. Off-Channel Reservoir. LCRA has recently completed engineering work on a new reservoir to be built in the lower Colorado River basin. Construction work has been contracted and the groundbreaking for the project occurred in December, 2014. The project will replace some supplies currently met from the Highland Lakes, improve agricultural water reliability and efficiency, and increase LCRA's overall water supply.

The new reservoir in Wharton County will capture water downstream and hold it for beneficial use by downstream industrial and agricultural customers. This is the

first project that will allow LCRA to capture and store significant amounts of water downstream that can be used by multiple customers.

The reservoir will be able to hold about 40,000 acre-feet, but could be filled and used multiple times over the course of a year, making it capable of adding 90,000 acre-feet of firm water to the region's supply. The Texas Water Development Board has provided \$250 million for financing the reservoir. The project is scheduled to be on-line in 2017 – which may not be early enough to help with the current drought, and definitely not early enough to help address the situation in the near-term.

- 6. Wastewater reuse program in the Highland Lakes.** Enhanced direct reuse of wastewater around the Highland Lakes could reduce demand by about 5,000 AFY over the next 1-2 years. This amount of savings is not sufficient over the near term to alleviate the need for emergency relief. The estimated cost for an enhanced direct wastewater reuse pilot project for 1,120 acre-feet of supply is \$5,700,000.
- 7. Line or pipe high loss canals utilized by industry.** Determining high loss areas of canals can be a challenge and estimating the amount of water savings difficult. Although LCRA has some very general information about its canal systems, it could not immediately implement a canal lining project that would serve to reduce water usage in such quantities as to avert the need for emergency relief.
- 8. Interbasin transfers or water trucking/rail transport.** Interbasin transfers of water or transport of water by truck or rail from areas with a more plentiful supply is an option that poses no realistic likelihood of alleviating the need for the emergency relief requested. Moreover, there are very few options close to the lower Colorado River basin with much supply to spare. Even if such supply exists, the interbasin transfer permitting process and construction of the necessary infrastructure would significantly limit the ability to bring such supplies on line in a timely manner. The logistics of locating sufficient transporting equipment to meet the levels of demand would be very difficult if not impossible.
- 9. Ocean or Brackish Groundwater Desalination.** Although ample supply is likely available, the time required to permit and construct such facilities is estimated to be 5-10 years. This alternative thus does not eliminate the need for emergency relief. The estimated cost of this alternative is \$177,000,000 for 22,400 acre-feet of supply.