

**APPLICATION OF THE
LOWER COLORADO RIVER
AUTHORITY FOR EMERGENCY
AUTHORIZATION RELATED TO
WATER MANAGEMENT PLAN**

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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 Ryan Rowney, including attachments;
 - f. Affidavit of Nora Mullarkey Miller, including attachments; and
 - g. 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 (including LCRA's own water utility systems), 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 2013 was about 247,000 acre-feet in 2011. (*See* Affidavit of Ryan Rowney.)

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

- i. 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 can be implemented in time to prevent LCRA's need for the relief requested in its application.
- ii. In the past three years, LCRA has sought and obtained emergency relief from its Water Management Plan, significantly reducing the demand for water from the Highland Lakes. While such actions have been important in maintaining LCRA's existing supply, the authorization sought in this application would allow LCRA to retain additional inflows in the lakes to help meet firm customer demands during this severe drought and could help delay pro rata curtailment of firm customers.
- iii. For three years, 2012, 2013 and 2014, LCRA has obtained temporary permits to allow LCRA to use its downstream water rights 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. However, the amount of demand that can be met using these downstream water rights is limited by the availability of run-of-river flows and subject to environmental flow requirements. LCRA was able to divert about 4,000 acre-feet in 2012 under the temporary authorizations, and about 1,000 acre-feet in 2013. 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 9,000 acre-feet and 10,000 acre-feet, respectively, of industrial demands were met with that amended water right. 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.
- iv. LCRA and its customers are taking action to bring on some additional supplies. LCRA has recently obtained groundwater production permits

in Bastrop County and is currently installing wells to meet demands 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.

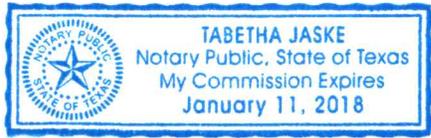
- v. Release of the water stored in the other lakes LCRA manages is not a feasible alternative to the relief requested. Several are cooling water reservoirs with operational constraints. Lake LBJ is the cooling water reservoir for the replacement Ferguson Power Plant which will be brought online in 2014. If Lake LBJ is lowered, it would have to be replenished prior to commissioning either with inflows, if any, from the Llano River (that could otherwise be captured in Lake Travis if Lake LBJ were full), or releases from Lake Buchanan. Lowering Lake Bastrop introduces multiple issues; including that any released surface water would need to be replenished with either surface water, including releases from Lakes Travis and Buchanan if no rains come, or a limited supply of groundwater, and operational and timing issues related to the ability to release and replenish water in the lake on a schedule needed for generation reliability. Releases from other intervening lakes could raise operational issues for LCRA's firm customers over a timeframe that cannot be readily addressed. And moreover, releases from Lake Buchanan may ultimately be required if local inflows do not materialize.
- c. Appropriateness of Emergency Relief Requested. It is my opinion no additional interruptible stored water should be made available this year beyond the amount already committed to farmers in the Garwood irrigation division (consistent with an existing contract). If additional interruptible stored water is made available, it will increase the already significant risk of mandatory pro rata curtailment of LCRA's firm water customers. Deviating from the 2010 WMP for the remainder of the 2014 irrigation season, consistent with the emergency relief granted to date, continues to be a highly prudent drought response.

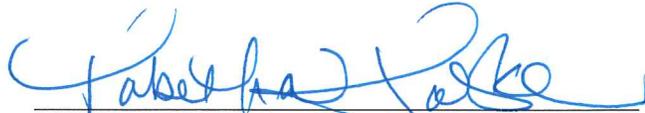
Further affiant sayeth not.



DAVID WHEELOCK, AFFIANT

SWORN TO AND SUBSCRIBED before me on the 1st day of
July, 2014.





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.

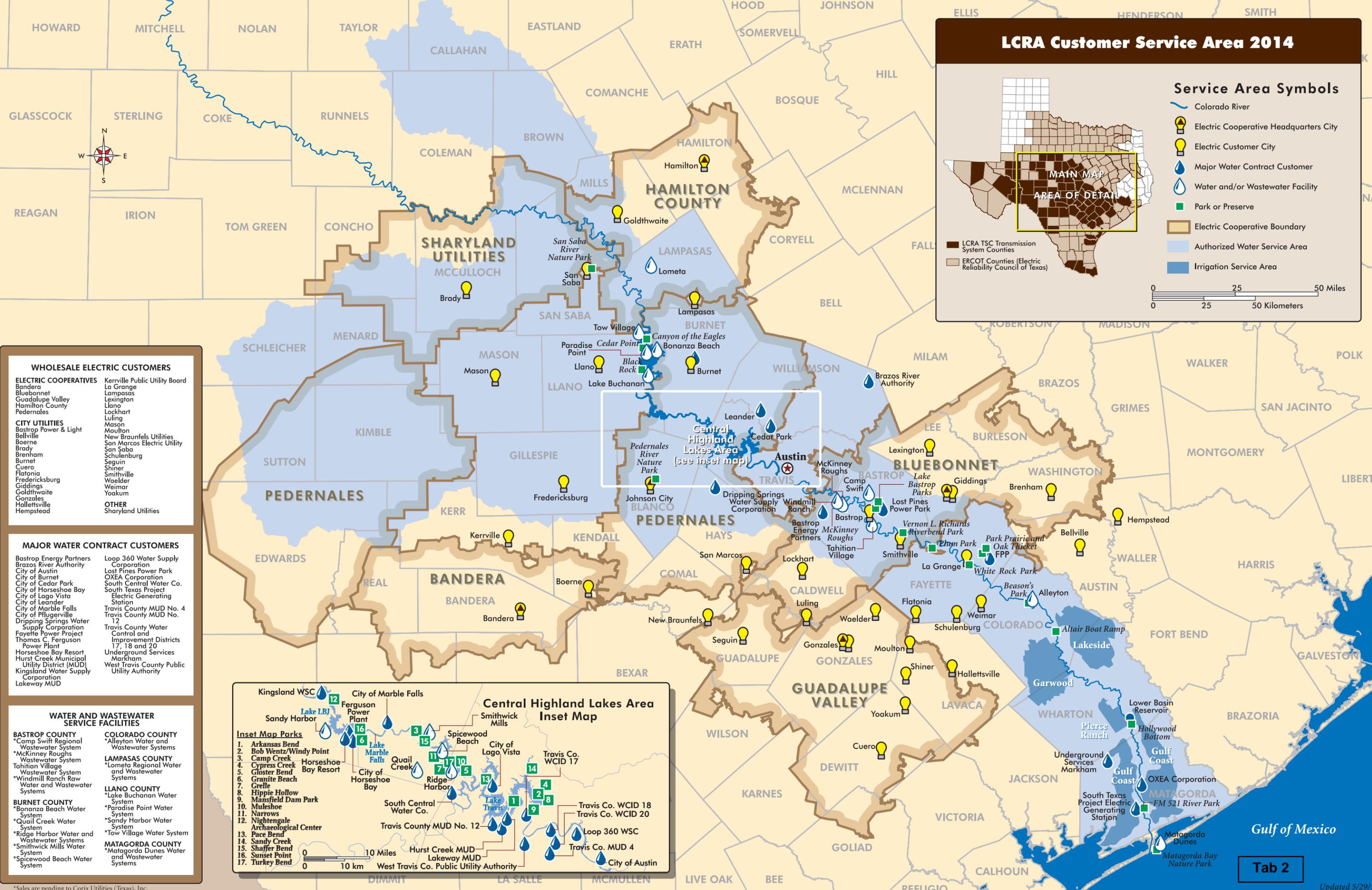
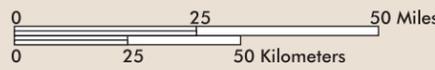
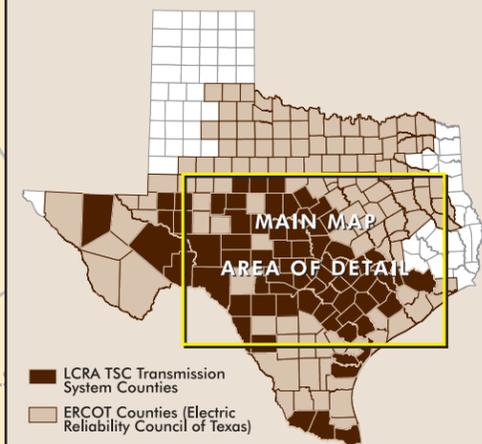
American Society of Civil Engineers – past Director – Texas Section.

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

LCRA Customer Service Area 2014

Service Area Symbols

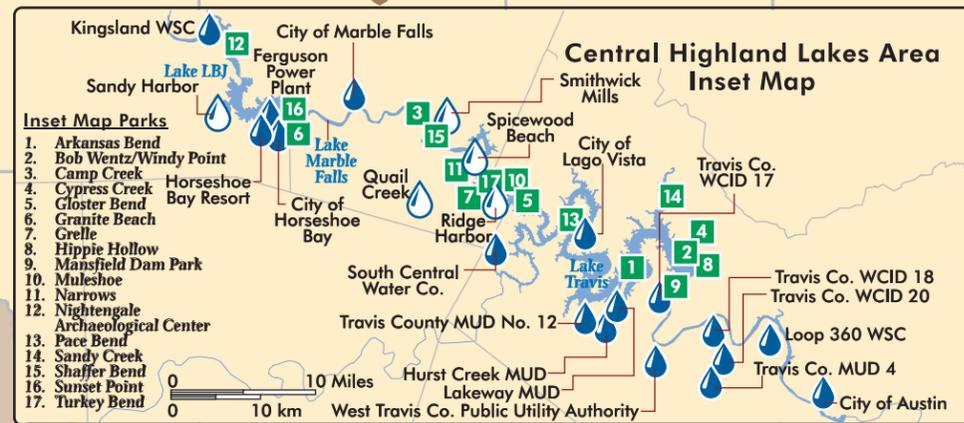
- Colorado River
- Electric Cooperative Headquarters City
- Electric Customer City
- Major Water Contract Customer
- Water and/or Wastewater Facility
- Park or Preserve
- Electric Cooperative Boundary
- Authorized Water Service Area
- Irrigation Service Area



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 Lockhart Luling Brady Brenham Burnet Cuero Flatonina Fredericksburg Giddings Goldthwaite Gonzales Hallettsville Hempstead
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

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	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 a groundwater permit in the Lost Pines Groundwater Conservation District for up to 10,000 AFY to use at LCRA's power facilities in Bastrop County. LCRA is still in the process of installing a number of groundwater wells in order to produce the water.

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 has also learned that some limited supplies of groundwater are currently being delivered to Manor, a small city east of Austin, and that there may be some small amount of additional supply available for use at that point. It is estimated that 6-18 months, minimum, would be required to implement this alternative – not soon enough to eliminate the need for emergency relief.

5. Off-Channel Reservoir. Engineering work is underway on a new reservoir to be built in the lower Colorado River basin. LCRA is moving forward with plans to build the new reservoir to 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 preliminary cost estimate for the reservoir is \$215 million, and it 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.