TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

P.O. Box 13087 MC-160, Austin, Texas 78711-3087
Telephone (512) 239-4691, FAX (512) 239-4770

APPLICATION FOR A TEMPORARY WATER USE PERMIT FOR MORE THAN 10 ACRE-FEET OF WATER, AND/OR FOR A DIVERSION PERIOD LONGER THAN ONE CALENDAR YEAR

This form is for an application for a temporary permit to divert water under Section 11.138, Texas Water Code. Any permit granted from this application may be suspended **at any time** by the applicable TCEQ Office if it is determined that surplus water is no longer available.

Notice: This form will not be processed until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the Delinquent Fee and Penalty Protocol.

1. **Data on Applicant and Project:** Social Security or Federal ID No. **CN 600253637**

   A. Name: **Lower Colorado River Authority (LCRA); Attn: David Wheelock, P.E., Manager, Water Supply and Conservation**

   B. Mailing Address: **P.O. Box 220, L200, Austin, TX 78767**

   C. Telephone Number: **512-730-6822** Fax Number: **512-473-4026** E-mail Address: **david.wheelock@lcra.org**

   D. Applicant owes fees or penalties? ☐ Yes ☑ No

   If yes, provide the amount and the nature of the fee or penalty as well as any identifying number:

   N/A

   E. Describe Use of Water **Temporary emergency authorization to allow LCRA to deviate from the 2010 Water Management Plan as it relates to release of interruptible stored water for the 2015 growing season, as described more fully in LCRA's Brief and Attachments provided with this application.**

   F. Description of Project (TDH Project No. if applicable) **N/A**

   G. Highway Designation No. **N/A** Counties **Llano, Burnet, Travis, Bastrop, Fayette, Colorado, Wharton, and Matagorda**

2. **Type of Diversion (check one):**

   ☑ From Stream ☑ From Reservoir

3. **Rate of Diversion:**

   A. Maximum _____ gpm
   (capacity of pump)

4. **Amount and Source of Water:**

   See Supplemental Brief and Attachments provided with this application.

   _____ acre-feet of water within a period of _____ (specify term period not to exceed a three year term). The water is to be obtained from _____, tributary of _____, tributary of _____, tributary of _____, _____ Basin.

5. **Location of Diversion Point:** Provide Latitude and Longitude in decimal degrees to at least six decimal places, and indicate the method used to calculate the diversion point location.

   At Latitude _____°N, Longitude _____°W, ((at) or (near) the stream crossing of), (at a reservoir in the vicinity of) _____(R-O-W) (Highway), located in Zip Code _____, located _____ miles in a _____ direction from _____ _____ (County Seat), _____ County, and _____ miles in a _____direction from _____ _____, a nearby town shown on County road map. Note: Distance in straight line miles.

   Enclose a USGS 7.5 minute topographic map with the diversion point and/or the return water discharge points labeled. Owner's written consent is required for water used from any private reservoir, or private access to diversion point.

6. **Access to Diversion Point (check one):**

   ____ Public right-of-way
   ____ Private property
   (A letter of permission from landowner is attached)
   ____ Other (Explain)

7. **Fees Enclosed:**

	10 ac-ft or less	greater than 10 ac-ft
Filing	$ 100.00	$ 250.00
Recording.....	$ 1.25	$ 1.25
Use ($1.00 per ac-ft or fraction thereof)	$ _____	$ 500.00
(Note: 1 ac-ft = 325,851 gals. 1 ac-ft = 7758.35 bbls.) Total	$ _____	$ **751.25**

Upon completion of any project for which a temporary water permit is granted, the Permittee is required by law to report the amount of water used. This document must be properly signed and duly notarized before it can by accepted or considered by the Texas Commission on Environmental Quality.

Name (sign) _____ Name (print) Phil Wilson

Subscribed and sworn to me as being true and correct before me this 22nd day of December, 20 14

Notary Public, State of Texas

TABETHA JASKE
Notary Public, State of Texas
My Commission Expires
January 11, 2018

APPLICATION OF THE	**§**	**BEFORE THE**
LOWER COLORADO RIVER	**§**	
AUTHORITY FOR EMERGENCY	**§**	**TEXAS COMMISSION ON**
AUTHORIZATION RELATED TO	**§**	
WATER MANAGEMENT PLAN	**§**	**ENVIRONMENTAL QUALITY**

LOWER COLORADO RIVER AUTHORITY'S BRIEF AND ATTACHMENTS IN SUPPORT OF APPLICATION FOR EMERGENCY AUTHORIZATION RELATED TO WATER MANAGEMENT PLAN UNDER TEXAS WATER CODE §§ 5.501, 11.138 & 11.139 AND THE GOVERNOR'S EMERGENCY DISASTER PROCLAMATION RELATED TO DROUGHT

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AUTHORITY FOR EMERGENCY	**§**	**TEXAS COMMISSION ON**
AUTHORIZATION RELATED TO	**§**	
WATER MANAGEMENT PLAN	**§**	**ENVIRONMENTAL QUALITY**

LOWER COLORADO RIVER AUTHORITY'S BRIEF AND ATTACHMENTS IN SUPPORT OF APPLICATION FOR EMERGENCY AUTHORIZATION RELATED TO WATER MANAGEMENT PLAN

I. Introduction.

The lower Colorado River basin continues to suffer from a prolonged and exceptional drought. After suffering from the worst single year drought in recorded history, the Lower Colorado River Authority (LCRA) has, three years in a row, sought and obtained emergency relief from the Texas Commission on Environmental Quality (TCEQ) related to the LCRA Water Management Plan (WMP), which orders have provided for alternative procedures for the curtailment of interruptible stored water from lakes Buchanan and Travis.[1] Most recently, on August 15, 2014, TCEQ issued a new emergency order for 120 days, continuing LCRA's rights to restrict releases of interruptible stored water for irrigated agriculture in the lower basin through the end of the 2014 irrigation season.[2] Consistent with these Emergency Orders, with the exception of the Garwood division, LCRA has not provided interruptible stored water for agricultural use for the last two years.

Unfortunately, although LCRA has eliminated nearly all releases of interruptible stored water for agriculture for the past three years, the drought continues to plague the upper basin. Notwithstanding some periods with normal rainfall amounts, the lakes have not recovered, and

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[1] Attachment A – TEX. COMM'N ENVTL. QUAL., Docket No. 2014-1044-WR, *Order Affirming an Order Granted by the Executive Director that Grants an Emergency Order Requested by the Lower Colorado River Authority* (August 15, 2014) (herein "August 2014 Emergency Order"); TEX. COMM'N ENVTL. QUAL., Docket No. 2014-0124-WR, *Order Affirming an Order issued by the Executive Director that grants a renewal of the Emergency Order issued to the Lower Colorado River Authority* (June 17, 2014) (herein "2014 Emergency Order Extension"); TEX. COMM'N ENVTL. QUAL., Docket No. 2014-0124-WR, *Order Affirming in Part, and Modifying in Part, the Executive Director's Emergency Order Authorizing the Lower Colorado River Authority to Amend its Water Management Plan* (Feb. 27, 2014) (herein "2014 Emergency Order").

See also TEX. COMM'N ENVTL. QUAL., Docket No. 2013-0225-WR, *Order Granting an Emergency Authorization to the Lower Colorado River Authority* (July 26, 2013) (herein "July 2013 Emergency Order"); TEX. COMM'N ENVTL. QUAL., Docket No. 2013-0225-WR, *Order Affirming, with Modification, an Emergency Order Granted by the Executive Director to the Lower Colorado River Authority* (June 10, 2013) (herein "2013 Emergency Order Extension"); TEX. COMM'N ENVTL. QUAL., Docket No. 2013-0225-WR, *Order Affirming, with Modification, an Emergency Order Granted by the Executive Director to the Lower Colorado River Authority* (Feb. 19, 2013) (herein "2013 Emergency Order"); TEX. COMM'N ENVTL. QUAL., Docket No. 2011-2096-WR, *Order Affirming an Emergency Order Granted by the Executive Director to the Lower Colorado River Authority* (Dec. 12, 2011) (herein "2011 Emergency Order").

[2] *See* Attachment A, August 2014 Emergency Order.

the combined storage in lakes Buahanan and Travis on December 1, 2014 of 691,000 acre-feet is the lowest December 1 level in LCRA's history.

This drought is unprecedented in many respects, particularly with regard to inflows into lakes Buchanan and Travis, the primary water supply for this region. The Governor's Emergency Disaster Proclamation has consistently included the watershed contributing inflows to lakes Buchanan and Travis since July 2011. The reason for this inclusion is clear: annual inflows in 2011 to 2013 were all among the ten lowest on record—and if 2014 inflows follow the year-to-date trend, 2011, 2013 and 2014 will represent the three lowest inflow years on record. As discussed further herein, by many metrics, inflows are significantly lower than inflows in the 1950s Drought of Record.

Without a new emergency order in place before the growing season begins in March 2015, LCRA will once again be obligated under the 2010 Water Management Plan to release substantial amounts of water for irrigated agriculture. With persistent drought conditions, such releases could cause storage levels to fall to 600,000 acre-feet or lower, which would prompt LCRA to declare a Drought Worse than Drought of Record (DWDR). Such a declaration would occur based upon indicator criteria including drought duration, drought intensity, and combined storage levels that suggest the basin may be experiencing a drought worse than the 1950s. At such time, LCRA would immediately cease releases of water for agriculture, thus potentially burning up crops mid-season and wasting water supply that cannot be recaptured, while at the same time imposing mandatory water use reductions of 20% on municipal and industrial customers.

As the Commission has previously recognized, these conditions pose an imminent threat to human health and safety. Accordingly, the LCRA Board has again concluded that it must seek permission to deviate from the 2010 WMP with respect to the supply of interruptible water for agricultural purposes. Because of the persistence of this exceptional drought, the lack of any significant recovery in over three years, and the lack of a clear weather signal pointing to a significant recovery in 2015, LCRA seeks relief to suspend any obligation to release interruptible stored water to LCRA's Gulf Coast and Lakeside agricultural divisions and Pierce Ranch if TCEQ determines that the water supply conditions have not changed substantially by March 1, 2015 as compared to conditions in mid-November 2014. If TCEQ determines that water supply conditions *have* changed substantially, reversion to the 2010 WMP may still present an emergency, warranting an order that sets forth more restrictive conditions under which LCRA may supply some interruptible stored water under more limited circumstances in 2015 than provided by the 2010 WMP. This relief is the most practicable alternative to addressing the emergency conditions faced by the lower Colorado River basin by better ensuring that firm customer demands are not curtailed while the drought continues because of releases of interruptible water for irrigated agriculture.

II. Relief Requested – Overview.

Pursuant to LCRA Board Action,[3] LCRA requests that TCEQ issue a new emergency order suspending LCRA's obligations under the 2010 WMP related to interruptible stored water

[3] Attachment B-2, November 19, 2014 Resolution of the Board of Directors of the Lower Colorado River

for downstream irrigation purposes in 2015. Specifically, LCRA seeks an emergency order pursuant to Texas Water Code § 11.139, and any other applicable law, to allow LCRA to deviate from the 2010 WMP as it pertains to the determination of interruptible supply for 2015. LCRA requests that TCEQ suspend any obligation to release interruptible stored water to LCRA's Gulf Coast and Lakeside agricultural divisions and Pierce Ranch if TCEQ determines that the water supply conditions have not changed substantially as compared to conditions in mid-November 2014. If TCEQ determines that water supply conditions *have* changed substantially, reversion to the 2010 WMP may still present an emergency warranting an order that sets forth more restrictive conditions under which LCRA may supply some interruptible stored water under more limited circumstances in 2015 than provided by the 2010 WMP. This relief is necessary in light of the prolonged and uncertain duration of the ongoing exceptional drought emergency that grips the lower Colorado River basin. Without substantial improvement in the water supply conditions presented by this drought, the water supply for over a million people is at risk of substantial curtailments if the drought continues. LCRA would provide interruptible stored water to the Garwood irrigation division and Pierce Ranch,[4] to the extent required by their contracts.

LCRA requests this relief notwithstanding anything to the contrary in the 2010 WMP. LCRA requests that relief be granted pursuant to Texas Water Code §§ 5.501, 11.138, 11.139 and the Governor's Emergency Disaster Proclamation related to drought. To the extent the Commission deems appropriate, and consistent with the Governor's Proclamation, LCRA requests that procedural requirements associated with this request, or any portion thereof, be waived to expedite the processing of this request.

III. Background: LCRA's Water Management Plan and Drought Contingency Plan.

A. Overview of LCRA's 2010 Water Management Plan.

LCRA holds several water rights, including the water rights for lakes Buchanan and Travis under Certificates of Adjudication 14-5478 and 14-5482 (Attachments C and D), which are further subject to the conditions and criteria set forth in the 2010 WMP (Attachment E). The original Water Management Plan was required by court order[5] and is a condition of LCRA's Certificates of Adjudication 14-5478 and 14-5482.[6] The Certificates of Adjudication and the TCEQ-approved WMP govern LCRA's operation of lakes Buchanan and Travis and dictate how LCRA makes water available from these lakes to help meet "firm" water[7] customer needs,

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Authority Regarding Drought Management Actions in Response to Current Drought Conditions (herein "November 2014 LCRA Board Resolution").

4 LCRA's agreement with Pierce Ranch provides that it is subject to curtailment in accordance with the Water Management Plan, as amended, which would include any emergency order issued by the Commission.

5 *See* Attachment F, Excerpts from *In re The Exceptions of the Lower Colorado River Authority and the City of Austin to the Adjudication of Water Rights in the Lower Colorado River Segment of the Colorado River Basin*, No. 115, 414-A-1 (264th Dist. Ct., Bell County, Tex. April 20, 1988), Lake Buchanan Conclusion of Law 4 and Lake Travis Conclusion of Law 6.

6 *See* Attachment C, Certificate of Adjudication 14-5478 at p. 4 (2.B.(7)); and Attachment D, Certificate of Adjudication 14-5482 at p. 4 (2.B.(7)).

7 Firm water refers to the amount of water that LCRA has determined would be available on a consistent or firm basis through the 1950s Drought of Record water availability analysis after honoring all senior water rights.

downstream interruptible irrigation demands, and environmental flow needs of the lower Colorado River and Matagorda Bay. Certificates of Adjudication 14-5478 and 14-5482 state that "LCRA shall interrupt or curtail the supply of water . . . pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demand for water under such certificate[] pursuant to all firm, uninterruptible water commitments."[8] The TCEQ-approved WMP further describes how LCRA will manage and curtail supplies from the lakes during times of drought including through a repeat of the 1950s Drought of Record.[9] The WMP also sets forth criteria for triggering various drought response measures for customers upon declaration of a Drought Worse than the Drought of Record (DWDR).[10]

As established in the 2010 WMP, the combined firm yield of lakes Buchanan and Travis, while honoring downstream senior water rights, is 535,812 acre-feet per year (AFY). Of this amount, 90,546 AFY is committed to O.H. Ivie Reservoir, making 445,266 AFY of firm water supply available from lakes Buchanan and Travis for LCRA to help meet the firm water needs of its customers.[11] Until firm demand for water from lakes Buchanan and Travis equals the combined firm yield, LCRA can supply stored water from these lakes for irrigated agriculture on an interruptible basis.[12] The maximum historical annual amount of reported firm water use by LCRA customers from the firm supplies of lakes Buchanan and Travis during 2000 through 2013 was about 247,000 acre-feet in 2011. In addition, about 33,000 acre-feet of water was supplied in 2011 to help meet environmental flow needs. The maximum amount of interruptible water released from lakes Buchanan and Travis during this same period occurred in 2011 and totaled about 433,000 acre-feet. The maximum total amount released or used from the Highland Lakes, about 714,000 acre-feet, occurred in 2011. In 2012, firm water use from lakes Buchanan and Travis by LCRA customers was about 148,000 acre-feet; about 31,000 acre-feet was supplied to help meet environmental flow needs; and about 9,000 acre-feet of interruptible water was supplied to farmers in the Garwood irrigation division. Total use of water from lakes Buchanan and Travis in 2012 was about 188,000 acre-feet. In 2013, firm water use from lakes Buchanan and Travis by LCRA customers was about 173,000 acre-feet; about 33,000 acre-feet was supplied to help meet environmental flow needs; and about 22,000 acre-feet of interruptible water was supplied for farmers in the Garwood irrigation division. Total use of water from lakes Buchanan and Travis in 2013 was about 229,000 acre-feet. Use of water in 2014 is expected to

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8 *See* Attachment C, Certificate of Adjudication 14-5478 at p. 4 (2.B.(7)); and Attachment D, Certificate of Adjudication 14-5482 at p. 4 (2.B.(7)).

9 Drought of Record refers to the worst hydrologic drought that has occurred since detailed records have been kept. This drought for the lower Colorado River basin is the drought that occurred from 1947-1957. The WMP states that the Drought of Record occurred between 1947 and 1956. The reservoirs, however, did not recover until mid-1957. See Attachment E – 2010 WMP at p. 4-19.

10 Attachment E – 2010 WMP at 4-34. The WMP criteria for declaring a DWDR are indicator criteria that can be evaluated in real time to assess whether an ongoing drought might be worse than the 1950s Drought of Record. One of these criteria – combined storage – is also affected by demands. Therefore, it is possible that a drought may actually be worse than the Drought of Record *even if* storage content is held above the triggering criteria through the implementation of demand management strategies.

11 Attachment E – 2010 WMP at 5-31.

12 *See* Attachment F, Excerpts from *In re The Exceptions of the Lower Colorado River Authority and the City of Austin to the Adjudication of Water Rights in the Lower Colorado River Segment of the Colorado River Basin*, No. 115, 414-A-1 (264th Dist. Ct., Bell County, Tex. April 20, 1988), Finding of Fact No. 19(e) (Lake Buchanan) and Finding of Fact No. 26(e) (Lake Travis).

be similar to 2012 and 2013 with the exception of a reduction in the amount of water supplied to help meet environmental flow needs. *See* Affidavit of Ryan Rowney (Attachment G).

To manage the supply, the 2010 WMP imposes several trigger points keyed to the total combined storage capacity of lakes Buchanan and Travis that are intended to ensure that reasonable firm water demands can be met during droughts.[13] For purposes of this application, the most relevant trigger points are set out in Table 1.

Table 1. 2010 WMP Triggers

Combined Storage of lakes Buchanan and Travis	Date on Which Trigger is Decided	Action Taken
1.4 MAF	At any time	Request firm customers to implement voluntary drought response measures.[14]
1.4 MAF	On Jan. 1	Begin gradual curtailment of interruptible supply to four major irrigation operations. Environmental releases for instream flows reduced to meet critical needs for ecosystems for following year.[15]
900,000 acre-feet	At any time	Request firm customers to implement mandatory water restrictions; develop firm customer curtailment plan.[16]
600,000 acre-feet	At any time	If criteria indicate a drought worse than the Drought of Record, then cease interruptible supply and begin mandatory pro rata curtailment of firm supply.[17]

The 2010 WMP also includes conditions under which the LCRA Board of Directors may declare a Drought Worse than the Drought of Record (DWDR).[18] To declare a DWDR, the Board must find that the following three conditions are simultaneously met:

1. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both lakes Buchanan and Travis were last full;[19]

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[13] Attachment E – 2010 WMP at 4-5.

[14] *Id.* at 4-32.

[15] Attachment E – 2010 WMP at 4-32; 2010 WMP Order at FOF 9, 10 and 11.

[16] Attachment E – 2010 WMP at 4-32.

[17] *Id.*

[18] As noted above, these criteria are real-time indicators that a drought *might* be worse than the 1950s Drought of Record. It is possible that although the criteria are all met, once the full hydrologic dataset is evaluated, the drought might not be worse than the 1950s Drought of Record. Conversely, in a drought that is later shown to hydrologically be worse than the 1950s Drought of Record, because of demand management during the drought, the combined storage might remain above 600,000 acre-feet, such that all three criteria for the declaration of DWDR are not satisfied.

[19] *Id.* at 4-34. For purposes of the WMP, the duration of a drought is the time period since both lakes Buchanan and Travis were at their maximum allowable water conservation storage levels.

2. Inflows to the lakes are less than inflows during the Drought of Record;[20] and
3. Combined storage of lakes Buchanan and Travis is less than 600,000 acre-feet of water.[21]

Under the 2010 WMP, once a drought has lasted more than 36 months and a DWDR has been declared, interruptible stored water must be fully and immediately curtailed – making no stored water available for agricultural irrigation or other interruptible uses until lake levels recover or the inflows into the lakes increase substantially.[22] Moreover, LCRA will implement pro rata curtailment of its firm water users once a DWDR is declared and after interruptible stored water (agriculture) uses have been cut off.[23]

Prior to a declaration of a DWDR, however, LCRA is obligated by the 2010 WMP to provide at least some interruptible water to its four major irrigation operations. Under the 2010 WMP, the LCRA Board is to make a preliminary determination in November based on projections of storage on January 1 of the upcoming year.[24] Using January 1 storage, the amounts available under the 2010 WMP follow a sliding scale.[25] Thus, the decision regarding curtailment of interruptible supplies to the four major irrigation operations during the entire year is keyed to the January 1 storage levels.[26] The 2010 WMP includes a relatively shallow slope of how much stored water would be available for diversion by the four downstream irrigation operations: if combined storage is 1,150,000 acre-feet, the 2010 WMP provides 195,000 acre-feet for diversion, and if storage was just over 600,000 acre-feet, the plan would provide about 172,000 acre-feet for diversion.[27] (*See* Figure 1, Curtailment Curve from 2010 WMP.) Total curtailment of interruptible water does not occur until a declaration of a DWDR.

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[20] The cumulative inflow deficit since the beginning of the drought must exceed the envelope curve for cumulative inflow deficits by at least 5 percent for six consecutive months. Attachment E – 2010 WMP at 4-34.

[21] *Id*. at 4-34.

[22] *Id*. at 4-34.

[23] *Id*.

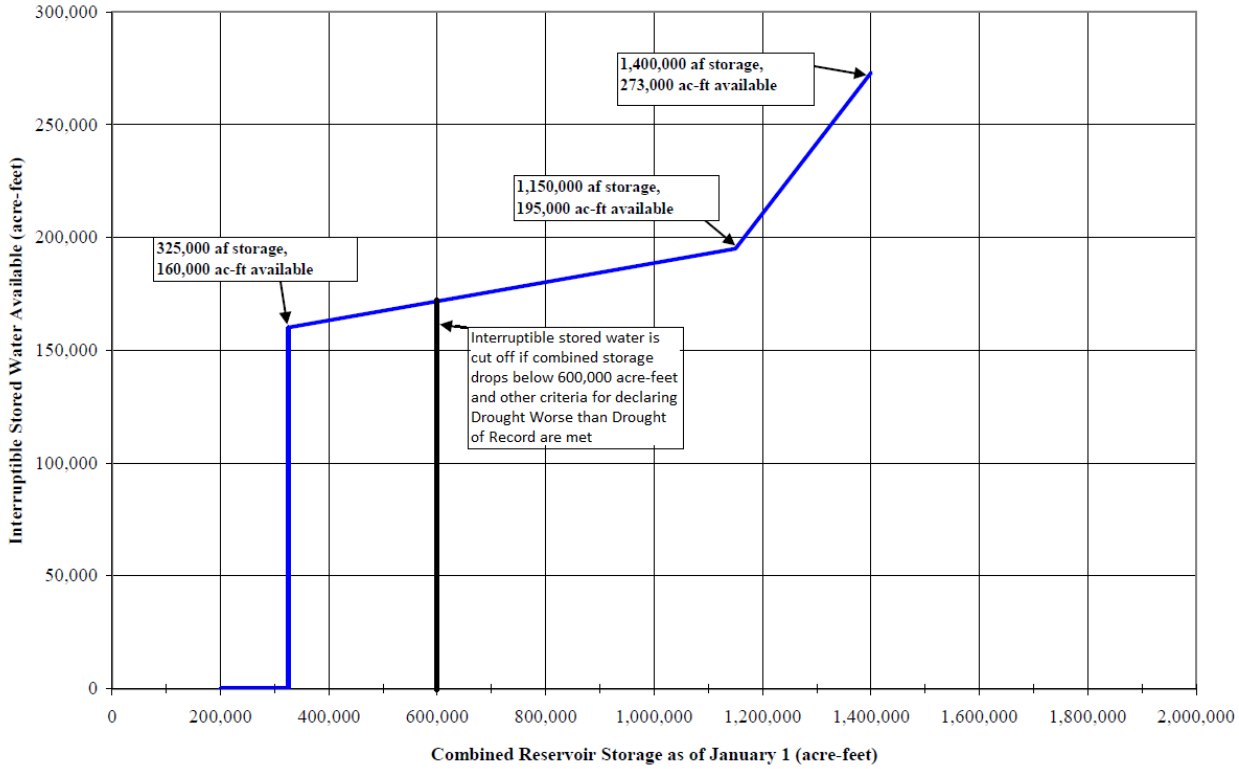
[24] *Id*. at 3-7 and 4-21.

[25] *Id*. at 4-24.

[26] *Id*. at 3-7 and 4-21.

[27] *Id*. at 4-24 and 4-26.

Figure 1. Interruptible Stored Water Available for Diversion by the Four Downstream Irrigation Operations under the 2010 WMP



B. Overview of LCRA's Drought Contingency Plan and relationship to the Water Management Plan.

Prior to adoption of state law in 1997 and TCEQ's subsequent adoption of the Chapter 288 rules in 1999 that require all major water rights holders to develop and implement a drought contingency plan (DCP), LCRA already had a "Drought Management Plan" for managing its water supplies in lakes Buchanan and Travis through a repeat of the 1950s Drought of Record. The "Drought Management Plan" was incorporated in the WMP and when TCEQ adopted its rules for DCPs, LCRA adopted separate stand-alone DCPs for its irrigation, municipal and industrial operations that more specifically addressed the requirements of the Chapter 288 rules. Then, although the DCP addressed things not specifically required of the original court or TCEQ orders on the WMP, LCRA incorporated the DCPs into Chapter 4 of the 2010 WMP, largely for customer ease of reference. LCRA was originally required to develop the Drought Management Plan as a direct result of the court order adjudicating LCRA's water rights and the Texas Water Commission's 1989 WMP Order, giving initial approval to LCRA of an earlier version of the plan. Specifically, the Commission ordered LCRA to submit a drought management plan to the Commission for its review and approval, which was filed with the Texas Water Commission on October 19, 1990.[28] The Drought Management Plan is subject to the continuing supervision of the TCEQ and LCRA is required to provide an annual report documenting compliance with the approved plan and any special conditions.[29]

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[28] Attachment E – 1989 WMP Order, Ordering Provision 1.g.; 1990 WMP Order FOF 4.

[29] Attachment E – 1990 WMP Order, Ordering Provision 1.b., 1.e.

When LCRA was required under TCEQ's Chapter 288 rules to develop and implement a DCP, LCRA simply incorporated all of the same triggers and criteria from the approved WMP into its DCP, and elaborated on the details of how pro rata curtailment of interruptible customers might occur to comply with the additional requirements of TCEQ's Chapter 288 rules. The Drought Management Plan included elements that go beyond what is required of a DCP, particularly the allocation of supply between firm and interruptible customers. Because the curtailment provisions of the DCP related to interruptible supplies are one of the most fundamental principles underlying the WMP, LCRA cannot unilaterally alter through changes to the DCP that which it cannot alter under the WMP without TCEQ's permission. LCRA's current WMP incorporates the Chapter 288-required DCP in Chapter 4. However, TCEQ has recognized that LCRA *can* and, indeed, LCRA has modified other elements of its DCP that do not affect the allocation of supply between firm and interruptible customers, such as the water use reduction goals for firm water use.[30]

The water use reduction targets in LCRA's DCP for firm water supplies comply with TCEQ's DCP rules adopted in 2004. These include:

- water use reduction goals for firm water supply customers of 5 percent by asking customers to implement their voluntary water use reduction measures when the combined storage of lakes Buchanan and Travis is less than 1.4 million acre-feet;
- a 10 to 20 percent reduction goal by asking firm customers to implement their own mandatory water use reduction measures when combined storage levels fall below 900,000 acre-feet; and
- pursuant to Texas Water Code § 11.039, a mandatory pro rata curtailment of firm water supplies for customers of 20 percent or more will be implemented when combined storage levels fall below 600,000 acre-feet and other criteria in the WMP are met that correspond to a drought more severe than the Drought of Record.

In April 2007, LCRA adopted changes to LCRA's raw water contract rules to improve implementation of LCRA's DCP. These included:

- clarifying how LCRA will, in accordance with Texas Water Code § 11.039, impose a pro rata curtailment during an emergency shortage of firm water as a result of a drought, accident, or other cause;
- providing that a customer must pay a surcharge to be set by the LCRA Board for the unauthorized use of water, if the customer takes more water than authorized under a mandated curtailment of firm water supplies; and
- clarifying the drought contingency requirements related to golf course irrigation and recreational use.

[30] Attachment E – 2010 WMP Order, Ordering Provision 1.g.

In June 2010, LCRA adopted additional changes to LCRA's raw water contract rules that include the procedures for implementing a pro rata curtailment of firm water customers.[31] The 2010 WMP includes a requirement that LCRA develop a stored water curtailment plan to be approved by the LCRA Board and TCEQ in response to combined storage dropping below 900,000 acre-feet.[32] TCEQ approved LCRA's water curtailment plan for its firm customers in December 2011.[33] Under this curtailment plan and LCRA's DCP, in the event that combined storage drops below 600,000 acre-feet and a DWDR is declared, firm customers will be subject to an initial 20 percent mandatory reduction in use as compared to a recent baseline demand.

In response to the ongoing drought conditions, the LCRA Board has amended the firm customer drought contingency plan to require that, if combined storage on March 1, 2014 was below 1.1 million acre-feet and interruptible stored water supply to the Gulf Coast, Lakeside and Pierce Ranch irrigation operations was cut off, LCRA's customers would be required to implement a landscape irrigation watering schedule of no more than once per week.[34] The Board reaffirmed this action in November 2014.[35] The criteria for this restriction to take effect have been met and the restriction will be in effect until storage increases to above 1.1 million acre-feet or the supply of interruptible stored water to the Gulf Coast, Lakeside and Pierce Ranch irrigation operations resumes. LCRA has also adopted measures that would take effect in the event that combined storage falls below 600,000 acre-feet and is preparing for possible further declines in storage. *See* Affidavit of Nora Mullarkey Miller (Attachment I).

IV. There is an Emergency.

LCRA requests the Commission to promptly act on its request to address the exceptional drought that has persisted in the areas that contribute inflows to lakes Buchanan and Travis and preserve water to meet the essential needs of LCRA's municipal and industrial customers if the drought continues. As discussed below, this drought is unprecedented in many respects, particularly with regard to inflows into the primary water supply for this region, lakes Buchanan and Travis. At times, this drought has been more intense than the region's Drought of Record that occurred between 1947 and 1957. The Governor on December 22, 2014, re-issued his Emergency Disaster Proclamation regarding drought for many areas of the state, including nearly all the counties in the lower Colorado River basin that border on and contribute inflows into lakes Buchanan and Travis.[36] The Governor's declaration recognizes that "significantly low rainfall has resulted in declining reservoir and aquifer levels, threatening water supplies and delivery systems in many parts of the state" and that the "drought conditions have reached

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31 *See* LCRA Water Contract Rules, Article 11, Pro Rata Curtailment of Water Use by Firm Water Customers, *available at*: http://lcra.org/water/water-supply/water-supply-contracts/ (last visited Dec. 18, 2014).

32 Attachment E – 2010 WMP at 4-32 & 2010 WMP Order, Ordering Provision No. 1(g).

33 Attachment H, TEX. COMM'N ENVTL. QUAL., Docket No. 2011-2097-WR, *Order Approving the Lower Colorado River Authority's Water Curtailment Plan for its Firm Water Customers* (Dec. 12, 2011).

34 *See* Attachment B-1, November 2013 LCRA Board Resolution.

35 *See* Attachment B-2, November 2014 LCRA Board Resolution.

36 Attachment J, *available at*: http://www.tceq.texas.gov/assets/public/response/drought/proclamation.pdf (last visited Dec. 22, 2014). Counties included in the Governor's declaration that contribute flows into or contain LCRA's Highland lakes include: Burnet, Edwards, Gillespie, Kendall, Kerr, Llano, Real, and Travis.

historic levels and continue to pose an imminent threat to public health, property, and the economy."[37]

A. The lakes have not recovered, despite the emergency orders in place in 2012, 2013 and 2014.

1. Record-low inflows into lakes Buchanan and Travis have continued.

By almost every measure, the inflows to the Highland Lakes are at record lows. At times, the deficit has been as much as 90% more than the inflow deficit for a similar period of inflows experienced during the historic Drought of Record for the lower Colorado River basin, which occurred from 1947 to 1957. Affidavit of Ron Anderson (Attachment K, Tab 2).

Annual inflows into lakes Buchanan and Travis in five of the last six years are among the ten lowest years of inflow on record as shown in Table 2. By contrast, only one year during the historic 1950s Drought of Record makes the list of ten lowest annual inflows. Inflows in 2011 were the lowest on record; inflows in 2012 were the sixth lowest on record; inflows in 2013 were the second lowest; and inflows in 2014 are on pace to be among the three lowest on record. *See* Affidavit of Ryan Rowney (Attachment G).

Table 2. Lowest Annual Inflows into the Highland Lakes (acre-feet)

Year	Amount
2014 Jan-Nov	197,339
2011	127,802
2013	215,138
2008	284,462
2006	285,229
1963	392,589
2012	393,163
1983	433,312
1999	448,162
2009	499,732
1950	501,926
Average (1942-2012)	1.23 million

Inflows into lakes Buchanan and Travis during the current drought have been the lowest for time periods ranging from 12 months up to 84 months, and are significantly lower for periods of similar duration during the historic Drought of Record. *See* Table 3. In fact, the total inflows for the past 84 months were only about half of the lowest 72-month inflow period in the Drought of Record. Affidavit of Ryan Rowney (Attachment G).

[37] *Id.*

Table 3. Comparison of inflows in current drought to Drought of Record

	Lowest inflows for time period in ongoing drought		Lowest inflows for time period in 1950s Drought of Record	
Time Period	Period ending	Inflows (acre-feet)	Period ending	Inflows (acre-feet)
12 months	Sept. 2011	120,160	Apr. 1951	408,784
24 months	May 2014	393,337	Mar. 1952	1,006,681
36 months	Sept. 2013	695,920	Aug. 1952	1,636,088
48 months	Oct. 2014	940,789	Aug. 1952	3,035,846
60 months	Nov. 2014	1,952,879	Aug. 1952	4,128,806
72 months	Apr. 2014	2,374,126	Apr. 1955	5,193,016
84 months	Nov. 2014	2,738,953	Aug. 1952	6,050,804

When inflows are adjusted to account for the fact that O.H. Ivie Reservoir was not in place in the 1950s, the comparison of the current drought to the Drought of Record still shows the recent inflows are dramatically lower than the 1950s Drought of Record, with inflows since 2008 at about half of the inflows for the first six years of the Drought of Record. *See* Affidavit of Ron Anderson (Attachment K, Tab 3).

2. High temperatures and sporadic rainfall have contributed to the low inflows and low lake levels.

In addition to the record-low inflow conditions affecting lakes Buchanan and Travis noted above, drought conditions have been recognized throughout the state in the form of rainfall and extreme heat. Year 2011 was recognized by Texas State Climatologist, Dr. John Nielsen-Gammon, as the worst one-year statewide drought on record. The summer of 2011 was the hottest on record in Texas. Year 2011 was the hottest on record for Austin, and the second hottest statewide. Year 2012 tied with 1921 as the hottest on record statewide. Summer temperatures for Austin in 2013 were the 5th hottest on record. Although summer 2014 was not as extreme in Austin, it was still above normal, ranking the 34th warmest since 1895. *See* Affidavit of Bob Rose (Attachment L).

Since 2011, there have been some periods with closer to normal rainfall totals, but the rainfall has generally been sporadic, often with several weeks between significant rain events. Rain events in the contributing watershed of lakes Buchanan and Travis 2014 failed to provide the type of inflows needed for the lake levels to improve. For example, a rain event in early November 2014 included rain totals averaging two to three inches above the Highland Lakes but produced only about 4,000 acre-feet of inflow to the lakes; another event later in November with rain totals averaging one to three inches yielded about 17,000 acre-feet of inflow. *See* Affidavit of Bob Rose (Attachment L); Affidavit of Ryan Rowney (Attachment G). While these events lacked prolonged, heavy rainfall intensity, the limited amount of inflows are indicative of the severity of the ongoing drought and the dry soil conditions that have yet to be overcome. By comparison, an event in March 2007 with similar rainfall totals (but more intensity) produced

almost 100,000 acre-feet of inflows to lakes Buchanan and Travis. *See* Affidavit of Bob Rose (Attachment L); Affidavit of Ryan Rowney (Attachment G). Similar rain events in 2013 were equally as unproductive from a water supply standpoint. *See* Affidavit of Ryan Rowney (Attachment G).

The drought conditions have created a circumstance where the lakes have been unable to recover in any significant manner, even with an emergency cutoff of nearly all water supply for downstream irrigation in 2012, 2013 and 2014, as well as the emergency relief for Blue Sucker in the Spring of 2014. As noted above, by many measures, the recent low inflows are already as bad as or worse than the 1950s.

3. Recent forecasts lack clear signs pointing to significant recovery.

As of December 2014, the sea surface temperatures in the tropical Pacific were above the threshold for El Niño. An El Niño condition has not been declared because the ocean has yet to fully couple with and influence the atmosphere. However, forecasters do expect El Niño to develop this winter and persist into early spring. For that period, a pattern of above normal rainfall is expected in Cental and South Texas. *See* Affidavit of Bob Rose (Attachment L). But beyond that period, the forecast is uncertain. *See* Affidavit of Bob Rose (Attachment L). And even if normal to above normal rainfall materializes in the near term, the likelihood of significant drought improvement is slight. *See* Affidavit of Ron Anderson (Attachment K).

B. Following the 2010 Water Management Plan creates the potential of losing water that should be preserved for later use if the drought persists.

Unless an unexpected change in the weather occurs that contributes significant water to storage in lakes Buchanan and Travis, following the 2010 WMP will almost certainly require LCRA to:

1. Make a substantial quantity of stored water available for interruptible use and enter into contracts for interruptible water, based on January 1, 2015 combined storage;
2. Begin releases of interruptible stored water to meet demands in the four irrigation operations for the 2015 crop;
3. Suffer a significant likelihood of reaching the third (and final) criteria for Drought Worse than Drought of Record (DWDR) conditions;
4. Declare a DWDR;
5. Cut off stored water for interruptible contracts, jeopardizing the crop already planted and potentially wasting the water already released and diverted; and
6. Curtail cities' and industries' water use by 20% or more.

This approach is unacceptable.

The 2010 WMP requires that firm customers (mainly cities and industries) be curtailed on a pro rata basis and that LCRA cease all releases for interruptible stored water (*regardless* of the

impact on the crops) when a DWDR is declared.[38] As discussed above, to declare a DWDR under the WMP, the Board must find that the following three criteria indicating conditions may be worse that the 1950s Drought of Record are simultaneously met:

1. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both lakes Buchanan and Travis were last full;[39]
2. Inflows to the lakes are less than inflows during the Drought of Record;[40] and
3. Combined storage of lakes Buchanan and Travis is less than 600,000 acre-feet of water.[41]

The first criterion has been met. The drought has lasted more than 24 months. In fact, despite significant rains in 2007 and 2010, the last time that both lakes Buchanan and Travis were simultaneously at their maximum allowable water conservation storage levels was February 13, 2005. *See* Affidavit of Ryan Rowney (Attachment G). In addition, the cumulative inflow deficit criteria has been met. *See* Affidavit of Ron Anderson (Attachment K). Despite the emergency relief implemented in 2012, 2013 and 2014, the combined storage in the lakes has failed to substantially recover. In fact, combined storage fell from a high of 1,032,000 acre-feet (51 percent full) on May 22, 2012 to a low of 637,000 acre-feet (31 percent full) on September 19, 2013. The combined storage in lakes Buchanan and Travis was about 691,000 acre-feet on December 1, 2014, or about 34 percent full. Affidavit of Ryan Rowney (Attachment G).

Following the 2010 WMP creates an unacceptable risk that a DWDR will be declared during 2015, possibly during the growing season. The 2010 WMP employs a "curtailment curve" that determines the amount of interruptible stored water to be made available based on the combined storage in lakes Buchanan and Travis on January 1 of any year. However, as explained above, interruptible stored water can be completely curtailed at any time during the irrigation season if the combined storage of lakes Buchanan and Travis drops to 600,000 acre-feet. For a January 1, 2015 combined storage in the range of current conditions (about 690,000 acre-feet), the 2010 WMP requires LCRA to make available around about 175,000 acre-feet for diversion for interruptible irrigation use in the lower basin for the 2015 crop year.[42] *See* Affidavit of David Wheelock (Attachment M). To account for delivery losses, this equates to as much as about 210,000 acre-feet in releases from lakes Buchanan and Travis. *See* Affidavit of Ryan Rowney (Attachment G).

Including the amount of water needed for firm water users and evaporation, it is easy to reach the conclusion that the combined storage could easily drop to 600,000 acre-feet well before irrigators could finish their crop in mid to late August. In fact, based on the most recent lake levels

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38 Attachment E – 2010 WMP at 4-32.

39 Attachment E – 2010 WMP at 4-34. For purposes of the WMP, the duration of a drought is the time period since both lakes Buchanan and Travis were at their maximum allowable water conservation storage levels.

40 The cumulative inflow deficit since the beginning of the drought must exceed the envelope curve for cumulative inflow deficits by at least 5 percent for six consecutive months. Attachment E – 2010 WMP at 4-34.

41 Attachment E – 2010 WMP at 4-34.

42 Attachment E – 2010 WMP at 4-24 & 4-26.

and forecast, there is a chance of reaching conditions triggering a declaration of Drought Worse than Drought of Record as soon as March 2015 and nearly a one in three chance by July 2015. *See* Affidavit of Ron Anderson (Attachment K, Tab 5). At that point, all interruptible stored water would be cutoff, potentially jeopardizing any crops that were not yet harvested, and firm customers would be subject to a 20 percent reduction in supply. Furthermore, any water previously released would no longer be in storage to help meet the needs of LCRA's firm customers through a prolonged drought.

Deviating from the 2010 WMP as requested by LCRA in this application, provides LCRA with the only opportunity to take meaningful action to preserve (and hopefully recover) the water supply, and avoid the potential of wasting water. *See* Affidavit of Ron Anderson (Attachment K); Affidavit of David Wheelock (Attachment M).

LCRA seeks emergency relief similar to that provided under the February 2014 TCEQ Emergency Order wherein the TCEQ determined that the conditions at that time warranted a suspension of most releases of interruptible stored water. Similar to that order, LCRA requests the Commission to evaluate the water supply conditions at the time it issues any order responding to this request. This includes an evaluation of not only combined storage conditions of lakes Travis and Buchanan, but also the inflows, weather conditions and forecast, water demands, and any other factor the Commission deems relevant and appropriate at the time.

Although storage is not the only factor to consider, LCRA has developed analyses in support of its application indicating that, as of December 2014, it is very unlikely that combined storage of lakes Buchanan and Travis will recover to a level that would eliminate the need for some sort of emergency order. Table 4 presents the likelihood of the combined storage being at or above various levels as of March 1, 2015. For example, there is only a 12 percent change of storage increasing above 1.0 million acre-feet by March 1, 2015. *See* Affidavit of Ron Anderson (Attachment K).

Table 4. Likelihood of combined storage in Lakes Buchanan and Travis being at or above varius storage levels on March 1, 2015.

Combined storage level	Likelihood of being at or above the specified storage level on March 1, 2015
1.0 million acre-feet	12%
1.1 million acre-feet	7%
1.2 million acre-feet	5%
1.3 million acre-feet	4%
1.4 million acre-feet	3%
1.5 million acre-feet	3%

Moreover, to support the Commission in its assessment of this request, LCRA has evaluated the impacts of reverting to the 2010 WMP under various combined storage levels by March 1, 2015. Table 5 below provides information regarding the likelihood that combined

storage could fall to 600,000 acre-feet within the next six to 18 months. *See* Affidavit of Ron Anderson (Attachment K).

Table 5. Likelihood of combined storage in lakes Buchanan and Travis falling below 600,000 acre-feet for various March 1, 2015 storage levels.

Combined storage level on March 1, 2015	Likelihood of storage falling to 600,000 AF by the end of 2015	Date of reaching 600,000 AF following 99% exceedance trace
1.0 million acre-feet	4%	September 2015
1.1 million acre-feet	>1%	November 2015
1.2 million acre-feet	<1%	May 2016
1.3 million acre-feet	0%	June 2016
1.4 million acre-feet	0%	July 2016
1.5 million acre-feet	0%	August 2016

V. The Emergency Conditions Present an Imminent Threat to the Public Health and Safety.

LCRA provides raw water out of the combined firm yield of lakes Buchanan and Travis to over 60 retail and wholesale potable water suppliers that together serve over one million people. LCRA's municipal raw water customers include, but are not limited to, the Cities of Austin, Cedar Park, Leander, Burnet, 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 electricity 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, including Oxea Chemical and Underground Services Markham. *See* Affidavit of David Wheelock (Attachment M).

As discussed above, if LCRA follows the 2010 WMP, LCRA would be obligated to release significant quantities of water from lakes Buchanan and Travis for interruptible agriculture next spring with a significant risk of reaching a combined storage of 600,000 acre-feet in lakes Buchanan and Travis during agricultural users' first crop of rice, which is the predominant crop grown by LCRA irrigation customers. *See* Affidavit of Ron Anderson (Attachment K). This would prompt LCRA to make a declaration of DWDR in the middle of the first crop and all releases of interruptible stored water would cease. Curtailment of the interruptible stored water supply in the middle of the growing season could cause the farmers to lose their crops and the investment made to grow the crops. *See* Affidavit of Ryan Rowney (Attachment G). At that point, such releases would also amount to an irreversible reduction of the water supply available for firm customers.

The conditions are similar or worse than conditions in place when TCEQ issued its earlier orders for the 2012, 2013 and 2014 seasons. In fact, the December 1, 2014 combined storage level of about 691,000 acre-feet is the lowest recorded storage on that date since the lakes were built – and lower than on December 1 of the past three years. *See* Affidavit of Ryan Rowney (Attachment G). The conditions once again support the conclusion that following the 2010 WMP under these conditions poses an imminent threat to firm customers served by LCRA.[43] As the drought has continued, LCRA and its firm customers are actively exploring ways to acquire or develop alternative water supplies to meet essential needs of their respective potable water systems. However, it takes many years to develop significant additional new water supplies. As the Commission recognized prior emergency orders, the sheer length of time that it takes to develop or conserve significant quantities of water supply mean that a water supply emergency arises well before a reservoir goes dry.[44] Releasing interruptible stored water based on the 2010 WMP further increases the amount of water for essential needs that will need to be acquired elsewhere should the drought continue. For the most part, although LCRA's firm customers are working on plans to implement curtailment and secure alternate supplies (such as local groundwater), most have not secured any readily available sources of water supply that could substitute for their reliance on the Colorado River. *See* Affidavit of Ryan Rowney (Attachment G); Affidavit of David Wheelock (Attachment M).

Moreover, as the lake levels drop, it becomes more difficult and expensive for the retail water suppliers to pump water from lakes Buchanan and Travis. LCRA has over 15 customers that actively take raw water for municipal purposes from Lake Travis. The lowest pumping elevations of the intakes range from about 545 feet mean sea level (msl) to 645 feet msl on Lake Travis. If the levels in Lake Travis or Lake Buchanan drop below the current lowest pumping elevations, LCRA and its wholesale raw water customers must take action to either lower their pumping elevation or find alternative supplies. For smaller systems, the alternative is likely hauling water from a water utility with a viable source. For larger systems, temporary measures must be implemented to extend the intake capabilities to reach lower elevation water. Similar measures would likely be needed by LCRA's raw water customers that have their own intake facilities. Firm customers have indicated that they are actively spending or planning to spend funds to allow their intakes to operate at lower elevations or making plans to haul water. *See* Affidavit of Ryan Rowney (Attachment G). Overall, over 40 public water systems that rely on the Highland Lakes or that draw from the tributaries that typically contribute significant inflow to the Highland Lakes are already in some form of drought restriction and are at risk of water supply shortages.[45] If the lake levels drop more quickly than arrangements for alternative intakes

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[43] Attachment A - August 2014 Emergency Order, Finding of Fact Nos. 14-16, 20, 24-29, 32, 34-35, Conclusion of Law No. 2; 2014 Emergency Order Extension, Finding of Fact No. 3, 12, Conclusion of Law No. 4; 2014 Emergency Order, Finding of Fact Nos. 18-25, 28, 30, 31, 33-36, 45, 60, 61, Conclusion of Law 4; *see also* 2013 Emergency Order, Finding of Fact Nos. 18, 20, 22, 26, 27, 31-33, Conclusion of Law 2; 2013 Emergency Order Extension, Finding of Fact Nos. 9, 10, 16, 17, Conclusion of Law 4; July 2013 Emergency Order, Finding of Fact Nos. 21, 23, 26, 28, Conclusion of Law 2; 2011 Emergency Order, Finding of Fact Nos. 20, 21, 25, 30, 31, Conclusion of Law 2.

[44] Attachment A - August 2014 Emergency Order, Findings of Fact Nos. 32, 34; 2014 Emergency Order, Finding of Fact Nos. 45, 60, 61; *see also* 2013 Emergency Order, Findings of Fact Nos. 32-33; 2013 Emergency Order Extension, Finding of Fact No. 16; July 2013 Emergency Order, Finding of Fact No. 28; 2011 Emergency Order, Findings of Fact Nos. 30-31.

[45] *See* Tex. Comm'n Envtl. Qual., *List of Texas PWSs Limiting Water Use to Avoid Shortages* at:

or supplies can be implemented, the current drought presents an imminent threat to public health and safety for the water systems of those customers.

VI. The Threat to Public Health and Safety Override the Necessity to Comply with the Established Statutory Procedures.

Once again, allowing LCRA the flexibility to deviate from the requirements of the 2010 WMP, as requested by this application, provides LCRA with one of the very few opportunities it has to make a substantial difference in the amount of water available in the combined storage of the two lakes. *See* Affidavit of David Wheelock (Attachment M).[46]

The 2010 WMP requires LCRA to make a preliminary determination about how much interruptible stored water is available in November based on projections of combined storage capacity for January 1. The actual supply to be made available under the 2010 WMP is based on actual January 1 storage, with releases of the water beginning in March. *See* Affidavit of Ryan Rowney (Attachment G). Thus, LCRA must make a decision in the very near future regarding interruptible water availability in time for these customers to make decisions and investments in preparing their fields for planting. This short decision-making window is not compatible with the more lengthy WMP amendment process.[47] Because the WMP is required by, and incorporated into, LCRA's Certificates of Adjudication 14-5478 and 14-5482, the WMP may only be amended in the same manner and following the same procedures as one would amend any state-issued water right, which procedures for this type of amendment would require basin-wide 30-day public notice and significant staff review.

The time period in which LCRA must make decisions regarding its commitments of interruptible water occur long before there could be any decision on any amendments to the 2010 WMP if the regular TCEQ water rights permitting procedures are followed. Once interruptible stored water is released, the water cannot be brought back. Thus, the emergency authorization is the only means by which LCRA can obtain timely approval to make a significant impact on its supply remaining in storage.

VII. There are No Feasible Alternatives to the Emergency Authorization.

A. LCRA has implemented and will continue to implement its water conservation and drought plans.

LCRA has, to this point, fully implemented its Drought Contingency Plan. LCRA requires all of its customers that currently divert and purchase water from LCRA to have a

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http://www.tceq.texas.gov/drinkingwater/trot/droughtw.html (last updated on December 17, 2014) (last visited December 18, 2014).

[46] *See also* Attachment A, August 2014 Emergency Order, Findings of Fact 51-54, 57; 2014 Emergency Order Findings of Fact Nos. 66-69; July 2013 Emergency Order, Findings of Fact Nos. 26, 36-37, 39; 2013 Emergency Order Finding of Fact No. 44, 46; 2011 Emergency Order, Finding of Fact No. 46.

[47] *See* Attachment A, August 2014 Emergency Order, Finding of Fact No. 59-60; 2014 Emergency Order, Finding of Fact No. 70; *see also* 2013 Emergency Order, Finding of Fact Nos. 34-35; July 2013 Emergency Order, Finding of Fact No. 41; 2011 Emergency Order, Findings of Fact Nos. 32-33.

drought contingency plan (DCP). As of December 1, 2014, 100 percent of those customers are covered by a DCP that is on file. *See* Affidavit of Nora Mullarkey Miller (Attachment I). In August 2011, the combined storage of lakes Buchanan and Travis dropped below 900,000 acre-feet. LCRA called on its firm water customers to voluntarily implement mandatory water use restrictions under their individual DCPs to reduce their water use by 10 to 20 percent.[48] *See* Affidavit of Nora Mullarkey Miller (Attachment I). As lake conditions continued to deteriorate, LCRA's firm customers stepped up their efforts to extend the water supply. Since that time, most of LCRA's municipal customers have stayed in some form of mandatory water restrictions, significantly limiting landscape irrigation. LCRA industrial customers, who consist of power plants and a few large industries along the Gulf Coast, have also worked to reduce non-essential water uses. *See* Affidavit of Nora Mullarkey Miller (Attachment I, Tab 2). As noted above, in November 2013 (and reaffirmed in November 2014), as part of LCRA's drought response, the LCRA Board approved a no more than once-per-week watering restriction that took effect in March 2014 and remains in effect as long as combined storage is below 1.1 million acre-feet and interruptible stored water for Gulf Coast, Lakeside and Pierce Ranch is cut off.[49] While many customers were already implementing once or twice per week watering restrictions, the LCRA Board action makes the once per week restriction applicable across all LCRA customers.

While water conservation is in the forefront of everyone's minds during times of drought, LCRA has on-going water conservation efforts that it has been implementing for many years. As detailed in the Affidavit of Nora Mullarkey Miller (Attachment I, Tab 2), LCRA's commitment to water conservation is unwavering, and spans all user groups. Prior to any state requirement for water conservation plans, LCRA required its municipal customers to adopt such plans and has continued to strengthen the minimum requirements of those plans to further encourage wise water use. LCRA developed the Major Rivers fourth-grade curriculum in 1988, which has reached more than 1 million school children in Texas through a partnership with the Texas Water Development Board (TWDB). LCRA also provides significant conservation program planning support for its customers. *See* Affidavit of Nora Mullarkey Miller (Attachment I, Tab 2). In 2012, LCRA began a rebate program for certain irrigation technologies, and a wholesale customer cost-share program focused on conservation. *See* Affidavit of Nora Mullarkey Miller (Attachment I, Tab 2).

LCRA's conservation efforts have also supported significant improvements in irrigation water use efficiency in rice irrigation systems. Since the 1990s, volumetric pricing and canal rehabilitation are estimated to have saved approximately 13 percent, or about 41,500 acre-feet annually, of the projected water use that would have occurred without conservation practices in place. Between 2006 and 2013, LCRA provided up to 30 percent of the costs to the farmers for the implementation of precision laser land leveling on more than 30,000 acres of land. *See* Affidavit of Nora Mullarkey Miller (Attachment I, and Tab 2). Additional efforts implemented by LCRA to use water more efficiently in the irrigation operations are described in LCRA's Water Conservation Plan.

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[48] The WMP does not allow LCRA to impose mandatory curtailments on its firm water customers until a drought worse than the Drought of Record is declared.

[49] *See* Attachments B-1 and B-2, November 2013 and November 2014 LCRA Board Resolutions.

B. Requiring the firm water customers to curtail water use by up to 20 percent will take time and have a significant impact on these customers.

When LCRA declares a DWDR and releases of interruptible stored water cease, LCRA's DCP requires firm customers to implement measures to try to immediately reduce their water consumption by twenty percent (20%), unless those customers have already received an adjustment based on previous water savings or other limited factors.[50] In December 2011, LCRA obtained approval from the TCEQ of its Water Curtailment Plan for firm water customers.[51] Since that time, LCRA has worked with its firm customers on the development of their plans for drought response under a pro rata curtailment. *See* Affidavit of Nora Mullarkey Miller (Attachment I).

Achievement of a twenty percent reduction in water use will require firm customers to implement fairly dramatic measures. Many municipal customers plan to eliminate all outdoor spray irrigation as a drought response measure under pro rata curtailment. Some of LCRA's customers, such as the City of Austin, have already achieved significant water savings through dramatic reductions in outdoor water use. While this could mean required reductions under pro rata curtailment for these customers may be a smaller incremental step initially, the practical matter is that, if water supplies continue to decline, customers will likely have to adopt water reductions that are more stringent than the initial twenty percent. Moreover, most industrial customers would have to implement the full twenty percent reduction more immediately. Reductions in use by industrial customers, including power plants, likely means a curtailment in annual production. *See* Affidavit of Nora Mullarkey Miller (Attachment I, and Tab 2).

Reductions in water use by firm customers cannot prevent the emergency created by falling reservoir levels that would result from the level of irrigation releases required by the 2010 WMP. Firm customer water use reductions simply cannot be implemented fast enough once such a reduction is mandated by LCRA.[52] Extensive benchmarking research shows that these savings are achievable but that it will likely take water suppliers considerable time (up to a year) to implement drought restrictions that result in the level of water savings identified in LCRA's DCP. *See* Affidavit of Nora Mullarkey Miller (Attachment I, Tab 3 and Tab 4).

C. Implementation of the 2010 WMP is not sufficient.

LCRA's 2010 WMP helps better protect firm customers through a repeat of the 1950s Drought of Record than prior versions of the Water Management Plan. However, as discussed above, significant amounts of interruptible stored water would be made available under that plan—even if combined storage were just above 600,000 acre-feet. In light of current projected storage levels, following the 2010 WMP for purposes of determining the amount of interruptible stored water available for downstream irrigation operations presents an unacceptable risk of

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[50] Attachment E – 2010 WMP at p. 4-32.

[51] Attachment H, TEX. COMM'N ENVTL. QUAL., Docket No. 2011-2097-WR, *Order Approving the Lower Colorado River Authority's Water Curtailment Plan for its Firm Water Customers* (Dec. 12, 2011).

[52] *See* Attachment A – August 2014 Emergency Order, Finding of Fact No. 54; 2014 Emergency Order, Finding of Fact No. 69; *see also* 2013 Emergency Order, Finding of Fact No. 44; July 2013 Emergency Order, Finding of Fact No. 40; 2011 Emergency Order, Finding of Fact No. 39.

reaching DWDR conditions. *See* Affidavit of David Wheelock (Attachment M); Affidavit of Ron Anderson (Attachment K). In fact, DWDR could be reached early in the first crop irrigation season in 2015, cutting off the supply of interruptible water and risking the crop not maturing to harvest. *See* Affidavit of Ron Anderson (Attachment K); Affidavit of Ryan Rowney (Attachment G).

D. The use of LCRA's downstream run-of-river water rights to meet firm customer needs provides an additional supply, but not a sufficient or predictable supply.

In evaluating options to address the firm water needs of its customers, LCRA evaluated the possibility of using its downstream run-of-river rights to meet the needs of the firm water customers located downstream of Lake Travis. LCRA has obtained temporary permits in 2012 2013, and 2014 to use water under Certificate of Adjudication 14-5476 at diversion points along the river downstream of Lady Bird Lake. LCRA is seeking similar authority to use Certificate of Adjudication 14-5475 in this manner in 2015. These permits have allowed LCRA to meet some firm demands with run-of-river water.

By their very nature, the downstream run-of-river water rights are highly variable in terms of availability and quantity. LCRA's firm customers need to have certainty as to the quantity of water that will be available and when the water will be available for their operations. To make these rights sufficiently predictable without backup supply from lakes Buchanan and Travis, especially in times of severe drought, LCRA would need to construct small reservoirs for storage beyond those existing reservoirs that some of LCRA's customers own and operate. The normal permitting process for such facilities, at best, takes up to two years with approvals or permits required from, at a minimum, TCEQ and the United States Army Corps of Engineers. *See* Affidavit of David Wheelock (Attachment M).

Finally, the downstream run-of-river water rights do not provide by themselves a sufficient quantity of water to eliminate the need for the emergency relief from the 2010 WMP as requested herein. LCRA using the downstream water rights to supply the downstream industrial and municipal users at diversion points for which LCRA does not have permanent authorizations kept about 7,000 and 1,000 acre-feet of water in the reservoirs in 2012 and 2013 respectively. These rights would only serve to offset the amount of stored water required to be released for the downstream firm customers. While clearly beneficial, it is equally as clear that temporary permits to supply these firm customers are not a sufficient replacement for the water that could be lost if LCRA were required to follow the 2010 WMP. *See* Affidavit of David Wheelock (Attachment M).

E. Relief related to the Blue Sucker helps preserve supply in the Highland Lakes, but is not an alterantive to the requested relief.

LCRA is also seeking relief for 2015 that would reduce the release requirement for the Blue Sucker fish under the 2010 WMP identical to the relief granted in the Spring of 2014. In 2014, the relief preserved in lakes Buchanan and Travis about 17,000 acre-feet of water that would otherwise have been released. *See* Affidavit of Ryan Rowney (Attachment G). As with the use of downstream water rights, the Blue Sucker relief, while clearly beneficial, is not a

replacement for water that could be lost if LCRA were to provide water for downstream agricultural customers pursuant to the 2010 WMP.

F. LCRA has explored other alternatives for protecting firm supply, but they are not feasible or practicable alternatives to the emergency authorization.

LCRA has evaluated many other alternatives to address the emergency conditions that the drought presents. As was the case when LCRA sought emergency relief over the past two years, none of the alternatives identified would avert the projected water supply shortage because most of the supplies identified would produce insufficient or uncertain quantities of supply, would create other operational issues for customers, involve a lengthy permitting process (if not implemented on an emergency basis), or would take years to develop.[53] None of the alternatives identified are feasible or practicable alternatives to the emergency authorization. *See* Affidavit of David Wheelock (Attachment M, Tab 3).

VIII. The Emergency Relief.

A. Proposed Relief – Allow curtailment of interruptible stored water to deviate from the TCEQ-approved 2010 WMP.

To mitigate the continued and devastating effects this exceptional drought is having on the water supply, avoid waste, and to ensure that the water supply of LCRA's firm customers is preserved for essential needs, LCRA requests that TCEQ suspend LCRA's obligation to release interruptible stored water to LCRA's Gulf Coast and Lakeside agricultural divisions and Pierce Ranch if TCEQ determines that the water supply conditions have not changed substantially by March 1, 2015 as compared to conditions in mid-November 2014. If TCEQ determines that water supply conditions *have* changed substantially, reversion to the 2010 WMP may still present an emergency warranting an order that sets forth more restrictive conditions under which LCRA may supply some interruptible stored water under more limited circumstances in 2015 than provided by the 2010 WMP. This relief is necessary in light of the prolonged and uncertain duration of the ongoing exceptional drought emergency that grips the lower Colorado River basin. Without substantial improvement in the water supply conditions presented by this drought, the water supply for over a million people is at risk of substantial curtailments if the drought continues. LCRA would provide interruptible stored water to the Garwood irrigation division and Pierce Ranch, to the extent required by their contracts.

The relief granted may be of limited duration. As such, LCRA may seek additional relief later in 2015.

This deviation from the 2010 WMP would apply notwithstanding anything to the contrary in the 2010 WMP. LCRA requests that relief be granted pursuant to Texas Water Code

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[53] *See* Attachment A – August 2014 Emergency Order, Finding of Fact No. 51; 2014 Emergency Order, Finding of Fact No. 66; *see also* 2013 Emergency Order Findings of Fact Nos. 47-48; 2013 Emergency Order Extension, Finding of Fact No. 15; July 2013 Emergency Order, Finding of Fact No. 37; 2011 Emergency Order, Findings of Fact Nos. 41-42.

§§ 5.501, 11.138, 11.139 and the Governor's Emergency Disaster Proclamation related to drought. To the extent the Commission deems appropriate, and consistent with the Governor's Proclamation, LCRA requests that procedural requirements associated with this request, or any portion thereof, be waived to expedite the processing of this request.

B. Proposed dates the authorization should begin and end.

LCRA requests that TCEQ process this request in a manner that allows LCRA to gain the benefit of the authorization for as long as may be needed to address this exceptional drought. To that end, LCRA requests that:

1. The emergency authorization become effective prior to March 1, 2015 (and preferably no earlier than February 12, 2015, *i.e.* 20 days prior to the Commission's March 4, 2015 Agenda, so as to allow the most meaningful use of the 120 days of initial relief); and

2. The emergency authorization continue through the initial 120 day period allowed by Texas Water Code § 11.139, and any extension thereof as allowed by Section 11.139.

Should this exceptional drought persist, LCRA will evaluate at the appropriate time whether any further relief from the Water Management Plan may be needed and seek such relief as the LCRA Board may deem necessary and appropriate at that time.

C. The requested relief will be effective by preserving stored water for firm customers and avoiding waste.

Deviating from the 2010 WMP to suspend releases interruptible stored water to LCRA's Gulf Coast and Lakeside agricultural divisions and Pierce Ranch would preserve significant quantities of stored water for the essential needs of firm water customers. *See* Affidavit of David Wheelock (Attachment M). This relief would also reduce the possibility that interruptible stored water would be released and then cut off during a crop, jeopardizing the ability to finish the crop, and potentially wasting that amount of supply. In LCRA's prior experience, it is apparent that the farmers can wait until March 1 to make final planting decisions. *See* Affidavit of Ryan Rowney (Attachment G).

IX. Conclusion.

It is clear the 2010 WMP puts at risk a significant quantity of stored water that may be needed to meet firm water commitments in this unprecedented drought. The ongoing drought and its effect on the water supply is an emergency that presents an imminent threat to the public health and safety. Authorizing a temporary deviation from the 2010 WMP will help preserve the water supply to help meet the critical needs of LCRA firm water customers in this prolonged drought. This application, in combination with actions LCRA has already taken related to use of its downstream water rights, presents the only feasible and practicable alternatives to addressing this exceptional drought in a timely manner. For these reasons, LCRA respectfully requests that

its application for an emergency authorization under Texas Water Code §§ 5.501, 11.138, 11.139, and consistent with the Governor's Emergency Disaster Proclamation be granted.

X. Certification.

"I, Phil Wilson, General Manager, the Lower Colorado River Authority, certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Date: 12/22/14

Phil Wilson, General Manager
Lower Colorado River Authority

Subscribed and sworn to as being true and correct before me on this the 22nd day of December 2014.

TABETHA JASKE
Notary Public, State of Texas
My Commission Expires
January 11, 2018

Notary Public of the State of Texas

XI. Attachments

Attachment A – TEX. COMM'N ENVTL. QUAL., Docket No. 2014-1044-WR, *Order Affirming an Order Granted by the Executive Director that Grants an Emergency Order Requested by the Lower Colorado River Authority* (August 15, 2014) (herein "August 2014 Emergency Order"); TEX. COMM'N ENVTL. QUAL., Docket No. 2014-0124-WR, *Order Affirming an Order issued by the Executive Director that grants a renewal of the Emergency Order issued to the Lower Colorado River Authority* (June 17, 2014) (herein "2014 Emergency Order Extension"); TEX. COMM'N ENVTL. QUAL., Docket No. 2014-0124-WR, *Order Affirming in Part, and Modifying in Part, the Executive Director's Emergency Order Authorizing the Lower Colorado River Authority to Amend its Water Management Plan* (Feb. 27, 2014) (herein "2014 Emergency Order").

See also TEX. COMM'N ENVTL. QUAL., Docket No. 2013-0225-WR, *Order Granting an Emergency Authorization to the Lower Colorado River Authority* (July 26, 2013) (herein "July 2013 Emergency Order"); TEX. COMM'N ENVTL. QUAL., Docket No. 2013-0225-WR, *Order Affirming, with Modification, an Emergency Order Granted by the Executive Director to the Lower Colorado River Authority* (June 10, 2013) (herein "2013 Emergency Order Extension"); TEX. COMM'N ENVTL. QUAL., Docket No. 2013-0225-WR, *Order Affirming, with Modification, an Emergency Order Granted by the Executive Director to the Lower Colorado River Authority* (Feb. 19, 2013) (herein "2013 Emergency Order"); TEX. COMM'N ENVTL. QUAL., Docket No. 2011-2096-WR, *Order Affirming an Emergency Order Granted by the Executive Director to the Lower Colorado River Authority* (Dec. 12, 2011) (herein "2011 Emergency Order").

Attachment B LCRA Board Resolutions Regarding Drought Management Actions

B-1: November 19, 2013 Resolution of the Board of Directors of the Lower Colorado River Authority Regarding Drought Management Actions in Response to Current Drought Conditions.

B-2: November 19, 2014 Resolution of the Board of Directors of the Lower Colorado River Authority Regarding Drought Management Actions in Response to Current Drought Conditions.

Attachment C – Certificate of Adjudication 14-5478, as amended

Attachment D – Certificate of Adjudication 14-5482, as amended

Attachment E – Excerpts from the 2010 Water Management Plan (2010 WMP) including:

Table of Contents and Preface;

Chapter 1 – Introduction to the Water Management Plan;

Chapter 3.C. – Annual Allocation of Firm and Interruptible Water;

Chapter 4 – Development of the Drought Management Plan;

September 20, 1989 Texas Water Commission Order approving LCRA's Water Management Plan (1989 WMP Order");

December 23, 1991 Texas Water Commission Order approving LCRA's Drought Management Plan (1991 WMP Order");

December 18, 1992 Texas Water Commission Order approving amendments to LCRA's Water Management Plan and Drought Management Plan (1992 WMP Order"); and

March 1, 1999 Texas Natural Resource Conservation Commission Order approving amendments to LCRA's Water Management Plan and Drought Contingency Plan (1999 WMP Order").

January 27, 2010 Texas Commission on Environmental Quality Agreed Order Approving Amendments to Lower Colorado River Authority's Water Management Plan (2010 WMP Order).

Attachment F – Excerpts from Order Adjudication LCRA's Water Rights for Lakes Buchanan and Travis, *In re The Exceptions of the Lower Colorado River Authority and the City of Austin to the Adjudication of Water Rights in the Lower Colorado River Segment of the Colorado River Basin*, No. 115, 414-A-1 (264th Dist. Ct., Bell County, Tex. April 20, 1988).

Attachment G – Affidavit of Ryan Rowney

Tab 1 – Resume of Ryan Rowney

Tab 2 – Combined Storage in lakes Buchanan and Travis since Jan. 1, 2008

Attachment H – TEX. COMM'N ENVTL. QUAL., Docket No. 2011-2097-WR, *Order Approving the Lower Colorado River Authority's Water Curtailment Plan for its Firm Water Customers* (Dec. 12, 2011).

Attachment I – Affidavit of Nora Mullarkey Miller

Tab 1 – Resume of Nora Mullarkey Miller

Tab 2 – LCRA's Ongoing Water Conservation Initiatives and Drought Response Efforts

Tab 3 – Benchmarking Research on Drought Restrictions implemented in other Communities (2011).

Tab 4 – Benchmarking Research on Mandatory Drought Restrictions implemented in other Communities (2013).

Attachment J – Proclamation by the Governor of the State of Texas (Dec. 22, 2014)

Attachment K – Affidavit of Ron Anderson

Tab 1 – Resume of Ron Anderson

Tab 2 – Summary of Inflow Deficit for lakes Buchanan and Travis

Tab 3 – Cumulative Historical Inflows to Lakes Travis and Buchanan

Tab 4 – Description of Stochastic Modeling

Tab 5 – Likelihood of Reaching All 3 DWDR Criteria following the 2010 WMP

Attachment L – Affidavit of Bob Rose

Tab 1 – Resume of Bob Rose

Attachment M – Affidavit of David Wheelock

Tab 1 – Resume of David Wheelock

Tab 2 – Map of LCRA Water Service Area

Tab 3 – Summary of Water Supply Alternatives

Attachment N – LCRA Policies Regarding Delegation of Authority and Organizational Chart

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER affirming an Order issued by the Executive Director that grants an Emergency Order requested by the Lower Colorado River Authority; TCEQ Docket No. 2014-1044-WR.

On July 2, 2014, the Lower Colorado River Authority ("LCRA") requested that its 2010 Water Management Plan ("WMP") be amended by an emergency order issued pursuant to any authority deemed appropriate, including Texas Water Code ("TWC") §§ 5.501, 11.138, 11.139 and the Governor's Emergency Disaster Proclamation related to drought. Specifically, LCRA's request sought an emergency order confirming that LCRA does not have to provide interruptible stored water to any landowners or customers within the Gulf Coast, Lakeside, or Pierce Ranch irrigation operations, including those who might seek to use stored water for irrigating rice that has to date been watered with groundwater, or for any other purposes such as row, crops, pasture, or wildlife management. The Executive Director ("ED") reviewed and granted LCRA's request by issuing an emergency order pursuant to TWC § 11.139 on July 24, 2014.

On August 6, 2014, the Texas Commission on Environmental Quality ("Commission") considered whether to affirm, modify, or set aside the ED's emergency order. After taking public comment and oral arguments, the Commission determined that the ED's Emergency Order was necessary given the continued drought conditions and low reservoir levels. Consequently, the Commission affirmed the ED's Emergency Order issued to LCRA on July 24, 2014.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

The ED's Emergency Order amending LCRA's 2010 WMP, Permit No. 5838, which is attached hereto as Exhibit A and incorporated into this Order by reference, is **AFFIRMED.**

Issue date: AUG 15 2014

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Bryan W. Shaw, Ph.D., P.E., Chairman

Exhibit A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER granting an emergency authorization to the Lower Colorado River Authority to amend its Water Management Plan, Permit No. 5838, pursuant to Section 11.139 of the Texas Water Code

On July 24, 2014, the Executive Director of the Texas Commission on Environmental Quality considered a request from the Lower Colorado River Authority (LCRA) for an emergency order to amend its 2010 Water Management Plan (WMP), Permit No. 5838, under Texas Water Code Sections 5.501, 11.138, and 11.139, and the Governor's Emergency Disaster Proclamation relating to drought.

The Executive Director has jurisdiction to consider this matter and makes the following Findings of Fact and Conclusions of Law:

I. FINDINGS OF FACT

On July 3, 2014, LCRA filed a request for an emergency order suspending any obligation LCRA might have under the 2010 WMP to release interruptible stored water to customers in the Gulfcoast, Lakeside, and Pierce Ranch irrigation operations through the remainder of the irrigation season due to persistent drought conditions in and around LCRA's five Highland Lakes (Lakes Buchanan, Inks, LBJ, Marble Falls, and Travis). LCRA's request is attached hereto as Attachment A and incorporated herein by reference.

LCRA'S Water Rights and 2010 Water Management Plan

1. LCRA has the right to divert and use up to 1.5 million acre-feet (AF) from Lakes Buchanan and Travis under Certificates of Adjudication Nos. 14-5478 and 14-5482. By court order, LCRA has developed a WMP, Permit No. 5838, currently dated 2010, which is part of these certificates.

2. The Certificates of Adjudication and the 2010 WMP govern LCRA's operation of Lakes Buchanan and Travis and dictate how LCRA makes water available from these lakes to help meet "firm" water customer needs, downstream interruptible irrigation demands, and environmental flow needs of the lower Colorado River and Matagorda Bay.

3. Certificates of Adjudication 14-5478 and 14-5482 state that "LCRA shall interrupt or curtail the supply of water . . . pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demand for water under such certificate pursuant to all firm, uninterruptible water commitments." The WMP further describes how LCRA will manage and curtail supplies from the lakes during times of drought including through a repeat of the Drought of Record.

4. As established in the 2010 WMP, the combined firm yield of Lakes Buchanan and Travis is 535,812 acre-feet per year (AFY). Of this amount, 90,546 AFY is committed to O.H. Ivie Reservoir, making 445,266 AFY of firm water supply available from Lakes Buchanan and Travis for LCRA's firm water customers.

5. As established in the 2010 WMP, so long as firm demand for water equals the combined firm yield, LCRA can supply water for irrigated agriculture on an interruptible basis. To manage the supply, LCRA's 2010 WMP imposes several trigger points keyed to the total combined storage capacity of Lakes Buchanan and Travis that are intended to ensure the firm water supply is protected during droughts. The most relevant trigger points are set out in the following table:

Combined Storage of Lakes Buchanan and Travis	Date on Which Trigger is Decided	Action Taken
1.4 million acre feet	At any time	Request firm customers to implement voluntary drought response measures.
1.4 million acre feet	On Jan. 1	Environmental releases for instream flows reduced to meet critical needs for ecosystems for following year. Begin gradual curtailment of interruptible supply to four major irrigation operations.
900,000 acre feet	At any time	Request firm customers to implement mandatory water restrictions; develop firm customer curtailment plan.
600,000 acre feet	At any time	If criteria indicate a drought worse than the Drought of Record, then cease interruptible supply and begin curtailment of firm supply.

6. LCRA's 2010 WMP defines "Drought of Record" as "the drought that occurred during the critical drought period." "The Critical Drought Period" is defined as

"the period of time during which the reservoir was last full and refilled, and the storage content was at its lowest minimum value."

7. Under the 2010 WMP, the LCRA Board may declare a Drought Worse than the Drought of Record (DWDR) if it finds that the following three conditions are simultaneously met:

   a. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both Lakes Buchanan and Travis were last full;

   b. Inflows to the lakes are less than inflows during the drought of record; and

   c. Lakes Buchanan and Travis combined storage has less than 600,000 AF of water.

8. Under the 2010 WMP, once a drought has lasted more than 36 months and a DWDR has been declared by the LCRA Board, the interruptible stored water would be fully and immediately curtailed – making no stored water available for agricultural irrigation or other interruptible uses until lake levels recover or the inflows into the lakes increase substantially. Moreover, LCRA will implement pro rata curtailment of its firm water users once a DWDR is declared and after interruptible stored water (agriculture) uses have been curtailed.

9. Prior to a declaration of a DWDR, LCRA is obligated by the 2010 WMP to provide at least some interruptible water to its four major irrigation operations. Under the WMP, LCRA is to make a preliminary determination in November of its interruptible water releases based on projections of storage on January 1 of the upcoming year.

10. The first and second criteria for a DWDR have been met. The drought has lasted for more than 24 months. Duration of drought is determined by counting the number of consecutive months since both Lakes Buchanan and Travis were last full, which was February 13, 2005. The cumulative inflow deficit has also been met. The last criteria, storage below 600,000 AF has not yet occurred, but could occur in the next few months.

Current Conditions

11. The combined storage of Lakes Buchanan and Travis on July 21, 2014, was 778,180 AF, or 39% full. The combined storage fell to the lowest level in the current drought on September 19, 2013, which was 637,123 AF or 31.7% full.

12. The inflows in to the lakes are at record lows. Annual inflows into Lakes Buchanan and Travis in four of the last five years are among the ten lowest years of inflow on record. Inflows into the lakes in 2011 were the lowest annual inflows on record,

about 10% of average inflows. Inflows in 2012 were the sixth lowest on record, and inflows in 2013 were the second lowest on record.

13. Extraordinary drought conditions have existed in much of Texas, including the Colorado River Basin for more than three years, dating back to October 2010. State Climatologist, Dr. John Nielsen-Gammon, recognized 2011 as the worst one year statewide drought on record dating back to 1895. Inflows in the first four months of 2014 were lower than inflows in the record low year of 2011. Statewide rainfall for the three-year period from January 2011 through December 2013 was well below normal, totaling 64.84 inches, which is 16.57 inches below normal or 80% of normal.

14. Annual inflows into Lakes Buchanan and Travis in six of the last nine years are among the ten lowest years of inflow on record. Inflows into the lakes in 2011 were the lowest annual inflows on record, about 10% of average inflows. Inflows in 2012 were the sixth lowest on record, and inflows in 2013 were the second lowest on record.

15. Inflows in the first six months of 2014 are 18.9% of the historical average inflows to Lakes Buchanan and Travis. This is the fifth lowest January through June six month total recorded for Lakes Buchanan and Travis and the inflows for this period are lower than any January through June period in the 1950s.

16. The inflows into Lakes Buchanan and Travis during the current drought have been lower for time periods ranging from 12 months to 72 months than the lowest inflows for periods of similar duration during the historic Drought of Record, including the 1950's. The total inflows for the 72 months ending in April 2014 were only about half of the lowest 72 month inflow period in the Drought of Record.

17. The maximum historical annual amount of reported firm water use from the firm supplies of Lakes Buchanan and Travis during 2000 through 2013 was 247,000 AF in 2011. The maximum interruptible water released from Lakes Buchanan and Travis during this same period occurred in 2011 and totaled about 433,000 AF. The maximum total amount released or used from the Highland Lakes, about 714,000 AF, occurred in 2011.

18. The firm water use in 2012 from Lakes Buchanan and Travis was about 148,000 AF. An amount of 31,000 AF was supplied for the environment, and 9,000 AF of water was supplied to farmers in the Garwood Irrigation Division. The total use for 2012 was about 188,000 AF. In 2013, firm use from the lakes was about 173,000 AF, 33,500 AF was supplied for environmental flow needs, and about 22,000 AF of water was supplied to Garwood Irrigation Division. Total use of water from the lakes in 2013 was about 229,000 AF.

19. High temperatures have been unprecedented. The summer of 2011 was the hottest on record in Texas, and 2011 was also the hottest in Austin. Year 2012 tied with

1921 as the hottest on record statewide. Summer temperatures for Austin in 2013 were the fifth hottest on record.

20. The lakes have not been able to recover in any significant manner even with an emergency suspension of nearly all water supply for downstream irrigation in 2012, 2013, and the first half of 2014.

21. Rainfall in the first four months of 2014 was extremely low across the Texas Hill Country, with many locations failing to record even one inch of rain.

22. Despite some generous rains in May and June of 2014, the long-term drought pattern will likely persist and possibly intensify during the hot months of summer. The National Weather Service precipitation outlook calls for below normal precipitation across roughly the eastern half of Texas from July to September, and near to below normal rainfall in Central Texas.

23. Recent weather forecasts provide some hope for relief during the period covered by this emergency order, including an El Niño developing in the September to November period, carrying on through March of 2015. There is at least a 70% chance that an El Niño will develop in the next six months. El Niños often cause a pattern of above-normal rainfall across Texas, mainly during the fall and winter months. The impacts of El Niño can vary significantly.

24. The current drought conditions are outside the range of hydrologic conditions that were considered during formulation of the 2010 WMP.

25. The conditions are similar or worse than conditions in place when TCEQ issued its earlier emergency orders for the 2012, 2013, and 2014 irrigation seasons.

26. As of July 2014, much of the Texas Hill Country was designated as being in a moderate or severe drought with parts in extreme drought.

27. The Governor of Texas issued an Emergency Disaster Proclamation on July 5, 2011, certifying that exceptional drought conditions posed a threat of imminent disaster in specified counties in Texas. This proclamation has been renewed monthly, most recently on July 3, 2014, and includes nearly every county bordering or that contributes inflow to the Highland Lakes.

LCRA's Firm Customers

28. LCRA provides raw water out of the combined firm yield of Lakes Buchanan and Travis to over 60 retail and wholesale potable water suppliers that together serve over one million people. In addition, LCRA provides water to several electric utilities from the firm water supply of Lakes Buchanan and Travis. These electric utilities provide electricity 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.

29. The 2010 WMP requires that firm customers (mainly cities and industries) be curtailed on a pro rata basis and that LCRA cease all releases for interruptible stored water (regardless of the impact on the crops) when a DWDR is declared.

30. LCRA-adopted water use reduction targets including mandatory pro rata curtailment of firm water supplies for customers of 20% or more will be implemented when combined storage levels fall below 600,000 AF and other criteria are met for a DWDR.

31. If the 20% reduction in water use is required, many municipal customers plan to eliminate all outdoor spray irrigation. Some customers, such as the City Austin, have already seen significant water savings through reductions in outdoor water use. Industrial customer will have to implement the full 20% reduction more quickly and these reductions, especially for power plants, could impact production.

32. If LCRA is required to follow the 2010 WMP and the drought continues, LCRA and its firm customers may need to acquire or develop large quantities of alternative water supplies to meet essential needs of their respective potable water systems. LCRA's firm customers are working on plans to implement curtailment and secure alternate supplies; however many of LCRA's firm customers do not have any readily available alternative sources of water supply that could substitute for their reliance on the Colorado River, and these projects could take years to develop. Following the 2010 WMP under current drought conditions could pose an imminent threat to firm customers served by LCRA from Lakes Buchanan and Travis.

33. Based on recent lake levels and the forecast, there is a chance of reaching conditions triggering a declaration of a DWDR in October 2014.

34. Currently, LCRA owns four systems that take raw water from Lakes Buchanan and Travis. LCRA also has 15 customers that actively take raw water for municipal purposes from Lake Travis that are not a part of LCRA's utility facilities. The lowest pumping elevations of the intakes range from 605 feet mean sea level (msl) to 645 feet msl on Lake Travis. As lake levels drop, retail water suppliers are unable to pump water from the lakes. This causes wholesale raw water customers to either move intakes to reach the water, or obtain alternate sources. Smaller systems will likely have to haul water from a water utility with a viable source. If the lake levels drop more quickly than arrangements for alternative intakes or supplies can be implemented, the situation presents an imminent threat to public health and safety for the LCRA water systems and for its customers' water systems.

35. At the time of this order, the public water systems that rely on the Highland Lakes or that draw from the tributaries that typically contribute significant inflow to the

Highland Lakes are already in some form of drought restrictions and are at risk of water supply shortages.

36. Without this emergency order, there may be uncertainty as to what obligations LCRA would have to provide interruptible stored water. In August, some crops could still be planted and other crops that were started with groundwater could be switched to surface water. Later in the season, LCRA may receive requests for water for supplemental uses such as wildlife management.

37. If LCRA had followed the 2010 Water Management Plan this year, it would have had to release as much as 214,300 AF of water to downstream irrigators. Allowing any additional release of interruptible stored water would only amplify the risk and shorten the timeframe that LCRA and its firm customers have to prepare for a DWDR.

Conservation and Drought Contingency Plan

38. LCRA's water conservation plan complies with TCEQ rules. LCRA has required its municipal customers to adopt conservation plans before there was a state requirement.

39. LCRA provides conservation program planning support for its customers. In 2012, LCRA began a rebate program for certain irrigation technologies and a wholesale customer cost-share program focused on conservation. LCRA has supported significant improvements in water use efficiency in rice irrigation systems, including volumetric pricing and canal rehabilitation.

40. LCRA was originally required to develop a Drought Contingency Plan (DCP) as a direct result of the court order adjudicating LCRA's water rights and the Texas Water Commission 1989 WMP Order.

41. When TCEQ adopted the Chapter 288 rules for DCPs, LCRA adopted separate stand-alone DCPs relating to irrigation, municipal, and industrial operations that more specifically addressed the requirements of the Chapter 288 rules. LCRA incorporated all of the same triggers and criteria from the WMP into its Chapter 288 DCP. These DCPs were incorporated into Chapter 4 of the WMP.

42. In August 2011, LCRA called on its firm water customers to voluntarily implement mandatory water use restrictions under their DCPs to reduce water use by 10 to 20%.

43. LCRA-adopted water use reduction targets including the following: water use reduction goals for firm water supply customers of 5% by asking firm customers to implement their voluntary water use reduction measures when the combined storage of Lakes Buchanan and Travis is less than 1.4 million AF; 10 to 20% reduction goals by asking firm customers to implement their own mandatory water

use reduction measures when combined storage levels fall below 900,000 AF; and a mandatory pro rata curtailment of firm water supplies for customers of 20% or more will be implemented when combined storage levels fall below 600,000 AF and other criteria are met for a DWDR.

44. As of July 1, 2014, LCRA has pending or final pro rata plans for all of its firm water customers who are actively diverting water. LCRA is continuing to work with some of these customers to finalize the plans.

45. LCRA has adopted additional changes to LCRA's raw water contract rules that include the procedures for implementing a pro rata curtailment of firm water customers. The rules also provide a surcharge to be set by the LCRA Board for unauthorized use of water (taking more water than authorized under a mandated curtailment of firm water supplies) and clarifying the drought contingency requirements related to golf course irrigation and recreational use.

46. LCRA's WMP requires LCRA to develop a firm water curtailment plan to be approved by the LCRA Board and TCEQ in response to combined storage dropping below 600,000 AF. TCEQ approved that plan for LCRA's firm customers in December of 2011.

47. LCRA has fully implemented its DCP. All of LCRA's firm customers that currently divert and purchase water from LCRA have a DCP. Most of these firm customers have stayed in some form of mandatory water restrictions, significantly limiting landscape irrigation. LCRA's industrial customers have worked to reduce non-essential water uses. Also, LCRA has had several meetings with firm customers in preparation for pro rata curtailment.

48. Except for a six-week period in the summer of 2012, the City of Austin customers have had once a week outdoor watering restriction for the past two years.

49. The LCRA Board approved a no more than once per week watering restriction that took effect in March 2014. The restriction applies if combined storage is below 1.1 million AF and interruptible stored water has been cut off.

Alternatives

50. LCRA has evaluated many alternatives to address the emergency conditions that the drought presents. Alternatives explored include: Utilizing water from LCRA's other lakes, aggressive conservation, interbasin transfers, an off-channel reservoir, and trucking in water from other sources. LCRA has evaluated many other alternatives to address the emergency conditions that the drought presents.

51. None of the alternatives LCRA has identified would avert the projected water supply shortage because most of the supplies identified would produce insufficient or uncertain quantities of supply, would create other operational issues for

customers, may involve a lengthy permitting process (if not implemented on an emergency basis), or would take years to develop. None of the alternatives identified are feasible or practicable alternatives to the emergency authorization.

52. Amending downstream run of the river rights to allow diversion for new uses and at new locations would provide some supply, but the use of these rights alone is not – by itself – a feasible and practicable alternative to the emergency relief related to the 2010 WMP. All of the rights would require amendments to add diversion points, additional places of use, and possible storage. Also, the downstream run-of-river water rights are highly variable in terms of availability and quantity, and do not provide by themselves a sufficient quantity of water to eliminate the need for the emergency relief from the 2010 WMP as requested herein. At best, using the downstream water rights to supply the downstream industrial and municipal users will keep up to about 10,000 AF of water in the reservoirs.

53. In 2012, 2013, and the first six months of 2014, LCRA supplied about 4,000 AF, 1,000 AF, and 3,200 AF, respectively, to firm customers downstream of Austin under temporary permits. This water would otherwise have been released from Lakes Buchanan and Travis. While this was beneficial, temporary permits are not sufficient replacement for water lost if releases are required.

54. Conservation incentives will not yield significant water. Reductions in water use will not result in preventing the emergency that would be created by falling reservoir levels due to the releases of stored water to irrigators under the 2010 WMP. Implementing reduced water use will likely take considerable time before the water savings identified in LCRA's DCP would be seen. Aggressive municipal conservation requires solid partnerships with customers, a good method for calculating water savings and a strong education and enforcement program; measures that are costly and take time. And, the result would be only a small amount of water supply.

55. Although groundwater appears to be available in many areas, the uncertainty associated with the long-term availability of groundwater supplies makes this a high-risk alternative for water supply. Many areas have Groundwater Conservation Districts (GCD) that regulate use and permitting of groundwater. Obtaining written agreements with landowners takes approximately 9 to 12 months and obtaining permits often takes several years.

56. LCRA has a permit for an off-channel reservoir in the lower basin that will add 90,000 AF of firm water for the region. LCRA is moving forward with constructing this reservoir, but it is not expected to be on-line until 2017.

57. The use of other LCRA lakes is not a viable option at this time. Lakes Inks, LBJ and Marble Falls are not currently authorized for municipal use. If LCRA quit refilling these lakes but allowed 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 AF could be made available. However,

lowering the storage of these lakes could also significantly impact hydroelectric generation capabilities.

58. Several LCRA-managed lakes are cooling water reservoirs with operational constraints. Any released surface water from Lake Bastrop would need to be replenished with either surface water (including releases from Lakes Travis and Buchanan) if there is no rain, or from a limited supply of groundwater. There are operational and timing issues related to releasing and replenishing 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.

59. LCRA is pursuing a formal amendment to its 2010 WMP but that process will not be completed in time to address LCRA's requested relief. LCRA filed an application to amend its 2010 WMP on March 12, 2012. TCEQ prepared a draft permit for LCRA comment on October 12, 2012. Notice of the application was sent to all water right holders in the Colorado River Basin and published in local newspapers in April 2013. May 28, 2013 was the last date to request a public meeting or a contested case hearing, or comment on the application. On June 3, 2013, the TCEQ Executive Director advised LCRA that he would not be forwarding the application to the Commission at this time, and that his staff would be conducting further review on the application. Staff issued a draft report with recommendations on curtailments of interruptible water on May 16, 2014, and LCRA is currently reviewing the draft report.

60. This emergency order is the only means by which LCRA can obtain timely relief to make a significant impact on its remaining storage in a workable manner.

Relief Requested

61. LCRA seeks an emergency order to suspend any obligation LCRA might have under the 2010 WMP to provide interruptible stored water to any landowners or customers within the Gulf Coast, Lakeside, and Pierce Ranch irrigation operations during the remainder of the irrigation season.

Notice

62. Notice was provided to the Governor of Texas regarding the Executive Director's consideration of this emergency order by letter dated July 23, 2014. The date and time of the hearing at which the Commission will consider whether to affirm, modify, or set aside this order is included in this emergency order under the Ordering Provisions. Notice of this emergency order and of the Commission hearing will be mailed to all water right holders in the basin.

II. CONCLUSIONS OF LAW

1. The Executive Director may issue an emergency order under Texas Water Code Section 11.139 to amend a certificate of adjudication after notice to the Governor if the Executive Director finds that emergency conditions exist which present an imminent threat to the public health and safety which requires emergency action before the Commission can take action and there are no feasible practicable alternatives to the emergency authorization.

2. The Findings of Fact show that the requirements of Conclusion of Law No. 1 have been met. Following the 2010 WMP with the ongoing drought and its effect on the water supply constitute an emergency that presents an imminent threat to the public health and safety and there are no feasible, practicable alternatives to this action. The Executive Director of the Commission has the authority to issue this emergency order.

3. The Commission must consider whether to affirm, modify, or set aside an emergency order issued by the Executive Director under Section 11.139 of the Texas Water Code no later than 20 days after the Executive Director issues the order.

NOW, THEREFORE, BE IT ORDERED BY THE EXECUTIVE DIRECTOR OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1. LCRA's 2010 WMP is amended to alleviate LCRA from any obligation to provide interruptible stored water to customers within the Gulf Coast, Lakeside, and Pierce Ranch irrigation operations for the duration of the emergency order.

2. This emergency order is final and effective on July 24, 2014.

3. This emergency order terminates in 120 days, November 20, 2014.

4. This emergency order may be renewed once for no more than 60 days.

5. This order only addresses the specific relief requested from LCRA and is not meant as precedent for amendments to LCRA's WMP or future emergency relief.

6. The Commission will consider whether to affirm, modify, or set aside this emergency order on August 6, 2014 at 9:30 a.m. at:

Texas Commission on Environmental Quality
12100 Park 35 Circle
Building E, Room 201S
Austin, Texas

7. If any provision, sentence, clause, or phrase of this emergency order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of this emergency order.

Issue Date:

July 24, 2014

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Richard A. Hyde, P.E.
Executive Director

ATTACHMENT A

Attachment A to this Order is LCRA's application. Please see the application at: http://www.tceq.texas.gov/agency/lcra-emergency-order

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER affirming an Order issued by the Executive Director that grants a renewal of the Emergency Order issued to the Lower Colorado River Authority; TCEQ Docket No. 2014-0124-WR.

On December 10, 2013, the Lower Colorado River Authority's ("LCRA") requested an emergency order, pursuant to Texas Water Code ("TWC") § 11.139, to amend its 2010 Water Management Plan ("WMP"). Specifically, LCRA's request sought to revise the trigger dates, combined storage levels, and release amounts for providing service to LCRA's interruptible customers for first crop irrigation. The Executive Director ("ED") reviewed and granted LCRA's request by issuing an emergency order pursuant to TWC § 11.139 on January 27, 2014.

On February 12, 2014, the Texas Commission on Environmental Quality ("Commission") considered whether to affirm, modify, or set aside the ED's emergency order. After taking public comment and oral arguments, the Commission determined that it was necessary to have an evidentiary hearing held by administrative law judges ("ALJs"). On February 26, 2014, the Commission considered the ALJs' Proposal for Decision and the ED's emergency order, and determined that, given the current conditions and weather forecasts, LCRA's WMP should be temporarily amended to completely curtail LCRA's interruptible customers. The Commission further determined that because there was virtually no possibility of reaching any of the proposed trigger levels before the trigger date, there was no need to establish a trigger level. Consequently, the Commission issued an order affirming in part and modifying in part.

The emergency order was scheduled to expire on May 26, 2014. On May 22, 2014, the ED, in response to a request filed by LCRA, issued an order, pursuant to TWC § 11.139, renewing the emergency order through July 25, 2014.

On June 4, 2014, the Commission considered whether to affirm, modify, or set aside an Order issued by the ED on May 22, 2014 that renewed the February 27, 2014 Emergency Order amending the LCRA 2010 WMP, Permit No. 5838. Based on the information before them, the Commission determined that the conditions which led to the emergency order being issued are still in existence. Consequently, the Commission affirmed the ED's Order renewing the February 27, 2014 Emergency Order granted to LCRA.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

The ED's Order, attached hereto as Exhibit A and incorporated into this Order by reference, which extends the February 27, 2014 Emergency Order amending LCRA's 2010 WMP, Permit No. 5838, is affirmed.

Issue date: JUN 17 2014

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Bryan W. Shaw

Bryan W. Shaw, Ph.D., P.E., Chairman

EXHIBIT A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER granting an extension of an emergency order issued to the Lower Colorado River Authority to amend its Water Management Plan, Permit No. 5838, pursuant to Section 11.139 of the Texas Water Code

On February 26, 2014, the Texas Commission on Environmental Quality (Commission or TCEQ) considered a request from the Lower Colorado River Authority (LCRA) for an emergency order to amend its Water Management Plan under Texas Water Code §§ 5.501, 11.138, and 11.139, and the Governor's Emergency Disaster Proclamation relating to drought. The Commission's emergency order, issued on February 27, 2014, expires on May 26, 2014. The February 27, 2014 emergency order is attached to this order as Exhibit A.

LCRA filed an application and brief for a 60-day extension of the February 27, 2014 emergency order on May 5, 2014. LCRA's extension request is attached to this order as Exhibit B. LCRA requests an extension of the February 27, 2014 emergency order through July 25, 2014.

The Executive Director has jurisdiction to consider this matter and makes the following Findings of Fact and Conclusions of Law:

I. FINDINGS OF FACT

1. The following Findings of Fact in the Commission's February 27, 2014 emergency order are incorporated by reference into this emergency order: 2-18, 20-25, 28-30, 32-34, 36, 38-42, and 44-73. The other Findings of Fact from the February 27, 2014 emergency order have not been incorporated due to the outdated nature of the information or the fact that it is not directly applicable to this order.

2. LCRA filed an application and brief for a 60-day extension of the February 27, 2014 emergency order on May 5, 2014. LCRA requests an extension of the February 27, 2014 emergency order through July 25, 2014.

3. Severe drought conditions continue in the area, including record-low inflows to the Highland Lakes, dry conditions upstream of the Highland Lakes, and low rainfall.

4. As of May 22, 2014, the combined storage of Lakes Buchanan and Travis is approximately 711,768 acre feet or 35% full.

5. Inflows to the Highland Lakes continue at record-low levels. Inflows in the first four months of 2014 are the lowest for these first four months in the historical record for the lakes, including the 1950's. The flows for those four months were only 10.3 percent of the historical average inflows for that period.

6. Monthly inflows into the Highland Lakes for this year have been 12,270, 9,489, 8,102, and 5,669 acre feet for January through April. Monthly inflows have been below average in 47 of the past 48 months.

7. As of May 1, 2014, the inflow deficit was 37 percent worse than the Drought of Record deficit reference (a requirement of declaring a Drought Worse than the Drought of Record).

8. The National Weather Service's three month lookout is for the drought to persist through July throughout the Texas Hill Country and to the west. The National Weather Service has issued an El Nino Watch, indicating that there is a greater than 50 percent chance an El Nino will develop within the next six months, which could cause a pattern of above-normal rainfall across Texas. If an El Nino develops this summer, its effects will not be felt across Texas until sometime in the fall or winter.

9. The Climate Prediction Center (CPC) monthly and seasonal outlooks call for equal chances of above, near, or below median precipitation across the central and southern Great Plains during May – July. The CPC monthly and seasonal temperature outlooks call for enhanced odds for above-normal temperatures which could intensify drought conditions.

10. LCRA's meteorologist, Bob Rose, expects a pattern of hotter than normal temperatures and below normal rainfall during June through August.

11. If severe drought conditions continue, the criteria for declaration of a Drought Worse than the Drought of Record may be met as early as June, 2014. There is a 38 percent chance that a DWDR will be declared by the end of October 2014.

12. The Governor of Texas issued an Emergency Disaster Proclamation on July 5, 2011, certifying that exceptional drought conditions posed a threat of imminent disaster in specified counties in Texas. This proclamation has been renewed monthly, most recently on May 9, 2014, and includes nearly all of the counties that contribute flows into or contain the Highland Lakes. These counties are in severe to extreme drought.

13. There is uncertainty as to what obligation LCRA may have to provide interruptible stored water after expiration of the February 27, 2014 emergency order. In May, crops that were started with groundwater could be switched to

surface water. LCRA may receive requests for water for supplemental uses such as row crops and later, for wildlife management. During a curtailment year, those requests are only considered if water is available in the canal system.

14. Notice regarding the Executive Director's consideration of this order was provided to the Governor of Texas by letter dated May 21, 2014.

II. CONCLUSIONS OF LAW

1. The Commission may issue an emergency order under Texas Water Code § 11.139 to amend a certificate of adjudication after notice to the Governor if the Commission finds that emergency conditions exist which present an imminent threat to the public health and safety and which override the necessity to comply with established statutory procedures and there are no feasible practicable alternatives to the emergency authorization. The order may be issued for 120 days, and may be extended for 60 days.

2. The Executive Director may issue an emergency order pursuant to Texas Water Code § 11.139 after notice to the Governor if an imminent threat to the public health and safety exists which requires emergency action before the Commission can take action and there are no feasible alternatives. The Executive Director can extend the order for 60 days.

3. A hearing to affirm, modify, or set aside the order for extension of the initial emergency order must be held by the Commission as soon as practicable, but not later than 20 days after the extension to the emergency order is granted.

4. The Findings of Fact in this order, including those Findings of Fact incorporated from the Commission's February 27, 2014 emergency order, show that the requirements of Texas Water Code § 11.139 continue to be met. Following the 2010 Water Management Plan with the ongoing drought and its effect on the water supply constitute an emergency that presents an imminent threat to the public health and safety. There are no practicable alternatives to this action.

5. Because conditions have remained the same or worsened since the Commission issued its emergency order on February 27, 2014, renewal of this emergency order is appropriate under the facts and the law.

6. A Commission hearing to affirm, modify, or set aside this order extending the February 27, 2014 emergency order will be held on June 4, 2014.

NOW, THEREFORE, BE IT ORDERED BY THE EXECUTIVE DIRECTOR OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1. The February 27, 2014 emergency order amending LCRA's Water Management Plan, Permit No. 5838, is extended through July 25, 2014.

2. This order extending the February 27, 2014 emergency order was issued without a hearing. A hearing to affirm, modify, or set aside this order extending the February 27, 2014 emergency order will be held before the Commission on June 4, 2014 at 9:30 a.m. The location of the hearing will be:

   Texas Commission on Environmental Quality
   12100 Park 35 Circle
   Building E, Room 210S
   Austin, Texas

3. The Chief Clerk of the Commission shall forward a copy of this order to all parties.

4. If any provision, sentence, clause, or phrase of this order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of this order.

Issue Date:

May 22, 2014

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Richard A. Hyde, P.E.
Executive Director

EXHIBIT A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER affirming in part and modifying in part the Executive Director's emergency order authorizing the Lower Colorado River Authority to amend its Water Management Plan, Permit No. 5838, pursuant to section 11.139 of the Texas Water Code; TCEQ Docket No. 2014-0124-WR; SOAH Docket No. 582-14-2123

On January 27, 2014, the Executive Director (ED) of the Texas Commission on Environmental Quality (TCEQ or Commission) granted an application by the Lower Colorado River Authority (LCRA) for an emergency order to amend its 2010 Water Management Plan (WMP), Permit No. 5838, under Texas Water Code §§ 5.501, 11.138, and 11.139, and the Governor's Emergency Disaster Proclamation relating to drought. On February 12 and 26, 2014, the Commission considered whether to affirm, modify, or set aside the emergency order that the ED granted. A proposal for decision (PFD) was presented by William G. Newchurch and Travis Vickery, Administrative Law Judges (ALJs) with the State Office of Administrative Hearings (SOAH), who conducted a hearing concerning the application on February 12, 17, and 18, 2014, in Austin, Texas.

After considering the ALJs' PFD, the Commission adopts Findings of Fact and Conclusions of Law and affirms in part and modifies in part the Executive Director's emergency order, as set out below:

I. FINDINGS OF FACT

1. On December 10, 2013, LCRA filed a request for an emergency order to amend its 2010 WMP to change requirements for the release of water to irrigation operations downstream in 2014 due to persistent drought conditions in LCRA's five Highland Lakes (Lakes Buchanan, Inks, LBJ, Marble Falls, and Travis). LCRA requested the authority to provide no interruptible stored water to its Gulf Coast and Lakeside Divisions and Pierce Ranch if the combined storage of Lakes Buchanan and Travis is below 1.1 million acre feet (AF). Additionally, it requested the stored water releases be smaller for combined storage levels above 1.1 million AF than those set forth in the 2010 WMP.

2. LCRA has not requested authorization to reduce the amount of water provided from Lakes Buchanan and Travis specifically for instream flow and freshwater inflow purposes below the levels required, in the absence of an emergency order, in the 2010 WMP.

LCRA'S Water Rights and 2010 Water Management Plan

3. LCRA has the right to divert and use up to 1.5 million AF from Lakes Buchanan and Travis under Certificates of Adjudication Nos. 14-5478 and 14-5482. By court order, LCRA has developed a WMP, Permit No. 5838, currently dated 2010, which is part of LCRA's Water Rights and is required by these certificates.

4. The Certificates of Adjudication and the 2010 WMP govern LCRA's operation of Lakes Buchanan and Travis and dictate how LCRA makes water available from these lakes to help meet "firm" water customer needs, downstream interruptible irrigation demands, and environmental flow needs of the lower Colorado River and Matagorda Bay.

5. Certificates of Adjudication Nos. 14-5478 and 14-5482 state that "LCRA shall interrupt or curtail the supply of water . . . pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demand for water under such certificates pursuant to all firm, uninterruptible water commitments." The WMP further describes how LCRA will manage and curtail supplies from the lakes during times of drought including through a repeat of the Drought of Record.

6. As established in the 2010 WMP, the combined firm yield of Lakes Buchanan and Travis is 535,812 acre feet per year (AFY). Of this amount, 90,546 AFY is committed to O.H. Ivie Reservoir, making 445,266 AFY of firm water supply available from Lakes Buchanan and Travis for LCRA's firm water customers.

7. As established in the 2010 WMP, until firm demand for water equals the combined firm yield, LCRA can supply water for irrigated agriculture on a limited basis. The maximum historical annual amount of reported firm water use from the firm supplies of Lakes Buchanan and Travis during 2000 through 2010 was 247,000 AF in 2011. The maximum interruptible water released from Lakes Buchanan and Travis during this same period occurred in 2011 and totaled about 433,000 AF. The maximum total amount released or used from the Highland Lakes, about 714,000 AF, occurred in 2011.

8. The firm water use by LCRA firm customers in 2012 from Lakes Buchanan and Travis was about 148,000 AF. An amount of 31,000 AF was supplied for the environment, and 9,000 AF of interruptible was supplied to farmers in the Garwood Irrigation Division. The total use for 2012 was about 188,000 AF. The firm water use by LCRA firm customers in 2013 from Lakes Buchanan and Travis was about 173,500AF; about 33,500 AF was supplied for the environment; and about 22,000 AF was supplied for the Garwood Irrigation Division. The total use in 2013 was about 229,000 AF.

9. To manage the supply, LCRA's 2010 WMP imposes several trigger points keyed to the total combined storage capacity of Lakes Buchanan and Travis that are intended to ensure the firm water supply is protected during droughts. The most relevant trigger points are set out in the following table:

Combined Storage of Lakes Buchanan and Travis	Date on Which Trigger is Decided	Action Taken
1.4 million acre feet	At any time	Request firm customers to implement voluntary drought response measures.
1.4 million acre feet	On Jan. 1	Environmental releases for instream flows reduced to meet critical needs for ecosystems for following year. Begin gradual curtailment of interruptible supply to four major irrigation operations.
900,000 acre feet	At any time	Request firm customers to implement mandatory water restrictions; develop firm customer curtailment plan.
600,000 acre feet	At any time	If criteria indicate a drought worse than the Drought of Record, then cease interruptible supply and begin curtailment of firm supply.

10. LCRA's 2010 WMP defines "Drought of Record" as "the drought that occurred during the critical drought period." "The Critical Drought Period" is defined as "the period of time during which the reservoir was last full and refilled, and the storage content was at its lowest minimum value."

11. Under the 2010 WMP, the LCRA Board may declare a Drought Worse than the Drought of Record (DWDR) if it finds that the following three conditions are simultaneously met:

    a. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both Lakes Buchanan and Travis were last full;

    b. Inflows to the lakes are less than inflows during the drought of record; and

    c. Lakes Buchanan and Travis combined storage has less than 600,000 AF of water.

12. Under the 2010 WMP, once a drought has lasted more than 36 months and a DWDR has been declared by the LCRA Board, the interruptible stored water would be fully and immediately curtailed – making no stored water available for agricultural irrigation or other interruptible uses until lake levels recover or the inflows into the lakes increase substantially. Moreover, LCRA will implement pro rata curtailment of its firm water users once a DWDR is declared and after interruptible stored water (agriculture) uses have been curtailed.

13. Prior to a declaration of a DWDR, LCRA is obligated by the 2010 WMP to provide at least some interruptible water to its four major irrigation operations.

Current Conditions

14. The combined storage of Lakes Buchanan and Travis on December 1, 2013, was 746,000 AF, or 37% full. On February 1, 2014, the combined storage was 764,000 AF, or 38% full. The combined storage fell to the lowest level in the current drought on September 19, 2013, which was 637,123 AF or 31.7% full.

15. The primary factors affecting the current combined storage levels have been (1) unprecedented low inflows in this current drought, (2) the interruptible stored water amounts authorized for release under current LCRA 2010 WMP, particularly in 2011, and (3) emergency orders issued by the Commission in 2012 and 2013.

16. It is not merely the amount of inflows, but also the management of the system over a multiyear period that greatly affects the lakes' combined storage. In recent years, emergency orders departing from the 2010 WMP have proven critical to that management.

17. On September 19, 2013, the combined storage of these reservoirs fell to the second lowest point in the history of these lakes—637,000 AF—nearing 30% capacity and just shy of the record low at 621,000 AF. Thus in September the lakes rapidly approached the 600,000 AF emergency level at which point the LCRA Board would have declared a DWDR. Continuing to curtail interruptible stored water releases under the exceptional circumstances presented by this drought, which would drive lake storage below 600,000 AF is critical to avoiding both an imminent threat to public health and safety and a situation whereby interruptible water supply releases would force declaration of a DWDR and drive firm customers into curtailment.

18. The inflows into the lakes are at record lows. Annual inflows into Lakes Buchanan and Travis in four of the last five years are among the ten lowest years of inflow on record. Inflows into the lakes in 2011 were the lowest annual inflows on record, about 10% of average inflows. Inflows in 2012 were the fifth lowest on record, and inflows in 2013 were the second lowest on record. January 2014 inflows of 11,763 AF were the lowest since the 1950's.

19. The inflows into Lakes Buchanan and Travis during the current drought have been lower for time periods ranging from 12 months to 72 months than the lowest inflows for periods of similar duration during the historic Drought of Record. The total inflows for the past 72 months were only about half of the lowest 72 month inflow period in the Drought of Record.

20. A ranking of the top ten lowest calendar year historical inflows since the reservoirs went into operation in the early 1940's shows that five of those years—2008, 2009, 2011, 2012 and 2013 occur in the current drought, and the top three years for lowest inflows—2011, 2013, and 2008 are all from the current drought. The recent year of 2006 is the fourth lowest.

21. The inflows for January 2014, at 11,763 AF, are lower than the inflows in either January 2011 (21,158 AF) or 2013 (15,117 AF), which are the two lowest inflow years on record. Historically a January with low inflows is usually followed by low inflows for both February and March. This data indicates a high likelihood of drought persistence in the near future.

22. Extraordinary drought conditions in the form of rainfall and extreme heat have existed in much of Texas, including the Colorado River Basin for nearly three years. State Climatologist, Dr. John Nielsen-Gammon, recognized 2011 as the worst one year statewide drought on record. 2011 was the second hottest year statewide, and was the hottest summer on record for both Austin and Texas. Year 2012 tied with 1921 as the hottest on record statewide.

23. Annual evaporation from LCRA's five Highland Lakes plus Lake Austin for 2010 through 2013 is set forth below:

Year	Total Evaporation
2010	183,923 acre feet
2011	192,404 acre feet
2012	144,759 acre feet
2013	120,899 acre feet

24. Although there has been close to normal rainfall in some places in Central Texas since 2011, these events have failed to produce significant inflows into Lakes Buchanan and Travis. The rainfall has been sporadic, and the soils have not remained saturated enough to allow for runoff in substantial amounts. Widespread heavy rains in the past few months have failed to produce significant inflows into the lakes.

25. This low inflow total is symptomatic of the drought's severity, including dry soils that absorb most of the rainfall that does occur. For example, heavy, widespread rainfall in the Llano River and San Saba River watersheds above the Highland Lakes on September 19 and 20, 2013, averaged two to three inches with some rain gages reporting totals as high as six or seven inches. However, this rain event only yielded approximately 24,000 AF of inflow to the lakes. By comparison, an event in March 2007 with about 40% less rainfall yielded almost 100,000 AF of inflows to Lakes Buchanan and Travis.

26. The weather forecasts do not indicate significant rainfall in the near future. Recent atmospheric and oceanic observations continue to indicate ENSO-neutral conditions and the outlook calls for this to persist into summer of 2014. The latest National Weather Service precipitation forecast indicates that precipitation across the Texas Hill Country is likely to remain normal with equal chances for above, below, or near normal precipitation. These forecasts indicate that the western edge of a below-average precipitation forecast area encroaches on Central Texas. This boundary does not quite reach areas which could produce significant inflows to Lakes Buchanan and Travis. It is not expected that precipitation will be heavy enough to cause significant drought improvement.

27. The most recent U.S. Seasonal Drought Outlook indicates the persistence of drought conditions above Lakes Buchanan and Travis through the end of April 2014. It is not expected that precipitation will be heavy enough to cause significant drought improvement. Climatological outlooks also indicate that temperatures will trend above normal through the summer, which tends to correlate with higher evaporation rates and lower overall precipitation.

28. The hydroclimatic conditions outlined above have created a circumstance where Lakes Buchanan and Travis have been unable to recover in any significant manner, even with an emergency cutoff of nearly all water supply for downstream irrigation in 2012 and 2013.

29. The first and second criteria for declaring a DWDR have been met. The drought has lasted for more than 24 months. Duration of drought for purposes of a DWDR declaration is determined by counting the number of consecutive months since both Lakes Buchanan and Travis were last full, which was February 13, 2005. The cumulative inflow deficit criterion has also been met.

30. The current drought conditions are outside the range of hydrologic conditions that were considered during formulation of the 2010 WMP.

31. The Governor of Texas issued an Emergency Disaster Proclamation on July 5, 2011, certifying that exceptional drought conditions posed a threat of imminent disaster in specified counties in Texas. This proclamation has been renewed monthly, most recently on February 14, 2014, and includes nearly every county bordering or that contributes inflow to the Highland Lakes. These areas are in severe drought or worse. The Emergency Disaster Proclamation also states that "As provided in Section 418.016 of the [Texas Government Code], all rules and regulations that may inhibit or prevent prompt response to this threat are suspended for the duration of the state of disaster."

LCRA's Firm Customers

32. LCRA provides raw water out of the combined firm yield of Lakes Buchanan and Travis to over 60 retail and wholesale potable water suppliers that together serve over one million people. In addition, LCRA provides water to several electric utilities from the firm water supply of Lakes Buchanan and Travis. These electric utilities provide electricity 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.

33. The 2010 WMP requires that firm customers (mainly cities and industries) be curtailed on a pro rata basis and that LCRA cease all releases for interruptible stored water (regardless of the impact on the crops) when a DWDR is declared.

34. If LCRA is required to follow the 2010 WMP and the drought continues, LCRA and its firm customers may need to acquire or develop large quantities of alternative water supplies to meet essential needs of their respective potable water systems. LCRA's firm customers are working on plans to implement curtailment and secure alternative supplies;

however many of LCRA's firm customers do not have any readily available alternative sources of water supply that could substitute for their reliance on the Colorado River, and these projects could take years to develop.

35. If LCRA is required to follow the 2010 WMP and the drought continues, LCRA will almost certainly have to:

    a. Begin releases of interruptible stored water to meet demands in the four irrigation operations for the 2014 crop;

    b. Probably reach the third (and final) criteria for DWDR conditions;

    c. Declare a DWDR;

    d. Cut off stored water for interruptible contracts, thereby ruining the crop already planted; and

    e. Curtail cities' and industries' water use by 20% or more.

36. Curtailments that would occur if combined storage drops substantially will result in reduced water supply to power plants, threatening their ability to generate electricity. Because LCRA's firm water customers would be required to cut back substantially if the drought persists under a DWDR declaration, municipal customers are likely to be forced to institute drought response measures that would include restrictions on indoor water use, resulting in threats to public health and safety.

37. Based on recent lake levels and the forecast, there is a chance of reaching conditions triggering a declaration of a DWDR as soon as May 2014 and greater than a one in two chance by late August.

38. In September 2013 the lakes came within 37,000 acre-feet of reaching the emergency level of 600,000 AF or 30% capacity and there has been very little recovery since then. In May 2012 the lakes refilled to an amount close 1.1 million AF (to 1.033 million AF on May 22, 2012) and yet without any release to Lakeside, Gulf Coast and Pierce Ranch the lakes dropped to the second lowest level on record of 637,000 AF on September 19, 2013, and came very close to falling below emergency levels. An emergency order in place in 2012 prevented such a release.

39. Water savings by Austin of an estimated 86,000 AF over the past two years played a key role in preventing combined storage from reaching the 600,000 AF level in September 2013.

40. The extraordinary magnitude of change in inflows since the drought of record upon which the 2010 WMP is based, in terms of how much lower the inflows have been in recent years, signals the need for great caution to be taken with regard to decisions concerning large releases to interruptible customers because they make it more probable that lake levels will not quickly recover once such releases occur.

41. Currently, LCRA owns four water systems that take raw water from Lakes Buchanan and Travis. LCRA also has 15 firm water customers that actively take raw water for municipal purposes from Lake Travis that are not a part of LCRA's utility facilities. The lowest pumping elevations of the intakes range from 555 feet mean sea level (msl) to 650 feet msl on Lake Travis. On January 9, 2014, the lake level at Travis was 628.45 msl. On February 15, 2014, the lake level at Lake Travis was 627.75 msl.

42. The lowest operating depths of the following raw water intakes owned and operated by LCRA's firm water customers on Lake Travis are as follows:

Brushy Creek Regional Utility Authority (BCRUA) = 620 ft-msl
Cedar Park (regular intake) = 615 ft-msl
Leander (regular intake) = 615 ft-msl
Lago Vista (Intake #1) = 612 ft-msl
Lago Vista (Intake #2) = 600 ft-msl
Jonestown WSC = 600 ft-msl
WCID 17 = 595 ft-msl
Lakeway MUD = 590 ft-msl
Cedar Park and Leander (joint emergency drought intake) = 590 ft-msl

43. In the absence of an emergency order, the raw water intakes owned and operated by LCRA's firm water customers on Lake Travis are projected to become inoperable as early as the following dates:

BCRUA = already inoperable and will remain inoperable
Cedar Park (regular intake) = inoperable by June 2014
Leander (regular intake) = inoperable by June 2014
Lago Vista (Intake #1) = inoperable by July 2014
Lago Vista (Intake #2) = inoperable by August 2014
Jonestown WSC = inoperable by August 2014
WCID 17 = inoperable by October 2014
Lakeway MUD= inoperable by December 2014
Cedar Park and Leander (joint emergency drought intake) = inoperable by December 2014.

44. The Windermere Oaks Water Supply Corporation (WOWSC) uses an intake barge to pump raw water from Lake Travis for its customers under an LCRA firm water contract. Although WOWSC has already modified its intake structure to operate in shallower water, lake level elevations of 618 ft- msl or lower present significant operating challenges. Groundwater is not feasible alternative water supply for WOWSC.

45. As lake levels drop, retail water suppliers are unable to pump water from the lakes. This causes wholesale raw water customers to either move intakes to reach the water, or obtain alternative sources. Smaller systems will likely have to haul water from a water utility with a viable source. If the lake levels drop more quickly than arrangements for alternative intakes or supplies can be implemented, LCRA water systems and its customers' water systems will have difficulty in meeting firm customers' water needs.

46. Low lake levels in Lake Travis have a direct impact on the ability of local emergency services personnel to fight structure fires and wildfires that may occur. In 2011, the Perdernales Fire Department, which serves western Travis County and relies primarily upon water from Lake Travis, was able to draft water from Lake Travis at multiple locations on the lake. As of February 17, 2014, the Fire Department had access to only one reliable water source at the lake. With these limitations, the Fire Department has experienced 45-minte turnaround times for trucks to bring water to a fire, and it has had to stop fighting a fire due lack of water in its trucks or helicopters. These circumstances constitute a current threat to the health and safety of residents served by the Perdernales Fire Department.

47. Combined storage levels are a strong indicator of an imminent threat to the public health and safety. However, given the rapid rise and fall of combined storage levels throughout the historical record, combined storage levels, in and of themselves, are insufficient to determine whether an imminent threat to the public health and safety exists.

Conservation and Drought Contingency Plan

48. LCRA's water conservation plan complies with TCEQ rules. LCRA has required its municipal customers to adopt conservation plans before there was a state requirement.

49. LCRA provides conservation program planning support for its customers. In 2012, LCRA began a rebate program for certain irrigation technologies and a wholesale customer cost-share program focused on conservation. LCRA has supported significant improvements in water use efficiency in rice irrigation systems, including volumetric pricing and canal rehabilitation.

50. LCRA was originally required to develop a Drought Contingency Plan (DCP) as a direct result of the court order adjudicating LCRA's water rights and the Texas Water Commission 1989 WMP Order.

51. When TCEQ adopted the Chapter 288 rules for DCPs, LCRA adopted separate stand alone DCPs relating to irrigation, municipal, and industrial operations that more specifically addressed the requirements of the Chapter 288 rules. LCRA incorporated all of the same triggers and criteria from the WMP into its Chapter 288 DCP. These DCPs were incorporated into Chapter 4 of the WMP.

52. LCRA adopted water use reduction targets including the following: water use reduction goals for firm water supply customers of 5 percent by asking firm customers to implement their voluntary water use reduction measures when the combined storage of Lakes Buchanan and Travis is less than 1.4 million AF; ten to twenty percent reduction goals by asking firm customers to implement their own mandatory water use reduction measures when combined storage levels fall below 900,000 AF; and a mandatory pro rata curtailment of firm water supplies for customers of 20 percent or more will be implemented when combined storage levels fall below 600,000 AF and other criteria are met for a drought more severe than the Drought of Record.

53. In August, 2011, LCRA called on its firm water customers to voluntarily implement mandatory water use restrictions under their DCPs to reduce water use by 10 to 20 percent.

54. LCRA has adopted additional changes to LCRA's raw water contract rules that include the procedures for implementing a pro rata curtailment of firm water customers. The rules also provide a surcharge to be set by the LCRA Board for unauthorized use of water (taking more water than authorized under a mandated curtailment of firm water supplies) and clarifying the drought contingency requirements related to golf course irrigation and recreational use.

55. LCRA's WMP requires LCRA to develop a stored water curtailment plan to be approved by the LCRA Board and TCEQ in response to combined storage dropping below 900,000 AF. TCEQ approved that plan for LCRA's firm customers in December of 2011.

56. LCRA has fully implemented its DCP. It requires all of its customers that currently divert and purchase water from LCRA to have a DCP. Most of these firm customers have stayed in some form of mandatory water restrictions, significantly limiting landscape irrigation. LCRA's industrial customers have worked to reduce non-essential water uses. Also, LCRA has had several meetings with firm customers in preparation for pro rata curtailment.

57. The LCRA Board approved a no more than once per week watering restriction that would take effect in March 2014 if combined storage is below 1.1 million AF and interruptible stored water to the Gulf Coast and Lakeside irrigation divisions and Pierce Ranch has been cut off. LCRA has not requested TCEQ approval of this action and this order does not address such action.

58. Just in the past 2 years Austin's conservation and drought measures have resulted in an estimated 86,000 AF savings. Austin hired outside consultants and participated in a rigorous process with LCRA to determine its annual conservation savings in preparation for possible pro-rata curtailment. This resulted in an estimated savings of 26,000 AF a year from conservation measures in place (52,000 in two years). In addition Austin has calculated its savings achieved from imposing drought measures for more than two years which includes a one-day a week watering schedule. This is estimated at 17,000 AF per year (34,000 AF in two years).

59. There has been a drop from Austin's highest recent year of 190 GPCD, in 2006, to the most recent year of 136 GPCD due to its conservation and drought measures.

60. Because the planning, permitting, and construction for developing large new water supplies for Austin and other large municipal areas is necessarily on a decades-long timeframe, a severe shortage in or total depletion of the already diminished supply within a few years due to an imminent release of interruptible stored water under LCRA's 2010 WMP is an imminent threat to public health and safety.

61. Health and safety consequences from supply shortages can start to be experienced long before a municipal water supply is totally depleted.

62. Water restrictions result in a drop in overall usage, which in turn impacts the amount of flow in the entire Austin Water Utility (AWU) system. The AWU system has more than 3,700 miles of water pipes and 39 storage tanks, which are designed to handle peak demands and fire flows. As flow decreases, AWU system's ability to handle peak demands and fire flows may be affected, which is an imminent threat to public health and safety.

63. Once combined storage levels have reached a point that will require Austin and other LCRA firm water customers, as a practical measure, to impose water rationing, then individual households will start to make choices in how to use that rationed amount of water. Over a vast population, some of those choices can be poor choices with regard to sanitation practices (for example deferring for too long certain sanitary uses of water) that can negatively impact public health and safety despite a utility's effort to educate its customers on safe practices.

64. Outdoor watering in a drought is critical to preserving trees and tree canopy important to human health in an urban environment, preventing home foundations from cracking, and avoiding negative health effects from landscaping dying off.

Alternatives

65. LCRA has evaluated many alternatives to address the emergency conditions that the drought presents. Alternatives explored include: Utilizing water from LCRA's other lakes, aggressive conservation, securing the Garwood right for purposes other than agriculture, interbasin transfers, and trucking in water from other sources. LCRA has evaluated many other alternatives to address the emergency conditions that the drought presents.

66. None of the alternatives LCRA has identified would avert the projected water supply shortage because most of the supplies identified would produce insufficient or uncertain quantities of supply, would create other operational issues for customers, may involve a lengthy permitting process (if not implemented on an emergency basis), or would take years to develop. None of the alternatives identified are feasible or practicable alternatives to the emergency authorization.

67. Amending downstream run of the river rights to allow diversion for new uses and at new locations would provide some supply, but the use of these rights alone is not – by itself – a feasible and practicable alternative to the emergency relief related to the 2010 WMP. All of the rights would require amendments to add diversion points, additional places of use, and possible storage. Also, the downstream run-of-river water rights are highly variable in terms of availability and quantity, and do not provide by themselves a sufficient quantity of water to eliminate the need for the emergency relief from the 2010 WMP as requested herein.

68. In 2012, LCRA supplied about 4,000 AF to firm customers downstream of Austin under temporary permits that would otherwise have been released from Lakes Buchanan and Travis. In 2013, LCRA supplied about 1,000 AF to such customers under such

temporary permits. While this was beneficial, temporary permits are not sufficient replacement for water lost if releases are required.

69. A twenty percent reduction in water use by firm customers will require difficult measures. There may be dramatic reductions in outdoor water use. However, none of these measures will occur quickly enough to help lake levels. Some LCRA customers, such as Austin, have achieved water savings through reductions in water use. Most industrial customers would have to implement the full twenty percent reduction more immediately and this likely means a curtailment in annual production.

70. LCRA is pursuing a formal amendment to its 2010 WMP but that process will not be completed in time to address LCRA's requested relief. LCRA filed an application to amend its 2010 WMP on March 12, 2012. TCEQ prepared a draft permit for LCRA comment on October 12, 2012. Notice of the application was sent to all water right holders in the Colorado River Basin and published in local newspapers in April, 2013. May 28, 2013, was the last date to request a public meeting or a contested case hearing, or comment on the application. On June 3, 2013, the ED advised LCRA that he would not be forwarding the application to the Commission at this time, and that his staff would be conducting further review on the application.

71. There is no feasible practicable alternative for Austin on short order to replace its water supply should it be depleted in a few years to the point of drastic shortages by large interruptible water releases during a period of record low inflows. Although Austin has made very earnest efforts to identify alternative water supplies, a replacement water supply for 1 million people cannot be identified and developed in a few years. Austin has identified only very small amounts of water that may be able to be purchased for exorbitantly expensive prices. The small amounts do not sufficiently address the health and safety risks and the exorbitant prices do not make these practicable alternatives.

72. An interruptible stored water curtailment trigger should be set to avert, rather than create, conditions that could require declaration of a DWDR.

73. LCRA staff performed analyses to determine whether lesser amounts of combined stored water than 100,000 AF could be supplied to Gulf Coast, Lakeside, and Pierce Ranch at lower combined storage trigger levels. The results showed that these alternatives were not practicable because the small amount of water that could be made available would result in significant losses and difficulties maintaining the canal water levels for the movement of water.

Relief Requested

74. LCRA's requested curtailment approach for 2014 is more restrictive than the curtailment triggers in emergency orders issued by the Commission in 2012 and 2013. The 850,000 AF trigger in effect in 2012 and 2013 was based on avoiding the potential for dropping below 600,000 AF during the first crop of the season. Under LCRA's current approach, before the releases for interruptible water users are made, LCRA requests a combined storage trigger increase to a level that puts off the possibility of storage falling below 600,000 AF until spring of 2015.

75. LCRA has determined that if the combined storage is less than 1.1 million AF, providing even some stored water releases to Gulf Coast, Lakeside, and Pierce Ranch operations amplifies the risk of a DWDR declaration before spring 2015.

76. LCRA requests TCEQ to issue an emergency order to deviate from the 2010 WMP as it pertains to the determination of interruptible supply for 2014 and instead provide interruptible stored water based on the combined storage of Lakes Buchanan and Travis on March 1, 2014 at 11:59 p.m. as follows:

    a. Provide no interruptible stored water to customers within the LCRA Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is below 1.1 million AF;

    b. Provide up to 100,000 AF of interruptible stored water for diversion by customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is at or above 1.1 million AF but below 1.2 million AF;

    c. Provide up to 124,000 AF of interruptible stored water for diversion by customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is at or above 1.2 million AF, but below 1.3 million AF;

    d. Provide up to 148,000 AF of interruptible stored water for diversion by customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is at or above 1.3 million AF but below 1.4 million AF; and

    e. Provide up to 172,000 AF of interruptible stored water for diversion by customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is at or above 1.4 million AF.

77. LCRA will also provide interruptible stored water to the Garwood Irrigation Division and Pierce Ranch, to the extent required by their contracts.

Notice to the Governor

78. Notice regarding the ED's consideration of this emergency order was provided to the Governor of Texas by letter dated January 23, 2014.

Procedure

79. On January 23, 2014, LCRA filed with the ED a supplement to its request for an emergency order.

80. On January 27, 2014, the ED considered LCRA's December 10, 2013 request and January 23, 2014 Supplement and issued an order granting an emergency authorization to the LCRA to amend its WMP, Permit No. 5838, pursuant to section 11.139 of the Texas Water Code.

81. The January 27, 2014 ED's Emergency Order included notice that the Commission would hold a hearing on February 12, 2014, to affirm, modify, or overturn the Order.

82. On January 24, 2014, the Chief Clerk of the Commission mailed notice of the Commission's February 12, 2014 hearing as required by law. The mailed notice stated: "Under 30 Tex. Admin. Code § 295.174, there is no right to a contested case hearing on this emergency order."

83. On February 10, 2014, LCRA submitted a second supplement to its request for emergency authorization.

84. On February 12, 2014, the Commission convened a public hearing on this matter, Chairman Shaw presiding. Commissioner Baker participated. Commissioner Covar recused himself. ALJ Newchurch was present throughout the public hearing, at the Commission's request.

85. The Commission and ALJ Newchurch heard over four hours of unsworn public comments about the Executive Director's Emergency Order. At the end of the public comment, the Commission discussed the matter with ALJ Newchurch and offered their preliminary view on the matter. The Commission then voted to refer the matter to SOAH for an evidentiary hearing to convene immediately. They also instructed ALJ Newchurch to submit a PFD to the Commission no later than February 21, 2014. The Commission stated that consideration of the PFD would be on its February 26, 2014 agenda.

86. ALJs Newchurch and Vickery reconvened the hearing on February 12, 2014. They admitted parties and other procedural matters were considered.

87. The following are parties in this case:

PARTY	**REPRESENTATIVE**
Lower Colorado River Authority (LCRA)	Lyn Clancy & Greg Graml
Executive Director (ED) of the TCEQ	Robin Smith
Office of Public Interest Counsel (OPIC)	Blas Coy & Vic McWherter
City of Austin	Ross Crow & Mary K. Sahs
Colorado Water Issues Committee (CWIC)	Carolyn Ahrens & Michael J. Booth
Central Texas Water Coalition (CTWC)	Cynthia C. Smiley, Shana Horton, & Frank Cooley
Highland Lakes Firm Water Customer Cooperative (Highland)	Patricia Carls & Carla Connolly
Texas Parks & Wildlife Department (TPWD)	Collette Baron Bradsby & James B. Murphy
National Wildlife Federation (NWF)	Myron Hess
Lehner/Lewis Interests & Garwood Irrigation (Garwood)	Molly Cagle & Samia Rogers
Clive Runnells d/b/a AP Ranch (AP Ranch)	Charles W. Irvine & Mary Carter

88. LCRA paid the cost of transcribing the hearing and expediting delivery of the transcript, and has not asked for any part of that cost to be allocated among the other parties.

II. CONCLUSIONS OF LAW

1. The ED may issue an emergency order under Texas Water Code § 11.139 to amend a permit or certificate of adjudication for 120 days after notice to the Governor if the ED finds that emergency conditions exist which present an imminent threat to the public health and safety which requires immediate action before the Commission can take action and there are no feasible practicable alternatives to the emergency authorization.

2. The Commission may issue an emergency order under Texas Water Code § 11.139 to amend a permit or certificate of adjudication for 120 days after notice to the Governor if the Commission finds that emergency conditions exist which present an imminent threat to the public health and safety and which override the necessity to comply with established statutory procedures and there are no feasible practicable alternatives to the emergency authorization.

3. LCRA is obligated under a 1988 court order and Certificates of Adjudication Nos. 14-5478 and 14-5482 to meet the demands of its firm, non-interruptible water supply customers 100% of the time without shortage through a repeat of the conditions in the Drought of Record.

4. The Findings of Fact show that the requirements of Texas Water Code § 11.139 have been met. Following the 2010 Water Management Plan with the ongoing drought and its effect on the water supply constitute an emergency that presents an imminent threat to the public health and safety. There are no practicable alternatives to this action.

5. The ED had the authority to issue the Emergency Order.

6. The Commission must consider whether to affirm, modify, or set aside an emergency order issued by the ED under Section 11.139 of the Texas Water Code no later than 20 days after the ED issues the order.

7. LCRA has the burden of proving that an emergency order should be granted.

8. The Commission in issuing an emergency order under Texas Water Code § 11.139 must ensure that the relief granted is adequate and tailored to address the imminent threat to public health and safety.

9. LCRA's application for an emergency order should be granted in part and the ED's Emergency Order should be affirmed in part and modified in part as set out below.

10. LCRA should pay the full cost of transcribing the hearing in this case.

11. By entering this order, the Commission is not construing in any way either the 1987 Agreement or the 1998 Purchase Agreement between LCRA and Garwood Irrigation Company. Nothing in this Order shall be considered or construed in any way to support one construction or another of the 1987 Agreement and the 1998 Purchase Agreement between LCRA and Garwood Irrigation Company.

III. EXPLANATION OF CHANGES

1. As directed by the Commission at its February 26, 2014 agenda, the Office of the General Counsel has made the necessary revisions to the ALJs' Proposed Order to effectuate the Commission's decision. Specifically, Findings of Fact, Conclusions of Law, and Ordering Provisions have been renumbered to reflect the Commission's revisions to the ALJs' Proposed Order. Thus, references in this section to Findings of Fact, Conclusions of Law, and Ordering Provisions refer to the provisions as renumbered by the Office of the General Counsel, except with respect to stricken provisions. In instances where this section references stricken provisions, the original numbering of the provisions by the ALJs in their Proposed Order is utilized.

2. On February 26, 2014, the ALJs distributed a letter with the ALJs' recommendations with respect to the parties' exceptions to their proposal for decision. In their presentation, the ALJs explained that these recommended revisions to their Proposed Order were supported by the evidence in the record. Accordingly, the Commission made the following revisions to the ALJs' proposed order: 1) Finding of Fact No. 3 is revised, as requested in the ED's exceptions; 2) Findings of Fact Nos. 8, 17, 29, 39, 43, 51, and 57, are revised, as requested in LCRA's exceptions; 3) Findings of Fact Nos. 44 and 46 are added as new Findings of Fact, as requested in CTWC's exceptions; and 4) original Finding of Fact No. 2a was relocated as Ordering Provision No. 6a, now renumbered as Ordering Provision No.7.

3. During the Agenda meeting, the Commission discussed that given the current conditions, the current lake levels, the forecasted weather, and the limited time between the agenda meeting and the March 1, 2014 trigger date that there is no need to establish a specific combined storage level as a trigger for this emergency order. The Commission also indicated that they must take only the action necessary to address the imminent threat to public health and safety. Therefore, the Commission decided to remove references to trigger levels from the ALJs' proposed order. Accordingly, the Commission struck Findings of Fact Nos. 30a, 30b, 30c, 30f, 30g, 31c, 45a, 49, 49a, and 49b, and struck the last sentence of Finding of Fact No. 38.

4. The Commission made several revisions to provide increased clarity to the ALJs' proposed order and to remove redundant provisions. Therefore, the Commission in its motion, struck Findings of Fact Nos. 41a, 42f, 42g and Ordering Provision No. 8; and revised Findings of Fact Nos. 7, 17, and 22. Additionally, Ordering Provision No. 3 was revised to reflect that the emergency order is final and effective on the date of issuance, pursuant to Texas Government Code § 2001.144(a)(3). Finally, the Commission revised Finding of Fact No. 78 to include the specific date on which notice was provided to the Governor of Texas.

5. In response to the exception filed by CWIC, the Commission struck the last part of the last sentence of Finding of Fact No. 17. Specifically, the Commission struck the words, "...in contravention of the 1988 Order and Certificates of Adjudication Nos. 14-5478 and 14-5482" as unnecessary to its decision to address the imminent threat to public health and safety in this matter.

6. The Commission stated in their deliberation that an automatic renewal is not appropriate in this emergency order given the variability of the specific facts and circumstances relating to the imminent threat to public health and safety in this matter. For this reason, the Commission added Finding of Fact No. 47, which reads, "Combined storage levels are a strong indicator of an imminent threat to the public health and safety. However, given the rapid rise and fall of combined storage levels throughout the historical record, combined storage levels, in and of themselves, are insufficient to determine whether an imminent threat to the public health and safety exists." In addition, the Commission added new Conclusion of Law No. 8, which reads, "The Commission in issuing an order under Texas Water Code § 11.139 must ensure that the relief granted is adequate and tailored to address the imminent threat to public health and safety."

7. Based on the Commission determination that all requirements of Texas Water Code § 11.139 have been met, and the Commissions' determination to remove references in the ALJs' proposed order to trigger levels, the Commission revised Ordering Provision No. 1 to read, "LCRA's 2010 WMP is amended to alleviate LCRA from any obligation to provide interruptible stored water to customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch for the duration of this emergency order."

NOW, THEREFORE, BE IT ORDERED BY THE COMMISSION OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1. LCRA's 2010 WMP is amended to alleviate LCRA from any obligation to provide interruptible stored water to customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch for the duration of this emergency order.

2. LCRA may provide interruptible stored water to the Garwood Irrigation Division and Pierce Ranch, to the extent required by their contracts.

3. Pursuant to Texas Government Code § 2001.144(a)(3), this emergency order is final and effective on the date of issuance.

4. This emergency order terminates on May 26, 2014. However, this emergency order may be renewed once for no more than 60 days.

5. This emergency order only addresses the specific relief requested from LCRA and is not meant as precedent for amendments to LCRA's WMP or future emergency relief.

6. If any provision, sentence, clause, or phrase of this emergency order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of this emergency order.

7. This emergency order does not alter LCRA's obligations to provide water specifically for instream flow or freshwater inflow purposes pursuant to the 2010 WMP.

8. LCRA shall pay the full cost of transcribing the hearing in this case.

9. All other motions, requests for entry of specific Findings of Fact or Conclusions of Law, and any other requests for general or specific relief not expressly granted herein, are hereby denied for want of merit.

10. The Chief Clerk of the Texas Commission on Environmental Quality shall forward a copy of this Order to the parties.

Issue Date: FEB 27 2014

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Bryan W. Shaw

Bryan W. Shaw, Ph.D., P.E. Chairman

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER granting an emergency authorization to the Lower Colorado River Authority to amend its Water Management Plan, Permit No. 5838, pursuant to Section 11.139 of the Texas Water Code; TCEQ Docket No. 2013-0225-WR.

On July 26, 2013, the Texas Commission on Environmental Quality (TCEQ or Commission) considered the Lower Colorado River Authority's (LCRA) request under Texas Water Code §§ 5.501, 11.138, and 11.139 and the Governor's Emergency Disaster Proclamation related to drought for an emergency order to amend its 2010 Water Management Plan, Permit No. 5838.

Over the last year, the TCEQ has responded to similar requests from LCRA for such emergency authorization. Specifically, the Executive Director (ED) issued an emergency order on January 29, 2013, and the Commission affirmed and modified the emergency order on February 19, 2013. LCRA filed a request to extend the order, and the ED extended the emergency order on May 17, 2013, effective May 29, 2013. On June 10, 2013, the Commission issued an order affirming and modifying the ED's extension of the order, changing the extension termination date to July 29, 2013.

On July 2, 2013, LCRA filed the application for a new emergency order to suspend any obligation LCRA might have under the 2010 Water Management Plan to release interruptible stored water through the remainder of 2013 irrigation season consistent with the prior emergency orders issued in 2013. LCRA's application is attached to this order as Exhibit A and incorporated herein by reference. LCRA subsequently made a clarification to the application on July 10, 2013, via email and that email is attached to this order as Exhibit B and incorporated herein by reference.

The Commission has jurisdiction to consider this matter and makes the following Findings of Fact and Conclusions of Law.

FINDINGS OF FACT

LCRA's Water Rights and 2010 Water Management Plan:

1. On July 2, 2013, LCRA requested emergency relief from the TCEQ related to its Water Management Plan due to persistent drought conditions in the Highland Lakes.

2. LCRA has the right to divert and use up to 1.5 million acre feet (MAF) from Lakes Buchanan and Travis under Certificates of Adjudication Nos. 14-5478 and 14-5482. By court order, LCRA has developed a Water Management Plan (WMP), Permit No. 5838, currently dated 2010, which is part of these certificates.

3. The Certificates of Adjudication and the 2010 WMP govern LCRA's operation of Lakes Buchanan and Travis and dictate how LCRA makes water available from these lakes in order to meet "firm" water customer needs, downstream interruptible irrigation demands, and environmental flow needs of the lower Colorado River and Matagorda Bay.

4. Certificates of Adjudication 14-5478 and 14-5482 state that "LCRA shall interrupt or curtail the supply of water . . . pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demand for water under such certificate pursuant to all firm, uninterruptible water commitments." The WMP further describes how LCRA will manage and curtail supplies from the lakes during times of drought including through a repeat of the Drought of Record.

5. As established in the 2010 WMP, the combined firm yield of Lakes Buchanan and Travis is 535,812 acre-feet per year (AFY). Of this amount, 90,546 AFY is committed to O.H. Ivie Reservoir, making 445,266 AFY of firm water supply available from Lakes Buchanan and Travis for LCRA to help meet the firm water needs of its customers.

6. As established in the 2010 WMP, until firm demand for water equals the combined firm yield, LCRA can supply water for irrigated agriculture on an interruptible basis. The maximum historical annual amount of reported firm water use from the firm supplies of Lakes Buchanan and Travis during 2000 through 2010 was 247,000 acre-feet in 2011. The maximum interruptible amount of water released from Lakes Buchanan and Travis during this same period occurred in 2011 and totaled about 433,000 acre-feet. The maximum total amount released or used from the Highland Lakes, about 714,000 acre-feet, occurred in 2011.

7. To manage the supply, the 2010 WMP imposes several trigger points keyed to the total combined storage capacity of Lakes Buchanan and Travis that are intended to ensure the firm water supply is protected during droughts. The most relevant trigger points are set out in the following table:

Combined Storage of Lakes Buchanan and Travis	**Date on Which Trigger is Decided**	**Action Taken**
1.4 MAF	At any time	Request firm customers to implement voluntary drought response measures.
1.4 MAF	On Jan. 1	Environmental releases for instream flows reduced to meet critical needs for ecosystems for following year. Begin gradual curtailment of interruptible supply to four major irrigation operations.
900,000 acre-feet	At any time	Request firm customers to implement mandatory water restrictions; develop firm customer curtailment plan.
600,000 acre-feet	At any time	If criteria indicates a drought worse than the Drought of Record, then cease interruptible supply and begin curtailment of firm supply.

8. LCRA's 2010 Water Management Plan defines "Drought of Record" as "the drought that occurred during the critical drought period." "The Critical Drought Period" is defined as "the period of time during which the reservoir was last full and refilled, and the storage content was at its lowest minimum value."

9. The LCRA Board may declare a Drought Worse than the Drought of Record if it finds that the following three conditions are simultaneously met:

   a. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both Lakes Buchanan and Travis were last full;

   b. Inflows to the lakes are less than inflows during the drought of record; and

   c. Lakes Buchanan and Travis combined storage has less than 600,000 acre-feet of water.

10. Under the 2010 WMP, once a drought has lasted more than 36 months and a Drought Worse than Drought of Record has been declared by the LCRA Board, the interruptible stored water would be fully and immediately curtailed – making no stored water available for agricultural irrigation or other interruptible uses until lake levels recover or the inflows into the lakes increase substantially. Moreover, LCRA will implement pro rata curtailment of its firm water users once a Drought Worse than Drought of Record is declared and after interruptible stored water (agriculture) uses have been curtailed.

11. Prior to a declaration of a Drought Worse than Drought of Record, LCRA is obligated by the 2010 WMP to provide at least some interruptible water to its four major irrigation operations. The allocation of interruptible water is determined by the LCRA Board of Directors in November, based on projections of the amount expected to be in the combined storage of Lakes Buchanan and Travis on January 1 of the following year. Using January 1 storage, the amounts available under the 2010 WMP follow a sliding scale. Thus, the decision regarding curtailment of interruptible supplies to the four major irrigation operations is keyed to the January 1 storage levels.

Current Conditions

12. Extraordinary drought conditions continue in the area, with record high temperatures, record low inflows to the Highland Lakes, dry conditions upstream of the Highland Lakes, and low rainfall.

13. Inflows into the Highland Lakes in 2013 continue at record low levels. Annual inflows into Lakes Buchanan and Travis in four of the last five years are among the ten lowest years of inflow on record. Inflow in 2013, if continuing at the existing rates, will be among the lowest on record. June 2013 inflows were only 3.5 percent of the historic average for June and were the lowest monthly inflows of the year.

14. The inflows in to Lakes Buchanan and Travis for the past 36 and 60 months are the lowest over a similar time period in the historic record. The past 60 months of inflows are only 52 percent of the lowest inflows in any 60 month period in the historic Drought of Record which occurred from 1947 - 1957. To illustrate further, the lowest 60 month consecutive inflows into the Highland Lakes in acre-feet are as follows:

60-month period ending:	60-month inflow amount:
June 2013	2,150,784
September 1984	3,862,234
October 1967	4,029,989
August 1952	4,128,806

15. Extraordinary drought conditions have existed in much of Texas, including the Colorado River Basin for nearly three years. Although there has been close to normal rainfall in some places in the last 18 months, these events have failed to produce significant inflows into Lakes Buchanan and Travis.

16. High temperatures have also been unprecedented in the summers of 2011 and 2012. The summer of 2011 was the hottest ever recorded in Texas, including Austin.

17. The recent weather forecasts do not indicate significant rainfall in the near future. For the fall of 2013, a pattern of near to below normal rainfall is expected.

18. The hydroclimatic conditions outlined above have created a circumstance where Lakes Buchanan and Travis have been unable to recover in any significant manner, even with an emergency cutoff of nearly all water supply for downstream irrigation in 2012 and the first half of 2013. The lakes are approximately 37% full at this time.

19. The first and second criteria for a Drought Worse than the Drought of Record have been met; more specifically, the drought has lasted for more than 24 months, and the cumulative inflow deficit criteria have been met.

20. If extraordinary drought conditions continue, the criteria for declaration of a Drought Worse than the Drought of Record may be met as early as September, 2013, and there is a one in four chance of these criteria being met by December 31, 2013. Additional releases of interruptible water would add to the risk that a Drought Worse than Drought of Record will be declared in the next few months.

21. The Governor of Texas issued an Emergency Disaster Proclamation on July 5, 2011, certifying that exceptional drought conditions posed a threat of imminent disaster in specified counties in Texas. This proclamation has been renewed monthly, most recently on June 14, 2013, and includes every county bordering or that contributes inflow to the Highland Lakes. These areas are in severe drought or worse. The Emergency Disaster Proclamation also states that as "...provided in Section 418.016 of the code, all rules and regulations that may inhibit or prevent prompt response to this threat are suspended for the duration of the state of disaster."

Imminent Threat To Public Health And Safety

22. LCRA provides raw water out of the combined firm yield of Lakes Buchanan and Travis to 64 retail and wholesale potable water suppliers that together serve over one million people. In addition, LCRA provides water to several electric utilities from the firm water supply of lakes Buchanan and Travis. These electric utilities provide electricity 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.

23. The current drought conditions are outside the range of hydrologic conditions that were considered during formulation of the 2010 WMP.

24. If LCRA had released interruptible water to agriculture users, it could have resulted in the combined storage dropping to 600,000 acre feet by July 2013, and LCRA having to declare a Drought Worse than the Drought of Record.

25. The 2010 WMP requires that firm customers (mainly cities and industries) be curtailed on a pro rata basis and that LCRA cease all releases for interruptible stored water (regardless of the impact on the crops) when a Drought Worse than the Drought of Record is declared.

26. If LCRA is required to follow the 2010 Water Management Plan and the drought continues, LCRA and its firm customers may need to acquire or develop large quantities of alternative water supplies to meet essential needs of their respective potable water systems. Many of LCRA's firm customers do not have any readily available alternative sources of water supply that could substitute for their reliance on the Colorado River, and these projects could take years to develop. Following the 2010 Water Management Plan under current drought conditions could pose an imminent threat to firm customers served by LCRA from Lakes Buchanan and Travis.

27. Currently, LCRA owns five systems that take raw water from Lakes Buchanan and Travis. LCRA also has twelve customers that actively take raw water for municipal purposes from Lake Travis that are not a part of LCRA's utility facilities. The lowest pumping elevations of the intakes range from 555 feet mean sea level (msl) to 660 feet msl on Lake Travis.

28. As lake levels drop, retail water suppliers are unable to pump water from the lakes. This causes firm customers to either spend funds to reach the water, or obtain alternate sources. Smaller systems will likely have to haul water from a water utility with a viable source. If the lake levels drop more quickly than arrangements for alternative intakes or supplies can be implemented, the situation presents an imminent threat to public health and safety for the LCRA water systems and for its customers' water systems.

29. Allowing any additional release of interruptible stored water would amplify the risk of LCRA declaring a Drought Worse than the Drought of Record and shorten the timeframe that LCRA and its firm customers have to prepare for such an occurrence. Without emergency authorization to suspend any obligations to release interruptible stored water under the 2010 WMP, farmers who have started crops on groundwater or run-of-the-river water may seek to compel LCRA to make interruptible stored water available.

Drought Contingency Plan

30. LCRA's Drought Contingency Plan (DCP) is contained in Chapter 4 of the 2010 WMP. LCRA was originally required to develop a DCP as a direct result of the court order adjudicating LCRA's water rights and the Texas Water Commission 1989 WMP Order.

31. When LCRA was required under the TCEQ's Chapter 288 rules to develop and implement a DCP, LCRA incorporated all of the same triggers and criteria from the approved WMP into its DCP and elaborated on the details of how pro rata curtailment of interruptible customers might occur to comply with the additional requirement of the TCEQ's Chapter 288 rules.

32. LCRA's current WMP incorporates the Chapter 288-required DCP in Chapter 4 of its WMP. Chapter 4 also complies with TCEQ's DCP rules.

33. In June 2010, LCRA adopted additional changes to LCRA's raw water contract rules that include the procedures for implementing a pro rata curtailment of firm water customers. The 2010 WMP includes a requirement that LCRA develop a stored water curtailment plan to be approved by the LCRA Board and TCEQ in response to combined storage dropping below 900,000 acre feet. TCEQ approved LCRA's water curtailment plan for its firm customers in December 2011.

34. In August, 2011, LCRA called on its firm water customers to voluntarily implement mandatory water use restrictions under their DCPs to reduce water use by 10 to 20 percent.

35. LCRA has fully implemented its DCP. It requires all of its customers that currently divert and purchase water from LCRA to have a DCP. Most of these firm customers have stayed in some form of mandatory water restrictions, significantly limiting landscape irrigation. LCRA's industrial customers have worked to reduce non-essential water uses. Also, LCRA has had several meetings with firm customers in preparation for pro rata curtailment and additional meetings are scheduled for July and August.

Feasible Alternatives

36. LCRA has evaluated many alternatives to address the emergency conditions that the drought presents. Alternatives explored include: Utilizing water from LCRA's other lakes, aggressive conservation, securing the Garwood right for purposes other than agriculture, interbasin transfers, and trucking in water from other sources.

37. None of the alternatives LCRA has identified would avert the projected water supply shortage because most of the supplies identified would produce insufficient or uncertain quantities of supply, would create other operational issues for customers, involve a lengthy permitting process (if not implemented on an emergency basis), or would take years to develop. None of the alternatives identified are feasible or practicable alternatives to the emergency authorization.

38. LCRA has, to this point, fully implemented its Drought Contingency Plan. All of LCRA's customers that currently divert and purchase water from LCRA must have a drought contingency plan. All of those customers have plans on file. LCRA has also implemented several conservation projects over the years.

39. Amending downstream run of the river rights to allow diversion for new uses and at new locations would provide some supply, but the use of these rights alone is not – by itself – a feasible and practicable alternative to the emergency relief related to the 2010 WMP. All of the rights would require amendments to add diversion points, additional places of use, and possible storage. Also, the downstream run-of-river water rights are highly variable in terms of availability and quantity, and do not provide by themselves a sufficient quantity of water to eliminate the need for the emergency relief from the 2010 WMP.

40. A twenty percent reduction in water use by firm customers will require some difficult measures. There may be dramatic reductions in outdoor water use. However, none of these measures will occur quickly enough to help lake levels.

41. LCRA is actively pursuing a formal amendment to its 2010 WMP but that process will not be completed in time to address LCRA's requested relief. LCRA filed an application to amend its 2010 Water Management Plan on March 12, 2012. TCEQ prepared a draft permit for LCRA comment on October 12, 2012. Notice of the application was sent to all water right holders in the Colorado River Basin and published in local newspapers in April, 2013. Following the end of the comment period, on June 3, 2013, the TCEQ Executive Director advised LCRA that he would not be forwarding the application to the Commission at this time, and that his staff would be conducting further review on the application.

Relief Requested

42. LCRA requests TCEQ to issue a new emergency order suspending any obligation LCRA might have under the 2010 WMP to release interruptible stored water through the remainder of the 2013 irrigation season consistent with the prior emergency orders issued in 2013.

Notice

43. Notice was provided to the Governor regarding the Commission's consideration of this emergency order. Notice of the Commission's July 26, 2013 agenda setting for this matter was sent to all water right holders of record in the Colorado River Basin at least ten days before the meeting.

CONCLUSIONS OF LAW

1. The Commission may issue an emergency order under Texas Water Code § 11.139 to amend a certificate of adjudication after notice to the Governor if the Commission finds that emergency conditions exist which present an imminent threat to the public health and safety and which override the necessity to comply with established statutory procedures and there are no feasible practicable alternatives to the emergency authorization.

2. The Findings of Fact show that the requirements of Conclusion of Law No. 1 have been met. The Commission has the authority to issue this emergency order.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1. LCRA is under no obligation under the 2010 WMP to provide interruptible stored water outside of the Garwood irrigation division for any purpose during the term of this order.

2. This emergency order is final and effective on July 30, 2013.

3. This emergency order terminates in 120 days, or November 27, 2013.

4. This emergency order may be renewed once for no more than 60 days.

5. The Chief Clerk of the Commission shall forward a copy of this emergency order to all parties.

6. If any provision, sentence, clause, or phrase of this emergency order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of this emergency order.

Issue Date:

JUL 26 2013

Effective Date:

July 30, 2013

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Bryan W. Shaw, Ph.D., Chairman

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER affirming, with modification, an Emergency Order granted by the Executive Director to the Lower Colorado River Authority; TCEQ Docket No. 2013-0225-WR.

On June 5, 2013, the Texas Commission on Environmental Quality (Commission) considered whether to affirm, modify, or set aside an Emergency Order issued by the Executive Director to the Lower Colorado River Authority (LCRA) to extend the duration of an Emergency Order issued to LCRA to amend its Water Management Plan, Permit No. 5838, for curtailment of interruptible stored water. The Executive Director issued the Emergency Order on May 17, 2013 after providing notice to the Governor on May 13, 2013. Notice of the hearing to affirm, modify, or set aside the Emergency Order was mailed to the water right holders in the Colorado River Basin more than ten days before the hearing. The Commission finds that the Executive Director appropriately issued the Emergency Order and that the requirements for an Emergency Order in Tex. Water Code § 11.139 have been satisfied. However, the Commission finds that the duration of the extension of the Emergency Order as issued by the Executive Director exceeds the limits of Tex. Water Code § 11.139. In order to address the above extension issue, the Commission revises Ordering Provision No. 1.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

The Emergency Order, attached hereto as Exhibit A and incorporated into this Order by reference, is affirmed, but modified as follows:

a. Ordering Provision No. 1 is revised to read, "The emergency order amending LCRA's Water Management Plan, Permit No. 5838, as modified by the Commission, is extended through July 29, 2013."

Issue date: JUN 10 2013

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Bryan W. Shaw

Bryan W. Shaw, Ph.D., Chairman

EXHIBIT A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER extending an emergency authorization to the Lower Colorado River Authority to amend its Water Management Plan, Permit No. 5838, pursuant to section 11.139 of the Texas Water Code

On May 17, 2013, the Executive Director of the Texas Commission on Environmental Quality (Commission) considered a request from the Lower Colorado River Authority (LCRA) for an extension of an emergency order issued to LCRA under TEX. WATER CODE §§ 5.501, 11.138, and 11.139 to amend its Water Management Plan, Permit No. 5838.

On January 29, 2013, the Executive Director issued an emergency order to LCRA under TEX. WATER CODE § 11.139 to amend its Water Management Plan, Permit No. 5838. That emergency order is attached hereto and incorporated herein by reference as Exhibit A. At its February 13, 2013 agenda meeting, the Commission modified and otherwise affirmed the emergency order. That Commission order is attached hereto and incorporated herein by reference as Exhibit B.

The Commission's order, issued on February 19, 2013, modified the Executive Director's emergency order to provide that the emergency order would continue until one of the following occurs:

> The issuance of any TCEQ order approving the LCRA's March 12, 2012 application for amendments to LCRA's 2010 Water Management Plan; or
>
> The expiration of the initial 120 day period allowed by Texas Water Code § 11.139, and any extension that may be granted pursuant to Texas Water Code § 11.139.

LCRA filed a request for an extension of the emergency order on May 6, 2013. LCRA's extension request is attached hereto and incorporated herein by reference as Exhibit C. The expiration of the initial 120 day period allowed by Texas Water Code § 11.139 is May 29, 2013. LCRA requests an extension of the emergency order until October 15, 2013, as well as waiver of the procedural requirements associated with the request to expedite processing the request under the Governor's Emergency Disaster Proclamation last renewed on April 18, 2013.

The Executive Director has jurisdiction to consider this matter and makes the following Findings of Fact and Conclusions of Law:

FINDINGS OF FACT

1. Severe drought conditions continue in the area, including record-low inflows to the Highland Lakes, dry conditions upstream of the Highland Lakes, and low rainfall.

2. Inflows into the lakes in 2013 continue at record low levels. For the first four months of 2013, inflow levels were only 13 percent of the historical average inflows for that period. Monthly inflows have been below average in 35 of the past 36 months.

3. The combined storage of Lakes Buchanan and Travis as of May 1, 2013 was approximately 795,000 acre feet, or 40 percent full. As of that date, the current inflow deficit is 34 percent worse than the Drought of Record deficit reference.

4. LCRA's 2010 Water Management Plan defines "Drought of Record" as "the drought that occurred during the critical drought period." "The Critical Drought Period" is defined as "the period of time during which the reservoir was last full and refilled, and the storage content was at its lowest minimum value."

5. The LCRA Board may declare a Drought Worse than the Drought of Record if it finds that the following three conditions are simultaneously met:

   a. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both Lakes Buchanan and Travis were last full;
   b. Inflows to the lakes are less than inflows during the Drought of Record; and
   c. Lakes Buchanan and Travis combined storage has less than 600,000 acre feet of water.

6. The first and second criteria for a Drought Worse than the Drought of Record have been met. The drought has lasted for more than 24 months. The cumulative inflow deficit criteria was met by December 2012.

7. If severe drought conditions continue, the criteria for declaration of a Drought Worse than the Drought of Record may be met as early as August, 2013.

8. The 2010 Water Management Plan requires that firm customers be curtailed on a pro rata basis and that LCRA cease all releases for interruptible stored water when a Drought Worse than the Drought of Record is declared.

9. If LCRA is required to follow the 2010 Water Management Plan and the drought continues, LCRA and its customers may need to acquire or develop large quantities of alternative water supplies to meet essential needs of their respective potable water systems. Many of LCRA's firm customers do not have any readily available alternative sources of water supply that could substitute for their reliance on the Colorado River. Following the 2010 Water Management Plan under current drought conditions could pose an imminent threat to firm customers served by LCRA from Lakes Buchanan and Travis.

10. The hydroclimatic conditions outlined in Finding of Facts Nos. 1-3 have created a circumstance where Lakes Buchanan and Travis have been unable to recover in any significant manner, even with an emergency cutoff of nearly all water supply for downstream irrigation in 2012, and may be unlikely to recover in the near term.

11. The latest National Weather Service's Climate Prediction Center Seasonal Drought Outlook calls for drought to persist through at least July in Central and South Texas, with some possible improvement if there are significant widespread spring rains.

12. If the emergency order expires on May 29, 2013, there may be uncertainty as to what obligations LCRA may have to still provide interruptible stored water. There may be requests for water to plant crops in June, and crops that have been planted with groundwater may switch to surface water. This could impact the supply of water for the firm customers.

13. LCRA's requests an extension of the emergency order through October 15, 2013, to eliminate any possible argument that LCRA must provide interruptible stored water in accordance with the 2010 Water Management Plan.

14. LCRA has evaluated many alternatives to address the emergency conditions that the drought presents. Alternatives explored include: Utilizing water from LCRA's other lakes, aggressive conservation, securing the Garwood right for purposes other than agriculture, interbasin transfers, and trucking in water from other sources.

15. None of the alternatives LCRA has identified would avert the projected water supply shortage because most of the supplies identified would produce insufficient or uncertain quantities of supply, would create other operational issues for customers, involve a lengthy permitting process (if not implemented on an emergency basis), or would take years to develop. None of the alternatives identified are feasible or practicable alternatives to the emergency authorization.

16. If lake levels drop more quickly than arrangements for alternative intakes or supplies can be implemented, the current drought presents an imminent threat to LCRA's water systems and its customers' water systems.

17. The Governor of Texas issued an Emergency Disaster Proclamation on July 5, 2011, certifying that exceptional drought conditions posed a threat of imminent disaster in specified counties in Texas. This proclamation has been renewed monthly, most recently on April 18, 2013, and includes every county bordering or that contributes inflow to the Highland Lakes. The Emergency Disaster Proclamation also states that as "... provided in Section 418.016 of the code, all rules and regulations that may inhibit or prevent prompt response to this threat are suspended for the duration of the state of disaster."

CONCLUSIONS OF LAW

1. The Commission may issue an emergency order under Texas Water Code § 11.139 to amend a certificate of adjudication after notice to the Governor if the Commission finds that emergency conditions exist which present an imminent threat to the public health and safety and which override the necessity to comply with established statutory procedures and there are no feasible practicable alternatives to the emergency authorization.

2. The Executive Director may issue an emergency order pursuant to Texas Water Code § 11.139(f) after notice to the Governor if an imminent threat to the public health and safety exists which requires emergency action before the Commission can take action and there are no feasible alternatives. A hearing to affirm, modify, or set aside the emergency order must be held by the Commission as soon as practicable, but not later than 20 days after the emergency order is granted.

3. A Commission hearing to affirm, modify, or set aside this emergency order will be held on June 5, 2013.

4. The Findings of Fact show that the requirements of Conclusions of Law 1 - 3 have been met. The Executive Director has the authority to issue this renewal of the emergency order.

NOW, THEREFORE, BE IT ORDERED BY THE EXECUTIVE DIRECTOR OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1. The emergency order amending LCRA's Water Management Plan, Permit No. 5838, as modified by the Commission, is extended through October 15, 2013.

2. This emergency order was issued without a hearing. A hearing to affirm, modify, or set aside this emergency order will be held before the Commission on June 5, 2013.

4. This emergency order is final and effective on May 29, 2013.

5. The Chief Clerk of the Commission shall forward a copy of this emergency order to all parties.

6. If any provision, sentence, clause, or phrase of this emergency order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of this emergency order.

Issue Date:

May 17, 2013

Effective Date:

May 29, 2013

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Zak Covar
Executive Director

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER affirming, with modification, an Emergency Order granted by the Executive Director to the Lower Colorado River Authority; Docket No. 2013-0225-WR.

On February 13, 2013, the Texas Commission on Environmental Quality ("TCEQ") or "Commission") considered whether to affirm, modify, or set aside an Emergency Order issued by the Executive Director to the Lower Colorado River Authority ("LCRA") to amend its 2010 Water Management Plan for curtailment of interruptible stored water. The Executive Director issued the Emergency Order on January 29, 2013 after providing notice to the Governor on January 24, 2013. Notice of this hearing to affirm, modify, or set aside the Emergency Order was mailed to all water right holders in the Colorado River Basin more than ten days before the hearing. The Commission finds that the Executive Director appropriately issued the Emergency Order and that the requirements for an Emergency Order in Tex. Water Code § 11.139 have been satisfied. However, the Commission finds that the duration of the Emergency Order as issued by the Executive Director exceeds the limits of Tex. Water Code § 11.139. In order to address the above duration issue as well as provide greater clarity to the Emergency Order, the Commission revises Finding of Facts Nos. 33 and 35 and Ordering Provisions Nos. 3 and 4.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

The Emergency Order, attached hereto as Exhibit A and incorporated into this Order by reference, is affirmed, but modified as follows:

a. Finding of Fact No. 33 is revised to read, "If the lake levels drop more quickly than arrangements for alternative intakes or supplies can be implemented, the current drought presents an imminent threat to the LCRA water systems and its customers' water systems.";

b. The second sentence of Finding of Fact No. 35 is revised to read, "Thus, the emergency authorization is the only means by which LCRA can be provided with the flexibility necessary under the present conditions to determine if it can commit to supplying interruptible stored water to its irrigation operations.";

c. Ordering Provision No. 3 is revised to read:

"This Order shall continue until one of the following occurs:

a) The issuance of any TCEQ order approving LCRA's March 12, 2012 application for amendments to the 2010 WMP; or

b) The expiration of the initial 120 day period allowed by Texas Water Code § 11.139, and any extension that may be granted pursuant to Texas Water Code § 11.139.";

d. Ordering Provision No. 4 is deleted; and

e. The remaining Ordering Provisions are renumbered accordingly.

Issue date: FEB 19 2013

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Bryan W. Shaw

Bryan W. Shaw, Ph.D., Chairman

EXHIBIT A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN EMERGENCY ORDER **granting an emergency authorization to the Lower Colorado River Authority to amend its Water Management Plan, Permit No. 5838, pursuant to section 11.139 of the Texas Water Code**

On January 29, 2013, the Executive Director of the Texas Commission on Environmental Quality (Commission) considered a request from the Lower Colorado River Authority (LCRA) for an Emergency Order, under Texas Water Code §§ 5.501, 11.138, 11.139, and the Governor's Emergency Disaster Proclamation related to drought, to amend its Water Management Plan, Permit No. 5838.

The Executive Director has jurisdiction to consider this matter and makes the following Findings of Fact and Conclusions of Law:

FINDINGS OF FACT

LCRA's Water Rights and 2010 Water Management Plan

1. On November 24, 2012, LCRA requested emergency relief from the TCEQ related to its Water Management Plan due to persistent drought conditions in the Highland Lakes. LCRA, based on worsening drought conditions and with unanimous board support, filed an Amended and Supplemental application for emergency relief with the TCEQ on January 11, 2013.

2. LCRA has the right to divert and use up to 1.5 million acre feet (MAF) from Lakes Buchanan and Travis under Certificates of Adjudication Nos. 14-5478 and 14-5482. By court order, LCRA has developed a Water Management Plan (WMP), Permit No. 5838, currently dated 2010, which is part of these certificates.

3. The Certificates of Adjudication and the 2010 WMP govern LCRA's operation of Lakes Buchanan and Travis and dictate how LCRA makes water available from these lakes to help meet "firm" water customer needs, downstream interruptible irrigation demands, and environmental flow needs of the lower Colorado River and Matagorda Bay.

4. Certificates of Adjudication 14-5478 and 14-5482 state that "LCRA shall interrupt or curtail the supply of water . . . pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demand for water under such

certificate pursuant to all firm, uninterruptible water commitments." The WMP further describes how LCRA will manage and curtail supplies from the lakes during times of drought including through a repeat of the Drought of Record.

5. As established in the 2010 WMP, the combined firm yield of Lakes Buchanan and Travis is 535,812 acre-feet per year (AFY). Of this amount, 90,546 AFY is committed to O.H. Ivie Reservoir, making 445,266 AFY of firm water supply available from Lakes Buchanan and Travis for LCRA to help meet the firm water needs of its customers.

6. So long as firm demand for water is equal or less than the combined firm yield, LCRA can supply water for irrigated agriculture on an interruptible basis. The maximum historical annual amount of reported firm water use from the firm supplies of Lakes Buchanan and Travis during 2000 through 2011 was 247,000 acre-feet in 2011. The maximum interruptible water released from Lakes Buchanan and Travis during this same period occurred in 2011 and totaled about 433,000 acre-feet. The maximum total amount released or used from the Highland Lakes, about 714,000 acre-feet, occurred in 2011.

7. LCRA's 2010 WMP defines "Drought of Record" as "the drought that occurred during the critical drought period." "The Critical Drought Period" is defined as "the period of time during which the reservoir was last full and refilled, and the storage content was at its lowest minimum value."

8. To manage the supply, the 2010 WMP imposes several trigger points keyed to the total combined storage capacity of Lakes Buchanan and Travis that are intended to ensure the firm water supply is protected during droughts. The most relevant trigger points are set out in the following table.

Combined Storage of Lakes Buchanan and Travis	Date on Which Trigger is Decided	Action Taken
1.4 MAF	At any time	Request firm customers to implement voluntary drought response measures.
1.4 MAF	On Jan. 1	Environmental releases for instream flows reduced to meet critical needs for ecosystems for following year. Begin gradual curtailment of interruptible supply to four major irrigation operations.
900,000 acre-feet	At any time	Request firm customers to implement mandatory water restrictions; develop firm customer curtailment plan.
600,000 acre-feet	At any time	If criteria indicate a drought worse than the Drought of Record, then cease interruptible supply and begin curtailment of firm supply.

9. The LCRA Board may declare a Drought Worse than the Drought of Record (DWDR) if it finds that the following three conditions are simultaneously met:

   a. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both Lakes Buchanan and Travis were last full;

   b. Inflows to the lakes are less than inflows during the Drought of Record; and

   c. Lakes Buchanan and Travis combined storage has less than 600,000 acre feet of water.

10. Under the 2010 WMP, once a drought has lasted more than 36 months and a Drought Worse than the Drought of Record (DWDR) has been declared by the LCRA Board, the interruptible stored water would be fully and immediately curtailed – making no stored water available for agricultural irrigation or other interruptible uses until lake levels recover or the inflows into the lakes increase substantially. Moreover, LCRA will implement pro rata curtailment of its firm water users once a DWDR is declared and after interruptible stored water (agriculture) uses have been curtailed.

11. Prior to a declaration of a DWDR, LCRA is obligated by the 2010 WMP to provide at least some interruptible water to its four major irrigation operations.

Current Conditions

12. Inflows to the Highland Lakes are at record lows. Four of the five lowest amounts of annual inflows into Lakes Buchanan and Travis on record have occurred since 2006, including in 2012.

13. The two month inflow total for November and December, 2012, represents the second lowest flow on record.

14. Rainfall events have occurred during the preceding twelve month period; however, these rainfall events failed to produce significant inflows into Lakes Buchanan and Travis.

15. The U.S. Drought monitor shows that most of the Texas Hill Country and Central Texas are now within the "severe drought" designation.

16. The period of October through December 2012 was the driest combined October through December period since 1950, with just 2.16 inches of rain statewide.

17. Weather forecasts indicate that an El Nino will not bring any relief. The National Weather Service's Seasonal Drought Outlook calls for the drought to persist across most of Texas or intensify through the winter and into early spring. Longer-term indicators suggest a pattern of near to below normal rainfall through next summer. If dry conditions continue, precipitation patterns will be similar to those experienced in the 1950s.

18. The hydroclimatic conditions outlined in Finding of Facts Nos. 12-17 have created a circumstance where Lakes Buchanan and Travis have been unable to recover in any significant manner, even with an emergency cutoff of nearly all water supply for downstream irrigation in 2012, and may be unlikely to recover in the near term.

19. On January 1, 2013, the combined storage in Lakes Travis and Buchanan had dropped by about 45,000 acre feet since November 1, 2012, and the combined storage was about 825,000 acre feet or 41% full.

20. The Governor of Texas issued an Emergency Disaster Proclamation on July 5, 2011, certifying that exceptional drought conditions posed a threat of imminent disaster in specified counties in Texas. This proclamation has been renewed monthly, most recently on January 25, 2013, and includes every county bordering or that contributes inflow to the Highland Lakes.

Harm from Following 2010 WMP Requirements

21. LCRA provides raw water out of the combined firm yield of Lakes Buchanan and Travis to over 60 retail and wholesale potable water suppliers that together serve over one million people. In addition, LCRA provides water to several electric utilities from the firm water supply of Lakes Buchanan and Travis. These electric utilities provide electricity 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.

22. The current drought conditions are outside the range of hydrologic conditions that were considered during formulation of the 2010 WMP.

23. Unless a change in the weather occurs that contributes significant water to storage in Lakes Buchanan and Travis, following the 2010 WMP will require LCRA to:

    a. Make a substantial quantity of stored water available for interruptible use and enter into contracts for interruptible water, based on January 1, 2013 combined storage;

    b. Begin releases of interruptible stored water to meet demands in the four irrigation operations for the 2013 crop;

    c. Suffer a significant likelihood of reaching the third (and final) criteria for DWDR conditions;

    d. Declare a DWDR;

    e. Cut off stored water for interruptible contracts, thereby ruining the crop already planted; and

    f. Curtail cities' and industries' water use by 20 percent or more.

24. Under the criteria for declaring a DWDR in Finding of Fact No. 9, the LCRA Board of Directors may declare a DWDR in the middle of the first crop and releases from storage would cease.

Farmers could lose their crops and the investment made to grow the crops. At the same time there would be an irreversible reduction in supply for firm customers.

25. The first and second criteria for a DWDR set out in Finding of Fact No. 9 have been met. The drought has lasted more than 24 months. The cumulative inflow deficit criteria was met by December 2012.

26. Following the 2010 WMP creates a risk that a DWDR will be declared during the growing season unless there is a substantial increase in storage before planting begins.

27. The 2010 WMP requires that firm customers be curtailed on a pro rata basis and that LCRA cease all releases for interruptible stored water when a DWDR is declared.

28. At a January 1 combined storage level of 825,000 acre feet, the 2010 WMP requires LCRA to make available around 185,000 acre-feet for diversion for interruptible irrigation use in the lower basin for the 2013 crop year.

29. Not including the amount of water needed for firm water users, evaporation, and releases for instream uses, the combined storage of the reservoirs could drop to 600,000 acre-feet well before irrigators could finish their crop in mid to late August unless there is significant rainfall in the watershed above Lakes Buchanan and Travis.

30. Based on LCRA's projections, the combined storage in Lakes Buchanan and Travis must be at or above 850,000 acre-feet and the release can be no more than 121,500 acre feet before the risk of reaching 600,000 acre feet is reduced.

31. If LCRA is required to follow the 2010 WMP and the drought continues, LCRA and its customers may need to acquire or develop large quantities of alternative water supplies to meet essential needs of their respective potable water systems. Many of LCRA's firm customers do not have any readily available alternative sources of water supply that could substitute for their reliance on the Colorado River. Following the 2010 WMP under current drought conditions could pose an imminent threat to firm customers served by LCRA from Lakes Buchanan and Travis.

32. LCRA owns five systems that take raw water from Lakes Buchanan and Travis. LCRA also has twelve customers that actively take raw water for municipal purposes from Lake Travis that are not a part of LCRA's utility facilities. The lowest pumping elevations of the intakes range from 555 feet mean sea level (msl) to 660 feet msl on Lake Travis. If the levels in Lake Travis or Lake Buchanan drop below the current lowest pumping elevations, LCRA and its wholesale raw water customers must take action to either lower their pumping elevation or find alternative supplies. For smaller systems, the alternative is likely hauling water from a water utility with a viable source. For larger systems, temporary measures must be implemented to extend the intake capabilities to reach lower elevation water. Similar measures would likely be needed by LCRA's raw water customers that have their own intake facilities.

33. If the lake levels drop more quickly than arrangements for alternative intakes or supplies can be implemented, the current drought presents an imminent threat to public health and safety for the LCRA water systems and for its customers' water systems.

34. Because the WMP is required by, and incorporated into, LCRA's Certificates of Adjudication 14-5478 and 14-5482, the WMP may only be amended in the same manner and following the same procedures as one would amend any state-issued water right, which procedures for this type of amendment would require basin-wide 30-day public notice and significant staff review.

35. The time period in which LCRA must make decisions regarding its commitments of interruptible water occurs long before there could be any decision on any amendments to the 2010 WMP if the regular TCEQ water rights permitting procedures are followed. Thus, the emergency authorization is the only means by which LCRA can be provided with the flexibility to determine if it can commit to supplying interruptible stored water to its irrigation operations.

Drought Contingency Plan

36. LCRA's Drought Contingency Plan (DCP) is contained in Chapter 4 of the 2010 WMP. LCRA was originally required to develop this part of the WMP as a direct result of the court order adjudicating LCRA's water rights and the Texas Water Commission's 1989 WMP Order, giving initial approval to LCRA of an earlier version of the plan.

37. Prior to any state requirement for water conservation plans, LCRA required its municipal customers to adopt such plans.

38. When LCRA was required under the TCEQ's Chapter 288 rules to develop and implement a DCP, LCRA incorporated all of the same triggers and criteria from the approved WMP into its DCP, and elaborated on the details of how pro rata curtailment of interruptible customers might occur to comply with the additional requirements of the TCEQ's Chapter 288 rules. LCRA's current WMP incorporates the Chapter 288-required DCP in Chapter 4. This plan also includes water use reduction targets for firm water supplies to comply with TCEQ's DCP rules adopted in 2004. In April 2007, LCRA adopted changes to LCRA's raw water contract rules related to implementation of LCRA's DCP.

39. In June 2010, LCRA adopted additional changes to LCRA's raw water contract rules that include the procedures for implementing a pro rata curtailment of firm water customers. The 2010 WMP includes a requirement that LCRA develop a stored water curtailment plan to be approved by the LCRA Board and TCEQ in response to combined storage dropping below 900,000 acre-feet. TCEQ approved LCRA's water curtailment plan for its firm customers in December 2011.

40. LCRA has fully implemented its Drought Contingency Plan. All of LCRA's customers that currently divert and purchase water from LCRA must have a drought contingency plan. As of October 2012, 96 percent of those customers have plans on file.

41. In August 2011, the combined storage of Lakes Buchanan and Travis reached 900,000 acre-feet. As required by the WMP, LCRA called on its firm water customers to voluntarily implement mandatory water use restrictions under their individual DCPs to reduce their water use by 10 to 20 percent. As lake conditions continued to decline, most of LCRA's municipal customers have remained in some form of mandatory water restrictions, significantly limiting landscape irrigation.

42. LCRA industrial customers, who consist of power plants and a few large industries along the Gulf Coast, have cut back on non-essential water uses, such as outdoor watering. However these cutbacks likely have resulted in a very minimal savings. Any further cutbacks will result in a decrease in production.

43. If LCRA declares a DWDR and releases of interruptible stored water cease, LCRA's DCP requires firm customers to implement measures to immediately reduce their water consumption by twenty-percent (20 percent). To achieve a 20 percent reduction in use, firm municipal customers would likely have to eliminate all outdoor water use. Further, industrial customers would likely have to curtail their production.

Feasible Alternatives

44. Reductions in water use by firm customers cannot prevent the emergency created by falling reservoir levels that would result from the level of irrigation releases required by the 2010 WMP. Even if firm customer water use reductions are implemented immediately once such a reduction is mandated by LCRA, the results of this reduction will not be fast enough to compensate for the falling reservoir levels.

45. Implementation of the 2010 WMP for purposes of determining the amount of interruptible stored water available for downstream irrigation operations could result in LCRA reaching DWDR conditions during first crop.

46. Amending downstream run of the river rights to allow diversion for new uses and at new locations would provide some supply, but the use of these rights alone is not – by itself – a feasible and practicable alternative to the emergency relief related to the 2010 WMP. All of the rights would require amendments to add diversion points, additional places of use, and possible storage. Also, the downstream run-of-river water rights are highly variable in terms of availability and quantity, and do not provide by themselves a sufficient quantity of water to eliminate the need for the emergency relief from the 2010 WMP as requested herein.

47. LCRA has evaluated many other alternatives to address the emergency conditions that the drought presents. Alternatives explored include: Utilizing water from LCRA's other lakes, aggressive conservation, securing the Garwood right for purposes other than agriculture, interbasin transfers, and trucking in water from other sources.

48. None of the alternatives LCRA has identified would avert the projected water supply shortage because most of the supplies identified would produce insufficient or uncertain quantities of supply, would create other operational issues for customers, involve a lengthy permitting process (if not implemented on an emergency basis), or would take years to develop. None of the alternatives identified are feasible or practicable alternatives to the emergency authorization.

Requested Relief

49. A modified curtailment procedure for interruptible stored water would provide LCRA the ability to supply a reduced amount of interruptible stored water. Supplying a reduced amount of interruptible stored water, up to 121,500 acre feet, when the reservoirs are at or above the 850,000 acre feet storage level on March 1, 2013, greatly reduces the risk of reaching 600,000 acre feet of combined storage and declaring a DWDR during first crop.

50. Specifically, LCRA requests that it be allowed to implement a different process than required by the 2010 WMP for curtailment of interruptible stored water that would:

    a. Provide interruptible stored water for first crop based on the combined storage of Lakes Buchanan and Travis on March 1, 2013 (11:59 p.m.), as follows:

        1) Provide no interruptible stored water to customers within Gulf Coast and Lakeside Divisions if the combined storage is below 850,000 acre-feet.

        2) Provide up to 121,500 acre-feet of interruptible stored water for diversion for customers within Gulf Coast, Lakeside, Garwood and Pierce Ranch Operations if the combined storage is at or above 850,000 acre-feet and less than 920,000 acre-feet.

        3) Provide interruptible stored water in accordance with the then current Water Management Plan if the combined storage is at or above 920,000 acre-feet based on March 1 storage instead of January 1 storage.

    b. Provide interruptible stored water for second crop based on the combined storage of Lakes Buchanan and Travis, as follows:

        1) If the combined storage is at or above 850,000 acre-feet and below 920,000 acre feet on March 1, 2013 (11:59 p.m.), and combined storage is below 950,000 acre feet on July 1, 2013 (11:59 p.m.), provide no interruptible stored water to customers within Gulf Coast and Lakeside Divisions.

        2) If the combined storage is at or above 850,000 acre-feet and below 920,000 acre-feet on March 1, 2013 2013 (11:59 p.m.), and the combined storage is at or above 950,000 acre feet on July 1, 2013 (11:59 p.m.), provide up to 50,000 acre feet of interruptible stored water for diversion for customers in Gulf Coast, Lakeside, Garwood and Pierce Ranch Operations.

3) If combined storage is at or above 920,000 acre-feet on March 1, 2013 (11:59 p.m.), provide interruptible stored water for the second crop in accordance with the then current Water Management Plan based on March 1 storage instead of January 1 storage.

c. Provide interruptible stored water to Garwood and Pierce Ranch, in accordance with their contracts.

51. LCRA requests that TCEQ process this request in a manner that allows LCRA to gain the benefit of the authorization for as long as may be needed to address continued drought conditions. To that end, LCRA requests that:

a. The emergency authorization become effective no earlier than December 31, 2012; and

b. The emergency authorization continue until the ***later*** of:

1) The initial 120 day period allowed by Texas Water Code § 11.139, and any extension thereof as allowed by Section 11.139; or

2) The issuance of any TCEQ order approving amendments to the 2010 WMP, as may be filed by the LCRA consistent with the January 27, 2010 Order Approving Amendments to the Water Management Plan, if such order is issued prior to December 31, 2013; or

3) December 31, 2013.

52. This order should not extend until the end of the initial 120 day period or extension, or December 31, 2013, whichever occurs last, if the Order Approving Amendments to the Water Management Plan is issued prior to December 31, 2013.

53. Consistent with the Governor's Proclamation, LCRA requests that procedural requirements associated with this request, or any portion thereof, be waived to expedite the processing of this request.

Notice

54. Notice was provided to the Governor on January 24, 2013. Notice for the Commission hearing to affirm, modify, or set aside this emergency order on February 13, 2013, will be provided by mail to all water right holders in the basin at least ten days before the hearing.

CONCLUSIONS OF LAW

1. The Commission may issue an emergency order under Texas Water Code § 11.139 to amend a certificate of adjudication after notice to the Governor if the Commission finds that emergency conditions exist which present an imminent threat to the public health and safety and which

override the necessity to comply with established statutory procedures and there are no feasible practicable alternatives to the emergency authorization.

2. The emergency authorization may be for 120 days, and renewed once for 60 days.

3. The Executive Director may issue an emergency order pursuant to Texas Water Code § 11.139(f) after notice to the Governor if an imminent threat to the public health and safety exists which requires emergency action before the Commission can take action and there are no feasible alternatives. A hearing to affirm, modify, or set aside the emergency order must be held by the Commission as soon as practicable, but not later than 20 days after the emergency order is granted.

4. Notice of the Commission hearing to affirm modify or set aside shall be given as the Commission considers practicable under the circumstances.

5. Consistent with the Governor's Proclamation and under Finding of Fact No. 20, the procedural requirements associated with this request, or any portion thereof, may be waived to expedite the processing of this request.

6. The Findings of Fact show that Conclusions of Law 1 through 3 have been met.

7. The Executive Director has the authority to issue this order. A Commission hearing to affirm, modify, or set aside will be held on February 13, 2013.

NOW, THEREFORE, BE IT ORDERED BY THE EXECUTIVE DIRECTOR OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1. LCRA's WMP, Permit No. 5838, is amended to temporarily establish a different process for curtailment of interruptible stored water that would:

   a. Provide interruptible stored water for first crop based on the combined storage of Lakes Buchanan and Travis on March 1, 2013 (11:59 p.m.), as follows:

      1) Provide no interruptible stored water to customers within Gulf Coast and Lakeside Divisions if the combined storage is below 850,000 acre-feet.

      2) Provide up to 121,500 acre-feet of interruptible stored water for diversion for customers within Gulf Coast, Lakeside, Garwood and Pierce Ranch Operations if the combined storage is at or above 850,000 acre-feet and less than 920,000 acre-feet.

      3) Provide interruptible stored water in accordance with the then current Water Management Plan if the combined storage is at or above 920,000 acre-feet based on March 1 storage instead of January 1 storage.

b. Provide interruptible stored water for second crop based on the combined storage of Lakes Buchanan and Travis, as follows:

1) If the combined storage is at or above 850,000 acre-feet and below 920,000 acre feet on March 1, 2013 (11:59 p.m.), and combined storage is below 950,000 acre feet on July 1, 2013 (11:59 p.m.), provide no interruptible stored water to customers within Gulf Coast and Lakeside Divisions.

2) If the combined storage is at or above 850,000 acre-feet and below 920,000 acre-feet on March 1, 2013 (11:59 p.m.), and the combined storage is at or above 950,000 acre feet on July 1, 2013 (11:59 p.m.), provide up to 50,000 acre feet of interruptible stored water for diversion for customers in Gulf Coast, Lakeside, Garwood and Pierce Ranch Operations.

3) If combined storage is at or above 920,000 acre-feet on March 1, 2013 (11:59 p.m.), provide interruptible stored water for the second crop in accordance with the then current Water Management Plan based on March 1 storage instead of January 1 storage.

c. Provide interruptible stored water to Garwood and Pierce Ranch, to the extent required by their contracts.

2. The emergency authorization becomes effective upon issuance; and

3. The emergency authorization shall continue until the issuance of any TCEQ order approving LCRA's March 12, 2012, application for amendments to the 2010 WMP.

4. If the Order Approving Amendments to the Water Management Plan for LCRA's application dated March 12, 2012, is not issued before December 31, 2013, this order shall continue until the later of:

a. The initial 120 day period allowed by Texas Water Code § 11.139, and any extension thereof as allowed by Section 11.139; or

b. December 31, 2013.

5. This order was issued without a hearing. A hearing to affirm, modify, or set aside this order will be held before the Commission on February 13, 2013.

6. The Chief Clerk of the Commission shall forward a copy of this order to all parties.

7. If any provision, sentence, clause, or phrase of this order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of this order.

Issue Date: 1/29/2013

EXECUTIVE DIRECTOR
TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Zak Covar
Executive Director

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER affirming an Emergency Order granted by the Executive Director to the Lower Colorado River Authority; Docket No. 2011-2096-WR

On December 7, 2011, the Texas Commission on Environmental Quality ("TCEQ" or "Commission") considered whether to affirm, modify, or set aside an Emergency Order issued by the Executive Director to the Lower Colorado River Authority (LCRA) to amend its 2010 Water Management Plan, Permit No. 5838, to allow LCRA to implement a different process than required by the 2010 Water Management Plan for curtailment of interruptible stored water. The Executive Director issued the Emergency Order on November 17, 2011, after providing notice to the Governor on November 15, 2011. Notice of this December 7, 2011 hearing to affirm, modify or set aside the Emergency Order was mailed to all water right holders in the Colorado River Basin more than ten days before the hearing. The Commission finds that the Executive Director appropriately issued the Emergency Order and that the requirements for an Emergency Order in Tex. Water Code § 11.139 have been satisfied.

THEREFORE, THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY ORDERS THAT:

The November 17, 2011 Emergency Order, attached hereto as Exhibit A and incorporated into this Order by reference, is affirmed.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Bryan W. Shaw

For the Commission

Issue Date: DEC 12 2011

THE STATE OF TEXAS
COUNTY OF TRAVIS
I hereby certify that this is a true and correct copy of a Texas Commission on Environmental Quality document, which is filed in the permanent records of the Commission. Given under my hand and the seal of office on

Bridget C. Bohac DEC 14 2011

Bridget C. Bohac, Chief Clerk
Texas Commission on Environmental Quality

EXHIBIT A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN EMERGENCY ORDER granting an emergency authorization to the Lower Colorado River Authority to amend it's Water Management Plan, Permit No. 5838, pursuant to section 11.139 of the Texas Water Code; TCEQ Docket No. 2011-2096-WR

On November 17, 2011, the executive director of the Texas Commission on Environmental Quality (Commission) considered a request from the Lower Colorado River Authority (LCRA) for an Emergency Order under TEX. WATER CODE § 11.139 and 30 TEX. ADMIN. CODE §§ 295.91 and 295.156 to amend its Water Management Plan, Permit No. 5838. The executive director has jurisdiction to consider this matter and the following Findings of Fact and Conclusions of Law are appropriate:

FINDINGS OF FACT

LCRA's Water Rights and 2010 Water Management Plan

1. LCRA has the right to divert and use up to 1.5 million acre feet (MAF) from Lakes Buchanan and Travis under Certificates of Adjudication Nos. 14-5478 and 14-5482. By court order, LCRA has developed a Water Management Plan (WMP), currently dated 2010, which is part of these certificates and has its own number, Permit No. 5838.

2. The Certificates of Adjudication and the 2010 WMP govern LCRA's operation of Lakes Buchanan and Travis and dictate how LCRA makes water available from these lakes to help meet "firm" water customer needs, downstream interruptible irrigation demands, and environmental flow needs of the lower Colorado River and Matagorda Bay.

3. Certificates of Adjudication 14-5478 and 14-5482 state that "LCRA shall interrupt or curtail the supply of water . . . pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demand for water under such certificate pursuant to all firm, uninterruptible water commitments." The WMP further describes how LCRA will manage and curtail supplies from the lakes during times of drought including through a repeat of the Drought of Record.

4. As established in the 2010 WMP, the combined firm yield of Lakes Buchanan and Travis is 535,812 acre-feet per year (AFY). Of this amount, 90,546 AFY is committed to O.H. Ivie Reservoir, making 445,266 AFY of firm water supply available from Lakes Buchanan and Travis for LCRA to help meet the firm water needs of its customers.

5. Until firm demand for water equals the combined firm yield, LCRA can supply water for irrigated agriculture on an interruptible basis. The maximum historical annual amount of reported firm water use from the firm supplies of Lakes Buchanan and Travis during 2000 through 2010 was 152,000 acre-feet in 2008. This use was about 30 percent of the

current total commitment of firm water supply. The maximum interruptible water released from Lakes Buchanan and Travis during this same period occurred in 2009 and totaled about 368,000 acre-feet. The maximum total amount released or used from the Highland Lakes, about 552,000 acre-feet, occurred in 2009.

6. To manage the supply of water, the 2010 WMP imposes several trigger points keyed to the total combined storage capacity of Lakes Buchanan and Travis that are intended to ensure the firm water supply is protected during droughts. The most relevant trigger points are set out in the following table:

Combined Storage of Lakes Buchanan and Travis	Date on Which Trigger is Decided	Action Taken
1.4 MAF	At any time	Request firm customers to implement voluntary drought response measures.
1.4 MAF	On Jan. 1	Environmental releases for instream flows reduced to meet critical needs for ecosystems for following year. Begin gradual curtailment of interruptible supply to four major irrigation operations.
900,000 acre-feet	At any time	Request firm customers to implement mandatory water restrictions; develop firm customer curtailment plan.
600,000 acre-feet	At any time	If criteria indicates a drought worse than the Drought of Record, then cease interruptible supply and begin curtailment of firm supply.

7. Under the 2010 WMP, once a drought has lasted more than 36 months and a Drought Worse than the Drought of Record (DWDR) has been declared, the interruptible stored water would be fully and immediately curtailed – making no stored water available for agricultural irrigation or other interruptible uses until lake levels recover or the inflows into the lakes increase substantially. Moreover, LCRA will implement pro rata curtailment of its firm water users once a DWDR is declared and after interruptible stored water (agriculture) uses have been curtailed.

8. Prior to a declaration of a DWDR, LCRA is obligated by the 2010 WMP to provide at least some interruptible water to its four major irrigation operations. The allocation of interruptible water is determined by the LCRA Board of Directors in November, based on projections of the amount expected to be in the combined storage of Lakes Buchanan and Travis on January 1 of the following year. Thus, the decision regarding curtailment of interruptible supplies to the four major irrigation operations is keyed to the January 1 storage levels.

Current Conditions

9. LCRA provides raw water out of the combined firm yield of Lakes Buchanan and Travis to 64 retail and wholesale potable water suppliers that together serve over one million people. In addition, LCRA provides water to several electric utilities from the firm water supply of Lakes Buchanan and Travis. These electric utilities provide electricity 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.

10. According to the latest U.S. National Drought Monitor, a product of the National Weather Service, the U.S. Department of Agriculture, and the National Drought Mitigation Center, all of Central Texas, the middle Texas coast, and the Texas Hill Country are designated as being in "exceptional drought," the worst of four (4) possible categories of drought.

11. The drought has been unprecedented relative to the long-term climate and hydrologic record: record low inflows, record low precipitation, extreme, record-setting summer heat and enormous wildfires.

12. At times, this drought has been more intense than the region's Drought of Record that occurred between 1947 and 1957.

13. Inflows into Lakes Buchanan and Travis through September of 2011 were at about eight percent (8%) of average inflows.

14. Inflows for the three months of June, July, August and September were less than one percent (1%) of the average inflows for this period. The approximately 2,000 acre-feet of inflows during this period are the lowest of any three-month period in the historical record. The record low inflows are a result of the lack of rain, record high temperatures, and high evaporation rates.

15. On a statewide basis, the current drought is the worst 1-year drought on record dating back to 1895.

16. Rainfall across Texas between October 1, 2010 and August 31, 2011 has totaled only 10.06 inches, just 40 percent of the long-term average rainfall. This has been the driest 12-month period ever recorded in Austin, dating back to 1856.

17. The City of Austin recorded the most 100-degree days and the most consecutive 100-degree days dating back to 1856.

18. High temperatures combined with numerous sunny days have caused much higher than normal evaporation. Evaporation rates were about 13 percent higher than they were in the summer of 2009. In most areas of the Colorado River basin, the soil moisture content in the top few inches of the soil is essentially zero.

19. The National Weather Service's Seasonal Drought Outlook calls for the drought to persist between October and December 2011. Below average rainfall is forecast across the southern U.S., including all of Texas, for the period of January through March 2012.

Based on similar historical developments, it is likely that drier than normal weather conditions could persist through the summer of 2012.

20. The Governor of Texas Issued an Emergency Disaster Proclamation for wildfires and drought which was originally issued on December 21, 2010 and last renewed on November 1, 2011, stating that the "exceptional drought conditions... pos[e] an imminent threat to public health, property and the economy." This proclamation allows the waiver of all rules and regulations that may inhibit or prevent prompt response to address the drought.

Harm from Following 2010 WMP Requirements

21. The current drought conditions are outside the range of hydrologic conditions that were considered during formulation of the 2010 WMP.

22. Unless a change in the weather occurs that contributes significant water to storage in Lakes Buchanan and Travis, following the 2010 WMP will require LCRA to:

    a. Make a substantial quantity of stored water available for interruptible use and enter into contracts for interruptible water, based on January 1, 2012 combined storage;

    b. Begin releases of interruptible stored water to meet demands in the four irrigation operations for the 2012 crop;

    c. Suffer a significant likelihood of reaching the third (and final) criteria for Drought Worse than Drought of Record (DWDR) conditions;

    d. Declare a DWDR;

    e. Cut off stored water for interruptible contracts, thereby ruining the crop already planted and wasting the water already released and diverted; and

    f. Curtail cities' and industries' water use by 20% or more.

23. The 2010 WMP includes conditions under which the LCRA Board of Directors may declare a DWDR. To declare a DWDR, the Board must find that the following three conditions are simultaneously met:

    a. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both Lakes Buchanan and Travis were last full;

    b. The cumulative inflow deficit since the beginning of the drought exceeds the envelope curve for cumulative inflow deficits by at least 5% for six consecutive months; and

    c. Lakes Buchanan and Travis combined storage has less than 600,000 acre-feet of water.

24. The first two criteria for a DWDR have been met. The drought has lasted more than 24 months and the cumulative inflow deficit for Lakes Buchanan and Travis as of September 29, 2011 exceeds the criteria in the 2010 WMP.

25. Following the 2010 WMP creates a risk that a DWDR will be declared during the growing season unless there is a substantial increase in storage before planting begins.

26. The 2010 WMP requires that firm customers (mainly cities and industries) be curtailed on a pro rata basis and that LCRA cease all releases for interruptible stored water (*regardless* of the impact on the crops) when a DWDR is declared.

27. Without significant rains, LCRA currently forecasts that combined storage in Lakes Buchanan and Travis will drop to between 640,000 and 680,000 acre-feet by January 1, 2012. At this January 1 combined storage, the 2010 WMP requires LCRA to make available around 170,000 acre-feet for diversion for interruptible irrigation use in the lower basin for the 2012 crop year.

28. Not including the amount of water needed for firm water users, evaporation, and releases for instream uses, the combined storage of the reservoirs would likely drop to 600,000 acre-feet well before irrigators could finish their crop.

29. Under the present and likely future weather patterns, LCRA has concluded that storage must be at or above 920,000 acre-feet before the risk of following the 2010 WMP can be reduced to reasonable levels.

30. If LCRA is required to follow the 2010 WMP and the drought continues, LCRA and its customers may need to acquire or develop large quantities of alternative water supplies to meet essential needs of their respective potable water systems. The length of time that it takes to develop or conserve significant quantities of water supply mean that a water supply emergency arises well before a reservoir goes dry. For the most part, LCRA's firm customers do not have any readily available alternative sources of water supply that could substitute for their reliance on the Colorado River. To follow the 2010 WMP under the current drought conditions would pose an imminent threat to firm customers served by LCRA from Lakes Buchanan and Travis.

31. As the lake levels drop, it becomes more difficult and expensive for the retail water suppliers to pump water from Lakes Buchanan and Travis. Currently, LCRA owns five systems that take raw water from Lakes Buchanan and Travis. LCRA also has twelve customers that actively take raw water for municipal purposes from Lake Travis that are not a part of LCRA's utility facilities. The lowest pumping elevations of the intakes range from 545 feet mean sea level (msl) to 630 feet msl on Lake Travis. If the levels in Lake Travis or Lake Buchanan drop below the current lowest pumping elevations, LCRA and its wholesale raw water customers must take action to either lower their pumping elevation or find alternative supplies. For smaller systems, the alternative is likely hauling water from a water utility with a viable source. For larger systems, temporary measures must be implemented to extend the intake capabilities to reach lower elevation water. Similar measures would likely be needed by LCRA's raw water customers that have their own intake facilities. If the lake levels drop more quickly than arrangements for alternative intakes or supplies can be implemented, the current drought presents an imminent threat to public health and safety for the LCRA water systems and for its customers' water systems.

32. The 2010 WMP requires LCRA to make its decisions about how much interruptible stored water is available in November based on projections of combined storage capacity

for January 1, with releases of the water beginning in March. This short decision-making window is not compatible with the more lengthy WMP amendment process. Because the WMP is required by, and incorporated into, LCRA's Certificates of Adjudication 14-5478 and 14-5482, the WMP may only be amended in the same manner and following the same procedures as one would amend any state-issued water right, which procedures for this type of amendment would require basin-wide 30-day public notice and significant staff review. Although LCRA is nearing the end of a process to finalize proposed revisions to the 2010 WMP, it does not expect to have those on file with the Commission until next year – too late to address the 2012 growing season.

33. The time period in which LCRA must make decisions regarding its commitments of interruptible water occur long before there could be any decision on any amendments to the 2010 WMP if the regular TCEQ water rights permitting procedures are followed. Thus, the emergency authorization is the only means by which LCRA can be provided with the flexibility to determine if it can commit to supplying interruptible stored water to its irrigation operations.

Conservation and Drought Contingency Plans

34. LCRA has, to this point, fully implemented its Drought Contingency Plan. All of LCRA's customers that currently divert and purchase water from LCRA must have a drought contingency plan. As of September 23, 2011, 83% of those customers, representing over 95% of customer demand over the last twelve months, have plans on file. The other customers have been notified that they are out of compliance.

35. In August 2011, the combined storage of Lakes Buchanan and Travis reached 900,000 acre-feet. As required by the WMP, LCRA called on its firm water customers to voluntarily implement mandatory water use restrictions under their individual DCPs to reduce their water use by 10 to 20 percent. Information was sent out via a press release, direct email notifications to customers, and certified letters.

36. Since the 900,000 acre-feet trigger was reached, twenty-one (21) LCRA municipal customers and LCRA's retail water utilities began implementing mandatory water restrictions. These customers in drought restrictions represent more than 90 percent of the population served in the LCRA water supply area. Most of the restrictions currently in place limit outdoor watering and other non-essential uses and include a public awareness element such as direct mailings, community presentations, and informational signs.

37. Also charged with the goal of reducing their water use by 10 to 20 percent, ten firm irrigation and recreation customers have informed LCRA of the water reduction measures they had implemented to cut back their water use. Most golf courses have reduced their overall water budget, while others have scaled back on ornamental beds, area of irrigated roughs (areas not essential to the playability of a course), or other high water using areas. LCRA industrial customers, including power plants and a few large industries along the Gulf Coast, have taken steps to limit non-essential water uses, such as limits on outdoor watering. However, these cut-backs of discretionary use have likely resulted in minimal savings compared to the total water use of these industries. Any further cutbacks will result in a decrease in production.

38. When LCRA declares a DWDR and releases of interruptible stored water cease, LCRA's DCP requires firm customers to implement measures to try to immediately reduce their water consumption by twenty-percent (20%). To achieve a 20% reduction in use will require firm customers to implement fairly dramatic measures. Firm municipal customers would likely have to eliminate all outdoor water use. Further, industrial customers, including power plants, would likely have to curtail their production.

39. National benchmarking research shows that these savings are achievable but that it will likely take water suppliers considerable time (up to a year) to implement drought restrictions that result in the level of water savings identified in LCRA's DCP.

Alternatives

40. LCRA explored several alternative water supplies that might be available to alleviate strain on LCRA's water supply reservoirs caused by persistent drought conditions.

41. LCRA evaluated the following alternatives to address the emergency conditions that the drought presents:

    a. Amend downstream run of the river rights to allow diversion at new locations;
    b. Utilize water from LCRA's Lakes Inks, LBJ, and Marble Falls;
    c. Conservation incentives and customer buyouts of non-essential uses;
    d. Aggressive municipal conservation;
    e. Garwood dry year option;
    f. Groundwater;
    g. Wastewater reuse program in the Highland Lakes;
    h. Line or pipe high loss canals utilized by industry;
    i. Interbasin transfers or water trucking/rail transport;
    Ocean or brackish groundwater desalination.

42. None of the identified alternatives would avert the projected water supply shortage because most of the supplies identified would produce insufficient or uncertain quantities of supply, would create other operational issues for customers, involve a lengthy permitting process (if not implemented on an emergency basis), or would take years to develop. None of the alternatives identified are feasible or practicable alternatives to the emergency authorization.

Requested Relief

43. In collaboration with affected stakeholders, representing agricultural, municipal and environmental interests within the basin, LCRA has determined that a reduced amount of interruptible stored water (up to 125,000 acre-feet for diversion) could be provided if storage is at or above 850,000 acre-feet on March 1, 2012, with a much-reduced risk of reaching 600,000 acre-feet of combined storage in Lakes Buchanan and Travis during first crop. This 125,000 acre feet of water is the amount LCRA estimates it needs to meet its contractual obligations to Garwood Irrigation Company and Pierce Ranch, and support a minimal amount of acreage in its Gulf Coast and Lakeside operations.

44. Specifically, LCRA requests that it be allowed to implement a different process than required by the 2010 WMP for curtailment of interruptible stored water that would:

a. Provide no interruptible stored water to customers within its Gulf Coast and Lakeside operations if combined storage is below 850,000 acre-feet on March 1, 2012;

b. Provide no more than 125,000 acre-feet of interruptible stored water for diversion for customers within the Gulf Coast, Lakeside, Garwood and Pierce Ranch operations if combined storage is at or above 850,000 acre-feet and less than 920,000 acre-feet on March 1, 2012;

c. Provide interruptible stored water in accordance with the then current Water Management Plan if combined storage is at or above 920,000 acre-feet on March 1, 2012;

d. Provide interruptible stored water for second crop only upon a determination by the LCRA Board that sufficient water is available; and

e. Provide interruptible stored water to Garwood and Pierce Ranch customers, in accordance with their contracts.

45. Consistent with the Governor's Proclamation, LCRA requests that procedural requirements associated with this request, or any portion thereof, be waived to expedite the processing of this request.

Notice

46. Notice was provided to the Governor. Notice for the Commission hearing to affirm, modify, or set aside this Emergency Order will be provided by mailed notice to all water right holders in the basin.

CONCLUSIONS OF LAW

1. The Commission may issue an emergency order under TEX. WATER CODE § 11.139 to amend a certificate of adjudication after notice to the governor if the commission finds that emergency conditions exist which present an imminent threat to the public health and safety and which override the necessity to comply with established statutory procedures and there are no feasible practicable alternatives to the emergency authorization.

2. The executive director may issue an emergency order after notice to the governor if an imminent threat to the public health and safety exists which requires emergency action before the commission can take action and there are no feasible alternatives. TEX. WATER CODE § 11.139(f). A hearing to affirm, modify, or set aside the Emergency Order must be held by the commission as soon as practicable, but not later than 20 days after the Emergency Order is granted.

3. Notice of the commission hearing to affirm modify or set aside shall be given as the commission considers practicable under the circumstances.

4. Consistent with the Governor's Proclamation, the procedural requirements associated with this request, or any portion thereof, may be waived to expedite the processing of this request.

5. The Findings of Fact show that the requirements of Conclusions of Law 1 – 3 have been met. The executive director has the authority to issue this order. A commission hearing to affirm, modify, or set aside will be held on December 7, 2011.

NOW, THEREFORE, BE IT ORDERED BY THE EXECUTIVE DIRECTOR OF THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1. LCRA's WMP, Permit No. 5838, is amended to temporarily establish a different process for curtailment of interruptible stored water that would:

    a. Provide no interruptible stored water to customers within the Gulf Coast and Lakeside operations if combined storage is below 850,000 acre-feet on March 1, 2012;

    b. Provide no more than 125,000 acre-feet of interruptible stored water for diversion for customers within the Gulf Coast, Lakeside, Garwood and Pierce Ranch operations if combined storage is at or above 850,000 acre-feet and less than 920,000 acre-feet on March 1, 2012;

    c. Provide interruptible stored water in accordance with the then current Water Management Plan if combined storage is at or above 920,000 acre-feet on March 1, 2012;

    d. Provide interruptible stored water for second crop only upon a determination by the LCRA Board that sufficient water is available; and

    e. Provide interruptible stored water to Garwood and Pierce Ranch customers, in accordance with their contracts.

2. This Order was issued without a hearing. A hearing to affirm, modify, or set aside this Order will be held before the Commission on December 7, 2011.

3. This Order shall become final and effective on December 31, 2011.

4. This Order shall continue until the later of:

    a. The initial 120 day period allowed by Texas Water Code § 11.139, and any extension thereof as allowed by Section 11.139; or

    b. The termination or expiration of the Governor's Disaster Proclamation of the Exceptional Drought Conditions, originally issued on December 21, 2010; or

    c. The issuance of any TCEQ Order approving amendments to the 2010 WMP, as may be filed by the LCRA consistent with the January 27, 2010 Order Approving

Amendments to the Water Management Plan, if such Order is issued prior to December 31, 2012, or

d. December 31, 2012.

5. The Chief Clerk of the Commission shall forward a copy of this Order to all parties.

6. If any provision, sentence, clause, or phrase of this Order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of this Order.

Issue Date:

NOV 17 2011

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Mark R. Vickery, P.G.
Executive Director
November 17, 2011

CERTIFICATE

STATE OF TEXAS §
§
COUNTY OF TRAVIS §

I, John W. Rubottom, hereby certify that I am the General Counsel and Assistant Secretary of the Board of Directors of the Lower Colorado River Authority (LCRA), a conservation and reclamation district, duly organized and existing under and by virtue of the public laws of the State of Texas.

I further certify that the Board of Directors of LCRA, on November 19, 2013, in a meeting posted properly in accordance with the Texas Open Meetings Act and with a quorum present and voting, by a vote of 8 to 7, adopted a resolution captioned "Resolution of the Board of Directors of the Lower Colorado River Authority Regarding Drought Management Actions in Response to Current Drought Conditions."

I further certify that a true and correct copy of the aforesaid Resolution is attached hereto. Such Resolution has not been modified, amended or repealed and remains in full force and effect as of this date.

TO CERTIFY WHICH, witness my hand and official seal this the 3rd day of December 2013.

John W. Rubottom, General Counsel
and Assistant Secretary of the
LCRA Board of Directors

Board approved Nov. 19, 2013

Resolution of the Board of Directors of the Lower Colorado River Authority Regarding Drought Management Actions in Response to Current Drought Conditions

Whereas, the Colorado River basin is experiencing a serious drought that has, at times, been more intense than the worst recorded drought this region has experienced, the Drought of Record that occurred from 1947 to 1957; and

Whereas, 2011, 2012 and 2013 have produced record low inflows to the Highland Lakes; and

Whereas, LCRA has sought and obtained emergency drought relief from the Texas Commission on Environmental Quality (TCEQ) to reduce demands for interruptible stored water for agricultural purposes in 2012 and 2013 that have reduced demands on lakes Buchanan and Travis; and

Whereas, combined storage in lakes Buchanan and Travis on Nov. 18, 2013, was 727,914 acre-feet, or 36 percent full; and

Whereas, the TCEQ has previously found that the conditions presented by the current drought pose an imminent threat to human health and safety because of the potential impacts on LCRA's firm customers, who face mandatory curtailment if storage in the lakes continue to drop; and

Whereas, recent heavy rains in the region have failed to replenish LCRA's water supply reservoirs, with most of the inflows entering the watercourse downstream of Lake Travis; and

Whereas, the contributing watershed to the Highland Lakes is included in the Governor's emergency disaster proclamation related to drought; and

Whereas, LCRA's Board of Directors understands the economic distress caused by this drought to farmers in the lower Basin and throughout the state; and

Whereas, LCRA's Board of Directors also understands the economic distress caused by this drought to firm customers and the region around the Highland Lakes; and

Whereas, current analysis indicates the possibility of combined storage dropping to 600,000 acre-feet and triggering the LCRA Board to declare a Drought Worse than Drought of Record as early as spring 2014; and

Whereas, absent emergency relief from the 2010 Water Management Plan, LCRA would be obligated to release significant amounts of interruptible stored water in 2014, even if combined storage on the evaluation date were just above 600,000 acre-feet; and

Whereas, many LCRA firm municipal water customers have implemented restrictions on landscape irrigation water use to once-per-week or twice-per-week or taken other measures to reduce nonessential water use; and

Whereas, LCRA's Board of Directors wants to take all necessary and prudent steps to manage the region's water supply to meet the essential needs of the communities and industries through this severe drought; and

Whereas, LCRA's Board of Directors has previously authorized staff to seek temporary amendments to downstream water rights to allow for their use in meeting firm customer demands at additional diversion points in 2014; and

Whereas, additional drought management measures must be pursued to address the drought in a responsible and measured way; and

Whereas, LCRA experts have analyzed numerous comparisons of current conditions and historical droughts and have recommended a comprehensive set of drought management actions needed to respond adequately to the continued and unprecedented drought conditions; and

Whereas, LCRA's Board of Directors believes that the severe drought conditions necessitate drought response measures related to LCRA's interruptible agricultural customers and firm water customers.

THEREFORE, BE IT RESOLVED that the LCRA Board of Directors hereby takes the following actions:

1. The General Manager or her designee is authorized to prepare and file an application to seek emergency relief from TCEQ under Texas Water Code § 11.139, and any other applicable law, to allow LCRA to deviate from the 2010 Water Management Plan as it pertains to the determination of interruptible supply for 2014 as follows:

    a. Provide interruptible stored water for first crop in 2014 based upon the combined storage of lakes Buchanan and Travis on March 1, 2014 at 11:59 p.m. as follows:

        i. Provide no interruptible stored water to customers within the LCRA Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is below 1.1 million acre-feet;
        ii. Provide up to 100,000 acre-feet of interruptible stored water for diversion by customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is at or above 1.1 million acre-feet but below 1.2 million acre-feet;
        iii. Provide up to 124,000 acre-feet of interruptible stored water for diversion by customers within LCRA's Gulf Coast and Lakeside

Divisions and Pierce Ranch if combined storage is at or above 1.2 million acre-feet but below 1.3 million acre-feet;

iv. Provide up to 148,000 acre-feet of interruptible stored water for diversion by customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is at or above 1.3 million acre-feet but below 1.4 million acre-feet;

v. Provide up to 172,000 acre-feet of interruptible stored water for diversion by customers within LCRA's Gulf Coast and Lakeside Divisions and Pierce Ranch if combined storage is at or above 1.4 million acre-feet;

b. Provide interruptible stored water to the Garwood irrigation division and Pierce Ranch, to the extent required by their contracts.

2. The LCRA Drought Contingency Plan is temporarily amended to provide for additional regulation of water use by firm water customers as follows:

   If combined storage of lakes Buchanan and Travis is below 1.1 million acre-feet on March 1, 2014 and TCEQ has issued an order that results in the cutoff of interruptible stored water supply to the Gulf Coast, Lakeside and Pierce Ranch irrigation operations, the following measures shall take effect until such time as either combined storage increases to1.1 million acre-feet or above or interruptible stored water is supplied to any customers in the Gulf Coast, Lakeside or Pierce Ranch irrigation operations:

   a. Firm customers shall adopt and implement watering restrictions that limit the irrigation of ornamental landscaped areas (such as lawns) with hose-end sprinklers or automatic irrigation systems other than drip irrigation to no more than once per week.

   b. Municipal wholesale water customers shall provide LCRA with an order, ordinance, or resolution to demonstrate adequate enforcement provisions related to the restrictions.

   c. Failure to comply with the watering restrictions will subject the customer to the following penalties to be determined by the LCRA Board of Directors:

      i. First documented violation: Written notice of violation;
      ii. Second documented violation: Penalty of up to $2,000;
      iii. Third and subsequent violation: Penalty of up to $10,000;
      iv. Each day in which the violation is observed is considered a separate violation.

Approved this 19th day of November 2013

CERTIFICATE

STATE OF TEXAS §
§
COUNTY OF TRAVIS §

I, Thomas E. Oney, hereby certify that I am the General Counsel and Assistant Secretary of the Board of Directors of the Lower Colorado River Authority (LCRA), a conservation and reclamation district, duly organized and existing under and by virtue of the public laws of the State of Texas.

I further certify that the Board of Directors of LCRA, on November 19, 2014, in a meeting posted properly in accordance with the Texas Open Meetings Act and with a quorum present and voting, authorized the general manager or his designee to seek emergency relief from the Texas Commission on Environmental Quality related to interruptible stored water for agricultural uses and stored water related to instream flows for the blue sucker fish, as evidenced in LCRA Board Minute No. 14-120, duly recorded in the Board's minutes of the meeting.

I further certify that the attached is a true and correct copy of an excerpt (Minute No. 14-120) from the Board's minutes of the meeting held on November 19, 2014.

TO CERTIFY WHICH, witness my hand and official seal this the 17th day of December 2014.

Thomas E. Oney, General Counsel
and Assistant Secretary of the
LCRA Board of Directors

EXCERPT FROM THE MINUTES OF THE REGULAR MEETING OF
THE BOARD OF DIRECTORS OF LCRA
HELD ON NOVEMBER 19, 2014

* * * * * * * *

14-120 John Hofmann, executive vice president of Water, presented for consideration a staff recommendation, described in revised Agenda Item 10 [attached hereto as Exhibit H], that the Board authorize the general manager or his designee to seek emergency relief from the Texas Commission on Environmental Quality related to interruptible stored water for agricultural uses and stored water related to instream flows for the blue sucker fish. Staff distributed the revised agenda item to Board members prior to the meeting.

Shana Horton, attorney for the Central Texas Water Coalition (CTWC), and Kirby Brown, co-chair of the Lower Colorado River Basin Coalition, addressed the Board regarding Agenda Item 10. Horton noted her comments will supplement the CTWC's written comments submitted prior to today's meeting.

After discussion, with staff responding to questions from Board members, Director Spears moved that the Board approve the staff recommendation as described in revised Agenda Item 10. The motion was seconded by Director Martine and approved by a vote of 11 to 2, with directors Balas and Berger voting no.

* * * * * * * *

FOR ACTION

10. Drought Emergency Relief for 2015

Proposed Motion

Authorize the general manager or his designee to seek emergency relief from the Texas Commission on Environmental Quality (TCEQ) related to interruptible stored water for agricultural uses and stored water related to instream flows for the blue sucker fish.

Board Consideration

LCRA Board Policy 102 - Authority and Responsibilities requires Board approval for all decisions in which Board policy or direction has not been clearly established.

Budget Status and Fiscal Impact

Approval of these actions will negatively impact the FY 2015 budget. The FY 2015 Business Plan assumed water availability for all interruptible customers in the 2015 crop season. The continued suspension of Gulf Coast and Lakeside agricultural division customers into 2015 will have a $2.7 million net margin decrease for FY 2015.

Summary

As the severe drought in the lower Colorado River basin persists, water supplies have not recovered, and combined storage in lakes Buchanan and Travis has generally remained below 800,000 acre-feet in 2014. With the combined storage in lakes Buchanan and Travis at 680,863 acre-feet as of Nov. 1, 2014, the earliest possibility of storage dropping below 600,000 acre-feet and triggering a Drought Worse Than Drought of Record (DWDR) declaration is now February 2015.

The 2010 Water Management Plan (WMP) calls for LCRA to make an initial determination of the available supply of interruptible stored water for agricultural customers in the lower basin in November. Absent emergency relief, and if a DWDR declaration is not declared prior to irrigation season, LCRA would be obligated to provide about 170,000 acre-feet of interruptible stored water for diversion for agricultural purposes in 2015.

Also under the 2010 WMP, LCRA is required to provide stored water to maintain a minimum instream flow of 500 cubic feet per second (cfs) in the lower river for a period of six weeks in the spring of 2015 for the state-threatened blue sucker fish. Depending on river conditions and required releases for downstream customer demands, LCRA could be required to release as much as 25,000 to 30,000 acre-feet to maintain 500 cfs. In 2014, LCRA obtained relief from TCEQ to reduce this minimum flow to 300 cfs, which was generally consistent with more recent science regarding instream flow needs during the spring. Based on spring 2014 conditions, LCRA estimated that without the emergency relief, up to about 21,000 acre-feet might be released from Lakes Buchanan and Travis to meet the requirement. LCRA released only about 4,000 acre-feet from storage for the requirement as a result of the emergency relief and inflows from rain events below Lake Travis during the six-week period. This resulted in significant water savings. A reduction of this requirement to 300 cfs is expected to maintain at least 86 percent of the maximum available spawning habitat for the blue sucker.

LCRA recently filed a revised application to amend the 2010 WMP, consistent with Board action taken in September. However, this revised application may not be in effect before the 2015 irrigation season. Therefore, as in the past three years, staff recommends LCRA seek emergency relief from the 2010 WMP as it relates to interruptible stored water for agricultural

EXHIBIT H

use and instream flows for the blue sucker as specified in the proposed resolution included with this agenda item.

Presenter(s)

John Hofmann
Executive Vice President of Water

Karen Bondy
Senior Vice President of Water Resources

Exhibit(s)

A - Board Resolution

EXHIBIT H

EXHIBIT A

REVISED

(Revisions highlighted below in yellow.)

Resolution of the Board of Directors of the Lower Colorado River Authority Regarding Drought Management Actions in Response to Current Drought Conditions

Whereas, the Colorado River basin is experiencing a serious drought that, at times, has been more intense than the worst recorded drought this region has experienced, the Drought of Record that occurred from 1947 to 1957; and

Whereas, the last four years (2011, 2012, 2013 and 2014) have produced record-low inflows to the Highland Lakes; and

Whereas, inflows to the Highland Lakes for the first 10 months of 2014 were the second lowest for the January to October period on record, dating back to 1942; and

Whereas, LCRA has sought and obtained emergency drought relief from the Texas Commission on Environmental Quality (TCEQ) to suspend releases of interruptible stored water for agricultural purposes in 2012, 2013 and 2014, thus reducing demands on lakes Buchanan and Travis; and

Whereas, in 2014, LCRA obtained emergency drought relief from TCEQ to reduce its obligation to provide stored water to maintain certain minimum instream flows for the state-threatened blue sucker fish; and

Whereas, combined storage in lakes Buchanan and Travis on Nov. 1, 2014, was 680,863 acre-feet, or about 34 percent full; and

Whereas, the TCEQ has repeatedly found, over the last three years, that conditions presented by the current drought pose an imminent threat to human health and safety; and

Whereas, the contributing watershed to the Highland Lakes has consistently remained in the governor's emergency disaster proclamation related to drought conditions since 2011; and

Whereas, the prolonged drought has caused significant adverse impacts throughout LCRA's service area and the state; and

Whereas, current analysis indicates the possibility of combined storage dropping to 600,000 acre-feet and triggering the LCRA Board to declare a Drought Worse Than Drought of Record as early as February 2015; and

EXHIBIT H

Whereas, absent emergency relief from the 2010 Water Management Plan, LCRA would be obligated to release significant amounts of interruptible stored water in 2015, even if combined storage on Jan. 1, 2015, is just slightly above 600,000 acre-feet; and

Whereas, absent emergency relief from the 2010 Water Management Plan, LCRA could be obligated to release significant amounts of stored water to maintain 500 cubic feet per second (cfs) instream flows in the lower river during a six-week period for the blue sucker fish; and

Whereas, LCRA's Board of Directors wants to take all necessary and prudent steps to manage the region's water supply to meet the essential needs of the communities and industries through this severe drought; and

Whereas, LCRA's Board of Directors recognizes its firm water customers have been implementing significant limits on water use and are taking action to reduce nonessential water use, which should continue under the severe current drought conditions; and

Whereas, LCRA's Board of Directors believes the severe drought conditions warrant continued limitations on releases of stored water, consistent with the limits implemented pursuant to prior TCEQ emergency orders;

NOW, THEREFORE, BE IT RESOLVED that the LCRA Board of Directors hereby takes the following actions:

1. The general manager or his designee is authorized to prepare and file all necessary applications to seek emergency relief from TCEQ under Texas Water Code §§ 11.139, 11.148 and any other applicable law, as specified below, and to take any other action necessary to implement such emergency relief. Such emergency relief should seek to allow LCRA to deviate from the 2010 Water Management Plan as follows:

    a. As it pertains to the determination of interruptible supply for 2015, suspend LCRA's obligation to release any interruptible stored water for LCRA's Gulf Coast and Lakeside agricultural divisions and Pierce Ranch if the TCEQ determines that the water supply conditions in the lower Colorado River basin have not changed substantially from existing conditions by March 1, 2015, except to the extent required by LCRA's contracts with the Garwood Irrigation Company and Pierce Ranch.

    b. Reduce LCRA's obligation to maintain a minimum instream flow for the blue sucker fish from 500 cfs to 300 cfs for a six-week period to end no later than May 31, 2015.

2. The drought response measures for firm customers, as adopted by the Board on Nov. 19, 2013, remain in effect.

EXHIBIT H

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

APPLICATION NO. 14-5478C

CERTIFICATE NO. 14-5478C

Name	:	Lower Colorado River Authority	Address	:	3701 Lake Austin Blvd. Austin, Texas 78703
Filed	:	December 12, 1995	Granted	:	MAR 29 1996
Purpose	:	Municipal, Industrial, Irrigation, Mining, Domestic, Recreation, Instream Flows, Bay/Estuary, Livestock, Hydroelectric, and Recharge	County	:	Llano and Burnet
Watercourse	:	Colorado River	Watershed	:	Colorado River

WHEREAS, Certificate of Adjudication No. 14-5478, as amended, includes authorization for the Lower Colorado River Authority (LCRA) to maintain an existing dam and 992,475 acre-foot capacity reservoir on the Colorado River (Buchanan Dam and Lake Buchanan) for in-place recreational purposes and to divert and use not to exceed 1,500,000 acre-feet of water per annum from the reservoir and Lake Travis (included in Certificate No. 14-5482) for municipal, industrial, irrigation, mining, and hydroelectric generation purposes; and

WHEREAS, the certificate included a time priority of March 29, 1926 for the impoundment of water in the aforesaid reservoir, the use of the impounded water for recreation, and the use of released water for hydroelectric generation, and a time priority of March 7, 1938 was assigned to the diversion and use of water for all other authorized purposes; and

WHEREAS, the certificate was amended to authorize the diversion, use, and release of the waters in Lake Buchanan for domestic, recreation, instream flows, bay/estuary inflows; and

WHEREAS, the certificate was amended a second time to authorize the diversion, use, and release of the waters in Lake Buchanan for livestock and recharge purposes; and

WHEREAS, Certificate No. 14-2564 was issued on August 31, 1983 to Palladian Capital Corporation and authorized the diversion and use of not to exceed 1100 acre-feet and the use of 1035 acre-feet of water per annum from the Colorado River to irrigate a maximum of 352 acres of land out of an 825.6 acre tract located in the William Seckatz Survey No. 535, Abstract No. 1046, San Saba County, Texas; and

WHEREAS, Commission records show ownership of Certificate No. 14-2564 as follows:

1. Haskel G. Hudson & Norma Jeanne Hudson - Diversion of 626 acre-feet per annum and use of 589 acre-feet for irrigation of 200.34 acres out of a 435.74 acre tract; and
2. Luther W. Simpson & Irma Nell Simpson - Diversion of 474 acre-feet per annum and use of 446 acre-feet for irrigation of 151.66 acres out of 329.86 acre tract; and

WHEREAS, William J. Maddux holds an option to purchase the right to divert 532 acre-feet and use 500 acre-feet per annum of the water rights owned by Haskel G. Hudson and Norma Jeanne Hudson authorized by Certificate No. 14-2564; and

WHEREAS, pursuant to an agreement between William J. Maddux and the LCRA (applicants), an application to amend Certificate No. 14-5478 has been submitted and requests the Commission to amend the Certificate by:

1. Changing the place of diversion of 532 acre-feet of water and place of consumptive use for 500 acre-feet of water from the current location in San Saba County to a location approximately 35 miles downstream to Lake Buchanan to be used in the LCRA's authorized service area; and

2. Severing the diversion of 532 acre-feet and consumptive use of 500 acre-feet of water from Certificate No. 14-2564 and combine it with Certificate No. 14-5478, as amended, thereby assigning all current authorizations under Certificate No. 14-5478, as amended, to the additional water; and

WHEREAS, the Texas Natural Resource Conservation Commission finds that jurisdiction over the application is established; and

WHEREAS, the Texas Natural Resource Conservation Commission is of the opinion and so finds the proposed changes will not impair the rights of any person entitled to the use of a portion of the waters of the Colorado River Basin; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Natural Resource Conservation Commission in issuing this amendment.

NOW, THEREFORE, this amendment to Certificate No. 14-5478, as amended, is issued to the Lower Colorado River Authority, subject to the following provisions:

1. USE

In addition to the existing authorizations under Certificate No. 14-5478, as amended, certificate owner is authorized to divert 532 acre-feet and consumptively use not to exceed 500 acre-feet of water per annum from Lake Buchanan on the Colorado River with current purpose and place of use authorizations as delineated in Certificate No. 14-5478, as amended.

2. DIVERSION

Diversions will occur on the Colorado River from Lake Buchanan at currently authorized locations and diversion rates authorized in Certificate No. 14-5478, as amended.

3. SPECIAL CONDITIONS

This amendment is conditional upon the purchase and sale of the 532 acre-feet of water from Haskel G. and Norma Jeanne Hudson and the subsequent transfer of that portion of Certificate No. 14-2564 from William J. Maddux to the LCRA.

4. PRIORITY

This amendment is junior in time priority to all the water rights in the Colorado River watershed between the diversion points included in Certificate No. 14-2564 and Certificate No. 14-5478. The time priority of this amendment as it relates to all other water rights is December 31, 1929.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 14-5478, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

The Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

The right to use State water appropriated hereunder is limited to that amount which can be beneficially used by the water use permit owner for the authorized purpose but not to exceed the amount ecifically authorized. Non-beneficial use or waste of water is a violation of this amendment.

This amendment is issued subject to the Rules of the Texas Natural Resource Conservation Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

For the Commission

DATE ISSUED: MAR 29 1996

ATTEST:

Gloria A. Vasquez, Chief Clerk

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 14-5478B			TYPE: AMENDMENT
Name:	Lower Colorado River Authority	Address:	P.O. Box 220 Austin, Texas 78767
Filed:	February 6, 1990	Granted:	February 21, 1990
Purposes:	Livestock and Recharge	Counties:	Llano and Burnet
Watercourse:	Colorado River	Watershed:	Colorado River Basin

WHEREAS, Certificate of Adjudication No. 14-5478 was issued to Lower Colorado River Authority on June 28, 1989 and authorized certificate owner to maintain Buchanan Dam and Lake Buchanan on the Colorado River in Llano and Burnet Counties and the diversion and use of water from Lake Buchanan and Lake Travis included in the Authority's Certificate No. 14-5482) for municipal, industrial, irrigation and mining purposes; and

WHEREAS, Certificate No. 14-5478A was issued on October 12, 1989 which authorized certificate owner to divert, use and release waters from Lake Buchanan for domestic, recreation, instream flows and bay/estuary purposes in addition to uses listed above; and

WHEREAS, certificate owner has requested an amendment to Certificate No. 14-5478, as amended, to add authority to divert, use and release the waters in Lake Buchanan for livestock and recharge purposes; and

WHEREAS, the Texas Water Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Water Commission in issuing this amendment; and

NOW, THEREFORE, this amendment to Certificate No. 14-5478, as amended, is issued to the Lower Colorado River Authority, subject to the following provisions:

USE

In addition to the authorizations included in Certificate No. 14-5478, as amended, to divert and use water from Lake Buchanan for municipal, industrial, irrigation, mining, domestic, recreation, instream flows and bay/estuary purposes, certificate owner is authorized to divert, use and release the waters in Lake Buchanan for livestock and recharge purposes.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 14-5478, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Water Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman

DATE ISSUED: MAR 08 1990

ATTEST:

Brenda W. Foster, Chief Clerk

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

AN ORDER severing a portion of the water rights authorized by Certificate No. 14-2564 and combine it with all of the water rights authorized by Certificate No. 14-5478, as amended, and amending Certificate No. 14-5478, as amended, under Certificate No. 14-5478, as amended, designating such as Certificate No. 14-5478C.

An application by the Lower Colorado River Authority and William J. Maddux was presented to the Executive Director of the Texas Natural Resource Conservation Commission for consideration of approval. The applicants request authorization to sever and combine a 532 acre-foot portion the water rights authorized by Certificate No. 14-2564, with the water rights authorized by Certificate No. 14-5478, as amended, under Certificate No. 14-5478, as amended.

The Commission has jurisdiction to consider this matter and after hearing all of the evidence pertaining to the matter, the Commission is of the opinion and so finds that the 532 acre-foot portion water rights authorized by Certificate No. 14-2564 should be severed from said certificate and combined with the water rights authorized by Certificate No. 14-5478, as amended, designating such combination as Certificate No. 14-5478C.

NOW THEREFORE, BE IT ORDERED BY THE TEXAS NATURAL RESOURCE CONSERVATION COMMISSION that the 532 acre-foot portion of water rights authorized by Certificate No. 14-2564 is hereby severed from Certificate No. 14-2564 and combined with the water rights authorized by Certificate No. 14-5478, as amended, by amendment to be so designated as Certificate No. 14-5478C.

All other terms and conditions contained in Certificate No. 14-5478, as amended, which are not specifically contrary to the terms of Certificate No. 14-5478, as herein combined, and to be so designated as Certificate No. 14-5478C by amendment, shall remain in full force and effect.

The Chief Clerk of the Commission is directed to forward a certified copy of this order to Mr. Gene Richardson, of the Lower Colorado River Authority, to Mr. William J. Maddux, to the County Clerk of Llano and Burnet County, and to the Commission Records Systems file of both of the certificates herein combined.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

For the Commission

DATE ISSUED: MAR 29 1996

ATTEST:

Gloria A. Vasquez, Chief Clerk

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 14-5478A		TYPE:	AMENDMENT
Name:	Lower Colorado River Authority	Address:	P.O. Box 220 Austin, Texas 78767
Filed:	September 6, 1989	Granted:	September 7, 1989
Purposes:	Domestic, Recreation, Instream Flows and Bay/Estuary Use	Counties:	Llano and Burnet
Watercourse:	Colorado River	Watershed:	Colorado River Basin

WHEREAS, Certificate of Adjudication No. 14-5478 was issued to Lower Colorado River Authority on June 28, 1989, and authorized the certificate owner to maintain Buchanan Dam and Lake Buchanan on the Colorado River in Llano and Burnet Counties and the diversion and use of water from Lake Buchanan and Lake Travis (included in the authority's Certificate No. 14-5482) for municipal, industrial, irrigation and mining purposes; and

WHEREAS, in conjunction with submittal of the Water Management Plan required by the Final Judgement and Decree in Case No. 155, 414-A-1 of the 264th Judicial District Court of Bell County, certificate owner has also requested an amendment to Certificate No. 14-5478 to add authority to divert, use and release the waters in Lake Buchanan for domestic, recreation, instream flow and bay/estuary inflow purposes; and

WHEREAS, the Texas Water Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Water Commission in issuing this amendment.

NOW, THEREFORE, this amendment to Certificate No. 14-5478 is issued to the Lower Colorado River Authority, subject to the following provisions:

1. USE

   a. In addition to the authorizations included in Paragraph 2.B., USE of Certificate No. 14-5478 to divert and use water from Lake Buchanan for municipal, industrial, irrigation and mining purposes, certificate owner is authorized to divert, use and release waters from Lake Buchanan for domestic, recreation, instream flows and bay/estuary purposes.

   b. The combined firm yield for Lakes Travis and Buchanan is as found by the Commission by Order approved on September 7, 1989, approving the Water Management Plan as may be modified by the Commission from time to time.

2. SPECIAL CONDITIONS

   a. For purposes of perfection, use of water for recreation purposes is limited to that quantity of water actually sold for that purpose whether used in, or released or diverted from, Lakes Buchanan or Travis.

   b. Certificate owner shall follow the provisions of the Water Management Plan as approved by Order of the Commission on September 7, 1989, and the terms and conditions of the Order.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 14-5478, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Water Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman

DATE ISSUED: October 12, 1989

ATTEST:

Brenda W. Foster, Chief Clerk

CERTIFICATE OF ADJUDICATION

CERTIFICATE OF ADJUDICATION: 14-5478

OWNER: Lower Colorado River Authority
P. O. Box 220
Austin, Texas 78767

COUNTIES: Llano and Burnet

PRIORITY DATES: March 29, 1926 and March 7, 1938

WATERCOURSE: Colorado River

BASIN: Colorado River

WHEREAS, by final judgment and decree of the 264th Judicial District Court of Bell County, Texas, in Cause No. 115,414-A-1, In Re: The Exceptions of the Lower Colorado River Authority and the City of Austin to the adjudication of water rights in the Lower Colorado River Segment of the Colorado River Basin dated April 20, 1988, a right was recognized under Permit 954, Permit 1259 and Permit 1260 authorizing the Lower Colorado River Authority to appropriate waters of the State of Texas as set forth below:

NOW, THEREFORE, this certificate of adjudication to appropriate waters of the State of Texas in the Colorado River Basin is issued to the Lower Colorado River Authority (hereinafter called LCRA), subject to the following terms and conditions:

1. IMPOUNDMENT

LCRA is authorized to maintain an existing dam and reservoir on the Colorado River (Buchanan Dam and Lake Buchanan) and impound therein not to exceed 992,475 acre-feet of water. The dam is located in the Carl Conrad Mertz Survey, Abstract 510 and the Johann L. Henne Survey, Abstract 326 in Llano County and the Abraham Large Survey, Abstract 532; the F.H.R. Day Survey, Abstract 262 and the D. R. Banta Survey, Abstract 1215, in Burnet County, Texas.

2. USE

A. LCRA is authorized to use the water impounded in the aforesaid Lake Buchanan for recreation purposes with no right of diversion or release for this purpose.

B. LCRA is authorized to divert and use not to exceed 1,500,000 acre-feet of water per annum from the aforesaid reservoir and Lake Travis (Certificate of Adjudication 14-5482) for municipal, industrial, irrigation and mining purposes, subject to the following conditions:

(1) LCRA shall prepare and submit to the Commission, on or before December 31, 1988, a proposed reservoir operation

plan which shall include such studies and other information as may be required by the Commission to determine the Combined Firm Yield of Lakes Travis and Buchanan (as defined by Fact Finding No. 22 for Lake Buchanan in the "Modified Findings and Conclusions Defining LCRA's Water Rights with Respect to the Highland Lakes", Attachment No. 2 to Judgment in Cause No. 115,414-A-1) and demonstrate LCRA's compliance with, and its ability to comply with, these conditions (the "Management Plan"). In making its decision on the adoption of a Management Plan, the Commission shall consider all relevant public policies including, without limitation, the following:

(a) Recognition of the necessity of beneficial inflows from the Colorado River into the Lavaca-Tres Palacios Estuary consistent with §11.147 of the Texas Water Code;

(b) Protection of fish and wildlife habitats consistent with §11.147 of the Texas Water Code;

(c) Consideration of the effects, if any, on existing instream uses and water quality consistent with §11.147 of the Texas Water Code;

(d) Mitigation of adverse impacts, if any, on wildlife habitats inundated by new reservoir construction;

(e) Mitigation of adverse environmental impacts, if any, caused by new projects taking, storing or diverting in excess of 5,000 acre-feet per year consistent with §11.152 of the Texas Water Code; and

(f) Recognition of the Commission's statutory authority to require water conservation under §11.134(b)(4).

The Commission shall consider LCRA's proposal prior to adopting the initial Management Plan. The Management Plan may be amended from time to time upon the request of LCRA or on the Commission's own motion. The initial proceeding to consider the adoption of the Management Plan, and any major amendment thereof, shall be pursuant to contested case procedures. Any proceeding to consider the adoption or major amendment of the Management Plan shall be preceded by notice and opportunity to request a hearing in accordance with the Commission's regulations applicable to water rights permitting proceedings. The Texas Parks and Wildlife Department, at its option, may be a party in any such proceeding, in the same manner as it would be a party to a proceeding before the Commission incident to an

application for a permit governed by §11.147 of the Texas Water Code. The Commission shall name as other parties persons who establish a justiciable interest in the proceeding. In making a final decision on the adoption of a Management Plan and any amendment thereof, the Commission, in addition to other information, evidence, and testimony presented, shall consider all information, evidence, and testimony presented by the Texas Parks and Wildlife Department, including, without limitation, any memorandum of understanding between LCRA and Texas Parks and Wildlife Department relating to the management of the Highland Lakes.

(2) LCRA shall prepare and submit to the Commission, on or before March 1 of each year beginning with March 1, 1990, a report which documents compliance with the Management Plan and these conditions during the previous year. Such report shall be in a form approved by the Executive Director of the Commission.

(3) Except as provided in Paragraph (9) below, LCRA shall not supply or commit to supply any water under this certificate or under Certificate of Adjudication 14-5482 to any other party except pursuant to a written contract between LCRA and such party that defines such commitment.

(4) LCRA shall not supply or commit to supply any water under this certificate or under Certificate of Adjudication 14-5482 to itself for use by itself or other parties except pursuant to resolution adopted by LCRA's Board of Directors that defines such commitment.

(5) Each commitment by LCRA to supply water under this Certificate or under Certificate of Adjudication 14-5482 shall be considered to be on a firm, uninterruptible basis unless the contract, resolution or special condition defining such commitment specifically provides that such commitment "is subject to interruption or curtailment".

(6) LCRA shall not commit to supply water under this certificate or under Certificate of Adjudication 14-5482 on a firm, uninterruptible basis in excess of the Combined Firm Yield of Lakes Travis and Buchanan. During the period beginning as of January 1, 1988 until such time as the Management Plan is submitted and approved by the Commission, LCRA shall not enter into any contract or adopt any resolution by which it commits to supply any water under this certificate or under Certificate of Adjudication 14-5482 on a firm, uninterruptible basis, unless:

(a) The aggregate of all firm, uninterruptible commitments of water under this certificate or under Certificate of Adjudication 14-5482, including the commitment made pursuant to such contract or resolution, does not exceed 2,500,000 acre-feet of water over any five consecutive calendar-year period; or

(b) The commitment made pursuant to such contract or resolution is for municipal use, and such commitment does not exceed 10,000 acre-feet of water per annum; or

(c) Such contract or resolution is specifically approved by either the Executive Director or the Commission pursuant to the Special Condition contained in this paragraph (6).

(7) LCRA shall interrupt or curtail the supply of water under this certificate or under Certificate of Adjudication 14-5482 pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demands for water under such certificates pursuant to all firm, uninterruptible commitments. Commitments to supply water on a non-firm, interruptible basis may be interrupted or curtailed as necessary either on a pro rata basis or in accordance with a system of priorities, as may be set forth in various contracts and resolutions that define such commitments.

(8) LCRA shall not impose its priority under this certificate or under Certificate of Adjudication 14-5482 against any junior permanent water right with a priority date senior to November 1, 1987, except to the extent that:

(a) LCRA would have the right to impose such priority against such water right if LCRA's right under this certificate or under Certificate of Adjudication 14-5482 to divert and use water from Lakes Travis and Buchanan were limited to the Combined Firm Yield of such lakes; or

(b) The holder of such water right has agreed, or in the future agrees, otherwise.

(9) LCRA shall supply water under this certificate or under Certificate of Adjudication 14-5482 to or for the benefit of any downstream water right with a priority date junior to December 1, 1900 and senior to November 1, 1987 that authorizes the diversion of not more than 3000 acre-feet of water per annum, to the extent that:

(a) The holder of such water right applies to the Commission for release of such water; and

(b) The Commission finds that, but for the exercise of priority claims under Certificates of Adjudication 14-5471, 14-5472 (as pertains to rights recognized pursuant to CF-330), 14-5475, 14-5476 and 14-5477.

[1] Water would be available for diversion from the natural flow of the Colorado River or tributary thereof at an authorized point of diversion under such water right; and

[2] Applicant's water right would entitle him to divert such water;

provided, however, that LCRA shall not be obligated to supply more than 20,000 acre-feet of water in any year pursuant to this condition (9); that this commitment is subject to interruption or curtailment pro rata with other long-term interruptible commitments of LCRA; and that LCRA shall not be obligated to supply water under this condition to or for the benefit of a temporary or term permit beyond the initial term thereof.

(10) LCRA may from time to time apply to the Commission for amendment of the conditions outlined in paragraph 2B(1) through 2B(9) above pursuant to Commission rules.

(11) The rights recognized in Paragraph 2B are duplicative of, and not in addition to, those rights recognized under Certificate of Adjudication 14-5482 relating to LCRA's rights in Lake Travis.

C. LCRA is authorized to use the bed and banks of the Colorado River, below the aforesaid dam to convey water released from Lake Buchanan for use by LCRA or others entitled to use such water in the amounts and for the purposes authorized herein.

D. LCRA is authorized to divert and use water through Buchanan Dam for the purpose of hydroelectric power generation, subject to the following conditions:

(1) Such right is subordinated to the extent set forth in TEX. REV. CIV. STAT. ANN. art. 8280-107, as amended, Tex. Laws 1975, ch. 74 at 179, as such act may be amended from time to time (the "LCRA Act").

(2) Such right is further subordinated, to the extent that it may not be subordinated pursuant to the LCRA Act, as follows:

(a) LCRA shall not release water through Buchanan Dam solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under this certificate and under Certificate of Adjudication 14-5482 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments; and

(b) To the extent that water is released through Buchanan Dam solely for the purpose of hydroelectric generation, such right is specifically subordinated, as to priority, to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, industrial, irrigation and/or mining purposes, except during emergency shortages of electricity, and during other times to the extent that the holder of any such upstream right has agreed, or in the future agrees, otherwise.

E. LCRA is authorized to maintain and operate its existing pump-back unit, located below the aforesaid dam on Inks Lake, as an aid in utilizing the water authorized herein for hydroelectric generation purposes.

3. DIVERSION

A. Location:

(1) On the perimeter of the aforesaid reservoir.

(2) Releases through the dam.

B. Maximum rate:

(1) Unspecified from the perimeter of reservoir.

(2) 3630.00 cfs (1,633,500 gpm) for hydroelectric generation.

4. PRIORITY

A. The time priority of LCRA's right is March 29, 1926 for the impoundment of water in the aforesaid reservoir, the use of the impounded water for recreation and the use of released water for hydroelectric generation.

B. The time priority of LCRA's right is March 7, 1938 for the diversion and use of water for all other purposes authorized herein.

5. SPECIAL CONDITION

Owner shall maintain a suitable outlet in the aforesaid dam authorized herein to allow the free passage of water that Owner is not entitled to divert or impound.

The location of pertinent features related to this certificate are shown on Pages Nos. 21 and 25 of the Middle Colorado River Segment Certificates of Adjudication Maps, copies of which are located in the office of the Texas Water Commission, Austin, Texas.

This certificate of adjudication is issued subject to all terms, conditions and provision in the final judgment and decree of the 264th Judicial District Court of Bell County, Texas, in Cause No. 115,414-A-1, In Re: The Exceptions of the Lower Colorado River Authority and the City of Austin to the adjudication of water rights in the Lower Colorado River Segment of the Colorado River Basin dated April 20, 1988 and supersedes all rights of the Owner asserted in that cause.

This certificate of adjudication is issued subject to senior and superior water rights in the Colorado River Basin.

Certificate of Adjudication 14-5478

This certificate of adjudication is issued subject to the Rules of the Texas Water Commission and its continuing right of supervision of State water resources consistent with the public policy of the State as set forth in the Texas Water Code.

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman

DATE ISSUED:

JUN 28 1989

ATTEST:

Brenda W. Foster, Chief Clerk

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. *12-5482C* *TYPE: AMENDMENT*

Name:	*Lower Colorado River Authority*	*Address:*	*PO BOX 220 AUSTIN TX 78767-0220*
Filed:	*September 17, 1991*	*Granted:*	*October 9, 1991*
Purposes:	*Industrial and Irrigation*	*County:*	*Travis*
Watercourse:	*Colorado River*	*Watershed:*	*Colorado River Basin*

WHEREAS, Certificate No. 14-5482, as amended, was issued to Lower Colorado River Authority (LCRA) and authorized the certificate owner to maintain Mansfield Dam and Lake Travis on Colorado River in Travis County and the diversion and use of water from Lake Travis and Lake Buchanan (included in LCRA's Certificate No. 14-5478) for municipal, industrial, irrigation, mining, domestic, recreation, instream flows, bay/estuary, livestock and recharge purposes; and

WHEREAS, applicant seeks to amend Certificate No. 14-5482, as amended, to establish a diversion point and maximum diversion rate on Lake Austin (authorized by Certificate No. 14-5471 and owned by the City of Austin) for the purposes of diverting water released from Lake Travis for (industrial use) heat transfer or cooling purposes and for irrigation of landscaped areas surrounding LCRA's proposed office complex; and

WHEREAS, the Texas Water Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Water Commission in issuing this amendment.

NOW, THEREFORE, this amendment to Certificate No. 14-5482 is issued to the Lower Colorado River Authority, as follows:

1. USE

Certificate owner is authorized to divert and use 1470 acre-feet of water per annum for industrial and irrigation purposes at the certificate owner's proposed office complex.

2. DIVERSION

In addition to the authorized points of diversion in Certificate No. 14-5482, as amended, certificate owner is authorized to use the following point of diversion:

A. Location:

(3) At a point on the eastern end of Tom Miller Dam on the Colorado River, Travis County, the same being S 79° E, 1135 feet from the north corner of the Henry P. Hill Grant, Abstract No. 14.

B. Maximum rate:

(3) 4.0 cfs (1800 gpm).

3. POINT OF RETURN

At a point S 74° E, 1170 feet from the aforesaid survey corner.

4. SPECIAL CONDITION

Certificate owner shall maintain annual records indicating that water used under this amendment conforms to Article 5.1.2.(b) and 5.1.3.(b) of LCRA's Water Conservation Rules and the records shall be made available to representatives of the Executive Director of the Texas Water Commission upon reasonable request.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 14-5482, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

Certificate owner shall use those practices, techniques and technologies that will reduce the loss or waste of water and improve the efficiency and use of water so that only so much water as can be beneficially used will be diverted. Furthermore, diversion and use will occur only when reasonably necessary because of prevailing climatic conditions and subject to the terms and conditions of this amendment.

This amendment is issued subject to the Rules of the Texas Water Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS WATER COMMISSION

John Hall, Chairman

DATE ISSUED: OCT 3 1 1991

ATTEST:

Gloria A. Vasquez, Chief Clerk

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 14-5482B			TYPE: AMENDMENT
Name:	Lower Colorado River Authority	Address:	P.O. Box 220 Austin, Texas 78767
Filed:	February 6, 1990	Granted:	February 21, 1990
Purposes:	Livestock and Recharge	County:	Travis
Watercourse:	Colorado River	Watershed:	Colorado River Basin

WHEREAS, Certificate of Adjudication No. 14-5482 was issued to Lower Colorado River Authority on June 28, 1989 and authorized certificate owner to maintain Mansfield Dam and Lake Travis on the Colorado River in Travis County and the diversion and use of water from Lake Travis and Lake Buchanan (included in the Authority's Certificate No. 14-5478) for municipal, industrial, irrigation and mining purposes; and

WHEREAS, Certificate No. 14-5482A as issued on October 12, 1989 which authorized certificate owner to divert, use and release waters from Lake Travis for domestic, recreation, instream flows and bay/estuary purposes in addition to uses listed above; and

WHEREAS, certificate owner has requested an amendment to Certificate No. 14-5482, as amended, to add authority to divert, use and release the waters in Lake Travis for livestock and recharge purposes; and

WHEREAS, the Texas Water Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Water Commission in issuing this amendment; and

NOW, THEREFORE, this amendment to Certificate No. 14-5482, as amended, is issued to the Lower Colorado River Authority, subject to the following provisions:

USE

In addition to the authorizations included in Certificate No. 14-5482, as amended, to divert and use water from Lake Travis for municipal, industrial, irrigation, mining, domestic, recreation, instream flows and bay/estuary purposes, certificate owner is authorized to divert, use and release the waters in Lake Travis for livestock and recharge purposes.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 14-5482, as amended, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Water Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman

DATE ISSUED: MAR 08 1990

ATTEST:

Brenda W. Foster, Chief Clerk

AMENDMENT TO
CERTIFICATE OF ADJUDICATION

CERTIFICATE NO. 14-5482A		TYPE:	AMENDMENT
Name:	Lower Colorado River Authority	Address:	P.O. Box 220 Austin, Texas 78767
Filed:	September 6, 1989	Granted:	September 7, 1989
Purposes:	Domestic, Recreation, Instream Flows and Bay/Estuary Use	County:	Travis
Watercourse:	Colorado River	Watershed:	Colorado River Basin

WHEREAS, Certificate of Adjudication No. 14-5482 was issued to Lower Colorado River Authority on June 28, 1989, and authorized the certificate owner to maintain Mansfield Dam and Lake Travis on the Colorado River in Travis County and the diversion and use of water from Lake Travis and Lake Buchanan (included in the authority's Certificate No. 14-5478) for municipal, industrial, irrigation and mining purposes; and

WHEREAS, in conjunction with submittal of the Water Management Plan required by the Final Judgement and Decree in Cause No. 155, 414-A-1 of the 264th Judicial District Court of Bell County, certificate owner has also requested an amendment to Certificate No. 14-5482 to add authority to divert, use and release the waters of Lake Travis for domestic, recreation, instream flow and bay/estuary inflow purposes; and

WHEREAS, the Texas Water Commission finds that jurisdiction over the application is established; and

WHEREAS, no person protested the granting of this application; and

WHEREAS, the Commission has complied with the requirements of the Texas Water Code and Rules of the Texas Water Commission in issuing this amendment.

NOW, THEREFORE, this amendment to Certificate No. 14-5482 is issued to the Lower Colorado River Authority, subject to the following provisions:

1. USE

   a. In addition to the authorizations included in Paragraph 2.B., USE of Certificate No. 14-5482 to divert and use water from Lake Travis for municipal, industrial, irrigation and mining purposes, certificate owner is authorized to divert, use and release waters from Lake Travis for domestic, recreation, instream flows and bay/estuary purposes.

   b. The combined firm yield for Lakes Travis and Buchanan is as found by the Commission by Order approved on September 7, 1989, approving the Water Management Plan as may be modified by the Commission from time to time.

2. SPECIAL CONDITIONS

   a. For purposes of perfection, use of water for recreation purposes is limited to that quantity of water actually sold for that purpose whether used in, or released or diverted from, Lakes Buchanan or Travis.

   b. Certificate owner shall follow the provisions of the Water Management Plan as approved by Order of the Commission on September 7, 1989, and the terms and conditions of that Order.

This amendment is issued subject to all terms, conditions and provisions contained in Certificate No. 14-5482, except as specifically amended herein.

This amendment is issued subject to all superior and senior water rights in the Colorado River Basin.

Certificate owner agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the granting of this amendment.

All other matters requested in the application which are not specifically granted by this amendment are denied.

This amendment is issued subject to the Rules of the Texas Water Commission and to the right of continuing supervision of State water resources exercised by the Commission.

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman

DATE ISSUED: October 12, 1989

ATTEST:

Brenda W. Foster, Chief Clerk

Adj 5482

CERTIFICATE OF ADJUDICATION

CERTIFICATE OF ADJUDICATION: 14-5482

OWNER: Lower Colorado River Authority
P. O. Box 220
Austin, Texas 78767

COUNTY: Travis

PRIORITY DATES: March 29, 1926 and March 7, 1938

WATERCOURSE: Colorado River

BASIN: Colorado River

WHEREAS, by final judgment and decree of the 264th Judicial District Court of Bell County, Texas, in Cause No. 115,414-A-1, In Re: The Exceptions of the Lower Colorado River Authority and the City of Austin to the adjudication of water rights in the Lower Colorado River Segment of the Colorado River Basin dated April 20, 1988, a right was recognized under Permit 951, Permit 952, Permit 1259 and Permit 1260 authorizing the Lower Colorado River Authority to appropriate waters of the State of Texas as set forth below:

NOW, THEREFORE, this certificate of adjudication to appropriate waters of the State of Texas in the Colorado River Basin is issued to the Lower Colorado River Authority (hereinafter called LCRA), subject to the following terms and conditions:

1. IMPOUNDMENT

LCRA is authorized to maintain an existing dam and reservoir on the Colorado River (Mansfield Dam and Lake Travis) and impound therein not to exceed 1,170,752 acre-feet of water. The dam is located in the John S. Choate Survey 461, Abstract 186 and the C. B. Townsend Survey 192, Abstract 2640, Travis County, Texas.

2. USE

A. LCRA is authorized to use the water impounded in the aforesaid Lake Travis for recreation purposes with no right of diversion or release for this purpose.

B. LCRA is authorized to divert and use not to exceed 1,500,000 acre-feet of water per annum from the aforesaid reservoir and Lake Buchanan (Certificate of Adjudication 14-5478) for municipal, industrial, irrigation and mining purposes, subject to the following conditions:

(1) LCRA shall prepare and submit to the Commission, on or before December 31, 1988, a proposed reservoir operation plan, which shall include such studies and other information as may be required by the Commission to determine the Combined Firm Yield of Lakes Travis and Buchanan (as

defined By Fact Finding No. 29 for Lake Travis in the "Modified Findings and Conclusions Defining LCRA's Water Rights with Respect to the Highland Lakes", Attachment No. 2 to Judgment in Cause No. 115,414-A-1) and demonstrate LCRA's compliance with, and its ability to comply with, these conditions (the "Management Plan"). In making its decision on the adoption of a Management Plan, the Commission shall consider all relevant public policies including, without limitation, the following:

(a) Recognition of the necessity of beneficial inflows from the Colorado River into the Lavaca-Tres Palacios Estuary consistent with §11.147 of the Texas Water Code;

(b) Protection of fish and wildlife habitats consistent with §11.147 of the Texas Water Code;

(c) Consideration of the effects, if any, on existing instream uses and water quality consistent with §11.147 of the Texas Water Code;

(d) Mitigation of adverse impacts, if any, on wildlife habitats inundated by new reservoir construction;

(e) Mitigation of adverse environmental impacts, if any, caused by new projects taking, storing or diverting in excess of 5,000 acre-feet per year consistent with §11.152 of the Texas Water Code; and

(f) Recognition of the Commission's statutory authority to require water conservation under §11.134(b)(4).

The Commission shall consider LCRA's proposal prior to adopting the initial Management Plan. The Management Plan may be amended from time to time upon the request of LCRA or on the Commission's own motion. The initial proceeding to consider the adoption of the Management Plan, and any major amendment thereof, shall be pursuant to contested case procedures. Any proceeding to consider the adoption or major amendment of the Management Plan shall be preceded by notice and opportunity to request a hearing in accordance with the Commission's regulations applicable to water rights permitting proceedings. The Texas Parks and Wildlife Department, at its option, may be a party in any such proceeding, in the same manner as it would be a party to a proceeding before the Commission incident to an application for a permit governed by §11.147 of the Texas Water Code. The Commission shall name as other parties persons who establish a justiciable interest in the

proceeding. In making a final decision on the adoption of a Management Plan and any amendment thereof, the Commission, in addition to other information, evidence, and testimony presented, shall consider all information, evidence, and testimony presented by the Texas Parks and Wildlife Department, including, without limitation, any memorandum of understanding between LCRA and Texas Parks and Wildlife Department relating to the management of the Highland Lakes.

(2) LCRA shall prepare and submit to the Commission, on or before March 1 of each year beginning with March 1, 1990, a report which documents compliance with the Management Plan and these conditions during the previous year. Such report shall be in a form approved by the Executive Director of the Commission.

(3) Except as provided in Paragraph (9) below, LCRA shall not supply or commit to supply any water under this certificate or under Certificate of Adjudication 14-5478 to any other party except pursuant to a written contract between LCRA and such party that defines such commitment.

(4) LCRA shall not supply or commit to supply any water under this certificate or under Certificate of Adjudication 14-5478 to itself for use by itself or other parties except pursuant to resolution adopted by LCRA's Board of Directors that defines such commitment.

(5) Each commitment by LCRA to supply water under this certificate or under Certificate of Adjudication 14-5478 shall be considered to be on a firm, uninterruptible basis unless the contract, resolution or special condition defining such commitment specifically provides that such commitment "is subject to interruption or curtailment".

(6) LCRA shall not commit to supply water under this certificate or under Certificate of Adjudication 14-5478 on a firm, uninterruptible basis in excess of the Combined Firm Yield of Lakes Travis and Buchanan. During the period beginning as of January 1, 1988 until such time as the Management Plan is submitted and approved by the Commission, LCRA shall not enter into any contract or adopt any resolution by which it commits to supply any water under this certificate or under Certificate of Adjudication 14-5478 on a firm, uninterruptible basis, unless:

(a) The aggregate of all firm, uninterruptible commitments of water under this certificate or under Certificate of Adjudication 14-5478, including the

commitment made pursuant to such contract or resolution, does not exceed 2,500,000 acre-feet of water over any five consecutive calendar-year period; or

(b) The commitment made pursuant to such contract or resolution is for municipal use, and such commitment does not exceed 10,000 acre-feet of water per annum; or

(c) Such contract or resolution is specifically approved by either the Executive Director of the Commission or the Commission pursuant to the condition contained in this Paragraph (6).

(7) LCRA shall interrupt or curtail the supply of water under this certificate or under Certificate of Adjudication 14-5478 pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demands for water under such certificates pursuant to all firm, uninterruptible commitments. Commitments to supply water on a non-firm, interruptible basis may be interrupted or curtailed as necessary either on a pro rata basis or in accordance with a system of priorities, as may be set forth in various contracts and resolutions that define such commitments.

(8) LCRA shall not impose its priority under this certificate or under Certificate of Adjudication 14-5478 against any junior permanent water right with a priority date senior to November 1, 1987, except to the extent that:

(a) LCRA would have the right to impose such priority against such water right if LCRA's right under this certificate or under Certificate of Adjudication 14-5478 to divert and use water from Lakes Travis and Buchanan were limited to the Combined Firm Yield of such lakes; or

(b) The holder of such water right has agreed, or in the future agrees, otherwise.

(9) LCRA shall supply water under this certificate or under Certificate of Adjudication 14-5478 to or for the benefit of any downstream water right with a priority date junior to December 1, 1900 and senior to November 1, 1987 that authorizes the diversion of not more than 3000 acre-feet of water per annum, to the extent that:

(a) The holder of such water right applies to the Commission for release of such water; and

(b) The Commission finds that, but for the exercise of priority claims under Certificates of Adjudication 14-5471, 14-5472 (as pertains to rights recognized pursuant to CF-330), 14-5475, 14-5476 and 14-5477.

[1] Water would be available for diversion from the natural flow of the Colorado River or tributary thereof at an authorized point of diversion under such water right; and

[2] Applicant's water right would entitle him to divert such water;

provided, however, that LCRA shall not be obligated to supply more than 20,000 acre-feet of water in any year pursuant to this condition (9); that this commitment is subject to interruption or curtailment pro rata with other long-tern interruptible commitments of LCRA; and that LCRA shall not be obligated to supply water under this condition to or for the benefit of a temporary or term permit beyond the initial term thereof.

(10) LCRA may from time to time apply to the Commission for amendment of the conditions outlined in paragraph 2B(1) through 2B(9) above pursuant to Commission rules.

(11) The rights recognized in Paragraph 2B, are duplicative of, and not in addition to, those rights recognized under Certificate of Adjudication 14-5478 relating to LCRA's rights in Lake Buchanan.

C. LCRA is authorized to use the bed and banks of the Colorado River below the aforesaid dam to convey water released from Lake Travis for use by LCRA or others entitled to use such water in the amounts and for the purposes authorized herein.

D. LCRA is authorized to divert and use water through Mansfield Dam for the purpose of hydroelectric power generation, subject to the following conditions:

(1) Such right is subordinated to the extent set forth in TEX. REV. CIV. STAT. ANN. art. 8280-107, as amended, Tex. Laws 1975, ch. 74 at 179, as such act may be amended from time to time (the "LCRA Act").

(2) Such right is further subordinated, to the extent that it may not be subordinated pursuant to the LCRA Act, as follows:

(a) LCRA shall not release water through Mansfield Dam solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under this certificate and under Certificate of Adjudication 14-5478 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments; and

(b) To the extent that water is released through Mansfield Dam solely for the purpose of hydroelectric generation, such right is specifically subordinated, as to priority, to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, industrial, irrigation and/or mining purposes, except during emergency shortages of electricity, and during other times to the extent that the holder of any such upstream right has agreed, or in the future agrees, otherwise.

3. DIVERSION

A. Location:
(1) On the perimeter of the aforesaid reservoir.

(2) Releases through the dam.

B. Maximum rate:
(1) Unspecified from the perimeter of said reservoir.

(2) 5530.00 cfs (2,488,500 gpm) for hydroelectric generation.

4. PRIORITY

A. The time priority of LCRA's right is March 29, 1926 for the impoundment of water in the aforesaid reservoir, the use of the impounded water for recreation and the use of released water for hydroelectric generation.

B. The time priority of LCRA's right is March 7, 1938 for the diversion and use of water for all other purposes authorized.

5. SPECIAL CONDITION

Owner shall maintain a suitable outlet in the aforesaid dam authorized herein to allow the free passage of water that Owner is not entitled to divert or impound.

The location of pertinent features related to this certificate are shown on Page 31 of the Middle Colorado River Segment Certificates of Adjudication Maps and Page 1 of the Lower Colorado River Segment Certificates of Adjudication Maps, copies of which are located in the office of the Texas Water Commission, Austin, Texas.

This certificate of adjudication is issued subject to all terms conditions and provisions in the final judgment and decree of the 264th Judicial District Court of Bell County, Texas, in Cause No. 115,414-A-1, In Re: The Exceptions of the Lower Colorado River Authority and the City of Austin to the adjudication of water rights in the Lower Colorado River Segment of the Colorado River Basin dated April 20, 1988 and supersedes all rights of the Owner asserted in that cause.

This certificate of adjudication is issued subject to senior and superior water rights in the Colorado River Basin.

This certificate of adjudication is issued subject to the Rules of the Texas Water Commission and its continuing right of supervision of State water resources consistent with the public policy of the State as set forth in the Texas Water Code.

TEXAS WATER COMMISSION

B. J. Wynne, III, Chairman

DATE ISSUED:

JUN 28 1989

ATTEST:

Brenda W. Foster, Chief Clerk

WATER MANAGEMENT PLAN

FOR THE

LOWER COLORADO RIVER BASIN

EFFECTIVE SEPTEMBER 20, 1989

INCLUDING

AMENDMENTS APPROVED BY
TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
THROUGH JANUARY 27, 2010

AND

DROUGHT CONTINGENCY PLAN CHANGES
APPROVED BY THE LCRA BOARD OF DIRECTORS
THROUGH JUNE 16, 2010

DEDICATION

This revision of LCRA's Water Management Plan
is dedicated to Dr. Quentin W. Martin (1946-2003).

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VOLUME 1

WATER MANAGEMENT PLAN
FOR THE LOWER COLORADO RIVER BASIN

PREFACE

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A. Background

The "business" of water resources management in Texas, and throughout the nation, is in the midst of transition and transformation. The transition is largely the result of ever increasing demands and competition for renewable but limited water supplies and a growing awareness of the limits of "traditional" water supply management strategies. Additionally, the spectra of long-range shifts in global climatic patterns have injected a new element of uncertainty in water resources planning and management. Clearly, the past may no longer be a valid guide to the future.

In response to new challenges and uncertainties, it is imperative that water management institutions, at all levels, adopt a balanced, flexible, and feasible approach that gives due weight to all the conflicting demands on the water, including the heavy economic dependence of the farmers on historic uses of irrigation water, rapidly emerging public interest in recreation, and environmental values. The challenge is to recognize both the historic uses and the forces of change, transform emerging problems into new opportunities, and guide the institutions of water resources management toward a new era where clean water in Central Texas is recognized as a scarce commodity.

On April 20, 1988 Judge J. F. Clawson of the 264th Judicial District of Bell County, Texas, signed the Final Judgment and Decree relating to LCRA's and the City of Austin's respective water rights. (See Appendix 1A, Volume II).[1] This settlement was the product of a long series of negotiations among LCRA, the City of Austin, and the Texas Water Commission (TWC), predecessor agency of the Texas Commission on Environmental Quality (TCEQ).

[1] The Appendices for Volume II of the Water Management Plan are also being updated at this time.

Under the Final Judgment and Decree, LCRA was granted the right to use 1,500,000 acre-feet annually from Lakes Buchanan and Travis. As part of this settlement LCRA was required to determine the Combined Firm Yield of both Lakes Buchanan and Travis. An interim level of Combined Firm Yield of 500,000 acre-feet was established by the Texas Water Commission (TWC) (predecessor to TCEQ) with an understanding that LCRA would establish the basis for the Combined Firm Yield calculation and submit it to the TWC. The amount of water available for use in excess of the Combined Firm Yield is considered interruptible water and may be sold only on an interruptible basis subject to annual availability and certain rules and conditions required by the TWC.

The purpose of this document, Water Management Plan for the Lower Colorado River Basin (WMP), is to define LCRA's water management programs and policies in accordance with these requirements.

The WMP is not a static document. As LCRA's blueprint for its operation of the Lakes Buchanan and Travis, the WMP is periodically revised to reflect changes in water demands. The last revision was completed by LCRA in February 1997 and approved by the Texas Natural Resources Conservation Commission (TNRCC) (predecessor to TCEQ) in 1999 (herein referred to as the 1999 WMP). The present revision was submitted to TCEQ in May 2003 and approved by TCEQ on January 27, 2010. The most notable changed condition over the last five years has been a significant increase in projected municipal and industrial (firm) water demands. With this large projected increase in firm water demand, the WMP must be adjusted to give a compensating reduction in the interruptible stored water supplies available since firm water demands take priority. This reduction will be achieved by revising the annual interruptible stored water supply curtailment policy adopted in this WMP. Revisions to the WMP require approval by LCRA's Board of Directors, followed by approval by the TCEQ. Such revisions become amendments to LCRA's water rights for Lakes Buchanan and Travis.

The allocation of water to various types of use in the WMP is also reviewed on an annual basis by LCRA. LCRA will continue to provide to the TCEQ an Annual Report on or before March 1.

B. Executive Summary

1. Legal Authority

The legal authority underlying the development of the WMP is derived from four principal sources:

(1) The Final Order of Adjudication of the water rights of the Lower Colorado River Authority;
(2) The Enabling Act of the Lower Colorado River Authority;
(3) General law of the State of Texas, particularly the Texas Water Code; and
(4) The water policies of the Lower Colorado River Authority Board of Directors.

In combination, the authorities establish and define LCRA's responsibility to develop and implement a WMP. In particular, the final adjudication of LCRA's water rights includes provisions relating to

the manner in which LCRA will manage the Highland Lakes and the Colorado River above and below the Highland Lakes and directed LCRA to prepare and submit a proposed WMP to the Texas Water Commission, predecessor agency to the TCEQ. This document was initially developed and is periodically revised by LCRA pursuant to that directive.

2. Summary of Water Management Plan

a. Key Elements of the Water Management Plan

The key elements of the WMP include the following:

(1) Lakes Buchanan and Travis and the Colorado River will be managed together as a single system for water supply purposes.

(2) LCRA will manage the system to maximize the beneficial use of water derived from inflows below the Highland Lakes.

(3) LCRA will manage the system to stretch and conserve the waters stored in Lakes Buchanan and Travis.

(4) All demands for water from the Colorado River downstream of Lakes Buchanan and Travis should be satisfied to the extent possible by run-of-river flows of the Colorado River.

(5) Inflows should be passed through Lakes Buchanan and Travis to honor downstream senior water rights only when those rights cannot be satisfied by the flow in the river below the Highland Lakes.

(6) The firm, uninterruptible commitments of water from Lakes Buchanan and Travis should not exceed the Combined Firm Yield.

(7) The water from Lakes Buchanan and Travis will be available on an interruptible basis as long as LCRA's ability to meet the demand for firm water is not impaired.

(8) Water shall not be released through any dam solely for hydroelectric generation, except during emergency shortages of electricity, and during other times that such releases will be needed for another beneficial purpose.

(9) Competing demands on the system include water quality matters, flood control, water supply, recreation and tourism, hydroelectric power, instream flows and bays and estuaries.

(10) The Combined Firm Yield of Lakes Buchanan and Travis is determined to be 535, 812 acre-feet, including that portion allocated to O.H. Ivie Reservoir, which is owned and operated by the Colorado River Municipal Water District.

(11) To supply existing firm water commitments, including commitments to the environment as proposed herein and the allocation of firm water to O. H. Ivie Reservoir, during a repetition of the critical drought would require an average of 442,350 acre-feet per year to be released, diverted, or otherwise committed from storage in Lakes Buchanan and Travis.

(12) LCRA's Board of Directions has reserved 50,000 acre-feet of the remaining Combined Firm Yield of Lakes Buchanan and Travis for the future needs within LCRA's 35-county water service area, particularly those areas now using ground water supplies that are becoming depleted or are of poor water quality.

(13) The four downstream irrigation operations (Gulf Coast, Lakeside, Garwood and Pierce Ranch) will have first priority for all the interruptible stored water in the annual allocation process to the extent of their Conservation Base acreage or Priority Allocation acreage, whichever applies.

(14) In recognition of the importance of recreation and tourism demands, additional sales of interruptible stored water, other than for the four irrigation operations pursuant to a semiannual allocation, will be limited based on the volume of water in Lakes Buchanan and Travis. The supply of interruptible stored water available for the January through June period will be based on the January 1 storage levels in Lakes Buchanan and Travis taken separately. The supply for the July through December period will be based on the minimum of the maximum storage levels in April, May and June in Lakes Buchanan and Travis taken separately. No sales will occur if either lake is less than 94% of its maximum conservation capacity. If both lakes are at their maximum conservation capacity as calculated above for either six-month period then such interruptible stored water sales will be limited to a total of 30,000 acre-feet for that year. For projected lake volumes between 94% and 100% of conservation capacity, such interruptible stored water sales will be limited proportionately, based on the storage reservoir with the lowest percentage of capacity on January 1 as calculated above.

(15) Instream flow needs will be met by the release of stored water from Lakes Buchanan and Travis to maintain the daily river flows at no less than the critical instream flow needs in all years. Daily river flows will be maintained at the target instream flow needs in those years when the four major irrigation operations are not curtailed, to the extent of inflows each day to the Highland Lakes as measured at the upstream streamgages. Releases of stored water will be a combination of firm and interruptible water supplies. Firm stored water will be supplied in years when the four major

irrigation operations' interruptible stored water supplies are curtailed. Interruptible stored water will be supplied in all other years. Total commitments of the Combined Firm Yield from Lakes Buchanan and Travis for instream flow maintenance will be an average of 27,380 acre-feet per year, with a maximum of:

(a) 51,100 acre-feet in any one year;
(b) 85,700 acre-feet in any two consecutive years;
(c) 114,200 acre-feet in any three consecutive years;
(d) 147,700 acre-feet in any four consecutive years;
(e) 184,500 acre-feet in any five consecutive years;
(f) 212,200 acre-feet in any six consecutive years;
(g) 246,500 acre-feet in any seven consecutive years; and
(h) 273,800 acre-feet in any eight to ten consecutive years.

(16) Bays and estuary needs will be met by releasing monthly stored water from Lakes Buchanan and Travis to meet target inflow needs of 1.03 million acre-feet per year if January 1 storage level in Lakes Buchanan and Travis combined is greater than 1.7 million acre-feet. Critical inflow needs of 171,120 acre-feet per year will be met in all years with releases of stored water from Lakes Buchanan and Travis. In years when the January 1 combined storage in Lakes Buchanan and Travis is less than 1.7 million acre-feet but greater than 1.1 million acre-feet (*i.e.* 86% and 55% full, respectively), one hundred and fifty percent (150%) of critical inflow needs (256,680 acre-feet per year) will be met, subject to the available monthly storable inflows into Lakes Buchanan and Travis. Releases of stored water will be a combination of firm and interruptible water supplies. Firm stored water will be supplied in years when the four major irrigation operations' interruptible stored water supplies are curtailed. Interruptible stored water will be supplied in all other years. Total commitments of the Combined Firm Yield from Lakes Buchanan and Travis for bays and estuaries (estuarine inflows) will be an average of 6,060 acre-feet per year, with a maximum of:

(a) 20,660 acre-feet in any one year;
(b) 23,570 acre-feet in any two consecutive years;
(c) 23,680 acre-feet in any three consecutive years;
(d) 32,220 acre-feet in any four consecutive years;
(e) 40,800 acre-feet in any five consecutive years;
(f) 41,400 acre-feet in any six consecutive years;
(g) 47,800 acre-feet in any seven consecutive years; and
(h) 60,600 acre-feet in any eight to ten consecutive years.

(17) The total firm stored water commitment for both environmental purposes will be an average of 33,440 acre-feet per year. Estimated interruptible stored water supplied

during the critical drought for both purposes will be an additional 23,030 acre-feet per year.

b. Key Elements of the Drought Management and Drought Contingency Plans

The key elements of the Drought Management and Drought Contingency Plans (DMP/DCP) include the following:

(1) A 10-year time period from 2000-2010 is the time frame for the DMP/DCP.

(2) The DMP/DCP establishes criteria for the curtailment of stored water that is committed through contract or by LCRA Board resolution.

(3) Establishes a criteria for interruptible stored water supply curtailments that protects firm demands, establishes a Reserve Storage Pool, and provides for gradual curtailment in order to protect the full demand of first crop rice in all years of the critical drought.

(a) Open Supply - If the total January 1 storage in Lakes Travis and Buchanan combined is equal to or greater than 1,400,000 acre-feet, then LCRA will supply all interruptible stored water demands. This assumes 273,000 acre-feet of interruptible storage water is sufficient to irrigate a total of 83,700 acres within the four irrigation operations, with seventy percent (70%) of that acreage being irrigated for a ratoon, or second, crop of rice.

(b) Curtailment occurs in stages when the combined storage in Lakes Buchanan and Travis on January 1 is less than 1.4 million acre-feet and greater than 325,000 acre-feet. If combined storage on January 1 is between 1.4 million acre-feet and 1.15 million acre-feet, the interruptible stored water supply available will vary beginning at 273,000 acre-feet available at 1.4 million acre-feet of storage and decreasing at a rate of approximately 31,200 acre-feet for each 100,000 acre-foot decrease in combined storage until a value of 195,000 acre-feet available at a combined storage of 1.15 million acre-feet. When the combined storage in Lakes Buchanan and Travis on January 1 is less than 1,150,000 acre-feet, the interruptible stored water supply available will vary beginning at 195,000 acre-feet available at 1.15 million acre-feet of storage and decreasing at a rate of approximately 4,250 acre-feet for each 100,000 acre-foot decrease in combined storage until a value of 160,000 acre-feet available at a combined storage of 325,000 acre-feet.

(c) Cutoff of interruptible supply for the coming year occurs when combined storage in Lakes Buchanan and Travis on January 1 is less than or equal to 325,000 acre-feet.

(d) Review and cancel the curtailment of interruptible stored water for the irrigation operations at any time during the year prior to July 31, if the combined storage in Lakes Buchanan and Travis is projected to be equal to or greater than 1.4 million acre-feet anytime in July.

(e) Reserve Storage Pool - Cutoff of all interruptible supplies when combined storage in Lakes Buchanan and Travis is less than or equal to 200,000 acre-feet.

(f) Allow each irrigation operation the option of a fixed maximum amount of interruptible stored water or all the water necessary to cultivate a maximum acreage agreed upon by the operation and LCRA.

(g) LCRA encourages its firm water customers to implement long-term water conservation measures year-round to meet the goals included in their water conservation plans. LCRA will implement a public awareness campaign on water use and conservation.

(h) Whenever total storage in Lakes Buchanan and Travis is at or below 1.4 million acre-feet, LCRA requests its firm water customers implement the voluntary water use reduction measures contained in their drought contingency plans, with a target reduction goal of five percent.

(i) Whenever the total storage in Lakes Buchanan and Travis is at or below 900,000 acre-feet, LCRA will ask all its firm water customers to implement mandatory water use reduction measures in their drought contingency plans, with a target reduction goal of 10 - 20 percent. LCRA will also begin discussions with firm water customers to develop a specific stored water curtailment plan, to be approved by the LCRA Board and TCEQ.

(j) During a drought more severe than the Drought of Record, LCRA will implement a mandatory pro rata curtailment of a minimum of twenty percent among all of its firm water supply customers according to the amount of firm water to which they are legally entitled under the terms of their contract and consistent with the curtailment plan approved by the LCRA Board and TCEQ. If lake levels continue to drop below 600,000 acre-feet, the mandatory pro rata curtailment percentage may be increased as determined by the LCRA Board. All uses of interruptible stored water will be totally cutoff prior to and during any mandatory curtailment of firm stored water customers.

(k) Require legally enforceable local drought contingency plans for LCRA firm water customers and the four major irrigation operations.

TABLE P-1, below, summarizes these plan elements.

TABLE P-1. DROUGHT CONTINGENCY PLAN SUMMARY TABLE

	A	B	C	D	E	F	G	H
	Drought Response Levels and Stages	**Water Use Reduction Goals**	**Water in Storage (acre-feet)**	**Status (Date)**	**Actions Affecting Interruptible Supplies**	**Actions Affecting Firm Supplies**	**Actions Affecting Instream Flows**	**Actions Affecting Matagorda Bay Freshwater Inflows**
1			**Full**	January 1	Full Supply	Full Supply **Voluntary Conservation; Public Awareness Campaign**	1. Full Supply for Critical Needs 2. Supply for Target Needs Limited to Storable Inflows	Supply for Critical and Target Needs Limited to Storable Inflows
2			**N/A**	January 1 or July 1 – Other customers (either Lake Travis or Buchanan less than 94% full)	1. Interruptible Supplies Cease for All Customers Except Four Major Irrigation Operations 2. Full Supply for Four Major Irrigation Operations			
3			**Less than 1,700,000**	January 1				1. Supply 150% of Critical Needs Limited to Storable Inflows 2. Cease Meeting Target Needs
5	**Firm Stage 1: Voluntary Conservation** **Interruptible Level 1: Initial Curtailment**	**5% of firm demand** ***0-30% of interruptible demand**	**Less than 1,400,000**	January 1 At Any Time – Conservation	Begin Curtailment for Four Major Irrigation Operations with interruptible stored water ranging from 273,000 acre-feet available at storage of 1.4 million acre-feet to 195,000 acre-feet at storage of 1.15 million acre-feet	Full Supply Begin Voluntary Drought Measures	1. Full Supply for Critical Needs Only 2. Cease Meeting Target Needs	
6	**Interruptible Level 2: Steeper Curtailment**	***30-40% of interruptible demand**	**Less than 1,150,000**	January 1	Continued Curtailment for Four Major Irrigation Operations with interruptible stored water ranging from 195,000 acre-feet at storage of 1.15 million acre-feet available to 160,000 acre-feet at storage of 325,000 acre-feet			
7	*NOTE: Interruptible water use reductions are built-in to the interruptible stored water curtailment schedule.							

TABLE P-1. DROUGHT CONTINGENCY PLAN SUMMARY TABLE

	A	B	C	D	E	F	G	H
	Drought Response Levels and Stages	**Water Use Reduction Goals**	**Water in Storage (acre-feet)**	**Status (Date)**	**Actions Affecting Interruptible Supplies**	**Actions Affecting Firm Supplies**	**Actions Affecting Instream Flows**	**Actions Affecting Matagorda Bay Freshwater Inflows**
8			**Less than 1,100,000**	January 1 - Environmental Flows At Any Time - Conservation	↓	↓		Supply Only for Critical Needs Limited to Storable Inflows
9	**Firm Stage 2: Requested Mandatory Conservation**	**10-20% of firm demand**	**Less than 900,000**	At Any Time During Year	↓	Full Supply Request Mandatory Drought Restrictions Meet with Firm Customers to Develop Curtailment Plan TCEQ and LCRA Board Approve Curtailment Plan		↓
10	**Firm Stage 3: Pro-Rata Curtailment**	**20% or more of firm demand**	**Less than 600,000** If Drought Worse Than Drought of Record*	At Any Time During Year	Interruptible Supplies Cease, Unless Drought Less than 36 Months in Duration, then Interruptible Supplies Cease No Earlier than Following July 31 or Jan. 1, which ever comes first	Curtail Firm Customers on Prorata Basis with Other Firm Users According to Approved Plan	Curtail on Prorata Basis with Other Firm Users	Curtail on Prorata Basis with Other Firm Users
11	**Interruptible Level 3: Cutoff Supplies**	**100% of interruptible demand**	**Less than 325,000**	January 1	Interruptible Supplies Cease			
12	**Interruptible Level 4: Cutoff Supplies**	**100% of interruptible demand**	**Less than 200,000**	At Any Time During Year	↓	↓	↓	↓
13	***NOTE:** Drought Worse than Drought of Record defined by all of the following conditions occurring simultaneously at any time: 1. Combined Storage in Lakes Travis and Buchanan being less than 600,000 acre-feet. 2. Drought duration of at least 24 months. 3. The cumulative inflow deficit of the current drought exceeding that of the drought of record by at least 5% for a minimum of six consecutive months. 4. Declaration of the LCRA Board based on all three of the above conditions occurring simultaneously.							

C. Definitions

To understand the WMP, it is important to know the definitions of the key legal and hydrologic terms used in this plan. The major terms are defined below and should be considered specific to LCRA.

adjudication - a court proceeding to determine all rights to the use of water on a particular stream system.

beneficial use of water - use of the amount of water that is economically necessary for a purpose authorized by law, when reasonable intelligence and reasonable diligence are used in applying the water to that purpose. Such uses include domestic use, municipal uses, industrial use, agricultural use, hydroelectric power, navigation, fish and wildlife, etc. The benefit may vary from one location to another and by custom. Beneficial uses are defined by statute in the Texas Water Code.

combined firm yield - a specific amount or quantity of water stated in acre-feet that represents the maximum average annual demand that can be met from a reservoir system during a simulation of a repetition of the system's Drought of Record, while honoring the full extent of upstream and downstream senior water rights.

conservation base acreage - the historical 10-year average acres irrigated at a total of 5.25 acre-feet of water per acre irrigated.

curtail - to reduce the supply of water being provided through a diversion by reducing the amount of water served under the contract for a specific period of time. Curtailment may occur during drought or other emergency conditions.

critical drought period - the period of time during which the reservoir system was last full and refilled, and the storage content was at its minimum value.

cutoff(water) - to discontinue, or to terminate completely, the supply of water provided under contracts for diversion for a certain period of time. Cutoff may occur during drought or other emergency conditions.

diversion demand - the water pumped from a water body for beneficial use.

domestic water use –use of water by an individual or a household to support domestic activity. Such use may include water for drinking, washing, or culinary purposes; for irrigation of lawns, or of a family garden and/or orchard; for watering of domestic animals; and for water recreation including aquatic and wildlife enjoyment, but does not include water used to support activities for which consideration is given or received or for which the product of the activity is sold.

drawdown - the lowering of the water level in a water body by diversion, pumping, or release.

drought - a prolonged period of dryness or lack of rainfall that has a significant effect on water or water-related uses.

drought of record - the drought that occurred during the critical drought period.

firm water - a supply of stored water that is drawn from the combined firm yield of the reservoir system. Such supplies are diverted or otherwise committed under a contract or resolution issued by the LCRA Board.

firm yield - the maximum average annual supply of water that can be supplied from a water source without shortages during a repetition of the critical drought period.

gaging station - particular site on a stream, canal, or lake where systematic observations of hydrological data are obtained.

instream flow - the specific amount of water needed to flow in a stream or river to support aquatic life, minimize pollution, or for recreational use, usually stated as a daily mean discharge values in cubic feet per second.

interruptible stored water - stored water supplied pursuant to contract or resolution, where the contract, resolution or special conditions defining the commitment specifically provides that such commitment is "subject to interruption or curtailment."

irrigation - The use of water for the irrigation of crops, trees, and pasture land, including, but not limited to, golf courses and parks, which do not receive water through a municipal distribution system.

reserve storage pool - a storage level that, when reached at any time during the year, would require the total cutoff of all water for interruptible use.

run-of-river flows - the natural flow in the river that is available under law at a given point on the river at a given instant in time to honor a right with a given priority date. This flow is determined by hydrologic studies that assume that all reservoirs and diversions under upstream junior rights do not exist. Rights to use run-of-river flows for beneficial uses, rights to store inflows in reservoirs, and pass-through of inflows and releases from reservoirs, are regulated by the TCEQ.

storable inflows - the actual daily inflows to the reservoir system minus the daily pass throughs from the reservoir system required to meet downstream senior water rights.

storage capacity - the quantity of water that can be contained in a reservoir.

streamflow - rate of flow of water that occurs in a natural channel.

water conservation - those practices, techniques, and technologies that will: (1) reduce the consumption, loss or waste of water, (2) improve the efficiency in the use of water, or (3) increase the recycling and reuse of water, so that a water supply is made available for future or alternative uses.

water right - a legally protected right, granted by law, to impound, divert, convey, or store state water and put it to one or more beneficial uses.

CHAPTER 1
INTRODUCTION TO THE WATER MANAGEMENT PLAN

A. Goals of the Water Management Plan 1-1
B. LCRA Act 1-2
C. LCRA Water Resources Management – History and Guiding Principles 1-4
D. LCRA's Comprehensive Water Policy Review and Public Stakeholder Process..... 1-5
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A. Goals of the Water Management Plan

The 1988 Final Judgment and Decree adjudicating LCRA's Highland Lakes water rights required LCRA to submit a reservoir operations plan describing how LCRA would determine the amount of firm and interruptible stored waters and how LCRA would manage the waters in Lakes Buchanan and Travis and the Colorado River. The Water Management Plan for the Lower Colorado River Basin (WMP) was developed using the following goals and guidelines as provided in the Final Judgment and Decree:

1. Lakes Buchanan and Travis and the Colorado River will be managed together as a single system for water supply purposes.

2. LCRA will manage the system to maximize the beneficial use of water derived from inflows below the Highland Lakes.

3. LCRA will manage the system to stretch and conserve the waters stored in Lakes Buchanan and Travis.

To achieve the goals stated above, LCRA will manage the system according to the following guidelines:

1. All demands for water from the Colorado River downstream of Lakes Buchanan and Travis should be satisfied to the extent possible by run-of-river flows of the Colorado River;

2. Inflows should be passed through Lakes Buchanan and Travis to honor downstream senior water rights only when those rights cannot be satisfied by the flow in the Colorado River below the Highland Lakes;

3. The firm, uninterruptible commitments of water from Lakes Buchanan and Travis should not exceed the Combined Firm Yield;

4. The water from Lakes Buchanan and Travis will be available on an interruptible basis as long as LCRA's ability to meet the demand of its firm water customers is not impaired;

5. Water shall not be released through any dam solely for hydroelectric generation, except during emergency shortages of electricity and during other times that such releases will be needed for another beneficial purpose.

B. LCRA Act

Through the passage of the LCRA Act by the Texas Legislature in 1934, LCRA was established as a "conservation and reclamation district" consisting of ten counties that comprise the watershed of the lower Colorado River. Those ten counties are Blanco, Burnet, Fayette, Colorado, Llano, Travis, Bastrop, Wharton, San Saba, and Matagorda. The LCRA Act was amended in 1993 to expand LCRA's water service area to include all or part of an additional twenty-four counties. In 1999, the LCRA Act was amended to include Williamson County in LCRA's water service area and was again amended in 2001 to allow LCRA to enter into an agreement with the San Antonio Water System (SAWS) to provide water. LCRA's current water service area is depicted in Figure 1-1. The 1999 amendment contains specific restrictions on LCRA water sales to Williamson County. Similarly, the 2001 amendment contains very lengthy and detailed restrictions and study requirements prior to any transfer of water to SAWS. The Highland Lakes system is comprised of two water storage reservoirs, Lakes Buchanan and Travis, and three intermediate pass-through reservoirs, Lakes Inks, LBJ and Marble Falls. Lake Austin, the last of the lakes in the chain, is owned by the City of Austin but operated by LCRA under agreement and may be referred to as part of the system from time to time. Technical data on each of the dams and lakes is included in Appendix 2A of Volume II.

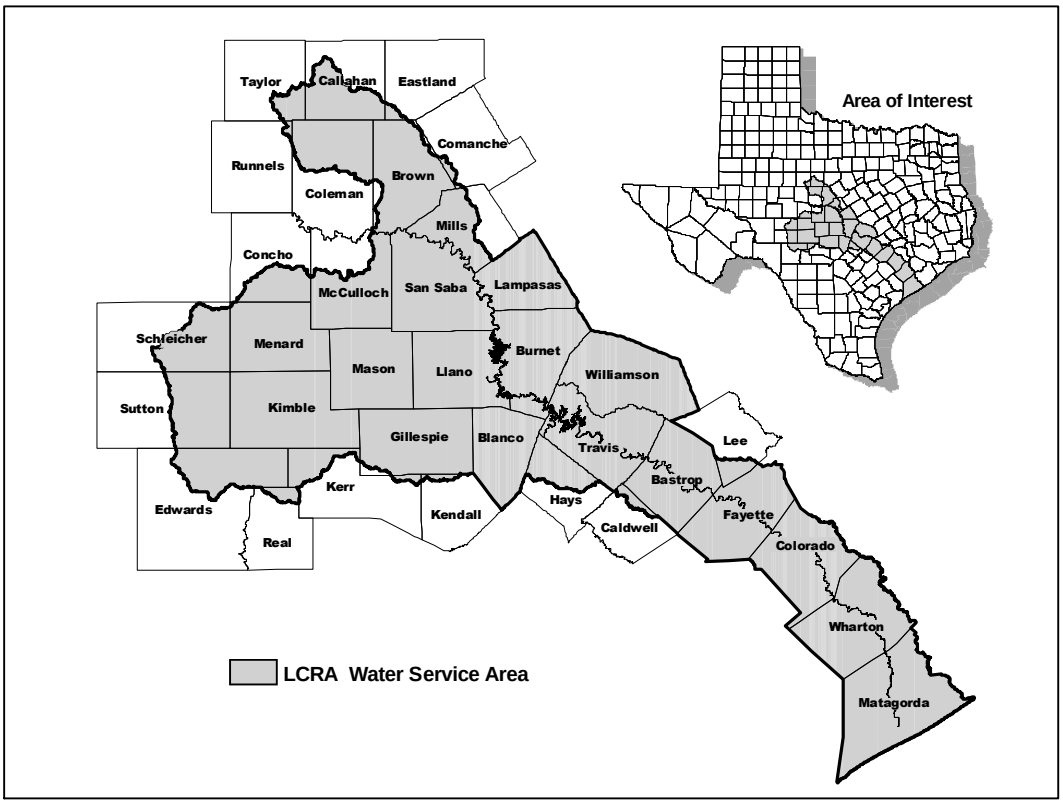

Figure 1-1. LCRA Water Service Area as of January 1, 2003.

LCRA has been delegated the responsibility of harnessing the Colorado River and its tributaries and making them productive for the people within LCRA's water service area.

The Act establishes LCRA's mission in four areas--water, electric energy, conservation and lands. In water, LCRA is empowered to control floods and control, store, sell, preserve and distribute the waters of the Colorado River and its tributaries. The waters are to be used for beneficial purposes including irrigation, generation of electric energy, reclamation of arid lands and the creation of lakes for water storage. LCRA is required to prevent flood damage to people and property by the Colorado River and to control the uses of the surface of the lakes it created.

Consistent with the control of the waters, LCRA is empowered to develop, distribute, and sell the energy created through hydroelectric generation both inside and outside the 10-county district. Later legislation allowed LCRA to expand its electric generation capabilities beyond hydropower through developing fossil fuel generation facilities.

As a conservation and reclamation district, LCRA is to conserve and develop the lands, forests and water of the district and to study and correct both artificial and natural sources of pollution that may affect the ground and surface waters within the district. LCRA is also empowered to provide water and wastewater treatment services within the district.

During the construction of the dams and development of the Highland Lakes system LCRA acquired large tracts of land that surround the reservoir system. The Act authorizes LCRA to develop, manage, and promote the use of these lands for parks, recreational facilities and natural science laboratories and to promote the preservation of fish and wildlife. LCRA must also provide public access to, and use of, its lakes and lands for recreation.

Each of the many purposes, functions, and uses of the elements of the river—the lakes, the lands, the ground and surface waters, the bays and estuaries—must be considered as parts of an integrated system.

The WMP describes the issues and conflicts that LCRA must recognize and, where possible, resolve.

C. LCRA Water Resources Management – History and Guiding Principles

It is important to consider the historical context in which this WMP has evolved. In the early years of LCRA's existence, the predominant priorities in water resources management were to moderate and control the floods and droughts in the Lower Colorado River Basin. This was accomplished through the construction of dams in the Hill Country west of Austin, which created the Highland Lakes.

The results have been impressive. The ravages of floodwaters have largely been controlled. These same dams have also provided a dependable source of water supply for municipal, industrial, agricultural, and mining uses. Additionally, the Highland Lakes provided the source of inexpensive, renewable electrical energy, and recreational opportunities for the citizens and communities of Central Texas. In sum, the work of LCRA in its early years provided the foundation on which much of the present day population and economy of Central Texas depend.

Notwithstanding the successes of the past, in developing a WMP for the river, LCRA today faces an array of water management issues and opportunities that were scarcely envisioned a half-century ago. Recreation has emerged as a major use, both on the lakes and the river. Maintaining the aquatic habitat in the river channel and in the bays and estuaries is a major use, as is water quality and the use of the river to sustain a growing population and economy. This intensified competition among the various users of the water resource is placing increasing stress on the ecological and environmental resources supported by the Colorado River. LCRA, in partnership with the State of Texas, local governments, and private interests, must confront these challenges as we develop a meaningful WMP.

LCRA's WMP is grounded in these key principles:

(1) LCRA recognizes the supremacy of the State of Texas, acting through the TCEQ, as the ultimate authority for water resources management and as the arbiter of disputes involving the allocation of water from the Colorado River and its tributaries. LCRA, within the intent and meaning of its legal authority, is the steward of the water rights granted to it by the State of Texas. Further, LCRA recognizes the responsibilities and prerogatives conferred upon local political subdivisions of the State and the rights of private citizens and corporations.

(2) Many water management issues and opportunities are regional in scope and effect. Solutions and strategies must be built upon regional consensus and action. LCRA considers its role as one of consensus-building among competing users of Colorado River water and among the public and private interests concerned with the management of the Colorado River.

(3) LCRA, in exercising its responsibilities as a steward of the water resources of the Colorado River and its tributaries, will strive to maximize the beneficial use of Colorado River water and achieve a sustainable balance among the competing demands on the system. In pursuing this objective, LCRA will implement management procedures and programs addressing:

(A) The efficient management of available water supplies as an integrated system;
(B) Water demand management measures including long-term conservation measures and short-term drought contingency measures;
(C) Protection and, where possible, enhancement of water-related environmental values; and
(D) Future water supply development and augmentation.

D. LCRA's Comprehensive Water Policy Review and Public Stakeholder Process

LCRA has approached the development of the WMP as much more than a set of complex engineering tools to serve as guidelines for operating the structures on the Colorado River system. The development of the WMP stimulated a comprehensive review of how LCRA has developed and operated the Highland Lakes and the lower Colorado River system for the past 60 years to meet the needs of the area it serves.

As a foundation for the prior versions of the WMP, LCRA conducted a comprehensive review of the policies and programs that guide and shape the way LCRA manages the river system. This review was conducted as a series of meetings held as joint public meetings of the LCRA Board's Planning and Public Policy and Natural Resources Committees. The meetings were designed to use staff expertise and information from outside experts to analyze the environmental, social, economic and legal factors that shape the issues that LCRA faces in managing the Colorado River system.

An important part of these public meetings was the involvement of the State agencies, environmental groups, business, industry and agricultural interests, wholesale electric customers and other constituencies whose interests are affected by LCRA policies. The process was designed to assure that participation was effective in informing LCRA of public views and also so that these constituencies would be better informed about the issues involved in the policy decisions. An issues inventory was developed and briefing papers were prepared for each of the meetings. Summaries of the meetings elements were developed and distributed to the LCRA Board and members of the public.

As a result of the Board and the public review, LCRA adopted a set of water and flood control policies to address many of the issues in water quality and water supply that face LCRA today and

will continue to face the agency well into the future. These policies undergo periodic review and revision by the LCRA Board. (See Appendix A, Volume I for the most current versions of these policies).[1] These policies, read in conjunction with LCRA's Certificates of Adjudication for the Highland Lakes, have formed the foundation of LCRA's WMP.

In developing the initial WMP and all of its subsequent revisions, LCRA has sought broad public participation through the work of an Advisory Committee and a series of public information and input meetings in the LCRA district. The Advisory Committee included over two dozen representatives from varied interests in the river basin. Taking part in the process were State and local officials, rice farmers, representatives of tourism and recreation interests, coastal sports and commercial fishing interests, business and industry and economic development representatives and environmental interest group leaders. The other major water right holders on the Lower Colorado River were also active participants on the Advisory Committee.

The purpose of the Advisory Committee has been to provide information to LCRA on the attitudes and interests of the major organizations and groups concerned with the allocation and management of LCRA's water resources. LCRA management and staff appreciate the commitment of time and energy made by the Advisory Committee. The Advisory Committee has actively participated in the development of the technical studies and the analysis of the policy options during every revision of the WMP. In addition, they aided LCRA by providing information on the WMP to the public and the local news media. Many of the policy concepts and alternatives found in the WMP are the direct result of suggestions made by the Advisory Committee. However, neither the report as a whole, nor any portion thereof, necessarily reflects the views of the Advisory Committee or any member of the Advisory Committee.

E. Organization of the WMP

Volume I of the WMP is organized as follows:

(1) Chapters 1-3 of the WMP describe the issues and conflicts in the demands on the Colorado River system and lays out the policies and management actions LCRA will use to accommodate the variety of demands on the system.

(2) Chapter 4 of the WMP describes the issues and conflicts in the demands on the Colorado River system during drought periods and sets forth the policies and

[1] Since the WMP's last approval in 1999, the LCRA Board of Directors has amended or consolidated several of its policies related to water. Board Policy 502 "Interbasin Transfers" and Board Policy 504 "Water Resources Management" were repealed by the LCRA Board on June 21, 2000 and combined, with amendments, into Board Policy 501 "Water Resources Management," initially adopted on Aug. 18, 1999 and subsequently amended June 21, 2000, Sept. 18, 2002, and November 16, 2005. Board Policy 503 "Lowering of LCRA Operated Lakes" was amended on Oct. 20, 1999, Sept. 18, 2002, and October 20, 2004. Board Policy 507 "Water Quality Leadership" was amended on December 13, 2000. Board Policy 509 "Water Conservation" was last amended on June 21, 2000. Board Policy 508 "Water Pricing Policy" is included, but has not been amended since December 16, 1988, but a reformatted version of the policy is contained in this submission.

management actions LCRA will use to address the competing demands for water in times of shortage based on 2010 projected demands for water.

(3) Chapters 5-6 of the WMP describe the engineering and hydrological models and data sources and the process for the determination of the Combined Firm Yield of Lakes Buchanan and Travis.

Volume II of the WMP is a compilation of several technical appendices used to develop the WMP.

- 40,800 acre-feet in any five consecutive years;
- 41,400 acre-feet in any six consecutive years;
- 47,800 acre-feet in any seven consecutive years; and
- 60,600 acre-feet in any eight to ten consecutive years.

The total firm stored water commitment for both purposes will be an average of 33,440 acre-feet per year. Estimated interruptible stored water supplied during the critical drought for both purposes will be an additional 23,030 acre-feet per year.

8. Summary

To supply the demands of the preceding commitments for firm water existing during a repetition of the critical drought would require an average of 442,350 acre-feet per year to be released or diverted from storage in Lakes Buchanan and Travis, assuming the proposed changes to firm commitments to instream flows and freshwater inflows to the bays and estuaries are accepted. This commitment is summarized below in Table 3-1.

Table 3-1. Existing Firm Water Commitments as of April 2003

O.H. Ivie Reservoir	90,546
City of Austin	122,084
Contracts from Lakes Buchanan and Travis	119,838
LCRA Water Utilities and Facilities	6,911
LCRA Power Plants	63,851
South Texas Project	5,680
Instream Flows/	27,380 (annual average)
Bays and Estuaries	6,060 (annual average)
TOTAL	442,350 acre-feet/year

Out of concern for the future needs of the many areas in LCRA's 35-county water service area, including areas now using ground water supplies that are becoming depleted or are of poor water quality, the LCRA Board committed to reserving 50,000 acre-feet of the remaining Combined Firm Yield.

This leaves an uncommitted balance of the Combined Firm Yield of 60,952 acre-feet per year with the commitments of firm supply to instream flows and freshwater inflows to the bays and estuaries as adopted by the TCEQ in 1999. Or, as indicated in Table 3-1, if the proposed changes to these commitments are accepted, the uncommitted balance of the Combined Firm Yield will drop to 43,462 acre-feet per year.

C. Annual Allocation of Firm and Interruptible Stored Water

Each year, LCRA will determine the amount of water that is available for interruptible commitments to supply the uses authorized under LCRA's Certificates of Adjudication.

No interruptible stored water will be supplied to cities or other industries that should be served on a firm basis. Interruptible stored water will be limited to irrigation or other similar uses where the value of water is well below firm water rates and the purchase is for one year only. New contracts for firm and interruptible stored water are subject to the Water Contract Rules as specified in Appendix 3 of Volume II.

In November of each year, LCRA determines the amount of water that is available in the following year to meet firm and interruptible demands in the system. LCRA manages the conservation storage of the reservoirs by using the interruptible stored waters to increase the average yield of the system.

Should an emergency occur that causes a demand for additional allocations of water to either firm or interruptible stored water contract holders, any interested party may petition the LCRA Board for such additional purchases.

1. Allocation of Firm Water

The amount of water required to meet the firm demand within the system for the preceding year will be calculated in early October. This amount will be compared to the projections for that year, and any variations will be noted and documented. LCRA will solicit information and projections of use from all of its firm supply contract holders and other firm uses provided for by resolution of the LCRA Board. This information will be used to develop a projection of firm demands for the coming year.

LCRA will assess the contents of Lakes Buchanan and Travis as of November 1 to project the storage levels for January 1 of the next year. Inflows into Lakes Buchanan and Travis from the upstream tributaries will be added to this preliminary storage level based on the minimum annual inflow from the period of drought.

This process will allow LCRA to reserve sufficient water in the system to meet all firm demands for one year beyond the year being considered for allocation.

Estimates for firm demand commitments for the next year will be subtracted from the total water supply available. The amount of water remaining will then be available for interruptible allocation for that year.

2. Allocation of Interruptible Stored Water

As part of the overall allocation process, every November LCRA will determine the amount of water that is available in the following year for interruptible contracts. LCRA may make commitments for interruptible stored water for terms in excess of one year. However, the allocation of interruptible stored water to be supplied under such commitments will be determined on an annual basis. All interruptible commitments are subject to full or partial curtailment.

3. Priority Uses in the Allocation of Interruptible Stored Water

In the allocation process, priority will be given to the irrigation operations (Lakeside, Gulf Coast, Garwood, and Pierce Ranch) to firm-up run-of-river water rights associated with individual irrigation operations. The LCRA Board will establish, by resolution, a Conservation Base number of acres determined by the historical (10-year) average acres that have been irrigated by Lakeside and Gulf Coast irrigation operations. The amount of surface water to be used for irrigation under this Conservation Base is based upon a limit of 5.25 acre-feet of water per acre irrigated (see Table 3-2). The priority allocation for Garwood irrigation operation is based on a contract that defines LCRA's commitment to supply interruptible stored water to the Garwood irrigation operation to the extent necessary to firm up the 133,000 acre-foot-per-year run-of-river water right associated with the Garwood irrigation operation. The priority allocation for Pierce Ranch is based on a contract that defines LCRA's commitment to supply interruptible stored water to Pierce Ranch. These contractual commitments to Garwood and Pierce Ranch are not based on a "Conservation Base acreage" calculation, but the 5.25 acre-foot-per-acre duty will apply to the acreage irrigated.

The Conservation Base acreage for the Lakeside and Gulf Coast irrigation operations will be served without charge for the amount of water designated under each operation's run-of-river rights. In years when the amount of run-of-river water is projected to be insufficient to serve the Conservation Base and the priority allocations for Garwood and Pierce Ranch, the annual allocation of interruptible stored water will provide back-up for those rights. The charge for the allocation of interruptible stored water shall be at the prevailing interruptible stored water rate set by the LCRA Board or, in the case of Garwood and Pierce Ranch, in accordance with their respective contracts with LCRA.

TABLE 3-2
CONSERVATION BASE ACREAGE OR OTHER PRIORITY ALLOCATION OF INTERRUPTIBLE STORED WATER

	LAKESIDE	GULF COAST	GARWOOD[1]	PIERCE[3]
Acres x Duty[2]=Ac. Ft.	26,000 x 5.25 = 136,500 acre-feet	24,300 x 5.25 = 127,575 acre-feet	32,000 with 100,000 acre-feet.	25,000 with 20,000 ac. ft. (Max. 30,000 ac. ft.)
Conservation Base[6] Or other Priority Allocation	see above	see above	see above	see above
% R-O-R Rts.[4]	44.6%	58.6%[7]	93.1%	0%[8]
% Stored Int.[5]	55.4%	41.4%[7]	6.9%	100%[8]

[1] Garwood Irrigation Company and LCRA entered into a contract dated December 10, 1987, which defines LCRA's commitment to supply interruptible stored water to Garwood and the terms for curtailment during periods of shortages. This contractual commitment to Garwood is not based on a "Conservation Base Acreage" calculation, but the 5.25 acre-foot-per-acre duty will apply to the acreage irrigated. In 1998, LCRA purchased the assets of Garwood Irrigation Company, including its water rights. Under the terms of the 1998 agreement, LCRA has committed to supply up to 100,000 acre-feet annually consisting of run-of-river under the LCRA-owned Garwood water rights and LCRA interruptible stored water.

[2] Duty set by TCEQ (5.25 Ac.Ft./Ac.) for rice irrigation.

[3] LCRA has entered into a contract with Pierce Ranch regarding LCRA's commitment to supply interruptible stored water to Pierce Ranch and the terms for curtailment during periods of shortage. This contractual commitment to Pierce Ranch of 20,000 acre-feet annually based on a rolling five-year average with a 30,000 acre-feet maximum in any calendar year is not based on a "Conservation Base Average" calculation, but the 5.25 acre-foot-per-acre duty will apply to the acreage irrigated. The Pierce Ranch operation needs may also still be met through exercise of Certificate of Adjudication No. 14-5477D.

[4] % of Conservation Base or other Priority Allocation likely to be supplied by run-of-river rights (*i.e.* estimated reliability of the water right)

[5] % of Conservation Base or other Priority Allocation expected to be supplied by Interruptible Stored Water based on reliability of run-of-river rights.

[6] LCRA purchased 55,000 acre-feet of water rights from Pierce Ranch and transferred these water rights for diversion and use within the Lakeside service area, which is currently 28,300 acres

[7] % based on water used for 37,000 acres (194,250 acre-feet)

[8] % based on water use for 7,200 acres (37,800 acre-feet)

4. Use of Interruptible Stored Water for Recreation

Interest groups around the Highland Lakes, such as marina owners and other tourist and recreation industry members represented by the Highland Lakes Tourist Association expressed the need for recreation to be given some priority in the allocation of interruptible stored water.

In developing the annual interruptible allocation process, LCRA has considered the needs of the recreation industry around the lakes and proposes establishing some use of the interruptible stored waters to maintain lake levels in Lakes Buchanan and Travis. These levels would be above the possible minimal drawdowns of the lakes under the operating rule curve and would be established in recognition of LCRA's public interest responsibilities.

The conflict between supplies of interruptible stored water being held in the lakes for recreation or being released and sent downstream for agricultural irrigation and public recreation is one of the most difficult issues for LCRA to balance. The rice farmers have a historic claim to a "first call" on the water used for rice farming as shown in Table 3-2. However, LCRA believes that the needs and interests of the recreation industry that has developed around the Highland Lakes must be heard and given due consideration.

Once the first priority allocation of interruptible stored water has been made to supply the Conservation Base of the Lakeside and Gulf Coast irrigation operations and LCRA's contractual commitments to the Garwood and Pierce Ranch irrigation operations, LCRA staff will make recommendations to the LCRA Board for the remainder of the interruptible stored water available for supplying other authorized uses under LCRA's water rights. In recognition of the economic benefits to the recreation industry in the Highland Lakes region, the WMP establishes a process to consider the levels of Lakes Buchanan and Travis.

LCRA will limit additional sales of interruptible stored water, other than for the four irrigation operations' Conservation Base or Priority Allocation acreages, based on the combined volume of water in Lakes Buchanan and Travis at certain times of the year. To provide for more flexibility to supply interruptible stored water in normal and wet years, the supply allocation formula is based on a semi-annual allocation process using the following policies:

1. Interruptible stored water supply available (other than to the four major irrigation operations) for January through June in any year is based on the minimum of the separate storage levels, as percent of maximum water conservation capacity) in Lakes Buchanan and Travis on January 1 of that year according to the schedule provided in Table 3-3.

2. Interruptible stored water supply available (other than to the four major irrigation operations) for July through December in any year would be based on the minimum for Lakes Buchanan and Travis of their separate maximum storage levels (as percentage of capacity) in April, May and June of that year. That is, the maximum percent full for each lake over April through June would be compared and the lower

of the two percentages selected. The water supply allocation for July through December is also given in Table 3-3.

3. Maximum supply available in any year is 30,000 acre-feet, with the semi-annual allocation based on a typical municipal monthly demand distribution.

TABLE 3-3. MAXIMUM INTERRUPTIBLE STORED WATER AVAILABLE FOR SALE, EXCLUSIVE OF SALES FOR THE CONSERVATION BASE OR PRIORITY ALLOCATION ACREAGE OF THE FOUR IRRIGATION OPERATIONS

Minimum of the Maximum Reservoir Storage for Either Lakes Travis or Buchanan Either on January 1 or over the months of April, May and June (As Percentage of Full Water Conservation Capacity)	Maximum Additional Interruptible Stored Water Available for Sale in January Through June (Acre-feet)	Maximum Additional Interruptible Stored Water Available for Sale in July Through December (Acre-feet)
≤94	0	0
95	2,170	2,830
96	4,330	5,670
97	6,500	8,500
98	8,670	11,330
99	10,830	14,170
100	13,000	17,000

No maintenance, except for emergencies that would require the lowering of Lakes LBJ, Marble Falls, and Inks, will be permitted if the refilling of those lakes would result in substantial loss of hydropower generation benefits or other costs. Periodic lowering and refilling of Lake Austin will be done when requested by the City of Austin and consistent with LCRA Board Policy 503-Lowering LCRA-Operated Lakes.

5. Publication of Allocation of Firm and Interruptible Stored Water

LCRA will publish the results of the allocation process and notify the LCRA Board, the firm supply contract holders, and any existing or potential interruptible contract holders of the results.

6. Monthly and Quarterly Operations

The operational rule curve will be applied to the system on a monthly basis to determine how the system is responding to current conditions as compared to historical operations. This will allow LCRA to optimize reservoir operations on a real time basis and to determine if adjustments to the amount of interruptible stored water should be considered. The monthly allocation model serves to continually evaluate inflows into the system, to evaluate risks, and to assess system reliability. The monthly analysis would detect early signs of drought and allow LCRA to develop and implement contingency measures in a timely fashion.

At minimum, a quarterly system operations report showing inflows to the system, monthly releases for firm and interruptible commitments, and important operating characteristics will be provided to the LCRA Board.

D. Summary of LCRA's Water Conservation Plan and Programs

Although LCRA has had extensive water conservation programs since the late 1980s, it did not formally adopt a water conservation plan until 1998. This plan was updated to reflect water conservation and drought contingency planning requirements under Senate Bill 1 and approved by the LCRA Board of Directors in April 2000. In March 2009, the LCRA Board of Directors approved water conservation goals and strategies that will be phased in over several years to reduce overall water use in the basin. The 2009 LCRA Raw Water Conservation Plan meets the requirements of Chapter 288 of the TCEQ rules as a wholesale water supplier for municipal, irrigation and industrial customers, as a retail supplier of water to irrigation operations, and as an industrial user of water at LCRA power plants. The Plan discusses separate water conservation strategies for municipal wholesale water customers, LCRA irrigation divisions, LCRA power plants, and other nonagricultural and agricultural irrigation, recreation and industrial uses. The following provides a summary of LCRA's plan.

1. Wholesale Municipal, Industrial and Other Firm Water Supply Strategies

Water conservation and reuse are viewed as important strategies for mitigating the effects of urban growth on the region's water resources, particularly in the Austin and surrounding areas. In addition to reducing future municipal water demands, municipal water conservation and reuse can make important contributions toward satisfying the water and wastewater service requirements of growing urban populations and economics.

LCRA's municipal water conservation programs are predicated on the fact that the implementation of conservation measures must occur in partnership with customers and stakeholders. Many water utilities have limited or no programs for water conservation, while the City of Austin (accounting for more than 70 percent of all municipal water use in LCRA's water service area) has one of the most aggressive conservation programs in Texas. As such, the focus of LCRA's programs is to increase water-use efficiency to reduce the waste of water throughout the water service area Strategies are listed below.

a. Water Measurement and Accounting

The LCRA Water Contract Rules impose requirements on LCRA's water customers to properly measure water diversions. One of the provisions specifically requires all meters to be accurate within +/- 5 percent of the indicated flow over the possible flow range. LCRA personnel read these meters on a monthly basis. Each customer is required to provide third-party verification of meter testing and calibration to LCRA staff each year. LCRA-owned and-operated water utilities must also follow these rules.

b. Monitoring and Records Management

LCRA maintains records of water distribution and sales through several monitoring and billing systems. A Windows-based system provides a central location for water billing information and an automated way to compile and present that information.

c. Conservation-Oriented Rates

LCRA's wholesale raw water rates were designed to encourage water conservation. The water rate is 42 cents per 1,000 gallons or $138 per acre-foot. However, any water used above the contracted amount increases to $262.20 per acre-foot. Customers also are allotted a reservation charge of $69 per acre-foot for water reserved but not used.

LCRA has also developed increasing block rates for all retail water utilities.

d. Contractual Requirements

According to LCRA Board Policy 509 - Water Conservation, all future water sales contracts and water utility agreements shall contain "appropriate conditions requiring conservation measures that are economically feasible." LCRA's Rules for Water Conservation are updated periodically to meet the requirements of Chapter 288 of TCEQ's rules for water conservation and drought contingency plans.

All plans must be reviewed and approved by LCRA staff before contracts are signed. Each customer agrees that, in the event that it furnishes water or water services to a third party that in turn will furnish the water or services to the ultimate consumer, the water conservation requirements shall be met through contractual agreements between it and the third party.

In April 2007, the LCRA Water Contract Rules were amended to clarify that LCRA will determine the reasonableness of the quantity of any raw water contract request. The reasonableness of the quantity requested is evaluated based on many factors, including the applicant's water conservation plan, delivery or system losses, and other factors. Agency and industry standards are used in LCRA's assessment, including but not limited to the TWDB Water Conservation Task Force Best Management Practices Guidebook. To the extent the applicant requests a water supply based on standards other than those commonly used, the applicant must submit a written justification describing the reasons these standards were not

employed and how the water supply needs were calculated.

e. Technical Assistance

LCRA has worked with communities and cities in its water service area for the past two decades to demonstrate the effectiveness of water conservation in reducing water consumption and wastewater flows. This effort ranges from providing sample water conservation programs, to developing conservation and drought contingency plans and landscape ordinances, to providing planning and equipment for plumbing retrofit programs.

f. Public Education and Outreach

LCRA began implementing the Water IQ program in Central Texas in 2006. The program uses a diverse set of tools to reach the public with water-saving tips and information, including television, radio, and print ads; billboards; electronic advertising; and community outreach with key audiences. In 2008, the City of Austin, LCRA, and the City of Cedar Park collaborated on the Water IQ: Know your Water campaign. Recognizing that water conservation outreach programs can be costly and consumers may become confused hearing mixed messages from water suppliers, LCRA and two cities pooled their resources on a shared outdoor water efficiency campaign. By reaching a consensus on a few key outdoor watering recommendations, the three entities were able to transmit a valuable regional message that reached a broad range of customers throughout the 10-county area.

Additional LCRA outreach and education efforts include the promotion of the Texas Hill Country Landscape Option to promote landscape best management practices, continued involvement in the Major Rivers education program, natural science education programs at LCRA nature parks, and the use of video tutorials and other water efficiency tips on the LCRA Web site. In 2008, TWDB and LCRA jointly updated the Major Rivers curriculum to correlate with the latest education standards and to add additional “hands-on” activities such as a new outdoor water use and conservation activity.

g. Future Conservation Strategies

In January 2009 LCRA staff proposed a comprehensive strategic plan for municipal, industrial and non-agricultural irrigation water conservation — based on results of the research and considering input from stakeholders and customers — to the LCRA Board. This comprehensive program will include a variety of strategies to save water, including incentive programs through which LCRA will partner with its customers to offer water-saving fixtures such as high-efficiency toilets; requirements that new construction meet standards for soil depth and irrigation systems; and expansion of LCRA’s education outreach efforts to provide useful information to consumers. Elements of the program will be phased in over the next several years.

2. Irrigated Agriculture Conservation Strategies

As the largest user of water from the lower Colorado River system, irrigated agriculture provides the best opportunity for reducing the overall demand through conservation programs. Beginning in 1986, LCRA initiated a major program to increase irrigation water use efficiency in rice irrigation systems. Rice cultivation accounts for more than 90 percent of all irrigation in LCRA's water service area.

LCRA's efforts in irrigation water conservation have been and continue to be focused on promoting water conservation at its irrigation operations: Lakeside, Gulf Coast and Garwood. These systems, along with one other privately owned major irrigation company, account for approximately 65 percent of the surface water irrigation in Colorado, Wharton, and Matagorda counties. The LCRA irrigation operations do not provide water for other wholesale customers or public water suppliers.

Substantial water savings resulted from irrigation conservation programs implemented in the Lakeside and Gulf Coast Irrigation Operations. Combined between the two operations, LCRA saved about 41,500 acre-feet annually from 1989 to 1996. This savings is approximately 13 percent of the projected water use that would have occurred without conservation practices in place. Conservation strategies implemented in the operations include the following:

a. Water Measurement

From 1989 to 1997, LCRA invested about $1.3 million for improvements in the water delivery system, structure standardization, purchase of electronic measurement devices for daily measurements, and customer education. Starting in 1993, LCRA began selling irrigation water in the Lakeside and Gulf Coast systems at a price based on a mix of acreage and water use. Formerly, LCRA provided water to individual customers of the irrigation operations only on the basis of acreage irrigated. In 2009, the LCRA Board approved a project to complete similar improvements to the Garwood system to enable on-farm water measurement which include the purchase of in-canal check structures to improve water distribution as well as structure standardization. Initial funding of $250,000 was approved recently from HB1437 funds. This project began in the fall of 2009 and is anticipated to be complete by 2012. This strategy is anticipated to save at least 3,400 acre-feet per year and possibly as much as 10,000 acre-feet per year.

b. Canal Maintenance (Water Loss) Program

In 1987, LCRA initiated an irrigation canal rehabilitation project for improving canal conveyance efficiency, reducing power consumption, and improving canal system management. In this project, from 1987 to 1996, LCRA invested about $1.5 million for regrading and selectively removing high water-consuming trees and vegetation from about 210 miles of canal; replacing about 300 water control structures, and modifying pump utilization schedules. The large majority of effort was in the Gulf Coast system. Prior to the implementation of this project, canal water loss in the Gulf Coast system was about 55 percent and in the Lakeside system was

about 25 percent. Following the implementation, based on recent analysis, this loss has come down to about 30 percent in the Gulf Coast system and about 20 percent in the Lakeside system.

With the completion of the canal rehabilitation project, LCRA has implemented a routine preventive maintenance program. This effort is expected to maintain existing canal operation efficiencies within the Lakeside and Gulf Coast systems. The Garwood canal system is in relatively good shape, with losses running at about 20 percent, similar to that found in the Lakeside system.

c. Customer Outreach

To facilitate communication with irrigation customers, LCRA created the Lakeside and Gulf Coast Farmer Advisory Committees in 1984. Garwood Irrigation Operation customers formed a farmer advisory committee in 1999, shortly after LCRA acquired the system. These committees represent the interests of customers of the irrigation systems. They also provide forums for LCRA to inform the farming community on LCRA's water conservation programs and to stimulate discussion on potential farming practices that can reduce water use. The HB1437 program also has an advisory committee, as required by the legislation. This committee was reappointed in 2009 and is actively involved in reviewing HB1437 activities.

LCRA initiated agricultural water conservation efforts in the mid 1980s through funding $90,000 to the Texas A&M University Agricultural Research and Experiment Station for developing the "Less Water, More Rice" program. The emphasis of this program was to deliver water conservation messages to rice irrigators. Based on the preliminary results of "Less Water, More Rice," improved cultivation and management practices (e.g., precision land leveling, multiple inlet systems, etc.) can reduce on-farm water use by 25 to 30 percent.

d. House Bill 1437

In May 1999, the Texas Legislature passed House Bill 1437, which allows LCRA to sell up to 25,000 acre-feet of water from the Colorado River to public water suppliers in Williamson County. The HB 1437 legislation requires "no net loss" of water in the Colorado River watershed and authorizes an additional charge to be added to the base water rate to fund strategies to ensure that an equal amount of water is conserved, replaced or offset. Funds collected from the additional charges are to be used for the development of water resources or other water use strategies to replace or offset the amount of surface water transferred. In 2000, LCRA entered into a water supply contract with the Brazos River Authority to provide water to Williamson County communities. A 25 percent surcharge is applied to the standard water rate to provide income to the Agricultural Water Conservation (Ag) Fund. In 2004, the LCRA Board authorized an engineering study and public meetings to develop a plan for implementing the HB 1437 program. The results of this study lead to the revised LCRA Board Policy 501, which defined the term "no net loss," and the development of a short-term plan to implement conservation projects that would allow the water transfer to occur under the provisions of the HB 1437 legislation. This short-term implementation plan has been updated recently and was finalized in October 2009.

The HB 1437 Agricultural Water Conservation Program was developed in 2005 in order to provide grants from the fund to eligible producers to construct on-farm water conservation projects. From 2006-2009, this program has provided grant funding to precision level a little over 19,000 acres, saving an estimated 4,750 acre-feet of water each year, mostly in the Lakeside and Garwood Irrigation Divisions. An annual report is prepared yearly showing details of current demand projects, current planning efforts, program results (including volume conserved and available for transfer), financial details about the Ag Fund, and a program outlook for the next year. To date, approximately $1.875 million has been spent on this program. Recently, the LCRA Board authorized an additional $200,000 to fund precision land leveling cost-share projects in 2010 and $250,000 to begin the Garwood measurement project. In 2009, LCRA contracted with a PhD student at the University of Texas' LBJ School to complete a statistical model to verify water savings from the precision land leveling grant program. This work is expected to be completed in 2010.

3. Industrial Water Conservation Strategies

a. Fayette Power Project

The Fayette Power Project (FPP) has an extensive conservation and reuse program. The power plant conserves and reduces the amount of water diverted from the river. This helps maintain the integrity of the cooling reservoir dam by properly controlling the water level. FPP developed a plant water balance that indicates water usage. It was found that unique opportunities existed at FPP that do not exist at other plants, mainly because of its size and the reuse design from the no-discharge ponds. Highlights of reused water and wastewater include:

- Water reuse from the reclaim pond in the Unit 3 Flue Gas Desulfurization (FGD).
- Reverse osmosis reject water reused in the FGD or returned to the lake.
- Reuse of ash pond water for Units 1 & 2 bottom ash and economizer fly ash removal.
- Reuse of wastewater treatment plant effluent in the ash pond or reclaim pond.
- Reuse of the fly ash runoff pond water in the reclaim pond.
- Reuse of the coal runoff water in the ash pond in times of drought.

Additional conservation measures for FPP include converting the bottom ash system on Units 1 and 2 to a dry system, using reclaimed pond water in place of raw water for dust suppression, recycling stormwater from the coal pile runoff pond back to the reservoir, recycling stormwater from the reclaimed water pond to the reservoir, distributing information and training about water conservation and leak detection to employees, and revising the irrigation system to use wastewater or alternative water sources.

b. Lost Pines Power Park (includes Sim Gideon and Lost Pines 1 Power Plants)

The largest water conservation and cost reduction measure at the facility is the implementation of a Lake Bastrop elevation level management policy, whereby the lake level is managed to an elevation that is eight to 14 inches below the spillway for multiple reasons. By maintaining an

average 12-inch drop in elevation, there is a reduction in the surface area of Lake Bastrop from 915 surface acres to 875 acres. This is a 4.4 percent reduction in the natural evaporation loss rate. Another benefit is the opportunity this level provides to capture rainfall runoff and never incur any loss by overflowing the spillway. Additionally, all the water used at Sim Gideon in the production of high purity boiler water, such as blowdown, backwash, and reverse osmosis reject waters, are returned to Lake Bastrop for reuse, which reduces the power plant's water consumption from Lake Bastrop. Additional conservation strategies include seasonally managing the lake level to optimize rainfall capture and further minimize natural evaporation rates, converting old plumbing fixtures to high efficiency models, distributing of information and training about water conservation and leak detection to staff, and revising the irrigation system to use wastewater or an alternative water source such as rainfall.

c. Thomas C. Ferguson Power Plant

The Thomas C. Ferguson Power Plant currently reuses approximately 450,000 gallons of water from its demineralization process. The water is reused by mixing it with Lake LBJ water and using it as clarifier makeup. Reusing this water has eliminated a discharge outfall to the Colorado River. Additional conservation strategies include converting old plumbing fixtures to high efficiency models, distributing information and training about water conservation and leak detection to staff, and revising the irrigation system to use wastewater or an alternative water source such as rainfall.

CHAPTER 4
DROUGHT MANAGEMENT PLAN AND DROUGHT CONTINGENCY PLAN

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A. Introduction

1. Background

On September 20, 1989, the Texas Water Commission, the predecessor agency to the TCEQ, issued its Order approving LCRA's Water Management Plan (see Appendix C, Volume I) for the Highland Lakes and the lower Colorado River. The Commission's Order included a requirement for LCRA to submit, within one year, a Drought Management Plan (DMP) with the Commission for its review and approval. On December 23, 1991, the Texas Water Commission issued its Order approving the DMP. (See Appendix D, Volume I). TCEQ subsequently adopted specific rules requiring water suppliers, such as LCRA, to develop a Drought Contingency Plan (DCP). LCRA's initial DCP was modeled after the most recent DMP approved by the Commission in 1999. As part of this WMP revision, LCRA proposes to fully incorporate into the WMP the LCRA's DCP, with modifications.

Chapter 4 describes the Lower Colorado River Authority's DMP, as required by the water rights granted to LCRA, as well as LCRA's DCP, as required by Commission rules (collectively DMP/DCP). Although the water resources available in the lower Colorado River are considered

as a system, only waters used under LCRA's water rights are addressed by this DMP/DCP.

LCRA recognizes that its responsibility and authority under this DMP/DCP is subject to and shall not conflict with the authority of any Watermaster operation the TCEQ may establish on the Colorado River. Moreover, LCRA recognizes that the Commission has jurisdiction to resolve any and all disputes regarding the allocation of stored water from Lakes Buchanan and Travis, not withstanding the procedures and guidelines set forth in this DMP/DCP.

2. The Lower Colorado River System

The lower Colorado River is considered to be the lower portion of the drainage basin of Colorado River beginning in San Saba County and continuing to Matagorda County on the Texas Gulf Coast (see Figure 1-1). The river flows through nine of the ten counties that make up LCRA's statutory water district.

The upper portion of LCRA's district is part of the Texas Hill Country. In the Hill Country, the river is largely controlled by a series of five dams and their reservoirs--Buchanan, Inks, Wirtz, Starcke, and Mansfield. Marked by steep slopes and shallow rocky soils with outcroppings of granite and limestone, the Hill Country ends abruptly in the Balcones Fault region near the edges of Austin. At Austin is the Tom Miller Dam that creates Lake Austin. From the eastern edges of Austin the river broadens out, snaking through the dark rich Blackland Prairie soils and then rolls gently downstream through the sand and shale of the coastal plains.

Water from the Colorado River and its tributaries is used for a variety of purposes to support the citizens and economy in the LCRA district. These uses include public water supply, manufacturing, cooling water for electric generating plants, irrigation, agriculture and mining. The water to supply these uses comes largely from the natural runoff into the Colorado River. However, the Colorado River Basin is subject to recurrent, severe droughts and devastating floods resulting in wide ranges of river flows. To provide an assured water supply and to relieve flooding, the LCRA, with the help of the Federal government, constructed the Highland Lakes reservoir system.

The development of LCRA's dams and reservoirs on the Colorado River, accomplished in the years from 1939 through 1951, changed Central Texas in many ways. Beginning by controlling the devastating floods on the river, using the river's power to generate electricity, and creating a secure and reliable water supply, LCRA has helped to stimulate the growth and development of the region. The lower Colorado River's water resources satisfy a wide variety of uses, many of which have changed and will continue to change in concert with the changes in the environment and the growth and development of the region.

3. Major Water Rights Holders

The largest water right holders in LCRA's water district also use the majority of the water (Table 4-1). LCRA holds the largest rights, with rights to use up to 1.5 million acre-feet per year from

Lakes Buchanan and Travis. Some of the other large water right holders downstream of Lakes Buchanan and Travis have priority dates earlier than that of LCRA's Highland Lakes permits. These rights belong to the City of Austin, Corpus Christi (portion of Garwood), LCRA for Pierce Ranch, and the LCRA's Garwood, Lakeside and Gulf Coast Irrigation Operations. These rights are considered as senior in time and superior to LCRA's right to store water in the Highland Lakes. Hence, any inflows to the Highland Lakes that need to be diverted for use under these rights must be passed through the Lakes for use downstream. There are also some large water rights downstream of Lakes Buchanan and Travis that have junior priority dates.

TABLE 4-1 MAJOR WATER RIGHTS AND AUTHORIZED RIGHTS IN THE LOWER COLORADO RIVER BASIN, LISTED IN ORDER OF PRIORITY (Acre-Feet/Year)

LCRA (GARWOOD)	133,000
CORPUS CHRISTI (GARWOOD)	35,000
CITY OF AUSTIN (LAKE AUSTIN)	250,150
LCRA (GULF COAST)	228,570
LCRA (LAKESIDE)	107,500
LCRA (PIERCE RANCH)	55,000
CITY OF AUSTIN (Remainder of Certificate of Adjudication No. 5471)	46,403
LCRA (Lakes Buchanan and Travis)	1,500,000
CITY OF AUSTIN (Certificate of Adjudication No. 5489)	35,456
STP NUCLEAR OPERATING COMPANY and LCRA	102,000
LCRA (Gulf Coast junior portion)	33,930
LCRA (Lakeside junior portion)	78,750
TOTAL	2,606,759

4. Historic Operation of the Highland Lakes

Lakes Buchanan and Travis serve as the water supply and flood control reservoirs in the Highland Lakes system. Since their construction in the late 1930s and early 1940s, the water storage in these lakes has fluctuated dramatically in response to extreme floods and droughts. The lakes were at their lowest levels in 1952 when Lake Buchanan was at 983 feet mean sea level (msl) and Lake Travis was at 614 feet msl. The highest water surface elevations were in 1991 for Lake Travis (710.4 feet msl) and in 1991 for Buchanan (1021.37 feet msl).

Operational management of the lakes has also changed over time. A major use of the dams in the 1940s and 1950s was for hydroelectric power generation. That use became secondary to water supply purposes when LCRA developed its fossil fuel electric generation stations. As a result of the Final Judgment and Decree for LCRA's water rights, the use of water for hydroelectric generation was formally subordinated to higher uses except during emergency shortages of electricity, and during other times to the extent that such releases will not impair

LCRA's ability to satisfy all existing and projected demands for water from Lakes Buchanan and Travis pursuant to all firm commitments and all non-firm, interruptible stored water commitments.

5. Purpose and Legal Considerations

The purpose of the DMP/DCP is to specify how LCRA will contract and supply firm and interruptible stored water supplies during a repetition of the critical Drought of Record. In managing the stored water from Lakes Buchanan and Travis, LCRA must

- Define the conditions under which water shortages exist, and
- Specify the actions to be taken by LCRA to mitigate the adverse effects of such shortages.

The overall goals of the DMP/DCP are to:

- Extend available water supplies.
- Preserve essential uses of water and protect public health and safety during extreme shortages of supplies.
- Equitably distribute among LCRA's water customers any adverse economic, social and environmental impacts associated with drought-induced water shortages.

The scope of the DMP/DCP must adhere to the findings of the State District Court's Final Judgment and Decree, adjudicating LCRA's water rights, as well as the 1989 Water Commission's Order approving the WMP and TCEQ rules concerning drought contingency plans. The scope of the DMP is limited to the curtailment of LCRA's interruptible stored water supplies to insure that there is sufficient firm water available to meet projected demands for such water through a repetition of the Drought of Record and also addresses how LCRA will provide water for environmental flow needs. Firm water is subject to curtailment only if it is determined that the drought in effect is worse than the Drought of Record. The DCP also addresses water use reduction goals required by TCEQ's Chapter 288 rules and establishes more detailed procedures for pro rata allocation of interruptible stored water during periods of curtailment.

In times of shortage of supply caused by drought or emergency, LCRA, in accordance with Section 11.039 of the Texas Water Code, will first curtail and distribute the available supply of interruptible stored water among all of its interruptible stored water supply customers on a pro rata basis, so that preference is given to no one and all interruptible stored water supply customers suffer alike. Although projected firm demands for stored water for the next ten years are significantly greater than demands included in the last revision to WMP, these projected needs are still significantly less than the total firm water supplies available.

If the shortage of supply caused by the drought is worse than the Drought of Record, then LCRA must curtail and distribute the available supply of firm water among all of its firm water supply customers on a pro rata basis, so that preference is given to no one and all firm water supply

customers suffer alike.

In the annual allocation of interruptible stored water supplies, LCRA follows the priority order of water use as specified in Section 11.024 of the Texas Water Code and the WMP.

Similarly, in making additional commitments of firm water supplies, LCRA must also follow the priority order of uses given in Section 11.024 of the Texas Water Code.

As noted above, a goal of the DMP/DCP is to determine how to allocate available water supplies when there is not sufficient supplies to meet projected water demands even after reasonable, cost-effective water conservation efforts have reduced the water demands. Therefore, the DMP/DCP does not emphasize water conservation practices that should occur all the time, not just in drought conditions. LCRA has major programs to encourage conservation in water use. These programs are summarized in Chapter 3 of this WMP.

As discussed previously, the WMP, and the DMP/DCP, require periodic revision to reflect changes in water demands. The last revision was completed by LCRA in February 1997 and approved by TCEQ in March 1999. Significant changes in demand, as discussed below, have necessitated the present revision.

The most noticeable changed condition over the last five years has been a significant increased projection of municipal and industrial (firm) water demands. The WMP approved in 1999 projected the ten-year future firm demands within LCRA's service area at about 280,000 acre-feet annually for 2005. Based on the analyses for Regional Plans pursuant to the Senate Bill 1, the ten-year projected demands are now projected to be about 360,100 acre-feet per year for 2010 (see Table 4-2). The primary reason for this increase is additional water needs to meet population and economic growth in the Austin area, including domestic water use around the Highland Lakes.

With this large projected increase in firm water demand, the WMP must be adjusted to give a compensating reduction in the interruptible stored water supplies available since firm needs take priority. This reduction can be achieved by revising the annual interruptible stored water supply curtailment policy adopted in the WMP.

B. Water Users and Interest Groups

1. LCRA Firm Water Customers

LCRA manages the Highland Lakes for the benefit of all users. LCRA supplies water under its water rights for the Highland Lakes to numerous municipal water supply systems, manufacturers, and power generating plants. As of May 2003, LCRA had over 110 contracts for firm water supplies. The total contractual commitments and reservations of firm water from Lakes Travis and Buchanan at the time was about 318,364 acre-feet per year. This number does not include any commitment to instream flows or freshwater inflows to the bays and estuaries or the amount

allocated to O. H. Ivie Reservoir. Annual use of firm stored water was about 35-36 percent of the 318,364 acre-foot amount.

The major concern of firm water customers is that sufficient supplies be allocated to insure that their demands for water are fully satisfied even during severe drought conditions. An additional concern for those customers pumping water directly from Lakes Buchanan and Travis is that the lake levels remain sufficiently high for them to continue to use their existing water intake structures. Extending intake facilities further into the lake to follow retreating shorelines can be very expensive. Most of the intakes can accommodate water levels at the historical low lake levels of 614 feet msl on Lake Travis and 983 feet msl on Lake Buchanan.

2. Agricultural Interests

a. Historic Claims to the Waters of the Colorado River

The waters of the Colorado River have served the rice farming industry of the Texas Gulf Coast counties of Colorado, Wharton and Matagorda counties since 1885 when the first rice crops were planted near Eagle Lake, Texas. When legislation creating LCRA was first proposed in the Texas Legislature in 1933, promises were given to the rice producers and other farmers that the waters stored behind the dams proposed for the LCRA system would be available to serve their needs when the natural flow of the river diminishes in dry years.

Rice is the major crop irrigated in the most downstream three counties in the LCRA water district. While some rice producers in the region irrigate their crops with pumped groundwater, the major source of water for irrigation is from the waters of the Colorado River, either under run-of-river water rights, or from releases of interruptible stored water from Lakes Buchanan and Travis. Approximately 40% of the water used to irrigate in the three counties comes from groundwater. The majority, 60%, is supplied from surface water. Approximately 379,300 acre-feet, which is about 56% of the annual water use of the Colorado River and the Highland Lakes, is used for rice farming. During an average year, about 30% of the total surface water used for irrigation comes from the interruptible stored water in Lakes Buchanan and Travis.

When LCRA has purchased irrigation operations (Gulf Coast in 1959, Lakeside in 1983, and Garwood in 1998) and their associated senior water rights from private firms, LCRA made certain commitments to the farmers to provide water from Lakes Buchanan and Travis as back-up to the run-of-river rights.

b. Concerns of the Agricultural Interests

The primary concern of the agricultural interests is how LCRA will curtail the interruptible stored water during times of shortage. The producers understand the interruptible concept because, in essence, the waters were always interruptible. The WMP formalizes the understanding of how the water supply--both run-of-river and stored water--is managed.

3. Recreation and Tourism Interests

The waters of the Colorado River and the Highland Lakes serve a variety of recreational and tourism interests in Central Texas. In the WMP, LCRA recognizes the economic interests of the tourism and recreation industry around the Highland Lakes through a commitment to limit its sales or commitments of interruptible stored water, other than to satisfy the four irrigation operations' Conservation Base acreage or Priority Allocation acreage, based on the volume of water in Lakes Buchanan and Travis, as described later in this Chapter.

While the WMP sets minimum projected reservoir storage levels for Lake Travis and for Lake Buchanan, the lakes will most likely have fallen below these levels during even a brief drought period. Economic hardship on the owners of the many marinas, small recreation businesses (bait stores, fishing camps, restaurants, campgrounds), and larger businesses, such as motels, could last much longer than the drought conditions. Many of the marinas on Lake Travis have the ability to move boat docks further out into deeper water and are willing to bear the added operational costs of such moves to stay in business. On Lake Buchanan, the shallow nature of the shoreline allows little flexibility in moving docks and other facilities. Some residents and other lake users have expressed concerns about the lack of access to the lakes during low elevations. Most of LCRA's boat ramp facilities and private boat ramps and launches become unusable when Lake Travis falls below 640 feet msl and Lake Buchanan falls below 1000 feet msl. Additionally, water hazards such as tree stumps and rock areas increase as reservoir levels recede, restricting more of the lake surface available for sail and power boating.

Lake area Chambers of Commerce, residents, and representatives of the tourism industry are also concerned about the elevation of the lakes area during low water periods even when a true drought is not in effect. There is a concern that first time visitors will not return to the area having once experienced low water levels in the reservoirs, thus dampening potential future economic growth.

River recreation interests downstream of the Highland Lakes are also concerned that drought conditions will leave stretches of almost dry riverbed and that water quality will deteriorate severely during drought periods.

4. Concerns for Instream Flows and Freshwater Inflows for the Bays and Estuaries

The Colorado River is the largest single source of freshwater flowing into the Lavaca-Tres Palacios estuary through channels in the Colorado River Delta. The Lavaca-Tres Palacios estuary is one of the largest of the seven major and three minor estuaries along the 370 miles of Texas Gulf shoreline. The bays and estuaries of this system provide a rich environment for wildlife, commercial seafood harvest, recreation, and aesthetic opportunities.

Average inflow to the bay has been 2.9 million acre-feet per year. Of that inflow, about 34 percent came from the Coastal Basins, 22 percent from the Lavaca River Basin, and 44 percent from the Colorado River. Freshwater inflows influence estuarine biological productivity by

lowering salinity, increasing nutrients, and providing sediments. In 1991, the U.S. Corps of Engineers re-routed the Colorado River into West Matagorda Bay to increase biological productivity by increasing the amount of freshwater entering the estuary. However, a storm blocked the new route until its channel could be dredged in 1992, when it became fully functional.

The Colorado River contributes freshwater to the estuary directly from the river and indirectly through return flows from rice fields irrigated from the river. Prior to the 1991 change, an average of 1.3 million acre-feet annually from the Colorado River entered the estuary at the mouth of the river, with about 150,000 acre-feet contributed through irrigation return flows. With the change in the Colorado River delta in 1991, the full average of 1.8 million acre-feet of annual flow of the Colorado River now enters Matagorda Bay.

Estuaries and their associated wetlands are a transition zone between the fresh water and marine environments and serve as the nurseries for over 97% of the fishery species in the Gulf of Mexico. Thus, the levels of salinity, nutrients, and sediments determined by freshwater inflows is critical for high estuarine production. Fluctuation of estuarine conditions from severe droughts, floods, and hurricanes results in a shift of the biological elements of the system and can directly affect the production and survival of many plant and animal species.

During the rice irrigation season, even under drought conditions, the instream flow needs should be satisfied as a result of natural inflows and return flows downstream of the Highland Lakes, pass-throughs of inflows to the Highland Lakes required to honor downstream senior water rights, and releases of interruptible stored water flowing downstream to the irrigation operations. Under current water demand conditions, it is in the winter months, when the portions of inflows required to be passed through the reservoirs to honor downstream senior rights are low and when downstream demands for stored water are also low, that it is most likely that instream flows will need to be supplemented with firm stored water releases. However, should interruptible stored water for irrigation be curtailed or cut off, the periods of low flow in the river would be extended and additional water would be demanded to serve these needs for periods of time.

While it is difficult to estimate the full effect of inadequate instream flows or inadequate inflow to the bays and estuaries, it is clear that many plant and animal species in the food chains would be severely stressed and that productivity would be lessened if the condition persisted for an extended period of time.

C. Projected 2010 Surface Water Demands During Droughts

1. Introduction

To properly allocate available water supplies in the DMP/DCP, LCRA must project the future water demand on those supplies. The DMP/DCP is based on conditions that may occur in the next decade. This ten year planning period was chosen because the critical drought period used to determine the Combined Firm Yield of Lakes Buchanan and Travis lasted approximately a

decade. Further, the estimates of future water demands are most accurate in the near future. If the critical drought were to repeat itself beginning now, the maximum demands during the drought period would be those in year 2010. Thus, a ten year planning period was used for the development of the DMP/DCP.

Total estimated surface water use in LCRA's 35 county water service area (Figure 1-1) in 2000 was approximately 675,800 acre-feet annually, including water released to maintain instream flows in the lower Colorado River. About 56% of water diverted was used for rice irrigation in the four major irrigation operations located in Colorado, Wharton and Matagorda Counties. The next largest demand for surface water is the City of Austin, with approximately 134,000 acre-feet yearly averaged over the last ten years for municipal use and steam-electric power generation. In general, City of Austin's use has been increasing steadily, with a use of 163,800 acre-feet for the year 2000.

LCRA supplies water to two general categories of water demands: firm and interruptible. Firm demands presently include the water for municipal, domestic, industrial, steam-electric power generation, some irrigation, and instream flow maintenance purposes. Currently, interruptible stored water is used almost entirely for agricultural irrigation, specifically rice irrigation, and for environmental needs. As noted earlier, the most noticeable changed condition over the last five years has been a significant increased projection of municipal and industrial water (firm) demands. With the large projected increase in firm water demand, the DMP/DCP must be adjusted to give a compensating reduction in the interruptible stored water supplies available since firm needs take priority.

Surface water demands in LCRA's water district over the next decade have been projected by LCRA staff based on drought-condition weather, population growth, water use patterns, and economic development, as outlined in the Senate Bill 1 regional water plan for Region K. The assumptions used in projecting 2010 demands are described in the following sections.

2. Projected Firm Water Demands

a. Municipal, Manufacturing, Steam-Electric, and Domestic Water Demand Projections

LCRA staff allocated Senate Bill 1 2010 projected demands using a 1996 water use distribution. Actual water use in 2000 and projected water demands for 2010 are shown in Table 4-2.

The water demand for STP and the Austin power plants may be met by using unregulated run-of-river flows under separate water rights associated with those facilities, supplemented as necessary with stored water. The arrangements for satisfying these demands at STP and at LCRA power plants are described in more detail in Finding 58 of the September 7, 1989 Order of the Texas Water Commission approving LCRA's WMP. The 2010 demands included in this WMP for these facilities reflect those provided to the Senate Bill 1 Regional Planning Group (Region K) by the City of Austin and the South Texas Project Nuclear Operating Company.

Today, LCRA has only a handful of firm water contracts for domestic water use. Unfortunately, most of this water is taken from the Highland Lakes by landowners that do not have contracts with LCRA. Absent a contract, most if not all of these diverters have no legal claim to the water they are diverting. At some point, LCRA may choose to pursue enforcement of its water rights to curtail these unauthorized diversions. Total domestic water use is projected to increase to 6,273 acre-feet by 2010. As water supplies become more and more scarce, many landowners are likely to realize the benefit of a firm water contract that better protects their water supply during drought conditions. Thus, for purposes of this WMP, LCRA has estimated that approximately 5,000 acre-feet of domestic water use will come under contract with LCRA over the next ten years.

TABLE 4-2. REPORTED 2000 AND PROJECTED 2010 ANNUAL FIRM SURFACE WATER DEMANDS UNDER DROUGHT CONDITIONS

Water Demand Category	2000 Reported Water Use (Acre-Feet)	Projected 2010 Water Demand (Acre-Feet)
Highland Lakes Municipal	23,100	37,200
Manufacturing (Excluding Austin)	8,500	11,500
City of Austin Municipal and Manufacturing	153,300	187,931
City of Austin Power Plants*	10,400	13,500
LCRA Power Plants	22,000	29,500
South Texas Project (STP)*	64,800	47,000
Instream Flow Maintenance & Estuarine Inflows	14,500	**33,440
Total	296,600	**360,071

*Firm water demands for STP and the City of Austin may be met from run-of-river flows, if they are available, under their existing water rights.

**Based on the 2003 revision resulting from the effect of the new trigger for curtailment of interruptible stored water supplies from Lakes Buchanan and Travis and freshwater inflow needs of the Matagorda Bay, as described in this Chapter.

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b.Instream Flow Demands

LCRA completed the initial instream flow needs study in 1992. The study identified two sets of instream flow needs: critical flows and target flows. The recommended instream flows for the Colorado River downstream of Austin are in Table 2-1.

LCRA will continue with the reservoir operation procedure to release stored water from Lakes Buchanan and Travis to maintain daily river flows as follows:

1. LCRA will release stored water and pass storable inflows to maintain no less than the critical instream flow needs in all years as set forth in Table 2-1, including maintaining, on an instantaneous basis, instream flows of 46 cfs and 500 cfs critical flows as set forth in Table 2-1 during the times those respective flow values are in effect, and

2. In those years when the four major irrigation operations are not curtailed, LCRA will schedule the passage of inflows to lakes Buchanan and Travis that are legally available for storage, as measured at the upstream stream gages, to maintain the target flows as set forth in Table 2-1 as a daily average. Furthermore, during those times when target instream flow requirements are in effect and when such inflows are sufficient to allow LCRA to satisfy the daily target flow requirement at the Bastrop gage, LCRA will also schedule the passage of these inflows to maintain the following minimum flows, as measured at any time at the Bastrop gage:

Month	**Minimum Flow (cfs) 100% of the time**	**Minimum Flow (cfs) 95% of the time**
January	266	
February	269	
March	233	
April	244	287
May	492	579
June	355	418
July	295	347
August	165	
September	201	
October	208	

November	241	
December	264	

In rare instances, LCRA's ability to meet the instream flow requirements set forth in this WMP may be impaired by certain unavoidable constraints such as the capacity of its hydro-generation units and hydro-generation scheduling mandates as well as unforeseen diversions, unforeseen changes in flow conditions downstream, and adjustments to the ratings of the applicable gages.

This recommendation fully meets the most important instream flow needs at all times and meets the target flows during periods of normal or above normal streamflow conditions.

To fully honor this commitment, LCRA will use both firm water and interruptible stored water. Firm water is only supplied in years when the interruptible stored water supply is curtailed for the four major irrigation operations. The actual annual releases of stored water will vary from year to year depending on hydrologic conditions.

For the 2003 update, it is estimated that an annual average of about 27,380 acre-feet of firm water is needed to meet these instream flow commitments, with the remainder coming from interruptible stored water supplies. Therefore, the present annual commitment for instream flows of 12,860 acre-feet of firm water is recommended to be increased to 27,380 acre-feet per year. In addition to firm water, interruptible stored water will be provided to meet instream flow needs. The estimated interruptible stored water to be supplied during the critical drought will be an additional 8,590 acre-feet/year**.** Demands for both firm and interruptible stored water for instream flow needs were estimated from the simulated results of the water supply alternative that was recommended for the 2003 update of the WMP. The recommended water supply alternative represents a careful balance of environmental and irrigation impacts based on results from various scenarios that were considered.

The releases for instream flows generally, but not always, contribute to meeting the Critical or Target freshwater inflow needs of Matagorda Bay. However, the timing for these instream flow releases is independent of the monthly freshwater inflow needs for the bay.

c. Freshwater Inflow Demands

The water demands for maintaining the ecological balance of coastal bays and estuaries have been determined in 1997 by LCRA, in cooperation with TPWD, TWDB and TNRCC (predecessor to TCEQ). As indicated in Table 2-4, estimates of freshwater inflow needs (FIN) from the Colorado River at Bay City are 1.03 million acre-feet annually for the target needs and 171,000 acre-feet yearly to meet critical needs. Historically, an average of approximately 1,800,000 acre-feet flows annually in the Colorado River at Bay City.

For the 2003 WMP update, LCRA has recommended a change in the reservoir operation procedure for releasing stored water from Lakes Buchanan and Travis for estuarine needs after a careful balance of environmental and irrigation impacts from the results of various scenarios that

were considered. LCRA will release stored water from Lakes Buchanan and Travis to maintain monthly estuarine inflows at:

1. the target inflow needs in those years when the combined storage in Lakes Buchanan and Travis on January 1 is greater than or equal to 1.7 million acre-feet, to the extent of storable inflows each month to Lakes Buchanan and Travis, as measured at the upstream stream gages;

2. one hundred and fifty percent of the critical inflow needs in all years when the combined storage in Lakes Buchanan and Travis on January 1 is less than 1.7 million acre-feet and greater than 1.1 million acre-feet, to the extent of storable inflows each month to Lakes Buchanan and Travis, as measured at the upstream stream gages; and

3. the critical inflow needs in all years when the combined storage in Lakes Buchanan and Travis on January 1 is less than 1.1 million acre-feet, to the extent of storable inflows each month to the Highland Lakes, as measured at the upstream stream gages.

With the recommended intermediate estuarine inflow reservoir operation procedure of increasing the release of stored water from Lakes Buchanan and Travis in years when the combined storage is between 1.1 and 1.7 million acre-feet, the estuarine ecosystem will receive more freshwater inflows during moderate droughts than it would have under the WMP as approved in 1999. For any given month, LCRA will compensate for any deficit in releasing stored water to meet freshwater inflow needs during the following month by releasing additional stored water from the Lakes Buchanan and Travis. LCRA will not account for the inflow in the following month in making such release to make up for the previous month's deficits.

The reservoir operation procedure of releasing stored water for the freshwater inflow needs are based on the following:

- both Target and Critical FIN are provided with stored water;
- Target FIN are used as the estuarine inflow demands during years of plentiful water;
- water supply needs for the four major irrigation operations from the interruptible stored water supply were balanced carefully with the environmental needs while assessing the impacts from the results of various scenarios that were considered;
- the frequency and duration of high salinity conditions in Matagorda Bay are kept relatively low; and
- the Critical FIN are met about 80 percent of the months during the critical drought.

This recommendation will require an estimated 205,060 acre-feet of stored water during the ten-year critical drought for estuarine inflows. However, not all of this is from the Combined Firm

Yield of Lakes Buchanan and Travis. Similar to the instream flow demands, both firm water and interruptible stored water are used to meet the freshwater inflow needs. Firm water is only supplied in years when the interruptible stored water supply is curtailed for the four major irrigation operations. An annual average of about 6,060 acre-feet of firm water should be allocated, with the remainder coming from interruptible stored water supplies to meet freshwater inflow needs. The estimated annual interruptible stored water supplied during the critical drought will be an additional 14,450 acre-feet/year**.** The recommended changes are based on the alternative that was selected for the 2003 update based on a careful balance of environmental and irrigation impacts from the results of various scenarios that were considered.

For purposes of estimating required releases of water from Lakes Buchanan and Travis to meet the instream flow or freshwater inflow requirements of this WMP, LCRA will rely on stage data obtained from the gaging system jointly maintained and operated by the U.S. Geological Survey and LCRA for determining these requirements. If the ratings used to convert stage to flow published by LCRA and the USGS are not identical at the time required releases are estimated, LCRA will exercise its discretion to rely on the latest updated rating of the gage.

3. Projected Interruptible Stored Water Demands

a. Interruptible Stored Water Customers

LCRA presently supplies interruptible stored water to four major irrigation operations. These operations are: Pierce Ranch Irrigation Company, and LCRA's Garwood, Lakeside and Gulf Coast Irrigation Operations. These operations have associated with them very early run-of-river rights to divert surface water from the Colorado River, to the extent it is available, to satisfy customer needs up to their permitted amounts. These run-of-river rights are all senior to LCRA's water rights in the Highland Lakes. Thus, LCRA may impound only that portion of the inflows to the Highland Lakes remaining after passing through inflows to the extent needed to honor these and any other downstream senior water rights.

These four operations are primarily concerned with the growing of rice although there are some turf and row-crops grown within these operations. Virtually all irrigation water is pumped from the Colorado River. Only the Lakeside Irrigation Division has the use of a small amount of groundwater for irrigation purposes.

b. Projected Rice Irrigation Water Demands

The projected average annual irrigation water demand for 2010 is about 438,200 acre-feet annually (Table 4-3). Water to supply that need will come from both interruptible stored water and run-of-river sources. Statistical analysis by LCRA staff indicates that agricultural water diversions at these operations are influenced by the number of acres planted, rainfall, and evaporation. Planted acreage is the strongest statistical predictor of agricultural water use, but is also the most difficult to forecast since annual acreage varies greatly. Rice acreage is largely governed by the federal farm support program, which is currently undergoing changes. It is

premature to forecast the ultimate impact of these changes on the rice industry in LCRA's water district.

Because of the many variables that impact total water diversions at the irrigation operations, a conservative projection was made of future rice irrigation water acreage. First crop acreage for each operation was projected to be equal to the largest acreage cultivated over the last ten years. The projected first crop acreage, as well as 2000 actual first crop acreage, is given in Table 4-3. The Lakeside Irrigation Division has cultivated more acreage in the last ten years, but has used groundwater to meet the excess water needs.

The projections of second crop acreage are based on a fraction of the first crop acreage. The fraction used is the ratio of the second crop to first crop acreage in the year of greatest first crop acreage over the past ten years. These fractions are 0.44, 0.83, and 0.96, respectively, for Gulf Coast, Lakeside and Garwood. Second crop acreage for Pierce Ranch is taken as 6% of the total second crop acreage for Gulf Coast, Lakeside and Garwood.

The actual use of water for irrigation is highly variable, with relatively large differences from year to year. Water diversions projected for each irrigation operation, except Pierce Ranch, are calculated from predictive equations that consider rainfall and evaporation conditions, as well as acreage, during each irrigation season (Martin, 1990). These projected demands are based on rainfall and evaporation conditions expected during the duration of a repetition of the critical drought period experience from 1947 through 1956. The projected demands from Pierce Ranch are taken as 9% of the total projected demands of the other three major irrigation systems. This percentage reflects Pierce Ranch's historical proportion of total diversions over the past ten years adjusted for the major water reductions through water conservation.

TABLE 4-3. REPORTED YEAR 2000 AND PROJECTED ACREAGE AND SURFACE WATER DEMANDS FOR IRRIGATION				
Irrigation System	**Reported 2000 First Crop Acreage (Acres)**	**Reported 2000 Water Use (Acre-Feet)**	**Projected Year 2010 First Crop Acreage (Acres)**	**Projected Year 2010 Water Use (Acre-Feet)**
Gulf Coast	18,800	152,200	30,300	155,600
Lakeside	23,500*	117,800	27,500	135,600
Garwood	15,000**	83,200	21,200	109,000
Pierce Ranch	4,500**	26,100	4,740	36,000
Other Senior Rights	0	0	1,000	2,000
Total	61,800	379,300	84,740	438,200
* Includes acreage supplied from groundwater.				
** Estimated				

Adjustments are also made to the water demand estimates developed from the equations to reflect ongoing water use efficiency improvement programs. Aggressive water conservation efforts are projected to reduce the water diversions at the Gulf Coast Division by over 25% by 2010, from historical 1968-1986 period usage levels. The water demands for the other three major irrigation operations are expected to decline as well due to water conservation efforts, with 5% total cumulative reductions by 2010, from patterns of historical usage.

To estimate the demand for interruptible stored water supply for irrigation needs, a table of acreage was developed for the irrigation operations that included the likely allocation of various amounts of interruptible stored water between first and second rice crop. Such table was developed based on several assumptions.

Allocation of interruptible stored water supply to the individual irrigation operations was according to the following formula:

> Interruptible Stored Water Supply = 0.5*Average annual interruptible stored water usage over past 10 years + 0.5*Highest year of interruptible stored water usage within past 10 years.

Using the last ten years of interruptible stored water usage, it was found that each irrigation operation is entitled to the following percentages of interruptible stored water supplies available:

Gulf Coast	.425
Lakeside	.425
Garwood	.063
Pierce Ranch	.088

Pierce Ranch was not included in the acreage table since there is not a reasonably accurate predictive equation for water use at Pierce Ranch. To represent Pierce Ranch's needs, water use and acreage were assumed at 9 % and 6 %, respectively, of the combined water use and acreage, respectively, of the other three operations.

In developing the table of acreage, it was assumed that the hydrologic and meteorological conditions reflected a 1 in 5 dry year, or stated differently, the dry conditions that would be expected only 20% of the time.

The maximum annual demand for the interruptible stored water acreage projected for 2010, under a 1 in 5 dry year condition, was 273,000 acre-feet. Using that as the greatest interruptible stored water demand, a set of smaller interruptible stored water supplies were assumed to generate a set of first and second crop acreages expected to be cultivated by the three major operations. These acreages were assumed to be the maximum planting acreage that could be supported by the limited water supplies, both run-of-river and interruptible stored water. The allocation of the available interruptible stored water supplies for irrigation was based on the assumption that the demand for projected first crop acreage for rice (83,700 acres) will be fully met, with any acreage curtailments occurring in second crop.

The acreage level was set for each level of interruptible stored water supply using the following process:

1. The total interruptible stored water supply available was allocated to each of the three major operations according to the percentages given above.

2. The available interruptible stored water for each irrigation operation was used first to meet the needs of first crop rice.

3. The remaining interruptible stored water supply, after first crop, was used for second crop needs. If there was insufficient interruptible stored water supplies, then the maximum allowed second crop acreage was reduced in the same proportion as the ratio of the available to the maximum needed interruptible stored water supplies. For example, if there is only 50% of the interruptible stored water needed to meet the needs of the maximum second crop acreage allowed, the second crop acreage is set to 50% of the maximum second crop.

The table of acreage thus developed for the irrigation operations was used in simulations conducted with the RESPONSE model for this WMP update to define the planning decisions of allocating available interruptible stored water when curtailments were instituted. As noted

before, Pierce Ranch acreage and water demand were treated in the RESPONSE model as percentages of the combined acreage and water demand of the three other irrigation operations.

In addition to the senior water right holders and major irrigation operations, there are additional demands for surface water along the Colorado River. These demands, and their water rights, are junior in time to December 1, 1900 but senior to November 1, 1987. Consistent with LCRA's water rights for Lakes Buchanan and Travis, the WMP provides that LCRA will treat any of these rights junior to the water rights for Lakes Buchanan and Travis in the same manner as the users of interruptible stored water. The maximum amount of interruptible stored water to meet the demand of such junior water rights is about 4,700 acre-feet annually, however these demands are not likely to take place each and every year.

c. Instream Flow and Estuarine Freshwater Inflow Water Demands

As noted in the section on firm water demands, interruptible stored water is used to meet part of the environmental water demands for instream flow and estuarine freshwater inflows. During the critical drought, the average annual demand on interruptible stored water is estimated to be 23,030 acre-feet per year, with 8,600 acre-feet per year of that amount provided for instream flow maintenance.

4. Summary

Projected surface water demands in LCRA's ten-county water district during severe droughts total about 798,300 acre-feet annually in 2010. Firm water demands are projected to be approximately 360,100 acre-feet annually in 2010 (See Table 4-2). Surface water demands for irrigated agriculture under drought conditions are estimated to be 438,200 acre-feet annually. The projected irrigation demands, as well as reported use in 2000, are indicated in Table 4-3.

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Tex. Water Dev. Bd., WATER FOR TEXAS – 2002 VOLUME III (2002) (Region K Plan) (available online at http://www.twdb.state.tx.us/rwp/k/PDFs/).

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D. Projected Water Supplies

1. Water Supply Management Procedure

a. Systems Operation Concept

A fundamental concept of the WMP is that Lakes Buchanan and Travis and the lower Colorado River are operated as a combined water supply system. Unregulated inflows entering the

Colorado River from drainage areas downstream of the Highland Lakes must be used to the maximum extent possible before inflows to the Lakes Buchanan and Travis are passed through or stored and subsequently released to satisfy downstream water needs.

Such a system concept requires a careful and extensive analysis of the interconnection of hydrologic conditions, water demands, and priority of water rights and uses. The WMP uses the following general guidelines for the storage and use of water in the Highland Lakes and the lower Colorado River.

b. Critical Drought Period Concept

A basic assumption in assessing water availability for the DMP/DCP is that all operational procedures must be evaluated as if the worst drought ever recorded for the lower Colorado River were to reoccur. This Drought of Record for the Highland Lakes was the 1947-1957 period, a period that was identified as the most severe occurring during the 105 years since data collection started in February 1898.

c. Procedures For Evaluating Water Availability

LCRA staff developed a computer program for evaluating water availability under a variety of management policies. This program is called "RESPONSE - Lower Colorado River Authority Reservoir System Simulation Computer Program." The evaluation of water availability proceeds on an annual basis. For each year, a three-stage process is executed:

1. water demands are estimated for each user or usage category for the coming year;

2. the daily flows are allocated among users based on legal priority or seniority; and

3. the operation of Lakes Buchanan and Travis is simulated on a monthly basis to reflect the storage of unused inflows, evaporation, and potential spills.

The demands for water in the next year are specified as either fixed annual amounts or demands that vary depending on water in storage. The firm demands are all held constant in each year of simulated hydrologic conditions. The irrigation demands change from year to year depending on: (1) the acres cultivated in each irrigation operation for first and second crop rice; (2) weather conditions (rainfall and evaporation) in that year; and (3) water held in storage in Lakes Buchanan and Travis at the beginning of the year. The water demand for first crop rice occurs only in the months of March through July, while second crop demands are in August through October. All annual water demands are distributed on a daily basis using historical water usage information.

The simulated allocation of inflows into Lakes Buchanan and Travis in the DMP/DCP among downstream senior water rights holders follows the same procedure used in developing the Combined Firm Yield of Lakes Buchanan and Travis for the WMP. It is important to note, however, that these simulated monthly operations do not necessarily reflect the actual day-to-day

operations of the reservoir system, which often requires the exercise of best professional judgment.

2. Supplies for Firm Demands

The annual dependable water supply that can be supplied from Lakes Buchanan and Travis during a repetition of the Drought of Record is referred to as the Combined Firm Yield. Based on the studies available to LCRA, the Combined Firm Yield has been calculated by LCRA to be 445,266 acre-feet per year, exclusive of the amount allocated to O.H. Ivie Reservoir. In addition to this Combined Firm Yield, water supplies are also available from the natural flow of the river downstream of the Highland Lakes to meet a major part of the City of Austin's and the South Texas Project's firm water demands.

Adding the other firm water demands to those of the City of Austin gives a projected drought-condition demand in the year 2010 of approximately 360,100 acre-feet annually, as described in Table 4-2. Portions of the demands of the City of Austin and of STP can be supplied from run-of-river flows under separate water rights, reducing the projected drought-condition demand for stored water in year 2010 to about 184,000 acre-feet annually. The estimate of drought-condition firm demand for stored water in 2005 is about 134,000 acre-feet annually. The firm demands for stored water over the next ten years are low relative to the firm supplies from the Combined Firm Yield. Thus, curtailment of firm demands is not likely in the next decade, even under a recurrence of extreme drought conditions. A large surplus in firm stored water supplies is therefore available to meet interruptible stored water needs without placing at risk the stored water needed for firm water users in the next decade.

3. Supplies for Interruptible Stored Water Demands

As specified by the WMP, the amount of interruptible stored water available for the next irrigation season is projected by LCRA staff in November of each year. The projected supply depends upon the amount expected to be in the combined storage in Lakes Buchanan and Travis on January 1, anticipated inflows for the subsequent months through the irrigation season, and the current demands for firm water.

Several procedures were evaluated to predict the likely supplies available, during a repetition of the Drought of Record, in the next year for interruptible stored water demand. Historical records of streamflow were examined, but were found to be highly variable and hence not accurate in estimating water availability for the next year. The most accurate indicator of water availability is the combined storage in Lakes Buchanan and Travis at the beginning of the year. Thus, for the DMP/DCP, the allocation of stored water supplies to meet interruptible stored water demands is based solely on the combined reservoir storage in Lakes Buchanan and Travis at the beginning of each year, and decisions to curtail interruptible stored water supplies in annual contracts are keyed to particular total January 1 storage levels.

At relatively full storage levels on January 1, the supply of interruptible stored water is sufficient

to meet all projected firm and interruptible stored water demands. However, at or below some storage levels, there are not sufficient supplies and the annual contracts for interruptible stored water must be reduced. At lower and lower January 1 storage levels, less and less interruptible stored water is available for allocation through the annual contracts. At some relatively low storage, there will be a total cutoff of water for interruptible stored water use in the coming year. Provisions will be made to revise the water supply estimates during the year to respond to significant changes in projected streamflow and storage due to rainfall in the basin.

The evaluation of expected hydrologic and water demand conditions during a repetition of the Drought of Record can only be simulated based on projected information. This projected information is subject to some uncertainty. LCRA has determined it prudent to designate some minimum storage level serving as a safety factor to insure that all firm demands are fully met during the critical drought. Under this conceptual operating plan, there would be a storage level which, when reached at any time during the year, would require the total cutoff of all water for interruptible stored water use. That storage level defines a Reserve Storage Pool for the system.

With the increase in projected firm water needs of about 50,000 acre-feet annually from Lakes Buchanan and Travis for 2010, there is less water for interruptible stored water supply from Lakes Buchanan and Travis since firm water needs take priority over interruptible stored water uses. To avoid shortages to firm water users, it is recommended that interruptible stored water supplies from Lakes Buchanan and Travis be reduced during the critical drought years from what is available under the WMP approved in 1999 by revising the annual interruptible stored water supply curtailment policy, as discussed below. This reduction in supplies impacts irrigation primarily since irrigation has the highest priority for use of interruptible stored water.

E. Water Curtailment Policies

1. Triggering Conditions

The DMP/DCP contains distinct triggering levels, as well as several associated cancellation measures, that are associated with the amount of water available in Lakes Buchanan and Travis. These responses range from voluntary conservation by firm water customers to total cutoff of interruptible stored water customers. This DMP/DCP fully meets the critical instream flow needs at all times and meets the target flows during periods of normal or above normal stream flow conditions.

2. Curtailment of Interruptible Stored Water Demands within Irrigation Operations and for Instream and Bay and Estuary Freshwater Inflows

Given the large demand for interruptible stored water for rice production, there will likely be a shortage of interruptible stored water at some time during the next decade. The curtailment policies considered in the DMP/DCP focus primarily on the reduction in interruptible stored water supplies through the annual contracting process. The impact of reducing supplies in the annual contracts is far less than forcing a curtailment or total cutoff during the year after the rice

farmers have made economic commitments based on the assumed availability of the water.

a. Recommendation for Interruptible Stored Water Demand Curtailment for Irrigation and Environmental Needs

To examine possible alternative policies for the 2003 update, LCRA staff reviewed with the Water Management Plan Revision Advisory Committee over thirty options for allocating water supply between irrigation and environmental needs.

In determining available interruptible stored water supplies, it is essential that firm water demands be fully protected during a repetition of the Drought of Record (DOR). This drought is the worst ever recorded on the lower Colorado River and occurred from 1947 through 1956. As noted earlier, projected firm water demands from Lakes Buchanan and Travis over the next ten years (to 2010) are estimated to increase by 50,000 acre-feet annually (24 percent) from the ten-year projections used in the 1999 version of the WMP (to 2005). Meeting those increased demands may only be achieved by decreasing the interruptible stored water supplies presently provided from Lakes Buchanan and Travis. This reduction in supplies impacts irrigation primarily since irrigation has the highest priority for use of interruptible stored water. The second factor affecting interruptible stored water supplies available for irrigation is the allocation of interruptible stored water supplies between irrigation and environmental protection. This allocation is always a delicate balancing between benefits and adverse impacts.

After examining the alternatives, LCRA recommends that interruptible stored water supplies be reduced from present levels and that additional water be provided for estuarine freshwater inflows. As more specifically described below, LCRA recommends that interruptible stored water supplies be reduced from the current levels with the initial storage curtailment threshold raised from the current value of 1.1 to 1.4 million acre-feet. The annual interruptible stored water supplies are determined based on beginning-of-year storage. As storage declines, there is a decline in annual interruptible stored water supplies available. For storage levels less than 1.4 million acre-feet, there would be progressive reductions in annual interruptible stored water supplies.

Further, LCRA recommends that an intermediate release schedule be provided for estuarine freshwater inflows that allows a slightly more gradual reduction of inflows to Matagorda Bay during low flow years. The recommended changes are deemed by LCRA as a balance between a modest incremental decrease in irrigation water supplies during drought conditions and modest increased inflow to Matagorda Bay during non-drought years to help maintain the ecological health of the Bay. Based on a balance of environmental and irrigation impacts, the recommended WMP changes include an increase of stored water released for estuarine freshwater inflow. This increase would be provided in years when the January 1 storage level in Lakes Buchanan and Travis is between 1.1 to 1.7 million acre-feet (55 and 86 percent full).

The recommendations for the current update are as follows:

1) Open Supply - If the total January 1 storage in Lakes Travis and Buchanan combined is equal to or greater than 1,400,000 acre-feet, then LCRA will supply all interruptible stored water demands. This assumes 273,000 acre-feet of interruptible storage water is sufficient to irrigate a total of 83,700 acres within the four irrigation operations, with seventy percent (70%) of that acreage being irrigated for a ratoon, or second, crop of rice.

2) Curtailment will begin if the total January 1 storage is less than 1,400,000 acre-feet and greater than 325,000 acre-feet. The available interruptible stored water supply when combined storage on January 1 is less than 1,400,000 acre-feet is shown in Figure 4-1. If combined storage on January 1 is between 1.4 million acre-feet and 1.15 million acre-feet, the interruptible stored water supply available will vary beginning at 273,000 acre-feet available at 1.4 million acre-feet of storage and decreasing at a rate of approximately 31,200 acre-feet for each 100,000 acre-foot decrease in combined storage until a value of 195,000 acre-feet available at a combined storage of 1.15 million acre-feet. When the combined storage in Lakes Buchanan and Travis on January 1 is less than 1,150,000 acre-feet, the interruptible stored water supply available will vary beginning at 195,000 acre-feet available at 1.15 million acre-feet of storage and decreasing at a rate of approximately 4,250 acre-feet for each 100,000 acre-foot decrease in combined storage until a value of 160,000 acre-feet available at a combined storage of 325,000 acre-feet.

3) Cutoff of the interruptible stored water supply for the coming year will occur when the combined storage in Lakes Buchanan and Travis on January 1 is less than or equal to 325,000 acre-feet.

4) Reserve Storage Pool - If at any time during the year the total storage in Lakes Buchanan and Travis, combined, is less than or equal to 200,000 acre-feet then all use of interruptible stored water will be stopped.

5) During periods of curtailment or cutoff instituted on January 1, LCRA will cancel the curtailment of interruptible stored water for the irrigation operations at any time during the year prior to July 31, if the combined storage in Lakes Buchanan and Travis is projected to be equal to or greater than 1.4 million acre-feet anytime in July. Further, the remaining available interruptible stored water supplies for the year may be reallocated, at this time, between irrigation operations if such allocations do not adversely affect any irrigation operation.

6) During periods of curtailments, LCRA will allow each irrigation operation the option of either: (1) using up to a maximum authorized volume of interruptible stored water allocated to that operation, or (2) using sufficient water to cultivate a level of acreage agreed upon among the customers within each particular irrigation operation and LCRA.

Since the curtailment begins at a storage level more than one half full, curtailment of irrigation water supplies may occur during some relatively mild droughts, however such curtailment would be limited in scope and duration. Further, it is likely that the rice producers will only be

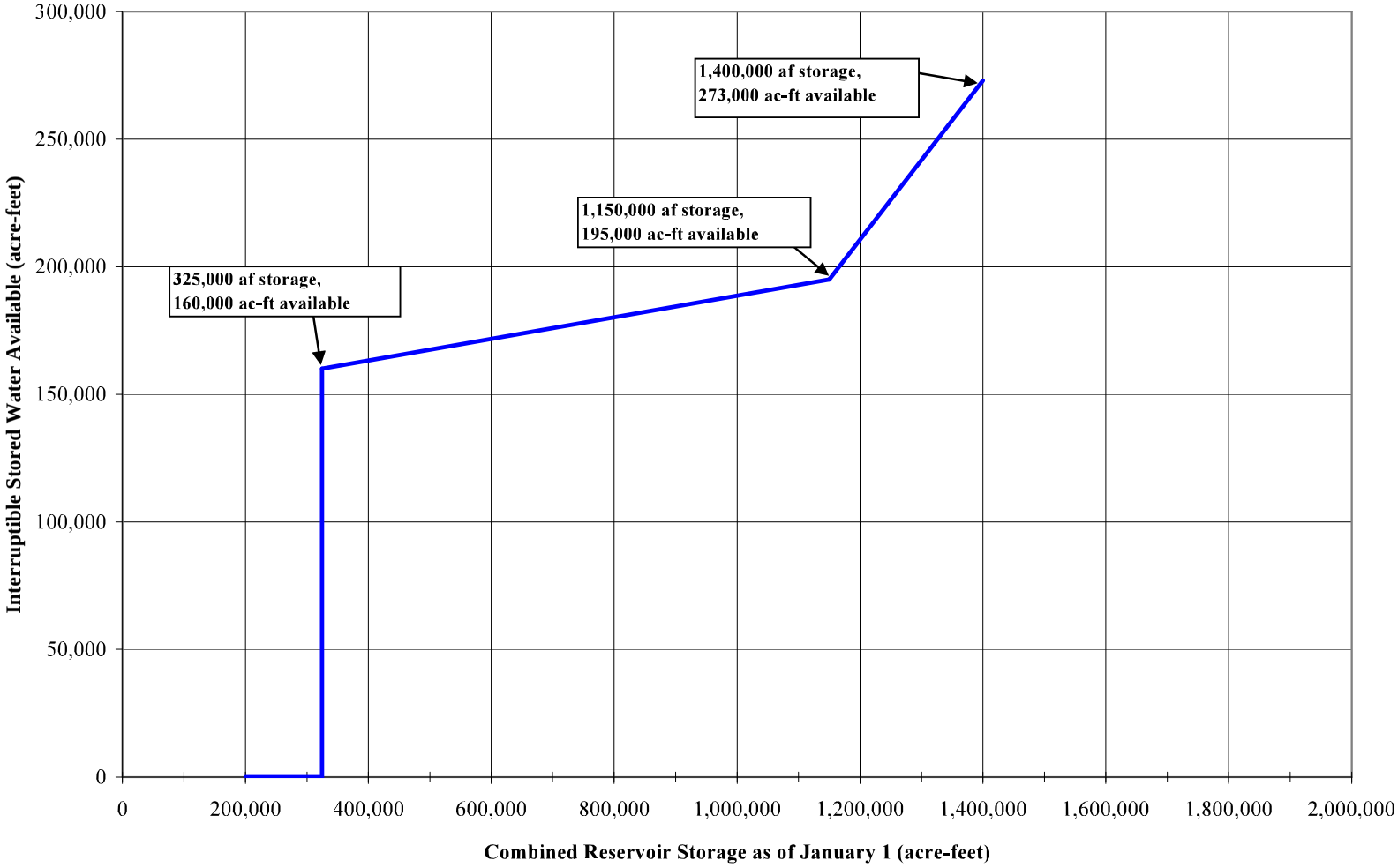
tentatively required to curtail second crop rice, which is cultivated after first crop rice is harvested in July and August. Thus, the curtailment plan has the added advantage that spring rains and runoff may increase water supplies and reduce demand and thereby allow an increase in the estimate of interruptible stored water available for second crop rice. Rice producers could relatively easily increase their second crop acres if they were aware of any increased water supply by June 15.

To achieve the estimated benefits of the management policy, it is necessary for the irrigation operations to reduce their water demands to correspond to reductions in the estimated interruptible stored water supplies, in accordance with the procedures in this WMP or the terms and conditions of contracts between LCRA and stored water users. Close coordination between LCRA and the operations will be needed. Should an operation choose not to reduce the acreage cultivated in response to the projected shortage of interruptible stored water supply, LCRA will only supply that operation with its estimated portion of the reduced interruptible stored water supply. No additional interruptible stored water will be released in that year for that irrigation operation once the diversion limit has been reached.

In addition to the above features, and consistent with state law, LCRA's customers must prepare and adopt a legally enforceable local drought contingency plan, which should include specifics concerning the actions to be taken to comply with LCRA's DMP/DCP regarding the curtailment of interruptible stored water supplies. LCRA staff is available to provide technical assistance with the preparation of required local plans.

FIGURE 4-1

Interruptible Stored Water Available During Curtailment
Based On January 1 Combined Storage in Lakes Buchanan and Travis



b.Irrigation Allocation Among the Irrigation Operations

As provided in Finding 25 of the September 7, 1989 Order of the Texas Water Commission approving LCRA's WMP, "the priority allocation and terms governing the interruption of supply of stored water for Garwood are based upon a contract between Garwood and LCRA."

LCRA has negotiated a contract with Pierce Ranch governing the interruption of the supply of stored water to Pierce Ranch. Interruption of the supply of stored water for other commitments similarly would be governed by contract or LCRA Board resolution.

There are many ways in which interruptible stored water demands may be curtailed through the annual contracts. The two most likely are a gradual curtailment with reductions indexed against beginning of year storage in Lakes Buchanan and Travis; or an abrupt total cutoff policy where the full demands are supplied if the beginning of year storage level in Lakes Buchanan and Travis was above a specific level, otherwise totally stop interruptible stored water sales for the next year.

The largest use for interruptible stored water is rice production. Rice producers must plan their crops for the next season based upon the projected interruptible stored water supply, even though more supply may actually be available in future months. The advantages of the gradual approach of curtailment are that the rice industry could use the water allocated to achieve the greatest benefit. Water could be used in first crop on the hope that conditions in the spring would refill the river and lakes. The disadvantage is that some curtailment would occur when it was not really necessary in years when the critical drought was not repeated. Lakes Buchanan and Travis would refill and spill because the drought ends before conditions become as severe as the critical Drought of Record.

The advantages of the "all or nothing" approach are that there would be more years when the full demands would be met and minor droughts would not affect available supplies. Disadvantages would be that in some years there would be no interruptible stored water and most rice producers would risk substantial or total loss of their crops if sufficient run-of-river water was not available throughout the growing season.

In years when there is not sufficient projected interruptible stored water available to meet all irrigation needs, the interruptible stored water will be allocated to the irrigation operations so that all operations have the same percentage shortage in their total interruptible stored water demand. The calculation of the annual demand of interruptible stored water will be based on a projection of relatively dry weather and low streamflow conditions in the next year.

The allocation of interruptible stored water supply to the individual irrigation operations is discussed above in Section C.3.b. Briefly, allocation of interruptible stored water supply to the individual irrigation operations for the 2003 update of the WMP is according to the following formula:

Interruptible Stored Water Supply = 0.5*Average annual interruptible stored water usage over past 10 years + 0.5*Highest year of interruptible stored water usage within past 10 years.

Using the last ten years of interruptible stored water usage, each irrigation operation was determined to be entitled to the following percentages of interruptible stored water supplies available:

Gulf Coast	.425
Lakeside	.425
Garwood	.063
Pierce Ranch	.088

Based on this allocation, a table of acreage was developed for the three major irrigation operations showing the likely allocation of various amounts of interruptible stored water between first and second rice crop. Pierce Ranch was not included in the table since there is not a reasonably accurate predictive equation for water use at Pierce Ranch. To represent Pierce Ranch's needs, water use and acreage were assumed at 9 and 6 %, respectively, of the combined water use and acreage, respectively, of the other three operations.

c. Irrigation Allocation Within the Irrigation Operations

Because Pierce Ranch has entered into a long-term interruptible stored water contract with LCRA, Pierce Ranch will determine how water will be allocated within its own operation. Within each LCRA irrigation operation, LCRA and its customers, through the advisory committees, will mutually determine which of the following allocation methods to follow:

Volumetric method – The total volume of water available to each operation will be divided by the operation's total recent base history to establish an amount available per acre, not to exceed 5.25 acre-feet. Each customer's actual first crop per acre usage for each landmass will then be subtracted from the per acre farm level availability and the balance, if any, will be made available to the customer for second crop production. Additional water made available due to any customers choosing not to irrigate either first or second crop will be equitably distributed to customers who irrigate other crops within the operation.

Acreage Method – The irrigation operation choosing this method would irrigate first crop acreage, but prior to the initial contracting process, would determine the maximum first crop acreage that could be irrigated with allocated water supplies. The first crop acreage for the particular irrigation operation would be determined by dividing the total water available to the particular irrigation operation by a first crop acre-foot per acre water use duty as agreed upon

between LCRA and the respective advisory committee. Contracted first crop acreage would be limited to this amount and would be made available to individual customers pro rata, based on their recent irrigation history as described below. For irrigation operations using volumetric measurement, any use of water in excess of the first crop acre-feet per acre duty would be subject to a surcharge. Prior to contracting for second crop water, the acreage available for second crop would be determined and contracted for on a pro rata basis, in a manner similar to that used for first crop, including a duty and surcharge. During a curtailment, water would be available for rice only, except at the Gulf Coast irrigation operation, where water would also be available for turf grass. Other supplemental agricultural interruptible demands within an operation would also be considered on a limited basis and only to the extent that water is available within the canal system which is not needed for rice irrigation.

Each customer's average base acreage history is to be determined based upon an averaging period agreed to by the farmer advisory committees. The averaging periods are as follows: Garwood – five (5) years; Gulf Coast – two (2) years; and Lakeside – six (6) years.

At the Lakeside and Garwood irrigation operations, the base acreage history shall be based upon the lands irrigated such that a customer shall not be entitled to irrigate lands in a curtailment year that were not previously irrigated by that customer, unless the current landowner of the land that contributed to the base acreage history grants express written consent, and such consent is provided to LCRA with customer's application. In the event that a customer no longer farms land which has a history of being farmed, that history shall be credited to the current landowner or a successor tenant farmer unless the landowner has granted consent for such base acreage to follow the customer to additional lands as described above.

At the Gulf Coast irrigation operation, the base acreage history shall follow the LCRA customer, and not be restricted to a particular landmass.

Allocation of curtailed interruptible stored water to the various users within the irrigation operation will be based on the amount of irrigated acreage on each landmass. This water use will be determined by accounting for established crop rotations during the defined averaging period and will include only those years during that same period that water was used on the landmass. Irrigation operations personnel will maintain this information for each irrigated landmass. Separate base acreage histories will be maintained for rice and turf grass. During periods of curtailment, irrigation customer contracts will be limited to the base acreage as determined by the method described above and any reductions necessary will be made from this base acreage.

d.Drought More Severe Than Drought of Record

In the event that the LCRA Board of Directors declares a drought to be more severe than the Drought of Record, limits would be placed on first crop production. If that occurred, the

following key elements of limiting first crop would stand:

- On Jan. 1 of each consecutive critical drought year, the projected run-of-river flow and interruptible stored water would be calculated and the water volume available to each operation would be projected.

- Each irrigation operation would decide with LCRA which allocation method to use, either the maximum acreage plan or the maximum volume plan.

- The application and contracting process would have a final deadline of February 15th of each year of the drought period that is more critical than the Drought of Record.

e. Termination of Water Allocation Policy

The water allocation model and water allocation plan for agricultural irrigation will terminate when the combined stored volume of Lakes Buchanan and Travis exceeds 1.4 million acre-feet.

The first crop water allocation process described here would terminate when LCRA reallocates interruptible stored water to the irrigation operations after the Board declares the drought worse than the Drought of Record to be over.

f. Procedures for Water Use Accounting

LCRA will employ its ordinary and standard water measurement procedures to account for water used during curtailment periods. During the implementation of the water allocation policies, LCRA will notify each customer of the amount of acreage for which LCRA will provide water. LCRA staff will perform actual field surveys to verify that each customer was not planting more than the allocated acreage. Customers planting excess acreage will be required to prevent irrigation waters from entering excess acreage through construction of appropriate outside levees enclosing only permitted acreage.

g. Transfer of Water Among Individual Users

Water allocation among individual users within individual operations is not a property right and there are no procedures or policies for individual users to obtain that right. All waters available during the critical drought would be allocated on a pro-rata basis to the landmasses contracted to irrigate during that critical drought year and either the maximum volume or maximum acreage for that irrigation operation would be consistent with that plan.

h. Variances

Within each LCRA irrigation operation, the LCRA General Manager or his designee is authorized, after consultation with the operation's advisory committee, to move and adjust the

averaging period for base acreages within farm service agency farms units to account for established field rotations and contemporary changes in management practices so long as such adjustments do not result in a net increase in acreage history.

i. Enforcement

All LCRA interruptible stored water contracts include a provision requiring that, in cases of a shortage of water resulting from drought, the water be distributed in accordance with LCRA's WMP and Texas Water Code section 11.039.

Interruptible stored water customers within the irrigation operations failing to comply with the pro-rata allocation requirements (curtailment plan) shall be subject to a civil action to enjoin the non-compliant customers for breach of contract. Additionally, the use of water in excess of the customer's per acre duty as described in section C.3.c above is subject to a surcharge.

3. Curtailment of Interruptible Stored Water Demands for Other than Irrigation Operations

LCRA will limit additional sales or commitments of interruptible stored water, other than for the four irrigation operations' Conservation Base acreage or other priority allocation, based on the combined volume of water in Lakes Buchanan and Travis at certain times of the year.

The supply of interruptible stored water made available outside the irrigation operations for the January through June period will be based on the January 1 storage levels in Lakes Buchanan and Travis taken separately. The supply for the July through December period for such sales will be based on the minimum of the maximum storage levels in April, May, and June in Lakes Buchanan and Travis, taken separately. No such sales will be allowed if either lake is less than 94% of its maximum conservation capacity. If both lakes are at their maximum conservation capacity as calculated above for either six-month period, then such interruptible stored water sales will be limited to a total of 30,000 acre-feet for that year. For projected lake volumes between 94% and 100% of conservation capacity, such interruptible stored water sales would be limited proportionately, based on the storage reservoir with the lowest percentage of capacity as calculated above.

4. Curtailment of Firm Water Demands

LCRA is required by TCEQ and the Texas Water Code to follow water supply allocation procedures to insure that there is no shortage or deficiency of stored water to meet firm demands during a repeat of the Drought of Record. Given the relatively small demand on firm water supplies at present, the possibility of a firm water shortage occurring is remote for the foreseeable future.

LCRA cannot determine with absolute certainty whether a particular drought event will be more or less severe than the Drought of Record. Therefore, LCRA will engage its customers in a public education campaign and seek voluntary reduction of firm demands from its firm

customers in the early stages of a drought, as more specifically described below.

LCRA cannot invoke mandatory curtailments of firm water demand unless a particular drought event is determined to be more severe than the Drought of Record or some other water emergency that drastically reduces the available firm water supply. LCRA Water Supply Planning staff has developed a simplified "drought monitoring procedure" for identifying a drought worse than the Drought of Record for the Highland Lakes watershed. Historical inflow data for the contributing watershed of the Highland Lakes were used in the development of this procedure.

a. Policy Recommendation for Firm Water Demand Curtailment

1) Recommendation 1: LCRA encourages its firm water customers to implement long-term water conservation measures year-round to meet the goals included in their water conservation plans. LCRA will implement a public awareness campaign on water use and conservation.

2) Recommendation 2: Whenever total storage in Lakes Buchanan and Travis is at or below 1.4 million acre-feet, LCRA requests its firm water customers implement the voluntary drought restrictions contained in their drought contingency plans, with a target reduction goal of 5 percent (5%).

3) Recommendation 3: Whenever the total storage in Lakes Buchanan and Travis is at or below 900,000 acre-feet, LCRA will ask all its firm water customers to implement mandatory water use reduction measures in their Drought Contingency Plans, with a target reduction goal of ten to twenty percent (10 – 20%). LCRA will also begin discussions with firm water customers to develop a specific stored water curtailment plan, to be approved by the LCRA Board and TCEQ.

4) Recommendation 4: A mandatory pro rata curtailment of a minimum of twenty percent (20%) of LCRA's firm water customers' demands pursuant to Texas Water Code §11.039 will be implemented when the LCRA Board determines that the river system is experiencing a drought more severe than the Drought of Record. If lake levels continue to drop below 600,000 acre-feet, the mandatory pro rata curtailment percentage may be increased as determined by the LCRA Board LCRA will curtail and distribute the available supply of firm water among all of its firm water supply customers on a pro rata basis according to the amount of firm water to which they are legally entitled under the terms of their contract and consistent with the curtailment plan approved by the LCRA Board and TCEQ. All uses of interruptible stored water will be totally cutoff prior to and during any mandatory pro rata curtailment of firm stored water supplies.

In addition to the above features, this curtailment policy for firm water demands, LCRA will require each of its firm water customers to prepare and adopt a legally enforceable local drought contingency plan that specifies the actions to be taken to comply with this DMP/DCP regarding

the curtailment of firm supplies. Such plans should be developed pursuant to LCRA guidelines and submitted for LCRA review and acceptance within a reasonable time.

b. Monitoring and Enforcement

LCRA will monitor customers' compliance with the required demand reduction goals and will take enforcement action as necessary against noncompliant customers. Monitoring and enforcement of water-use restrictions at the end-user level generally will be the customers' responsibility.

c. Variances

LCRA's General Manager or his designee may, in writing, grant a temporary variance to the pro rata water allocation requirement of this DMP/DCP if it is determined that failure to grant such a variance would cause an emergency condition adversely affecting the public health, welfare or safety and if one or more of the following conditions are met:

- Compliance with the plan cannot be technically accomplished during the duration of the water supply shortage or other condition for which the plan is in effect.

- Alternative methods can be implemented that will achieve the same level of reduction in water use.

Persons requesting an exemption from the provisions of the DMP/DCP shall file a petition for variance with the LCRA General Manager or his designee within five (5) days after pro rata allocation has been invoked. All petitions for variances shall be reviewed by the LCRA Board of Directors and shall include the following:

- Name and address of the petitioner(s).

- Detailed statement with supporting data and information as to how the pro rata allocation of water under the policies and procedures established in the LCRA DMP/DCP adversely affects the petitioner or what damage or harm will occur to the petitioner or others if the petitioner complies with the pro rata reduction requirements of the plan.

- Description of the relief requested.

- Period of time for which the variance is sought.

- Alternative measures the petitioner is taking or proposes to take to meet the intent of the plan and the compliance date.

- Other pertinent information.

Variances granted by the LCRA Board of Directors shall be subject to the following conditions, unless waived or modified by the LCRA Board of Directors:

- Variances shall include a timetable for compliance.
- Variances granted shall expire when pro-rata reduction requirements are no longer in effect, unless the petitioner has failed to meet specified requirements.

No variance shall be retroactive or otherwise justify any violation of the LCRA DMP/DCP occurring prior to the issuance of the variance(s).

d.Notification of TCEQ Executive Director

The LCRA General Manager or his designee will notify the TCEQ Executive Director within five (5) business days of implementation of any mandatory provisions in the DMP/DCP.

5. Declaration and Cancellation of a Drought More Severe Than the Drought of Record

The LCRA Board of Directors will declare a drought worse than the drought of record when the following three conditions are simultaneously met: (a) drought at least 24 consecutive months (24 months since both Lakes Buchanan and Travis were at their maximum allowable water conservation storage levels); and (b) the cumulative inflow deficit since the beginning of the drought exceeds the envelope curve for cumulative inflow deficits by at least 5% for six consecutive months; and (c) the combined storage in Lakes Buchanan and Travis is less than 600,000 acre-feet.

Curtailments of interruptible stored water due solely to the declaration of a drought worse than the drought of record of duration less than 36 months is only effective on the following January 1 or July 31, whichever occurs first following the declaration by the LCRA Board of Directors. Droughts more than 36 months in length have no restrictions as to when supply reductions can be implemented.

The LCRA Board of Directors will cancel such a declaration if any of the following conditions are met: (a) the cumulative inflow deficit since the beginning of the drought is less than the envelope curve for cumulative inflow deficits by at least 5% for six consecutive months; or (b) the combined storage in Lakes Buchanan and Travis is greater than 1.4 million acre-feet of water, which is simply the recommended threshold for curtailment of interruptible stored water during a repetition of the drought of record. Prior to declaring a drought worse than the drought of record, LCRA will re-evaluate this threshold level to determine if a more accurate conservation storage level in lieu of 1.4 million acre-feet can be determined.

6. Public Notice

LCRA will carry out a public information campaign that is appropriate to the particular curtailment contemplated. This could include some or all of the following efforts: (1) news releases, (2) news updates to area media, (3) interviews with local radio and television stations, (4) responses to requests for information, (5) distribution of water conservation education materials, (6) advertisements in local newspapers to inform the public about current water supply and usage and our water management planning strategies, (7) improvements to LCRA's automated telephone message system to provide information on lake levels, and (8) public service announcements on local radio stations.

7. Impacts of the Recommended Management Policy

a. Firm Water Demands and Supplies

All projected year 2010 demands for firm water are fully satisfied under these simulated critical drought conditions. The largest firm water demand is for the City of Austin. The majority of Austin's projected annual demand of 201,400 acre-feet is met from run-of-river flows diverted under its senior water rights.

Approximately 65% of the demand during the 1947-1956 critical drought years is estimated to be supplied by these flows with the remainder supplied by firm stored water.

b. Interruptible Stored Water Demands and Supplies

With the increase in projected firm water needs for 2010, there is less water for interruptible stored water supply from Lakes Buchanan and Travis since firm water needs take priority over interruptible stored water uses. To avoid shortages to firm water users, it is recommended that interruptible stored water supplies from Lakes Buchanan and Travis be reduced during the critical drought years from what is available under the WMP approved in 1999. This reduction in supplies primarily impacts irrigation.

Under the recommended management policy, all interruptible stored water available during a repetition of the Drought of Record is used by the four downstream irrigation operations, except for that portion committed to maintaining instream flows and estuarine freshwater inflows.

With the curtailment threshold raised from the current value of 1.1 to 1.4 million acre-feet, the projected first crop demand of 83,700 acres will be fully met under the proposed changes, as it is under the WMP approved in 1999. However, there will be a substantial reduction in the irrigation acreage supplied for second crop under the proposed curtailment policy. The WMP approved in 1999 provides sufficient water to irrigate an average of 56,500 acres of second crop each year during a repetition of the Drought of Record. The proposed plan would provide water only for an average of 32,700 acres of second crop under the same drought conditions. Approximately 92 percent (21,800 acres) of this decrease in acreage is due to the increased

projected municipal demands, with the remainder (2,000 acres) due to the proposed change in environmental releases for estuarine inflows. In spite of this reduction, irrigators would use, during a repeat of the Drought of Record, an average of 168,400 acre-feet annually, or 75 percent of all interruptible stored water used for irrigation and environmental protection.

The simulated acreage cultivated in first and second crops are given for all four operations combined and individually in Figures 4-2 thru 4-6, at the end of this Chapter. As noted previously, however, the actual interruptible stored water curtailments may differ from the values reflected by the cultivated acreage as shown in this simulation, depending on the facts as they then exist and the terms and conditions of the contracts between LCRA and users.

The recommendation concerning instream flows reflects the philosophy adopted in the initial WMP and continuation in the amendments to the WMP that instream flows be curtailed whenever there is a curtailment of interruptible stored water to the four major irrigation operations. Since the curtailment threshold for irrigation supplies is recommended to rise from 1.1 to 1.4 million acre-feet, LCRA has proposed that the curtailment storage threshold for instream flows also be revised upwards the same amount. By synchronizing these curtailment trigger points, the WMP reflects reduced supplies available to maintain instream flows, including both supplies released for irrigation that simultaneously benefit instream flows as well supplies dedicated to maintain streamflows for ecological benefit.

The recommended intermediate estuarine inflow policy would provide for releases of stored water from Lakes Buchanan and Travis of up to 256,700 acre-feet (150 percent of Critical FIN) annually to Matagorda Bay in years whenever the combined storage in Lakes Buchanan and Travis on January 1 is between 1.1 and 1.7 million acre-feet. By increasing the releases of stored water from Lakes Buchanan and Travis in years when the January 1 storage is within this given range, the estuarine ecosystem receives more freshwater inflows during moderate droughts than it would be under the present WMP.

The WMP, with the proposed revisions herein, will have essentially the same total stored water commitments for environmental purposes as currently provided in the present WMP. During a repetition of the DOR, the present WMP would provide an annual average of 56,000 acre-feet for both instream flows and estuarine inflows. With the proposed changes, the WMP would provide about 56,500 acre-feet annually during the same period and for the same purposes.

The proposed increase in the firm water allocated for environmental purposes from about 16,000 to 33,400 acre-feet is required to properly account for the stored water dedicated for environmental purposes. Whenever irrigation interruptible stored water supplies are curtailed, stored water used for environmental protection has be accounted as firm water since irrigation has priority use of available interruptible stored water supplies. Since the proposed storage threshold for curtailment of irrigation supplies is significantly greater than the present threshold, there will be more years in the DOR when irrigation supplies are curtailed, hence increasing the environmental flows that have to be assigned to firm water supplies.

The proposed additional 17,400 acre-feet firm water commitment for environmental purposes would be provided from the presently uncommitted firm yield of 60,952 acre-feet. The remaining firm yield available after this allocation would be 43,462 acre-feet. This amount is in addition to 50,000 acre-feet reserved by the Board for future uses. The total proposed firm water allocation of 33,400 acre-feet for environmental purposes represents 8 percent of the total firm supply from Lakes Buchanan and Travis.

c. Lake Storage Levels

For the simulated repetition of the Drought of Record, the total combined storage of Lakes Buchanan and Travis was reduced to very low levels in the worst drought years (Figure 4-8), even with the partial curtailment of interruptible stored water supplies. Approximately 200,000 acre-feet of stored water remains in Lakes Travis and Buchanan combined at the lowest storage content. The simulated lake water surface elevations and storage levels are given in Figures 4-9 and 4-10, for Lakes Buchanan and Travis, respectively. The minimum lake water surface levels during the simulation period are about 960 feet msl on Lake Buchanan and 578 feet msl on Lake Travis. The average lake water surface elevations (for the repetition of the 1941-1965 period hydrology) are projected to be 1005 feet msl on Lake Buchanan, and 657 feet msl on Lake Travis.

The simulated minimum water levels in Lakes Travis and Buchanan are lower than the historical low levels of 614 feet and 983 feet, respectively. The greater drawdown on the lakes in the simulated operation is largely because of greater water demands and lower storable inflows than occurred historically. The projected year 2010 water demands are significantly greater than those that occurred historically in the 1941-1965 period. Firm water demands during the actual drought of record were only a small fraction of those projected by year 2010. Additionally, the rice producers only cultivated one crop of rice prior to about 1963. The current practice of producing two crops each year has increased the water demands of irrigation over those of the 1947-1956 critical drought period.

The second factor causing the simulated storage levels to be lower than historical levels is a difference in the storable inflows. The simulated operation uses historical inflows adjusted for any flow reductions caused by water diverted for upstream water rights, particularly major reservoirs <u>including</u> O. H. Ivie Reservoir. Most of the large reservoirs upstream of the Highland Lakes were not in operation during the critical drought period. During any repetition of the Drought of Record, these upstream reservoirs would likely significantly reduce storable inflows.

d. Flows in the Colorado River

For a repetition of the hydrologic conditions in the 1947-1956 critical drought years, the estimated average flow of the Colorado River at Bay City is about 471,000 acre-feet annually with the projected 2010 demands. For a repetition of the 1941-1965 period, the simulated annual flow at Bay City averages 1.22 million acre-feet. Of this total, a portion of the flow consists of dedicated releases of stored water from Lakes Buchanan and Travis to meet the Target and

Critical freshwater inflow needs and a portion consists of stored water released to meet critical instream flow needs at several upstream locations.

The dedicated firm and interruptible stored water releases for the 1947-1956 critical period amount to an average of 56,500 acre-feet per year of which 36,000 acre-feet is for maintaining instream flows.

F. Annual Implementation of Drought Management and Drought Contingency Plans

1. Annual Review and Revisions

As part of the WMP, the DMP/DCP is subject to review each year. The DMP/DCP may be revised at any time subject to approval by the LCRA Board and the TCEQ. Changing water supply and demand conditions on the lower Colorado River will be reflected as necessary in future amendments to the WMP.

2. Administration

The curtailment of interruptible stored water supply will occur through the annual contracting process in November through January of each year. The curtailment of firm water will depend on storage levels and will be monitored continuously. Curtailment of interruptible stored water supply for Garwood and other entities supplied pursuant to long-term contracts will be accomplished pursuant to the terms of those contracts.

LCRA will monitor customer compliance with the required demand reduction goals and take enforcement action as necessary against noncompliant customers. Monitoring and enforcement of water use restrictions at the end-user level generally will be the customer's responsibility. At present, LCRA's ability to enforce curtailments of firm water demands is uncertain and may be limited to taking civil action to enjoin a non-compliant customer for breach of contract.

Figure 4-2: Simulated Irrigated Acreage - 4 Irrigation Operations Combined

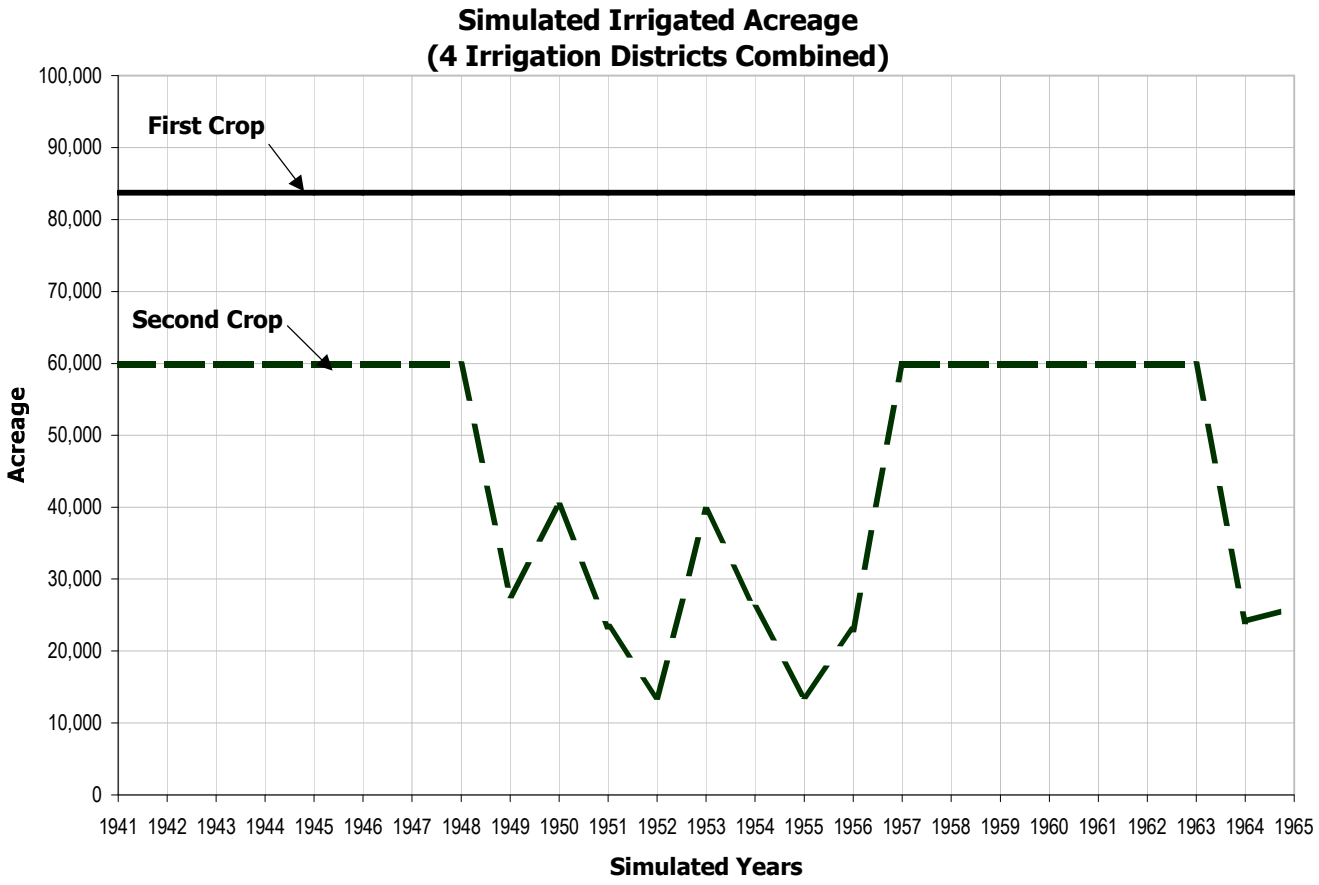


Figure 4-3: Simulated Irrigated Acreage - Gulf Coast

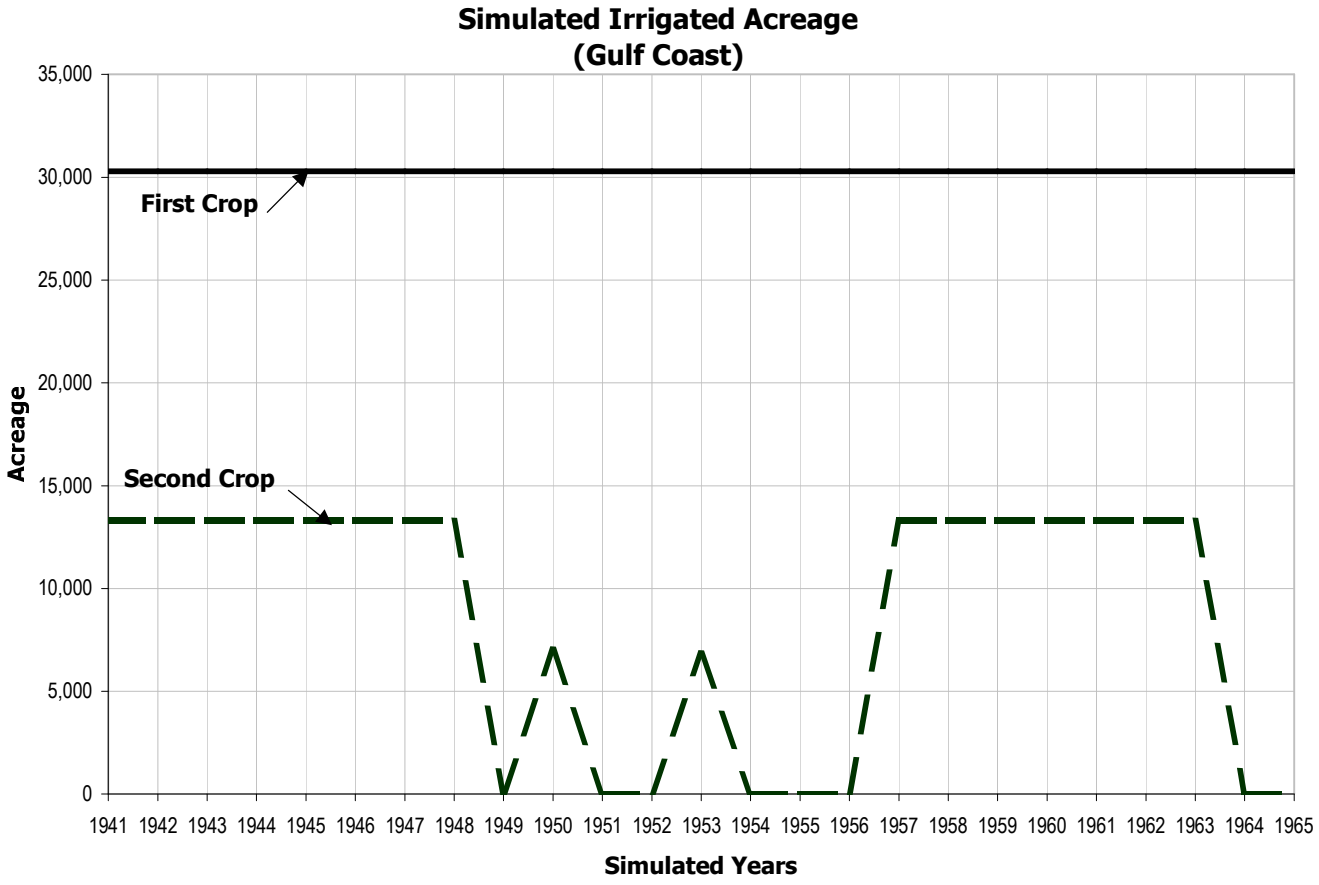


Figure 4-4: Simulated Irrigated Acreage - Lakeside

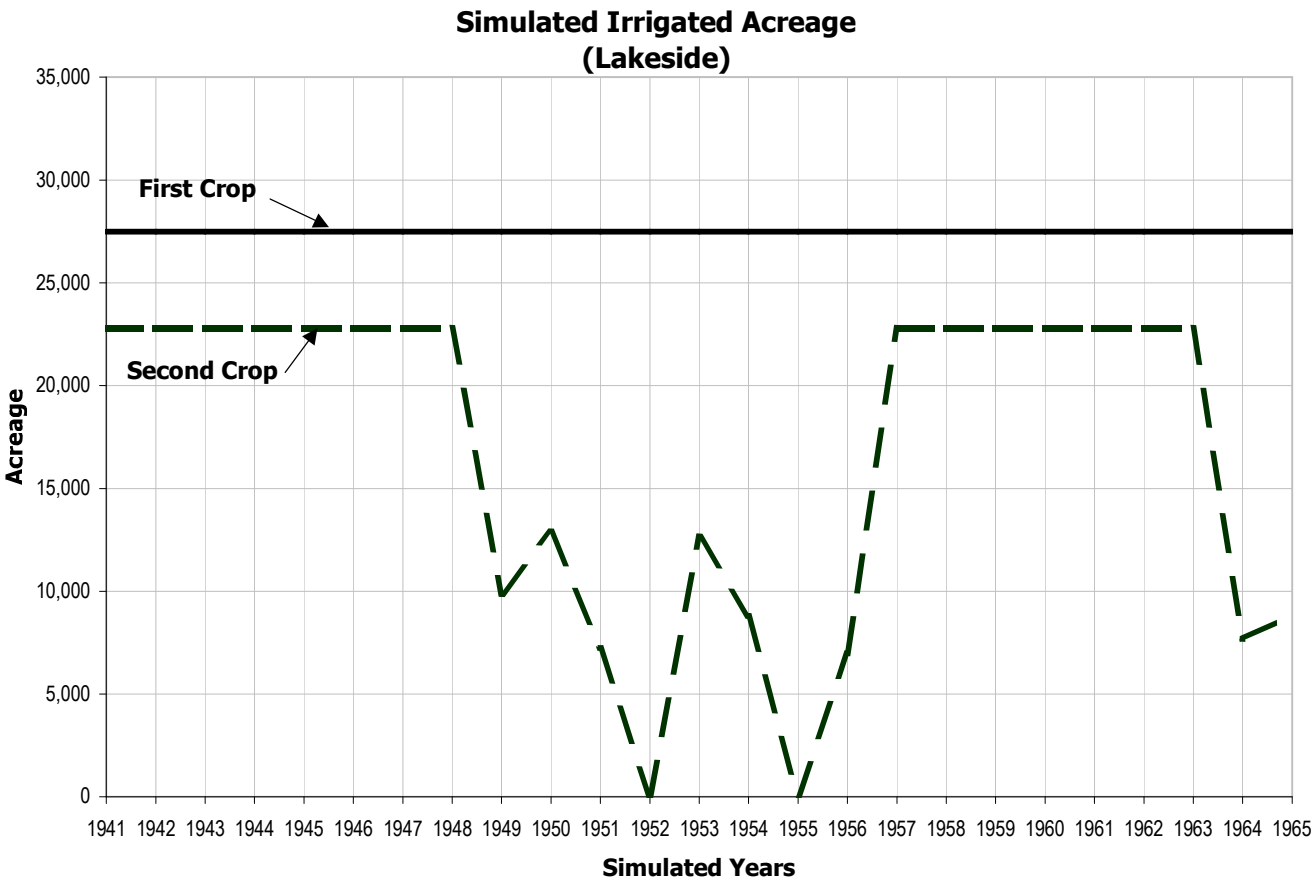


Figure 4-5: Simulated Irrigated Acreage - Garwood

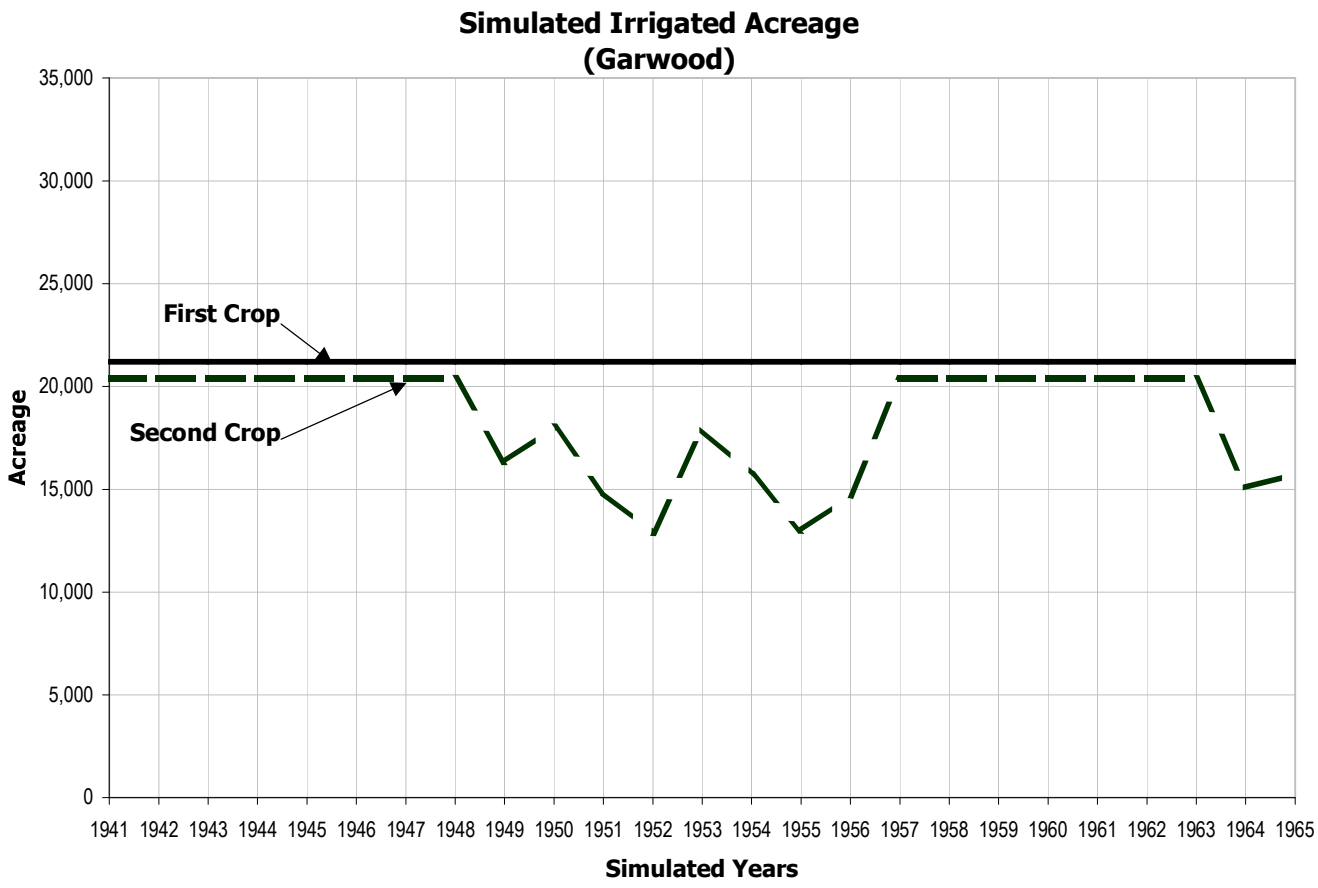


Figure 4-6: Simulated Irrigated Acreage - Pierce Ranch

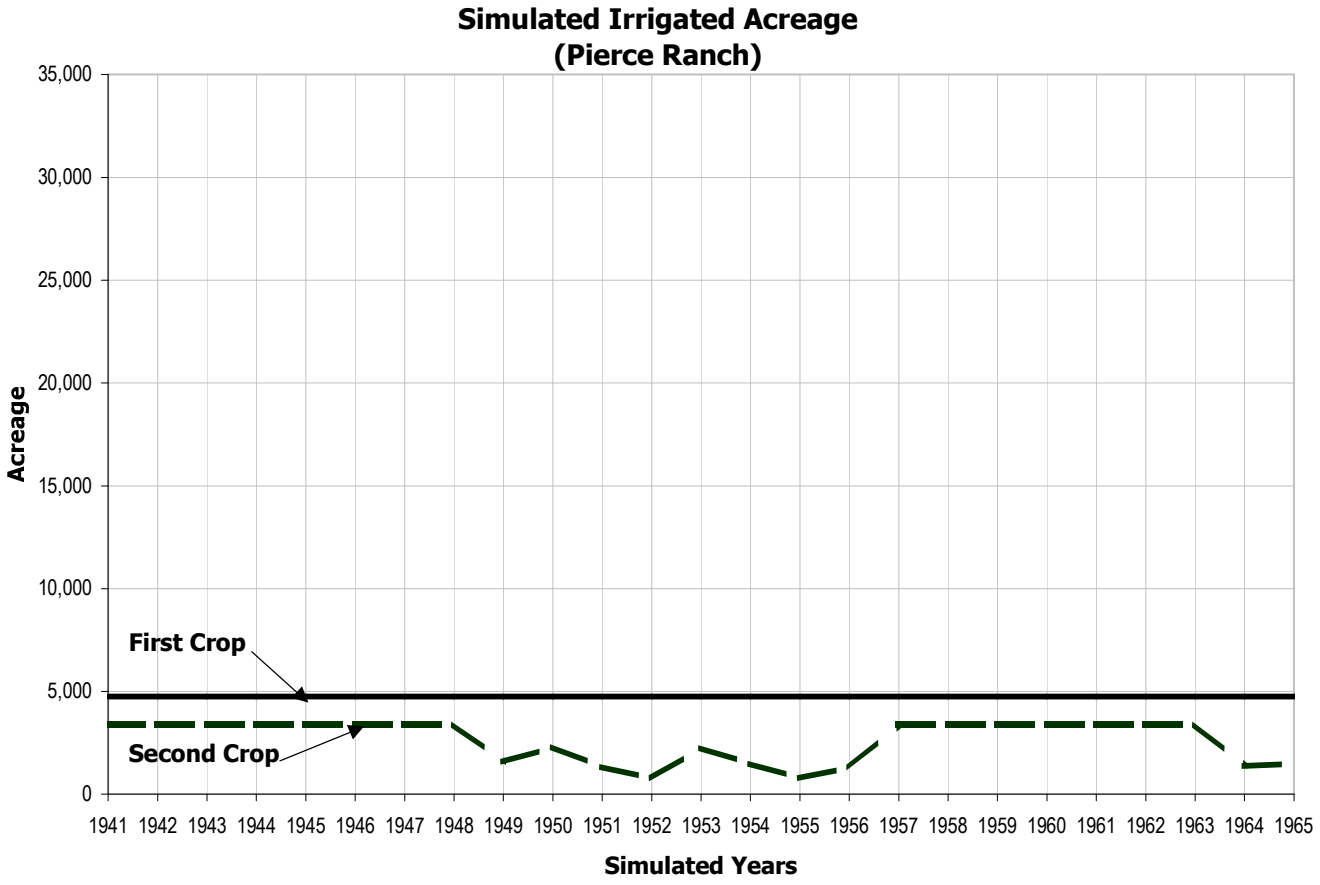


Figure 4-7: Simulated Travis and Buchanan Storage Condition

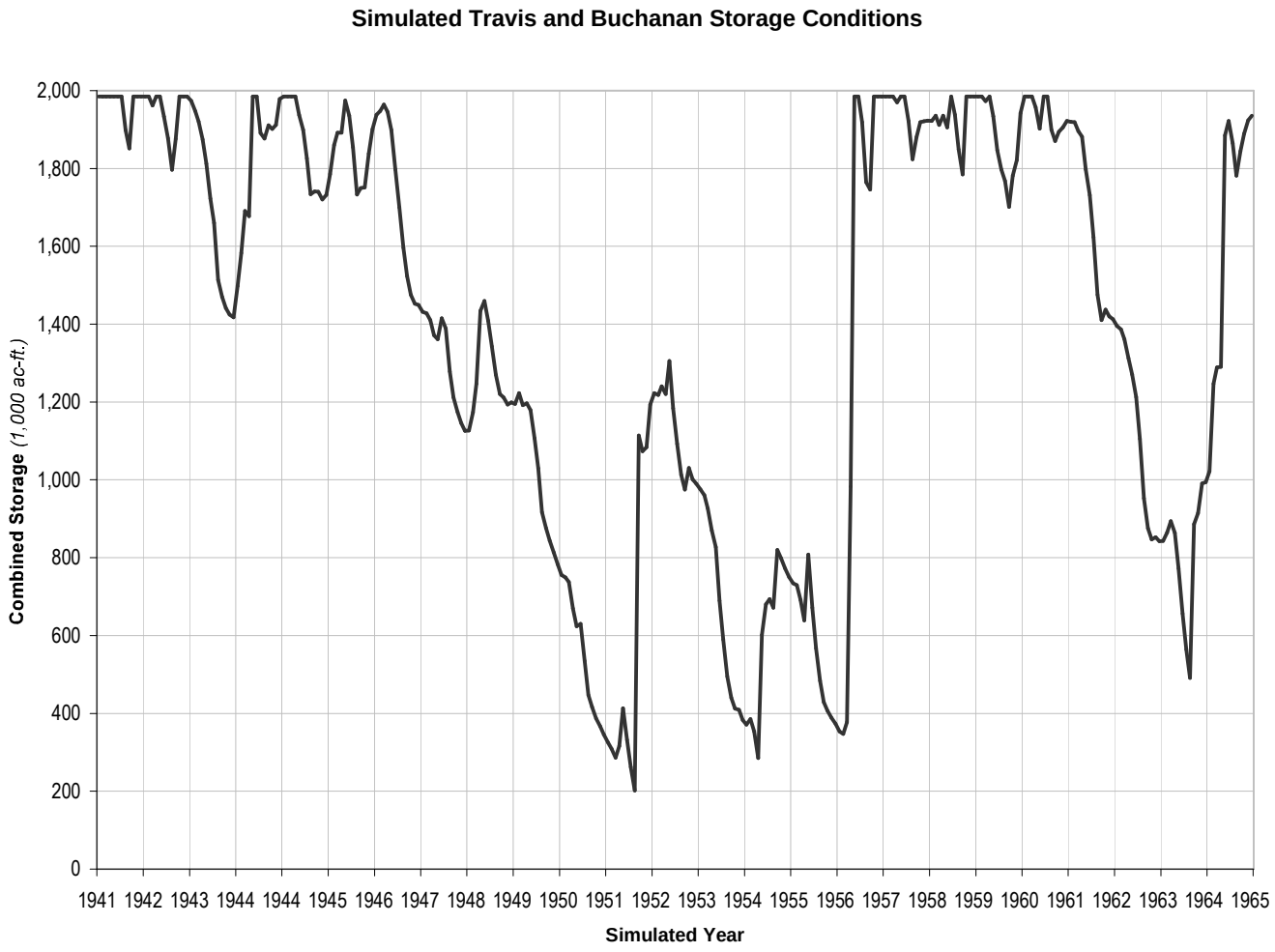


Figure 4-8: Lake Buchanan Simulated Elevation and Storage

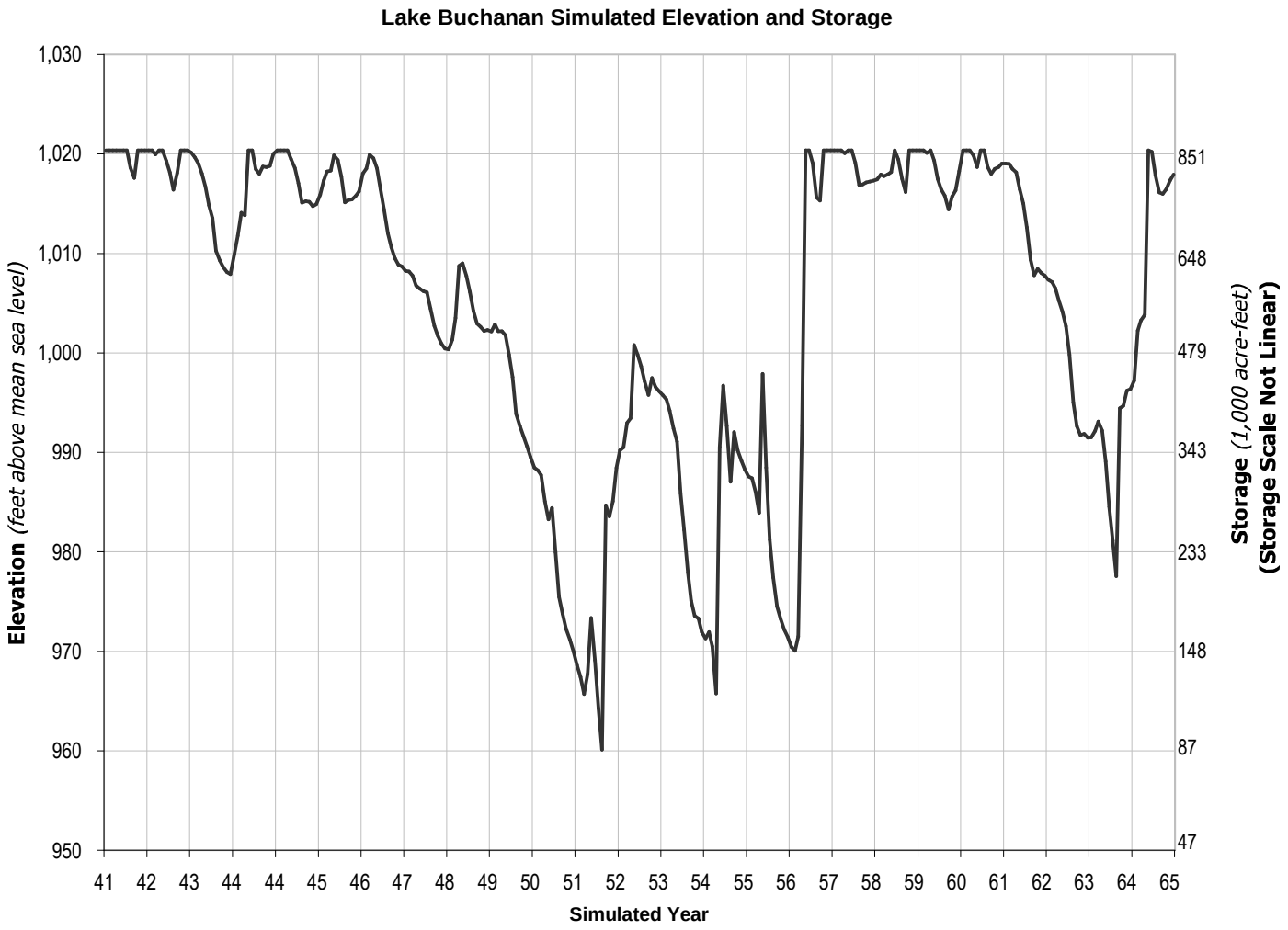
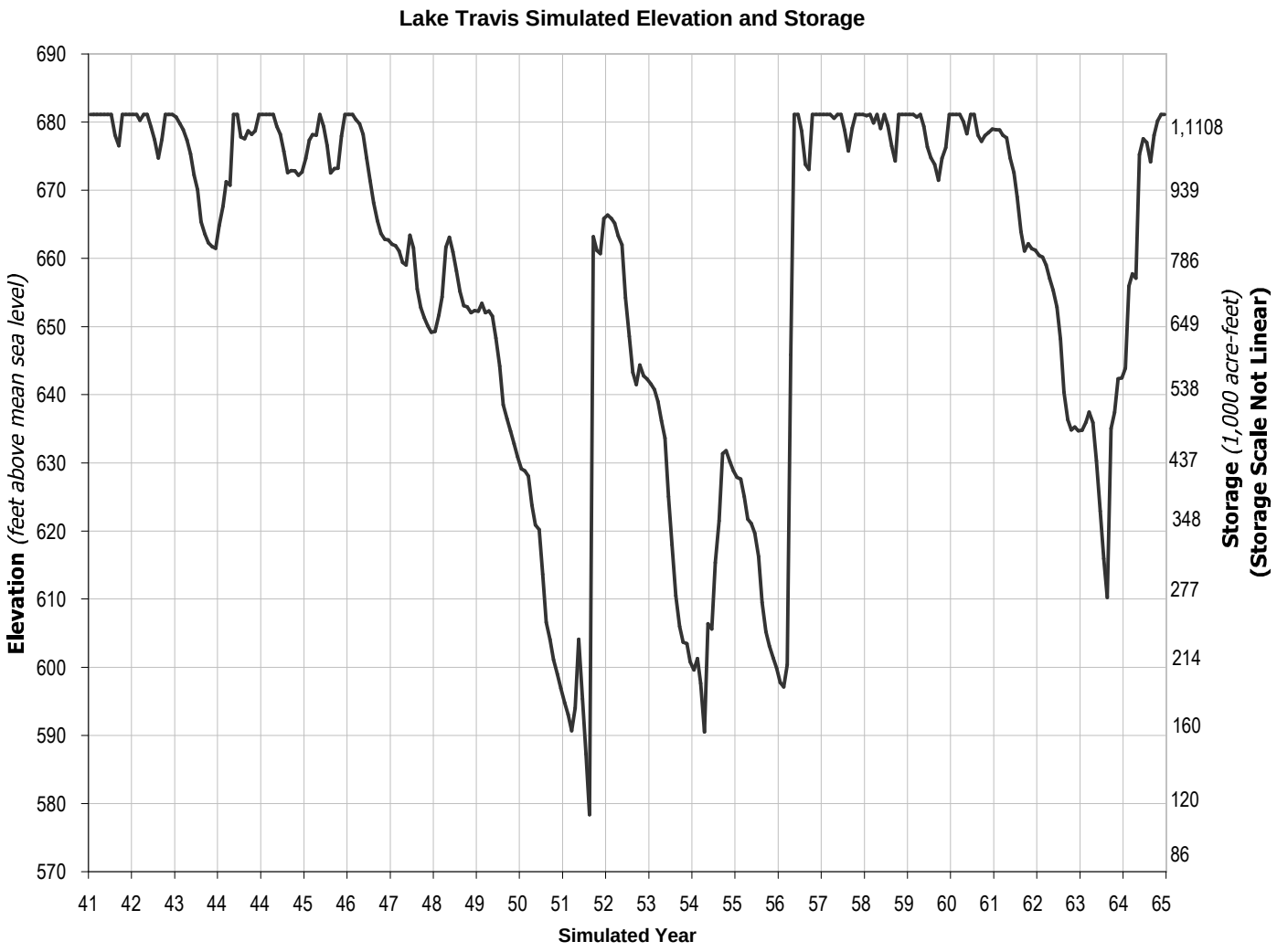


Figure 4-9: Lake Travis Simulated Elevation and Storage



TEXAS WATER COMMISSION

IN RE: CONSIDERATION OF THE LOWER COLORADO RIVER AUTHORITY'S WATER MANAGEMENT PLAN AND AMENDMENTS TO CERTIFICATES OF ADJUDICATION NOS. 14-5478 AND 14-5482	§ § § § § §	BEFORE THE TEXAS WATER COMMISSION

ORDER APPROVING LOWER COLORADO RIVER AUTHORITY'S WATER MANAGEMENT PLAN AND AMENDING CERTIFICATES OF ADJUDICATION NOS. 14-5478 AND 14-5482

On the 7th day of September, 1989, the Texas Water Commission ("Commission") held a public hearing to consider the Lower Colorado River Authority's Water Management Plan and applications to amend Certificates of Adjudication Nos. 14-5478 and 14-5482. At the hearing, the following were named as parties: the Lower Colorado River Authority; the Texas Parks and Wildlife Department; the City of Austin; the Garwood Irrigation Company; the Sierra Club, Lone Star Chapter; the Texas Farm Bureau; the Matagorda County Water Council; Houston Lighting and Power Company as Project Manager for the South Texas Project; Clear, Clean Colorado River Association; Pierce Ranch; the Village of Lakeway; the Executive Director of the Texas Water Commission; and the Public Interest Counsel of the Texas Water Commission. Having considered the evidence and arguments presented, the Commission makes the following Findings of Fact and Conclusions of Law:

FINDINGS OF FACT

1. Notice of the adjudicative public hearing was published on July 26, 1989, in the Blanco County News, Austin American-Statesman and the Colorado County Citizen, newspapers regularly published and generally circulated in Blanco, Travis and Colorado Counties, Texas, respectively; on July 27, 1989, in the San Saba News and Star, Llano News, Highlander and the Bay City Daily, newspapers regularly published and generally circulated in San Saba, Llano, Burnet, and Matagorda Counties, Texas, respectively; on July 28, 1989, in the Fayette County Record, a newspaper regularly published and generally circulated in Fayette County, Texas; on July 29, 1989, in the Wharton Journal-Spectator, a newspaper regularly published and generally circulated in Wharton County, Texas, and on July 31, 1989 in the Bastrop Advisor, a newspaper regularly published and generally circulated in Bastrop County, Texas, the only counties in which persons reside who may be affected by action taken as a result of the hearing. Said notice was published not less than thirty days before the date of the hearing.

2. On July 26, 1989, notice of the public hearing was sent by first-class mail to persons who may be affected by action taken as a result of the hearing and to each person as required by law.

3. The Lower Colorado River Authority (LCRA) is requesting approval of its Water Management Plan for the Lower Colorado River, Colorado River Basin in accordance with the Court's Final Judgment and Decree entered in Cause No. 115,414 A-1, 264th Judicial District, In Re: The Exceptions of the Lower Colorado River Authority and the City of Austin to the Adjudication of Water Rights in the Lower Colorado River Segment of the Colorado River Basin, and is further requesting approval of amendments to Certificates of Adjudication Nos. 14-5478 and 14-5482 to authorize LCRA to divert, release and use the water in Lakes Buchanan and Travis for additional beneficial uses including domestic, recreation, instream flow and bays/estuary purposes.

4. LCRA's Water Management Plan consists of two volumes. Volume I, Policies and Operations, describes the issues and conflicts in the demands on the Colorado River system and lays out the policies and management actions LCRA will use to accommodate the variety of demands on the system. Volume II, Technical Report, describes the models and data sources and the process used for the determination of the Combined Firm Yield and the Annual Rule Curve methodology. Volume II includes a set of Appendices consisting of the Court's Final Judgment and Decree, and the detailed data used to support the recommendations and conclusions discussed in Volumes I and II.

5. The Highland Lakes Reservoirs are operated by LCRA as a system for flood control and water supply. Mansfield Dam is the only structure with a dedicated flood pool and is operated during flooding according to flood-control regulations as published in the Code of Federal Regulations and under the supervision of the U.S. Corps of Engineers.

6. LCRA has a remote data acquisition system referred to as "Hydromet." The Hydromet allows for remote interrogation of a networked system of twenty-one self-reporting rainfall gages, twenty-two remotely monitored streamflow gages and six reservoir elevation gages. Twenty of the streamflow gages also gather rainfall information, giving a total of forty-one rainfall sites. The network is polled each hour, and all data is verified and stored in a real-time data base on a central computer system. Communications are a combination of microwave and UHF radio. The relational data provided by the Hydromet monitors flows above and below the lakes.

7. LCRA has a central computer system that is composed of two Digital Equipment Corporation MicroVAX II mini computers, one

of which is designated as an operations system located at the LCRA System Operations Control Center, and the other designated as a development system located at the Water Resources office. Real time data is logged and maintained on an on-line historical data base for one year. This is available for access by operations models, historical analyses, or other needs.

8. LCRA has developed several hydrologic models that are models used for routine operations of the system. Each model was developed to meet specific operational needs. The Daily Operations Model, analyzes the downstream inflow and demands by accessing streamflow data, totalling demands, and making multiple computer runs of the Model. The Flood Management Model is a user oriented operation tool which accesses real-time data and routes flood flows through the Highland Lakes. The Storage Projection Model uses historical inflow data to estimate the reliability of reservoir system storage subject to storage conditions and water demands.

9. The Daily Allocation Model will determine the extent to which releases from storage are diverted. It will perform a water balance every twenty-four hours at each river gage below Tom Miller Dam, and will allocate the natural flow of the river (whether or not it originated upstream or downstream of the lakes) to major water rights holders to the extent it is available. The remaining portion, if any, of each diversion is assumed to have been from water released from storage. Each amount is then totaled for the week, month and year to determine the total demand on storage.

10. Daily Operations are a joint effort between the System Operations Control Center (SOCC), Hydro Operations personnel located at the dams, and Water Operations personnel located at the Central Office complex. Water Operations personnel determine the required release by contacting downstream customers, operating the Daily Operations Model, and posting the daily release schedule. The SOCC then determines the optimum time and during the day to release the water based on the daily power peak demand, and orders the hydro generation units to begin and end at the necessary times. Hydro Operations personnel at each dam determine which unit to run at each dam.

11. The standard operating levels for the Highland Lakes are: Lake Buchanan, 1020.35 feet; Inks Lake, 887.30 +/- 0.4; Lake LBJ, 824.70 +/- 0.3; Lake Marble Falls, 736.60 +/- 0.4; Lake Travis, 681.00; and Lake Austin, 492.30 +/- 0.5. All levels are referenced to mean sea level.

12. The U. S. Corps of Engineers is evaluating potential flood damages to areas both upstream and downstream of Mansfield

Dam. LCRA is cooperating in this study. The Corps is also performing a reconnaissance study of possible additional flood control and water supply reservoirs. LCRA is cooperating in this study as well.

13. The Highland Lakes System consists of Lakes Buchanan, Inks, LBJ, Marble Falls, Travis and Austin.

14. LCRA's water rights for Lakes Buchanan, Inks, LBJ, Marble Falls and Travis are set forth in Certificates of Adjudication Nos. 14-5478, 14-5479, 14-5480, 14-5481 and 14-5482. LCRA operates Tom Miller Dam (the dam creating Lake Austin) pursuant to agreement with the City of Austin. Austin's water rights for Lake Austin are set forth in Certificate No. 14-5471.

15. LCRA's water rights on the Colorado River below the City of Austin are set forth in Certificates of Adjudication Nos. 14-5437, 14-5473, 14-5474, 14-5475, and 14-5476.

16. LCRA's right to use the waters of the Highland Lakes is subject to the terms and conditions as set out in the final judgment and decree dated April 20, 1988, in Cause No. 115, 414-A-1.

17. LCRA is committed to following the terms and conditions of the final judgment and decree dated April 20, 1988 in Cause No. 115, 414-A-1.

18. LCRA's first step in development of its Water Management Plan was a comprehensive review of LCRA's Board policies and existing programs that guide and shape the way LCRA manages the river system. The LCRA Board of Directors held a series of monthly public meetings and received testimony from LCRA staff, outside experts, and numerous representatives of diversified constituencies including state agencies, environmental groups, business, industry, agricultural interests, and wholesale electric customers. Based upon the evidence the Board received new comprehensive water policies were adopted by the LCRA Board. These policies form the foundation of the Plan.

19. LCRA's next step was the formulation of a Public Task Force. The LCRA staff and public task force met and worked together over a 6 month period.

20. A draft of the Technical Report (Volume II) of the Water Management Plan was transmitted to the Commission on December 30, 1988. A draft of both Volumes I and II of the Plan was submitted to the Commission's staff and distributed to the public in February 1989 for public comment, LCRA held public workshops followed by local meetings in Bay City, Eagle Lake

and at Buchanan Dam. Additionally, public discussions during LCRA Board meetings were held in March, April and May 1989. LCRA formally adopted the Plan in May 1989.

21. LCRA's proposed Water Management Plan was filed with the Commission on July 7, 1989. The Commission acknowledged receipt of LCRA's proposed Plan on July 18, 1989.

22. LCRA's Water Management Plan has essentially four criteria. One is that the Highland Lakes and the Colorado River downstream will be managed together as a single system for downstream water supply purposes. The second is that the beneficial use of the water derived from inflows below the Highland Lakes will be maximized. The third is that LCRA will stretch and conserve the waters stored in the Highland Lakes and advance water quality. The fourth is that adequate flows will be provided to maintain, and where reasonably possible, improve, fish, wildlife, and recreation resources in the Lower Colorado River and to maintain a proper ecological environment and health of related living marine resources in the Lavaca-Tres Palacios Estuary, to the extent it is affected by the lower Colorado River watershed.

23. LCRA will follow five guidelines in implementing its Water Management Plan including:

    a. All demands for water from the Colorado River downstream of the Highland Lakes will be satisfied to the extent possible by run-of-river flows of the Colorado River;

    b. Inflows will be passed through the Highland Lakes to honor downstream senior water rights only when those rights cannot be satisfied by the flow in the river below the Highland Lakes;

    c. The firm, uninterruptible commitments of water from Lakes Travis and Buchanan will not exceed the Combined Firm Yield;

    d. Water from Lakes Travis and Buchanan will be available on an interruptible basis only as long as LCRA's ability to meet the demand for uninterruptible water is not impaired;

    e. Water shall not be released through any dam solely for hydroelectric generation, except during emergency shortages of electricity, and during other times that such releases will be needed for another beneficial purpose.

24. LCRA has the ability to constantly monitor the amount of water in the river available to meet demands through the Hydromet

System which should allow full utilization of the flows originating below Lake Travis prior to making any releases from storage or passing inflows through the reservoirs.

25. Under the Water Management Plan the four downstream irrigation operations (Gulf Coast, Lakeside, Garwood, and Pierce Ranch) will have first priority for the interruptible water in the annual allocation process. This priority will be set by establishing a Conservation Base for LCRA's two irrigation districts. LCRA intends to negotiate a contract which will include a Conservation Base acreage with Pierce Ranch. The Conservation Base acreage for Gulf Coast, Lakeside and Pierce Ranch was determined on the basis of a ten-year (1976-1985) historical average of actual production acreage. The allocation of water for these three users is based on a duty of 5.25 acre-feet of water per acre irrigated. The priority allocation and terms governing the interruption of supply of stored water for Garwood are based upon a contract between Garwood and LCRA. The 5.25 acre-foot-per-acre duty also applies to Garwood irrigated acreage. In the annual allocation process Lakeside has a priority to interruptible stored water in an amount necessary to firm up run-of-river rights to 136,500 acre-feet per year; Gulf Coast an amount necessary to firm up run-of-river rights to 194,250 acre-feet per year and Garwood an amount necessary to firm up run-of-river rights to 168,000 acre-feet per year.

26. When the federal allocation for the number of acres of rice that can be grown exceeds the Conservation Base acreage of Lakeside and Gulf Coast, then in that year LCRA will provide back up stored water for up to 28,300 acres at Lakeside and 42,800 acres at Gulf Coast. These limits represent the maximum number of acres served by each of the two divisions during the 10 year historic period that was used to establish the Conservation Base. For the Lakeside Division, any acreage over 25,000 and up to 28,300 can be served from an alternate source.

27. Lake levels follow an annual cycle--that of filling the conservation storage space in the winter and spring months of the year to be drawn down by larger water uses during the summer months.

28. Because these multiple purpose reservoirs were not constructed for recreational use, the demands for stability in the reservoir levels by recreation interests present conflicts which are extremely difficult to accommodate. If limits are to be placed on how far down the reservoirs' water levels are allowed to decline, a corresponding limitation on the amount of water that is available to supply the other demands on the reservoir system must also be agreed to.

29. To the extent that the annual analysis of the amount of water in storage reveals that there are interruptible water supplies available after meeting the demands of the irrigation operations, interruptible water may be held in the reservoirs to better ensure the security of supply or to maintain lake levels.

30. If additional sales of interruptible water exceed the Conservation Base amounts and the priority allocation for Garwood would draw the lakes below these minimum levels the LCRA Board will not declare any additional interruptible water available for sale in that year. Those levels are 660 feet msl for Lake Travis and 1012 feet msl for Lake Buchanan. LCRA is not guaranteeing minimum lake levels.

31. Another item to help keep the levels of Lakes Buchanan and Travis as high as possible is the agreement that no maintenance, except for emergencies, which would require the lowering of Lakes LBJ, Marble Falls, and Inks will be permitted if the refilling of those lakes would draw the levels of Lakes Travis and Buchanan below the minimum levels. Periodic lowering and refilling of Lake Austin will be done pursuant to the Settlement Agreement (December 10, 1988) between LCRA and the City of Austin.

32. Downstream recreation interests may be enhanced by LCRA's commitment to maintain minimum instream flows. LCRA will develop additional boat launches and recreation areas on the river through LCRA's 10-county district in order to give the public better access to the Colorado River.

33. Hydroelectric power plants located in each of the dams owned and operated by LCRA total 242 megawatts of capacity. Hydropower generally has been subordinated to be a by-product of the release of water for other purposes. LCRA retains the right to make releases solely for hydropower production in times of emergency as part of the Water Management Plan operating policies.

34. LCRA and Texas Parks and Wildlife Department (TPWD) have entered into a Memorandum of Understanding (MOU), wherein the LCRA and TPWD have agreed that LCRA's Water Management Plan would have a goal of maintaining, and where reasonably possible, improving fish, wildlife, and recreation resources in the Lower Colorado Watershed and of maintaining a proper ecological environment and health of related living marine resources in the Lavaca-Tres Palacios Estuary, to the extent that it is affected by that watershed. Some of the provisions addressed in the MOU have been included in LCRA's Water Management Plan.

35. LCRA and TPWD currently are studying the instream flow issue. These studies are scheduled for completion in March 1991.

36. Until the instream flow studies are complete, LCRA will commit to maintaining a minimum monthly mean flow of 200 cfs throughout the lower basin. This flow may, at times, be satisfied from inflows into the river channel and releases made by LCRA to satisfy the demands of downstream users. To assure that sufficient water will be available to satisfy this instream flow demand, LCRA has allocated 25,000 acre-feet of firm water supply to back up this demand on the system and the demand for inflows into the bays and estuaries.

37. Fresh water inflows are essential to maintenance of the productivity of the bays and estuaries. Preliminary data indicate that the amount of inflows needed for the Lavaca-Tres Palacios Estuary may represent the largest single demand on the system. TPWD and the Texas Water Development Board (TWDB) are currently studying the issue of how much fresh water is necessary to maintain the productivity of the bays and estuaries. The study is scheduled for completion by the end of 1989 with public review scheduled during 1990.

38. Until the bays and estuaries study is completed, LCRA has committed to a minimum monthly mean flow of 200 cfs, a minimum seasonal mean flow of 375 cfs, and a minimum annual flow of 272,121 acre-feet for the bays and estuaries. Measurements are to be made at the USGS gage at Bay City. This flow may at times be satisfied from inflows into the river channel, releases of stored water by LCRA for downstream uses and runoff or tailwaters from the rice irrigation operations. These flows will be backed up with 25,000 acre-feet of firm supply water which is also available for instream flow demands.

39. The Texas Water Development Board (TWDB) and the U.T. Bureau of Economic Geology are currently studying the Carrizo-Wilcox and Gulf Coast Aquifers. LCRA is studying the feasibility of the use of groundwater resources in conjunction with interruptible surface water supplies including the evaluation of artificial recharge of depleted aquifer storage space.

40. Under the existing LCRA <u>Water Pricing Policy</u> the rates for purchasing water must recover the costs associated with the Water Management Plan including necessary funds for water quality and conservation activities.

41. The water to be captured by the Stacy Reservoir are waters that otherwise would have flowed into Lake Buchanan. LCRA determined that the appropriate approach at this time was to calculate the firm yield of the Stacy reservoir separately

from the Highland Lakes, then add it back in, to give the total combined firm yield for Lakes Buchanan and Travis.

42. LCRA used a standard single reservoir operation model to determine the firm yield of the Stacy Reservoir. Inputs to the model included: inflow, net evaporation, monthly water demand distribution, and area/capacity curve for the reservoir.

43. LCRA used a multiple reservoir operations model to determine the combined firm yield of Lakes Buchanan and Travis. User defined local water demands were assumed at each of the reservoirs. Inputs to the model included: inflows, net evaporation, local water demands, monthly water demand distribution, minimum and maximum allowable contents, and area/capacity curves for each reservoir.

44. The period of 1941-1965 was used in the determination of the combined firm yield which includes the worst drought of record encountered.

45. Hydrologic data was related to reservoir inflow. The inflow that actually occurred in the record drought was adjusted to simulate a future time period. The monthly values of inflow to Lakes Buchanan and Travis for the period of January 1940 through December 31, 1972 provided to LCRA by TWC water availability model were adjusted. Under the approach used at this time by LCRA to determine the combined firm yield, the simulated operations of Stacy Reservoir did not pass flow to fulfill downstream senior run-of-the-river water rights.

46. LCRA determined how much water was necessary to satisfy daily water demands at a specific location to the extent that flow is available in the river at that point on that specific day. LCRA found that the average annual unsatisfied demand was 520,657 acre-feet; the maximum annual unsatisfied demand was 674,095 acre-feet; and minimum annual unsatisfied demand was 340,500 acre-feet.

47. LCRA determined that the firm yield of the Stacy Reservoir is 90,546 acre-feet. The combined firm yield of Lakes Buchanan and Travis without inflow from upstream of Stacy Reservoir is 445,266 acre-feet/year. Adding the firm yield of Stacy Reservoir results in the combined firm yield for Lakes Buchanan and Travis of 535,812 acre-feet/year which represents the maximum average annual demand that can be met by these two lakes during a repetition of the most critical drought of record on the lower Colorado River. The combined firm yield may also be expressed as a total of 2,679,060 acre-feet over any five consecutive calendar-year period.

48. LCRA developed a rule curve which defines the ability of Lakes Buchanan and Travis to meet annual demands in excess of the combined firm yield, while reserving an adequate supply to meet firm demands.

49. Starting with the reservoirs full, various demands ranging from .781 million acre-feet to 1.5 million acre-feet were placed on the system for the period. It was found that even at a demand of 1.5 million acre-feet per year 100% of the demand was met in 46% of the years; 75% of the demand was met in 63% of the years; and the amount of .781 million acre-feet was met in 80% of the years.

50. This annual rule curve is considered conservative to the degree that the effect of a critical short-term drought equal to or less severe than historical will be negligible only if total firm demands are less than the combined firm yield.

51. The annual operations rule curve will analyze projected annual demands and based on October 1 lake levels will guarantee the supply of water for firm demands and identify an annual amount of water which may be used for non-firm purposes. It will be modified as firm demands increase, and as hydrologic conditions change in the Colorado River Basin.

52. The operational rule curve will be applied to the system on a monthly basis to determine how the system is responding to current conditions as compared to historical operations. This will allow LCRA to optimize reservoir operations on a real time basis and to determine if adjustments to the amount of interruptible water are necessary. This monthly analysis will help LCRA detect early signs of drought and allow LCRA to timely develop and implement drought contingency measures.

53. The amount of water required to meet the firm demand within the system for the preceding year will be calculated in early October. This amount will be compared to the projections for that year, and any variations will be noted and documented. LCRA will solicit information and projections of use from all of its firm supply contract holders and other firm uses provided for by resolution of the LCRA Board. This information will be used to develop a projection of firm demands for the coming year.

54. LCRA will assess the contents of Lakes Travis and Buchanan as of October 1 to project the storage levels for January 1 of the next year. Inflows into Lakes Travis and Buchanan from the upstream tributaries will be added to this preliminary storage level based on the minimum annual inflow from the period of drought. This process will allow LCRA to reserve sufficient water in the system to meet all firm demands for one year beyond the year being considered for allocations.

Estimates for firm demand commitments for the next year will be subtracted from the total water supply available. The amount of water remaining will then be available for interruptible allocation for that year.

55. In October, LCRA will publish the results of the allocation process, notify the LCRA Board, firm contract holders, the Texas Parks & Wildlife Department and any existing or potential interruptible contract holders. During the October LCRA Board meeting information will be presented to the Board and discussed.

56. The recommended annual allocation plan will be published and LCRA will consider public comments and will take into account any significant water events that may have occurred up to the date of publication. The annual allocation plan will be submitted as a recommendation for LCRA Board approval in November of each year.

57. The portion of the combined firm yield that is not yet committed and the firm uninterruptible water that is committed but not yet being used increases the interruptible water that is available each year. The water that is captured and stored from flood flows also adds to the amount of interruptible water that is available. Over time, as the current contracts draw fully on their commitments and the remainder of the firm yield is contracted for, there will be less interruptible water available on an annual basis.

58. LCRA has committed the following amounts out of the combined firm yield amount:

    a. Stacy Reservoir - the maximum impact of Stacy Reservoir on the firm yield of Lakes Travis and Buchanan is an average of 90,546 acre-feet per year.

    b. City of Austin - LCRA has agreed to firm up or supplement Austin's independent water rights to the extent of 290,156 acre-feet per year. A commitment of an average of 148,300 acre-feet per year of stored water is necessary to meet this demand.

    c. Highland Lakes Water Sale Contracts - municipal and industrial contracts total 104,754 acre-feet per year.

    d. Cooling Water for LCRA Power Plants - LCRA Board Resolution of January 22, 1987 committed 15,000 acre-feet for Ferguson; 10,750 acre-feet for Sim Gideon and 38,101 acre-feet for Fayette Power Project for a total of 63,851 acre-feet per year.

e. South Texas Project (STP) - LCRA has a contract to supply industrial water to STP in an amount up to 102,000 acre-feet per year. The commitment is met first by run-of-river water, firmed-up by stored water from Lakes Buchanan and Travis. Simulated operations through the drought of record showed a demand for stored water in one year of 51,700 acre-feet. A commitment of an average of 5,680 acre-feet per year of stored water is necessary to meet this demand.

f. Instream Flows and Bay/Estuary Needs - LCRA is also committing (reserving) 25,000 acre-feet out of the combined firm yield to meet instream flows and bay and estuaries' needs.

59. LCRA is reserving 50,000 acre-feet of the remaining combined firm yield for future uses under LCRA's certificates of adjudication. This reservation will be until water supply and demand assessments for LCRA's 10-county district are completed or within three years whichever is sooner.

60. The uncommitted balance of the combined firm yield of Lakes Buchanan and Travis is 47,681 acre-feet per year.

61. LCRA is in the process of developing a drought management plan and will be submitting the plan to the Commission in 1990.

62. LCRA is conducting county-by-county assessments of alternative water supply sources. This data will be useful in the development of local drought management plans.

63. The goal of LCRA's conservation programs is to promote the development and application of practices and technologies that will improve water use efficiency, increase the beneficial re-use of water, and minimize the waste of water.

64. LCRA's water conservation programs are directed at the two largest users of water, irrigated agriculture and municipal.

65. LCRA's goal for conservation of water used by irrigated agriculture is to reduce agricultural demands for stored water from the Highland Lakes and reduce costs associated with the operation of LCRA-owned irrigation water delivery systems in Colorado, Wharton and Matagorda Counties.

66. LCRA's current irrigated agriculture conservation programs consist of activities aimed at improving the operating efficiency of irrigation water delivery systems and improving on-farm water use efficiency.

67. The major elements of the irrigation canal rehabilitation program include: improved operational control and management

of the system; vegetation removal and control; improved hydraulics characteristics of canals; installation of water control and measurement structures; and automation of water diversion facilities.

68. The irrigated canal rehabilitation program is expected to reduce water use by 30 percent within the Gulf Coast canal system. Preventive maintenance at Lakeside is expected to maintain canal efficiency.

69. The major elements of the on-farm water conservation program include: Direct support through funding and staff for the Cooperative Rice Water Management Research Program; assistance with the transfer of information from the research arena to the rice producer; conservation demonstrations such as the development and testing of an automated levee gate; and the inclusion of water conservation stipulations in LCRA's standard irrigation water sale contract.

70. Preliminary results indicate that on-farm water use can be reduced by 25 to 30 percent.

71. LCRA's municipal water conservation programs are directed towards implementation of urban water conservation and water re-use. Focus is towards encouraging and supporting local level initiatives by more than 300 public water utility systems within LCRA's statutory district.

72. The five major elements of LCRA's municipal water conservation programs are:

    a. Direct technical assistance with the development and implementation of local water conservation programs including public awareness and education; water efficiency standards and guidelines for new construction (e.g., plumbing fixture efficiency standards); retrofit programs to improve water efficiency in existing developments; conservation-oriented water rates and other economic incentives; low-water-use landscaping (i.e., Xeriscape); and water re-use and recycling.

    b. Distribution system audit and leak detection services for local water utilities serving fewer than 10,000 connections.

    c. Integration of water conservation and re-use measures, as appropriate, with other LCRA programs and projects including LCRA water sale contracts; water resource planning and demand forecasting; water and wastewater utility service studies, projects, and service agreements; water rate design; environmental programs; and energy conservation programs.

d. Public awareness and education on the water conservation opportunities, benefits, and measures. On-going activities include distribution of brochures, fact sheets, and videos on water conservation; media promotion (e.g., news articles, public service announcements, talk shows, etc.); presentations to civic and service organizations; and workshops, seminars, and special events.

e. Demonstrations of advanced water conservation and re-use technologies and low-water-use landscaping techniques.

73. LCRA will no later than December 31, 1991 reference and summarize existing information on point and nonpoint pollution sources and loading on the Colorado River including inputs of nutrients, metals, pesticides, oxygen demanding substances and other contaminants that may affect water quality, fish wildlife and recreation resources in accordance with the MOU with TPWD.

74. LCRA will no later than December 31, 1991 identify new data needed to determine the effect of water quality on revision of minimum flow schedule and as soon as reasonably possible will modify its existing monitoring programs or new programs to collect such new data.

75. LCRA is evaluating the potential problems associated with anoxic hypolimnetic releases from reservoirs and the potential for related fish kills due to resulting low dissolved oxygen levels downstream. LCRA will no later than December 31, 1991 reference and summarize this evaluation.

76. LCRA has also applied to the Commission for an amendment to the Certificates of Adjudication Nos. 14-5478 and 14-5482 relating to Lakes Buchanan and Travis.

77. Certificates of Adjudication Nos. 14-5478 (Lake Buchanan) and 14-5482 (Lake Travis) authorize LCRA to divert and use water from Lakes Buchanan and Travis for municipal, industrial, irrigation and mining purposes. LCRA is authorized to use the water impounded in Lakes Buchanan and Travis for recreation purposes with no right of diversion or release. LCRA is authorized to use the bed and banks of the Colorado River, below Lakes Buchanan and Travis to convey water released from Lakes Buchanan and Travis for use by LCRA or others entitled to use such water in the amounts and for the purposes authorized in the Certificates. LCRA is also authorized to divert and use water through Buchanan Dam and Mansfield Dam for the purpose of hydroelectric power generation.

78. The Water Management Plan submitted by LCRA to the Commission for its consideration includes proposed reservoir operating

procedures whereby LCRA will divert or release waters stored in Lakes Buchanan and Travis for several additional purposes of use including domestic, recreation, instream flow and bays/estuary purposes.

79. In order to manage Lakes Buchanan and Travis as proposed in the Water Management Plan, LCRA's Certificates of Adjudication Nos. 14-5478 and 14-5482 need to be amended to authorize LCRA to divert, release and use the water in Lakes Buchanan and Travis for additional beneficial uses including domestic, recreation, instream flow and bay/estuary purposes.

80. As part of these amendments, LCRA is not requesting an additional amount of water. The proposed amendments will not result in an additional consumptive use of state water.

81. A "firm" demand is a contractual obligation or other commitment of LCRA's which must be met 100% of the time through the drought of record. Total firm demands will need to be less than or equal to the combined firm yield to be protected throughout recurrence of the drought of record.

82. Interruptible or "nonfirm" demands are LCRA's contractual obligations or other commitments for stored water which contractually do not have to be met 100% of the time. They will be met to the extent additional water is available each year after firm demands are satisfied.

83. LCRA has formally adopted standard water sale contract forms, and procedures and rules for administering water sale contracts. Existing contracts are written for firm supply of water, subject only to the general laws of availability. A second standard form contract for interruptible supply is presently being developed.

84. LCRA currently has no contracts upstream from the Highland Lakes, except those with upstream reservoirs with junior rights to the Highland Lakes which are more or less operation agreements.

85. Existing upstream operating agreements should be considered firm contracts, and their effect on the combined firm yield should be quantified as was Stacy Reservoir's effect.

86. Junior rights senior to November 1, 1987, will be honored as required by the Court's Judgment and Decree with interruptible supplies. Their diversions will be allocated similar to downstream senior rights.

87. A report which documents LCRA's compliance with the Water Management Plan during the previous year will contain information regarding the adequacy of the hydrologic and

hydraulic data monitoring system as to intensity and accuracy; accuracy of reported or monitored activities; adequacy of the operating rule curve and the adequacy of the daily allocation model and any additional information the Executive Director may request.

88. Under the approach used by LCRA at this time, the combined firm yield of Lakes Buchanan & Travis is 535,812 acre-feet/year. This amount may also be expressed as an average of a total of 2,679,060 acre-feet per year over any five consecutive calendar-year period.

89. LCRA's proposed Water Management Plan does not presently propose any new projects taking, storing or diverting water in excess of 5,000 acre-feet per year.

90. The use of an operational rule curve, as developed by LCRA, is an acceptable approach to insure utilization of the lakes' storage while at the same time guaranteeing that firm demands will be met dependably year after year.

91. LCRA's procedures and guidelines for the allocation of firm water and interruptible water supplies are acceptable, with the understanding that the allocation procedures may be amended at a later time to reflect the results of the instream flow and bay/estuary studies; provided, however, that the Commission shall retain jurisdiction to resolve all disputes regarding allocation of stored water that may arise in the future.

92. LCRA's initiatives regarding point and non-point sources of pollution are commendable.

93. The priorities in LCRA's Water Management Plan for interruptible water are subject to changes after the completion of the studies on the instream flows and bays/estuaries.

94. LCRA's proposed system operations under LCRA's Water Management Plan are consistent with the special conditions set forth in the Court's Final Judgment and Decree regarding LCRA's rights to use the waters of Lakes Buchanan and Travis.

CONCLUSIONS OF LAW

1. The public hearing was held under the authority and in accordance with Chapter 11 of the Texas Water Code, as amended and the Texas Water Commission Permanent Rules.

2. The Texas Water Commission has jurisdiction to consider LCRA's proposed Water Management Plan and applications to amend its Certificates of Adjudication.

3. LCRA's proposed Water Management Plan recognizes the necessity of beneficial inflows from the Colorado River into the Lavaca-Tres Palacios Estuary consistent with Section 11.147 of the Texas Water Code.

4. LCRA's proposed Water Management Plan recognizes the necessity of providing for the protection of fish and wildlife habitats and the water quality of the river as required by Section 11.147 of the Texas Water Code.

5. LCRA's proposed Water Management Plan recognizes the Commission's statutory authority to require water conservation and provides for water conservation consistent with Section 11.134(b)(4) of the Texas Water Code.

6. LCRA's applications to amend its Certificates of Adjudication Nos. 14-5478 and 14-5482 authorizing LCRA to use the waters of Lakes Buchanan and Travis for additional beneficial purposes do not contemplate an additional consumptive use of state water or an increased rate or period of diversion.

7. In order to effectuate the policies of this State relating to the conservation and best utilization of the water resources of this State as set forth in Chapter 11 of the Texas Water Code, LCRA's proposed Water Management Plan should be approved and LCRA's applications to amend Certificates of Adjudication Nos. 14-5478 and 14-5482 should be granted.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS WATER COMMISSION THAT:

1. LCRA's proposed Water Management Plan is approved with the following conditions:

   a. The Water Management Plan shall be subject to the continuing right of supervision of the Commission, and the Commission, on its own motion, may reconsider any element of the plan at any time in the future.

   b. LCRA's responsibility and authority under the Water Management Plan is limited to operational control of the Highland Lakes and LCRA's facilities downstream, and is limited by the terms of this Order.

   c. LCRA's responsibility and authority under the Water Management Plan is subject to and shall not conflict with the authority of any watermaster operation the Commission may establish on the Colorado River.

   d. LCRA shall make available to the Commission all real-time, historical or allocated streamflow data collected by LCRA.

e. LCRA shall supply interruptible water, in accordance with the provisions and conditions specified in the Final Judgement and Decree, to any downstream water right with a priority date junior to December 1, 1900 and senior to November 1, 1987 that authorizes the diversion of not more than 3000 acre-feet of water per year. Priority shall be given to these water rights in the same manner that LCRA allocates water to the major irrigation operations downstream (Lakeside, Gulf Coast, Garwood and Pierce Ranch).

f. All sales, agreements or LCRA Board commitments for the use of water in or from the Highland Lakes shall be submitted to the Commission within 45 days of the effective date of the document.

g. LCRA shall submit a drought contingency plan within one year from the date the Commission signs this order approving the Water Management Plan. Such plan shall be subject to the review and approval of the Commission.

h. LCRA shall allocate 25,000 acre-feet per annum of its firm water supply to supplement and maintain a minimum monthly mean flow of 200 cfs throughout the lower Colorado River measured at the USGS gage at Bastrop for instream flow purposes and a minimum monthly mean flow of 200 cfs, a minimum seasonal mean flow of 375 cfs and a minimum annual flow of 272,121 acre-feet measured at the USGS gage at Bay City for freshwater inflow to the Lavaca-Tres Palacios estuarine system.

i. Prior to any diversion of surface water for recharge purposes, LCRA shall obtain the necessary authorizations from the Commission.

j. LCRA shall prepare and submit to the Commission, on or before March 1 of each year beginning with March 1, 1990, a report which documents compliance with the approved Water Management Plan and any special conditions thereto during the previous year. Such report shall be in a form approved by the Executive Director.

k. After the instream study by LCRA and TPWD is completed, but in any event no later than March, 1992, LCRA will submit an application to amend its Water Management Plan to reflect the results of the instream flow studies and the studies and evaluations referenced in Findings of fact #73, 74, & 75 above. LCRA shall do all things necessary to ensure that such application is administratively and technically complete within 6 months of submission. The Commission agrees to hold a hearing within one year of the date of LCRA's submission to

consider the amendments of the Plan, or, if the studies are not complete, to determine why such studies are not complete.

l. After completion of the TWDB and TPWD study on freshwater inflows into the bays and estuaries, as applicable to the Lavaca-Tres Palacios Estuary, and in any event no later than March, 1993, LCRA will submit an application to amend its Water Management Plan to reflect the results of the bays/estuary study. LCRA shall do all things necessary to ensure that such application is administratively and technically complete within 6 months of submission. The Commission agrees to hold a hearing within one year of the date of LCRA's submission to consider the amendments of the Plan, or, if the studies are not complete, to determine why such studies are not complete.

m. The combined firm yield as found by the Commission in this Order is subject to adjustment and refinement from time to time as additional studies and simulations are developed that more accurately reflect assumptions and operations as required by law.

n. The Commission retains jurisdiction to resolve any and all disputes regarding the allocation of stored water from Lakes Travis and Buchanan, notwithstanding the procedures and guidelines set forth in the Water Management Plan.

2. LCRA's applications to amend Certificates of Adjudication Nos. 14-5478 and 14-5482 are granted with the following conditions:

a. LCRA's certificates of adjudication shall reflect the combined annual firm yield of Lakes Travis and Buchanan to be as found by the Commission in this Order, and as may be modified by the Commission from time to time.

b. For purposes of perfection, LCRA's authorization to divert, release or use water for recreation purposes is limited to that quantity of water actually sold for that purpose whether used in, or released, or diverted from Lakes Buchanan and Travis.

3. The Chief Clerk of the Texas Water Commission forward a copy of this Order, subject to the filing of motions for rehearing, to all parties.

4. If any provision, sentence, clause or phrase of this Order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of the Order.

5. Nothing in the Water Management Plan or this Order shall be construed to impair, or to authorize LCRA or any other person or entity to impair, senior or superior water rights in the Colorado River Basin.

Signed this 20th day of September, 1989.

TEXAS WATER COMMISSION

Buck J. Wynne, III, Chairman

(SEAL)

Brenda W. Foster, Chief Clerk

TEXAS WATER COMMISSION

THE STATE OF TEXAS
COUNTY OF TRAVIS
I hereby certify that this is a true and correct copy of a Texas Water Commission document, the original of which is filed in the permanent records of the Commission.
Given under my hand and the seal of office on
JAN 6 1992
Gloria A. Vasquez, Chief Clerk
Texas Water Commission

CONSIDERATION OF THE	§	BEFORE THE
LOWER COLORADO RIVER	§	TEXAS WATER COMMISSION
AUTHORITY'S DROUGHT	§	
MANAGEMENT PLAN	§	

ORDER APPROVING LOWER COLORADO
RIVER AUTHORITY'S DROUGHT MANAGEMENT PLAN

On the 18th day of December, 1991, the Texas Water Commission ("Commission") held a public hearing to consider the Lower Colorado River Authority's ("LCRA") proposed Drought Management Plan. At the hearing, the following were named as parties: the Lower Colorado River Authority; the Texas Parks and Wildlife Department ("TPWD"); the City of Austin; Garwood Irrigation Company; the Sierra Club, Lone Star Chapter; the Matagorda County Water Council; Houston Lighting and Power Company as Project Manager for the South Texas Project; the Executive Director of the Texas Water Commission; and the Public Interest Counsel of the Texas Water Commission. Having considered the proposed agreed order of the parties, the Commission makes the following Findings of Fact and Conclusions of Law:

FINDINGS OF FACT

1. Notice of the public hearing was published on October 10, 1991 in the Blanco County Record Courier, a newspaper regularly published and generally circulated in Blanco County, Texas; October 9, 1991 in the Austin American-Statesman, a newspaper regularly published and generally circulated in Travis County, Texas; on October 9, 1991 in the Colorado County Citizen, a newspaper regularly published and generally circulated in Colorado County, Texas; on October 10, 1991 in the San Saba News and Star, a newspaper regularly published and generally circulated in San Saba County, Texas; on October 10, 1991 in the Llano News, a newspaper regularly published and generally circulated in Llano County, Texas; on October 10, 1991 in the Highlander, a newspaper regularly published and generally circulated in Burnet County, Texas; on October 10, 1991 in the Bay City Daily Tribune, a newspaper regularly published and generally circulated in Matagorda County, Texas; on October 8, 1991 in the Fayette County Record, a newspaper regularly published and generally circulated in Fayette County, Texas; on October 5, 1991 in the El Campo Leader-News, a newspaper regularly published and generally circulated in Wharton County, Texas; and on October 7, 1991 in the Bastrop Advertiser, a newspaper regularly published and generally circulated in Bastrop County, Texas. These ten counties are

the only counties in which persons reside who may be affected by action taken as result of the hearing. Said notice was published not less than thirty (30) days before the date of the hearing.

2. On September 26, 1991, notice of the public hearing was sent by first-class mail to persons who may be affected by action taken as a result of the hearing and to each person as required by law.

3. LCRA is requesting approval of its Drought Management Plan for the Lower Colorado River, Colorado River Basin, in accordance with the Commission's September 7, 1989 Order approving LCRA's Water Management Plan and amending Certificates of Adjudication Nos. 14-5478 and 14-5482. LCRA's Water Management Plan was developed and submitted by LCRA in accordance with the Final Judgment and Decree entered by the court in Cause No. 115,414 A-1, 264th Judicial District, In Re: The Exceptions of the Lower Colorado River Authority and the City of Austin to the Adjudication of Water Rights in the Lower Colorado River Segment of the Colorado River Basin.

4. LCRA's proposed Drought Management Plan was filed with the Commission on October 19, 1990.

5. LCRA's procedures and guidelines set forth in the Water Management Plan and the Drought Management Plan for the allocation of firm water and interruptible water supplies are acceptable as conditioned by the provisions of this Agreed Order and with the understanding that the allocation procedures may be amended by the Commission at a later time for any justifiable reason including, but not limited to, an amendment to reflect the results of the instream flow and bay and estuary studies; provided, however, that the Commission shall retain jurisdiction to resolve all disputes regarding allocation of stored water that may arise in the future.

6. The priorities in LCRA's Water Management Plan and Drought Management Plan for interruptible water are subject to change after the completion of the studies on the instream flows and bays and estuaries required by conditions (k) and (l) of the September 7, 1989 Order.

7. Because of the water-availability and water-demand conditions that presently exist, it appears that 25,000 acre-feet of stored water per year probably will be adequate in the near future to firm up the minimum flows for instream flows and bays and estuaries set forth in condition (h) of the Commission's September 7, 1989 Order. Pursuant to conditions (k) and (l) of the Commission's September 7, 1989 Order, LCRA is required to submit applications to amend the Water Management Plan and the Drought Management Plan following completion of studies on instream flows and bays and estuaries

required by March 1992, and March 1993, respectively. Accordingly, it is unnecessary for the Commission to determine at this time whether the Commission, by its September 7, 1989 Order or otherwise, intended to give LCRA the authority or impose upon it the obligation to release more than 25,000 acre-feet of stored water in any one year to firm up those minimum flows.

8. Based on available studies and information, it is uncertain whether LCRA's proposed plan to begin curtailment of interruptible stored water supplies at a January 1 trigger level of 1.4 million acre-feet of water in storage is appropriate, in that it may provide more protection to firm supplies of stored water than is necessary. However, because of the water-availability and water-demand conditions that presently exist, it is likely that such level will not be reached in the near future. Accordingly, it is unnecessary for the Commission to determine at this time whether, or to what extent, such trigger level provides more protection to firm supplies than is necessary.

9. LCRA asserts that nothing in the Drought Management Plan should be construed to modify or impair in any way any contractual obligation of LCRA to supply water.

CONCLUSIONS OF LAW

1. The public hearing was held under the authority and in accordance with Chapter 11 of the Texas Water Code, as amended and the Texas Water Commission Permanent Rules.

2. The Texas Water Commission has jurisdiction to consider and take action on LCRA's proposed Drought Management Plan.

3. It is unnecessary at this time to determine whether the Commission, by its September 7, 1989 Order or otherwise intended to give LCRA the authority or impose upon it the obligation to release more than 25,000 acre-feet of stored water in any one year for instream flows and bays and estuaries. By approving the Drought Management Plan and entering this Order, the Commission specifically is not deciding these issues.

NOW, THEREFORE, BE IT ORDERED BY HE TEXAS WATER COMMISSION. THAT:

1. LCRA's proposed Drought Management Plan is approved with the following conditions:

   a. LCRA's Drought Management Plan is subject to LCRA's Water Management Plan and all findings, conclusions and conditions contained within the Commission's September 7, 1989 Order approving the Water

Management Plan including, without limitation, any findings, conclusions and conditions contained in this Order that are also contained within the September 7, 1989 Order.

b. The Drought Management Plan shall be subject to the continuing right of supervision of the Commission, and the Commission, on its own motion, may reconsider any element of the plan at any time in the future.

c. LCRA's responsibility and authority under the Drought Management Plan is limited to operational control of the Highland Lakes and LCRA's facilities downstream, and is limited by the terms of this Order and the Commission's September 7, 1989 Order.

d. LCRA is required to pass all inflows to the Highland Lakes to the extent necessary to satisfy the demands of all downstream senior rights, and nothing in the Drought Management Plan or this order shall be construed to modify or impair this obligation.

e. LCRA shall prepare and submit to the Commission, on or before March 1 of each year beginning with March 1, 1992, a report which documents compliance with the approved Drought Management Plan and any special conditions thereto during the previous year. Such report shall be in a form approved by the Executive Director.

f. After the instream study by LCRA and TPWD is completed, but in any event not later than March, 1992, LCRA shall submit an application to amend its Water Management Plan and its Drought Management Plan to reflect the results of the instream flow studies and the studies and evaluations referenced in Findings of Fact Nos. 73, 74, and 75 of the Commission's September 7, 1989 Order. Such application shall also propose conditions for implementing or cancelling the declaration of a drought to be worse than the drought of record. LCRA shall do all things necessary to ensure that such application is administratively and technically complete within six months of submission. The Commission agrees to hold a hearing within one year of the date of LCRA's submission to consider the amendments of the Plans, or if the studies are not complete, to determine why such studies are not complete.

g. After completion of the Texas Water Development Board ("TWDB") and TPWD study on freshwater inflows into the bays and estuaries, as applicable to the Lavaca-Tres Palacios Estuary, and in any event not later than March, 1993, LCRA shall submit an application to amend its Water Management Plan and its Drought Management Plan to reflect the results of the bays/estuary study. LCRA shall do all things necessary to ensure that such application is administratively and technically complete within six months of submission. The Commission agrees to hold a hearing within one year of the date of LCRA's submission to consider the amendments of the Plans, or, if the studies are not complete, to determine why such studies are not complete.

h. The combined firm yield as found by the Commission in Finding of Fact No. 47 of its September 7, 1989 Order is subject to adjustment and refinement from time to time as additional studies and simulations are developed that more accurately reflect assumptions and operations as required by law.

i. LCRA's proposed plan to begin curtailment of interruptible stored water at a January 1 trigger level of 1.4 million acre-feet of water in storage, and other aspects of LCRA's proposed curtailment plan, are subject to adjustment from time to time as additional studies and simulations may be developed that more accurately address the need to curtail interruptible supplies.

j. The Commission retains jurisdiction to resolve any and all disputes regarding the allocation of stored water from Lakes Travis and Buchanan, notwithstanding the procedures and guidelines set forth in the Water Management Plan and/or the Drought Management Plan.

2. The Chief Clerk of the Texas Water Commission shall forward a copy of this Order subject to the filing of motions for rehearing, to all parties.

3. If any provision, sentence, clause or phrase of this Order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remaining portions of the Order.

4. Nothing in the Drought Management Plan or this Order shall be construed to impair, or to authorize LCRA or any other person or entity to impair, senior or superior water rights in the Colorado River Basin.

Issued: DEC 2 3 1991

TEXAS WATER COMMISSION

John Hall, Chairman

ATTEST:

Gloria A. Vasquez, Chief Clerk

THE STATE OF TEXAS
COUNTY OF TRAVIS
TEXAS WATER COMMISSION
I hereby certify that this is a true and correct copy of a Texas Water Commission document which is filed in the permanent records of the Commission.
Given under my hand and the seal of office on
JAN 11 '99
Gloria A. Vasquez, Chief Clerk
Texas Water Commission

CONSIDERATION OF THE LOWER COLORADO RIVER AUTHORITY'S APPLICATION TO AMEND ITS WATER MANAGEMENT PLAN AND DROUGHT MANAGEMENT PLAN	§ § § §	BEFORE THE TEXAS WATER COMMISSION

AGREED ORDER APPROVING AMENDMENTS TO LOWER COLORADO RIVER AUTHORITY'S WATER MANAGEMENT PLAN AND DROUGHT MANAGEMENT PLAN

On the 2nd day of December, 1992, the Texas Water Commission ("Commission") considered the Lower Colorado River Authority's ("LCRA") application to amend its Water Management Plan and Drought Management Plan, and having heard evidence and arguments concerning the proposed order, the Commission makes the following Findings of Fact and Conclusions of Law:

Findings of Fact

1) Notice of the public hearing was published on September 3, 1992, in the Johnson City Record-Courier, a newspaper regularly published and generally circulated in Blanco County, Texas; on August 23, 1992 in the Austin American-Statesman, a newspaper regularly published and generally circulated in Travis County, Texas; on August 26, 1992 in the Colorado County Citizen, a newspaper regularly published and generally circulated in Colorado County, Texas; on August 27, 1992 in the San Saba News & Star, a newspaper regularly published and generally circulated in San Saba County, Texas; on September 3, 1992 in the Llano News, a newspaper regularly published and generally circulated in Llano County, Texas; on August 27, 1992 in the Marble Falls Highlander, a newspaper regularly published and generally circulated in Burnet County, Texas; on

August 25, 1992 in the Bay City Daily Tribune, a newspaper regularly published and generally circulated in Matagorda County, Texas; on August 25, 1992 in the Fayette County Record, a newspaper regularly published and generally circulated in Fayette County, Texas; on August 22, 1992 in the El Campo Leader-News, a newspaper regularly published and generally circulated in Wharton County, Texas; and on August 27, 1992 in the Bastrop Advertiser, a newspaper regularly published and generally circulated in Bastrop County, Texas. These ten counties are the only counties in which persons reside who may be affected by action taken as a result of the hearing. Said notice was published not less than thirty (30) days before the date of the hearing.

2) On August 11, 1992, notice of the public hearing was sent by first-class mail to persons who may be affected by action taken as a result of the hearing and to each person as required by law.

3) LCRA's Application to Amend its Water Management Plan and Drought Management Plan ("Application") was received by the Commission on May 29, 1992 and July 15, 1992.

4) LCRA's Application was accepted by the Commission as administratively complete on July 23, 1992.

5) The Lake Travis Chamber of Commerce requested LCRA to amend its Water Management Plan to change the trigger level of Lake Travis from 660 feet msl to 667 feet msl; to limit new interruptible water contracts to the volume of water saved in the rice irrigation conservation program; and to revise the description of the lake's economy.

6) In response to the request by the Lake Travis Chamber of Commerce, LCRA proposes to amend the Water Management Plan to

eliminate the trigger levels of 660 feet msl for Lake Travis and 1012 feet msl for Lake Buchanan; to limit sales of interruptible stored water, other than for the four major irrigation districts' Conservation Base or Priority Allocation acreage, based on the projected volume of water in Lakes Buchanan and Travis as of January 1, of each year. No such sales would occur if either lake is less than 94% of its maximum conservation capacity. If both lakes are projected to be at their maximum conservation capacity on January 1, then such interruptible water sales would be limited to a total of 80,000 acre-feet for that year. For projected lake volumes between 94% and 100% of the conservation capacity, such interruptible water sales would be limited proportionately, based on the storage reservoir with the lowest projected percentage of capacity on January 1. LCRA also proposes to increase the Conservation Base acreage for the Gulf Coast Irrigation Division from 37,000 acres to 50,000 acres and set the Priority Allocation acreage for Pierce Ranch at 10,476 acres.

7) LCRA's Drought Management Plan presently allows for the cancellation of curtailments of interruptible stored water to the four major irrigation districts if the combined storage of Lakes Buchanan and Travis is at least 1.4 million acre-feet on July 1.

8) LCRA proposes to amend LCRA's Drought Management Plan to provide that curtailment of interruptible stored water for the four major irrigation districts may be cancelled at any time during the year prior to July 31. The criteria for cancelling the curtailments is that the combined storage of Lakes Buchanan and Travis is projected to be equal to or greater than 1.4 million acre-feet of water anytime in July.

9) LCRA's Water Management Plan presently allows LCRA to reserve 50,000 acre-feet of the remaining combined firm yield of Lakes Buchanan and Travis for future uses under LCRA's certificates of adjudication. This reservation will be until water supply and demand assessments for LCRA's 10-county statutory district are completed or within three years, whichever is sooner.

10) LCRA has completed the water supply and demand assessments for its 10-county statutory district. The results of these studies indicate new surface water demands of approximately 39,000 acre-feet annually by the year 2013.

11) LCRA is presently in the process of updating these water supply and demand assessments to include the results of the 1990 federal census. To allow LCRA additional time to complete such updated assessments, it is reasonable to allow LCRA to continue to reserve 50,000 acre-feet of the remaining combined firm yield of Lakes Buchanan and Travis for future uses under its certificate of adjudication, through December 31, 1993.

12) The Commission's September 7, 1989 Order approving LCRA's Water Management Plan, directed LCRA in accordance with Findings of Fact No. 73, 74, and 75, to reference and summarize information on point and non-point pollution sources and loading on the Colorado River, identify new data needed to determine water quality effects on revision of the minimum flow schedule, and evaluate potential problems associated with anoxic hypolimnetic releases from reservoirs and the potential for related fish kills due to resulting low dissolved oxygen levels downstream. LCRA has completed these studies and evaluations. The instream flow schedule set forth in this Agreed Order was developed in response to those studies and evaluations.

13) The Commission's December 23, 1991 Order approving LCRA's Drought Management Plan directed LCRA to propose conditions for implementing and cancelling a declaration of a drought worse than the drought of record.

14) LCRA proposes that its Drought Management Plan be amended to provide that the LCRA Board of Directors will declare a drought worse than the drought of record when the following three conditions are simultaneously met:

(a) drought at least 36 consecutive months (36 months since both Lakes Buchanan and Travis were last full); and

(b) the cumulative inflow deficit since the beginning of the drought exceeds the envelope curve for cumulative inflow deficits by at least 5% for six consecutive months; and

(c) the combined storage of Lakes Buchanan and Travis is less than 600,000 acre-feet.

The LCRA Board of Directors will cancel such a declaration if any of the following conditions are met:

(d) the cumulative inflow deficit since the beginning of the drought is less than the envelope curve for cumulative inflow deficits by at least 5% for six consecutive months; or

(e) the combined storage in Lakes Buchanan and Travis is greater than 1.4 million acre-feet of water.

15) LCRA and TPWD have completed their instream flow needs study for the lower Colorado River. Based upon this study LCRA proposes that LCRA's Water Management Plan and Drought Management Plan be amended as follows:

(a) LCRA's existing commitment of 25,000 acre-feet of firm yield water supply, to supplement and maintain instream flows, be increased to an average of 31,800 acre-feet annually during any 10 consecutive year period.

(b) LCRA will maintain the daily river flows below the City of Austin's Longhorn Dam at no less than the subsistence/critical flows in all years.

(c) When the combined storage of Lakes Buchanan and Travis is projected to be above 1.4 million acre-feet of water on January 1, or if interruptible stored water curtailments are cancelled, LCRA will maintain during that calendar year or portion thereof target flows to the extent of inflows each day to the Highland Lakes as measured by upstream gages.

(d) Interruptible water contracts will be totally cutoff when the minimum January 1 storage of Lakes Buchanan and Travis is at or below 325,000 acre-feet of water.

16) The schedule of instream flows for the Colorado River downstream of the City of Austin's Longhorn Dam is as follows:

	Subsistence/ Critical Flows (cfs)		Target Flows (cfs)		
Month	Austin	Bastrop	Bastrop	Eagle Lake	Egypt
January	46[c]	120	370	300	240
February	46[c]	120	430	340	280
March	46[c]	500[b]	560	500[a]	360
April	46[c]	500[b]	600	500[a]	390
May	46[c]	500[b]	1030	820	670
June	46[c]	120	830	660	540
July	46[c]	120	370	300	240
August	46[c]	120	240	200	160
September	46[c]	120	400	320	260
October	46[c]	120	470	380	310
November	46[c]	120	370	290	240
December	46[c]	120	340	270	220

[a] Since target flow at Eagle Lake (based on overall community habitat availability) were insufficient to meet Blue Sucker (Cycleptus elongatus) spawning requirements during March and April target flows were superseded by critical flow recommendations for this reach.

[b] This flow should be maintained for a continuous period of not less than six weeks during these months. A flow of 120 cfs will be maintained on all days not within the six week period.

[c] LCRA will maintain a mean daily flow of 100 cfs at the Austin gage at all times, to the extent of inflows each day to the Highland Lakes as measured by upstream gages, until the combined storage of Lakes Buchanan and Travis reaches 1.4 million acre-feet of water. A mean daily flow of 75 cfs, to the extent of inflows each day to the Highland Lakes as measured by upstream gages, will

then be maintained until the combined storage of Lakes Buchanan and Travis reaches 1.0 million acre-feet of water. When the combined storage of Lakes Buchanan and Travis is reduced below 1.0 million acre-feet of water, then a subsistence/critical flow of 46 cfs will be maintained at all times regardless of inflows.

In addition, if the subsistence/critical flow of 46 cfs should occur for an extended period of time, then operational releases will be made by LCRA to temporarily alleviate the subsistence/critical flow conditions. Specifically, should the flow at the Austin gage be below a 65 cfs daily average for a period of 21 consecutive days, LCRA will make operational releases from storage sufficient to maintain daily average flow at the Austin gage of at least 200 cfs for two consecutive days. If this operational release condition persists for three consecutive cycles (69 days), then a minimum average daily flow of at least 75 cfs will be maintained for the next 30 days.

17) The priorities in LCRA's Water Management Plan and Drought Management Plan for use of interruptible water are subject to change after the completion of the studies on bay and estuary inflows referenced in condition (1) of the September 7, 1989 Order Approving LCRA's Water Management Plan.

18) Until such time that the Commission amends the requirement for freshwater inflows into the Lavaca Tres-Palacios Estuary as a result of the completion of the Texas Water Development Board and Texas Parks and Wildlife Department study on freshwater inflows LCRA shall continue to maintain a minimum monthly mean flow of 200 cfs, a minimum seasonal mean flow of 375 cfs and a minimum annual flow of 272,121 acre-feet measured at the USGS gage at Bay City for freshwater inflow to the Lavaca-Tres Palacios estuarine system.

Conclusions of Law

1) The Commission considered this Agreed Order under the authority and in accordance with Chapter 11 of the Texas Water Code, as amended and 31 Texas Administrative Code ("TAC") § 295 et. al.

2) The Texas Water Commission has jurisdiction to consider and take action on LCRA's application to amend its Water Management Plan and Drought Management Plan.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS WATER COMMISSION THAT:

1) LCRA's proposed amended Water Management Plan and Drought Management Plan are approved with the following conditions:

   a) LCRA's amended Water Management Plan is subject to all findings, conclusions, and conditions contained in the Commission's September 7, 1989 Order approving the Plan, except to the extent specifically provided otherwise by this Agreed Order.

   b) LCRA's amended Drought Management Plan is subject to all findings, conclusions, and conditions, contained in the Commission's December 23, 1991 Order approving the Plan, except to the extent specifically provided otherwise by this Agreed Order.

   c) Nothing in this Agreed Order shall be construed to impair any party's right to contest or seek clarification of, at anytime, any issue in connection with LCRA's Water Management Plan and Drought Management Plan. The Commission takes notice that the Sierra Club has contested the issue of priority of use of interruptible water and that contest has been remanded for hearing.

Nothing in this Agreed Order shall be construed as deciding that issue. Furthermore, if in that hearing, the priority of use for interruptible water, as it relates to instream flows, is determined by the Commission to be different than that set forth in those Plans, any party shall have the express right to reopen the issue of instream flow requirements by submitting a written request for hearing to the Office of Hearings Examiners.

2) The Chief Clerk of the Texas Water Commission shall forward a copy of this Agreed Order subject to the filing of motions for rehearing, to all parties.

3) If any part of this Agreed Order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remainder of the Agreed Order.

4) Nothing in LCRA's Water Management Plan and Drought Management Plan or this Agreed Order shall be construed to impair, or to authorize LCRA or any other person or entity to impair, senior or superior water rights in the Colorado River Basin.

ISSUED: DEC 1 8 1992

TEXAS WATER COMMISSION

John Hall, Chairman

ATTEST:

Gloria A. Vasquez, Chief Clerk

BW12\05

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

THE STATE OF TEXAS
COUNTY OF TRAVIS
I hereby certify that this is a true and correct copy of a Texas Natural Resource Conservation Commission document, which is filed in the permanent records of the Commission.
Given under my hand and the seal of office on

MAR 04 1999

La Donna Castañuela, Chief Clerk
Texas Natural Resource
Conservation Commission

DOCKET NO. 98-1387-WR

CONSIDERATION OF THE	§	BEFORE THE
LOWER COLORADO RIVER AUTHORITY'S	§	TEXAS NATURAL RESOURCE
APPLICATION TO AMEND ITS WATER	§	CONSERVATION COMMISSION
MANAGEMENT PLAN INCLUDING ITS	§	
DROUGHT MANAGEMENT	§	
PLAN	§	

ORDER APPROVING AMENDMENTS TO LOWER COLORADO RIVER AUTHORITY'S WATER MANAGEMENT PLAN INCLUDING ITS DROUGHT MANAGEMENT PLAN

On the 24th day of February, 1999, the Texas Natural Resource Conservation Commission ("Commission") considered the Lower Colorado River Authority's ("LCRA") application to amend its Water Management Plan including its amended Drought Management Plan ("WMP"), and having heard evidence and arguments concerning the proposed order, the Commission makes the following Findings of Fact and Conclusions of Law:

Findings of Fact

1) Notice of the public comment meeting and notice of the Commission's Agenda Date on proposed amendments to LCRA's WMP was published on December 17, 1998, in the Johnson City Record-Courier, a newspaper regularly published and generally circulated in Blanco County, Texas; on December 18, 1998 in the Austin American-Statesman, a newspaper regularly published and generally circulated in Travis County, Texas; on December 23, 1998 in the Colorado County Citizen, a newspaper regularly published and

generally circulated in Colorado County, Texas; on December 17, 1998 in the San Saba News & Star, a newspaper regularly published and generally circulated in San Saba County, Texas; on December 17 and 24, 1998 in the Llano News, a newspaper regularly published and generally circulated in Llano County, Texas; on December 18, 1998 in the Marble Falls Highlander, a newspaper regularly published and generally circulated in Burnet County, Texas; on December 20, 1998 in the Bay City Daily Tribune, a newspaper regularly published and generally circulated in Matagorda County, Texas; on December 18, 1998 in the Fayette County Record, a newspaper regularly published and generally circulated in Fayette County, Texas; on December 19, 1998 in the El Campo Leader-News, a newspaper regularly published and generally circulated in Wharton County, Texas; and on December 19, 1998 in the Bastrop Advertiser, a newspaper regularly published and generally circulated in Bastrop County, Texas. These ten counties are the only counties in which persons reside who may be affected by action taken by the Commission on the proposal amendments. Said notice was published not less than thirty (30) days before the Commission's Agenda Date.

2) On December 16 , 1998, notice of the public comment meeting and the Commission's Agenda Date was sent by first-class mail to persons who may be affected by action taken by the Commission and to each person as required by law.

3) By Commission order of September 20, 1989, the Commission conditionally approved LCRA's WMP. By Commission order of December 23, 1991, the Commission conditionally approved LCRA's Drought Management Plan, which is included as part of LCRA's WMP. Amendments to the plans were conditionally approved by Commission agreed order of December 18, 1992. These prior orders of the Commission required LCRA to submit an application to amend its WMP to reflect the results of a bay/estuary study to be completed

by Texas Water Development Board (TWDB) and Texas Parks & Wildlife Department (TPWD). In 1993, LCRA, TWDB, TPWD, and TNRCC entered into a cooperative agreement to complete the study. The study was completed in 1997 and LCRA filed its proposed amendments to the WMP to reflect the results of the study.

4) LCRA's application to Amend its WMP including its Drought Management Plan ("Application") was received by the Commission on May 29, 1997; addenda were received December 29, 1997 and September 29, 1998.

5) LCRA's Application was accepted by the Commission as administratively complete on November 13, 1998.

6) On January 5, 1999 the Commission held a public comment meeting. One person presented oral comments, which were not in opposition to the proposed amendments. No written public comments were provided by any person.

7) No protests and no requests for a contested case hearing have been filed with the Commission regarding the proposed amendments.

8) LCRA's WMP currently requires LCRA to meet an interim freshwater inflow need to the Lavaca-Tres Palacios Estuary, also known as the Lavaca-Colorado Estuary or the Matagorda Bay System of 272,000 acre-feet annually, as measured at the USGS Bay City gage.

9) LCRA's proposed amendments to the WMP would require LCRA to:

   (a) release monthly inflows otherwise available for storage in the Highland Lakes to meet monthly target freshwater inflow needs of the Matagorda Bay System totaling 1.03 million acre-feet per year, as measured at the USGS Bay City gage, if January 1 storage levels in Lakes Travis and Buchanan combined is greater than 1.7 million acre-feet;

(b) release monthly inflows otherwise available for storage in the Highland Lakes to meet monthly critical freshwater inflow needs of the Matagorda Bay System totaling 171,100 acre-feet per year, as measured at the USGS Bay City gage, in all years; and

(c) stored water releases will be a combination of firm and interruptible stored water supplies. Firm water will be supplied in years when the four major irrigation districts' stored water supplies are curtailed. Interruptible stored water will be supplied in all other years.

10) LCRA's WMP currently requires LCRA to use up to a maximum of 318,000 acre-feet of firm stored water over any ten (10) consecutive years for instream flows and freshwater inflow needs of the Matagorda Bay System. The WMP currently provides for a total commitment of 31,800 acre-feet per year from the Combined Firm Yield of Lakes Travis and Buchanan for instream flows and freshwater inflow needs of the Matagorda Bay System.

11) LCRA's proposed amendments to the WMP are as follows:

(a) total commitments of the Combined Firm Yield from the Highland Lakes for instream flow maintenance will be an <u>average</u> of 12,860 acre-feet per year, with a <u>maximum</u> of 36,720 acre-feet in any one year; 58,700 acre-feet in any two consecutive years; 76,800 acre-feet in any three or four consecutive years; 106,100 acre-feet in any five consecutive years and 128,600 acre-feet in any six to ten consecutive years. Total commitments of the Combined Firm Yield from the Highland Lakes for freshwater inflows to the Matagorda Bay System will be an <u>average</u> of 3,090 acre-feet per year, with a <u>maximum</u> of 11,200 acre-feet in any one year; 19,700 in any two consecutive years; 24,200 acre-feet in any three or four consecutive years; 28,200 acre-feet in any five consecutive years and 30,900 acre-

feet in any six to ten consecutive years. The total firm stored water commitment for both purposes will be an average of 15,950 acre-feet per year. Estimated interruptible stored water supplied during the critical drought for both purposes will be an average of an additional 40,060 acre-feet per year.

12) Currently under the WMP the LCRA Board of Directors will declare a drought worse than the drought of record when three (3) conditions are simultaneously met. First, a drought of at least 36 consecutive months since both Lakes Travis and Buchanan were last full. Second, the cumulative inflow deficit since the beginning of the drought exceeds the envelope curve for cumulative inflow deficits by at least 5% for six consecutive months. Third, the combined storage of Lakes Travis and Buchanan is less than 600,000 acre-feet.

13) Because of the severity of the 1996 drought LCRA proposes the following amendments to the WMP:

(a) reduce the 36 month minimum to 24 months;

(b) curtailments of interruptible stored water due solely to the declaration of a drought to be worse than drought of record of less than 36 months in duration is only effective on the following January 1 or July 31, whichever occurs first following the declaration by the LCRA Board of Directors. Droughts more than 36 months in length have no restrictions as to when supply reductions can be implemented;

(c) prior to implementing curtailment of firm water supplies during droughts worse than drought of record, LCRA will meet with its firm water customers and develop a specific stored water curtailment plan approved by the LCRA Board of Directors and the Commission.

(d) Such a declaration will be canceled when the combined storage in Lakes Travis and Buchanan is greater than 1.1 million acre-feet of water, which is simply the recommended threshold for curtailment of interruptible water during a repetition of the drought of record. Prior to declaring a drought worse than the drought of record, the LCRA will re-evaluate this threshold level to determine if a more accurate cancellation storage level in lieu of 1.1 million acre-feet can be determined.

14) LCRA's WMP currently states that the storage level for initial curtailment of interruptible stored water for the four (4) major irrigation districts (Lakeside, Gulf Coast, Garwood and Pierce Ranch) will commence when the combined storage in Lakes Travis and Buchanan is less than or equal to 1.4 million acre-feet projected on January 1.

15) LCRA's proposed amendment reduces the combined storage level from 1.4 to 1.1 million acre-feet projected on January 1.

16) LCRA's WMP currently provides that the allocation of interruptible stored water to users other than the four (4) major irrigation districts is made annually based on projected January 1 storage levels in Lakes Travis and Buchanan taken separately. The maximum supply of interruptible stored water available currently under the WMP is 80,000 acre-feet per year.

17) LCRA's proposed amendments will change the allocation of interruptible stored water to users other than the four (4) major irrigation districts to a semiannual allocation as follows:

(a) the supply for January through June is based on January 1 storage levels in Lakes Travis and Buchanan taken separately;

(b) the supply for July through December is based on the minimum of the maximum storage levels in April, May and June in Lakes Travis and Buchanan taken separately.

(c) maximum supply available under LCRA's proposed amendments is 30,000 acre-feet per year.

18) LCRA's WMP currently provides that the LCRA Board of Directors has committed to reserving 50,000 acre feet of the remaining Combined Firm Yield of the Highland Lakes through December 31, 1993 for future uses within LCRA's service area.

19) LCRA's proposed amendment is to reserve 50,000 acre-feet of water of the remaining Combined Firm Yield of the Highland Lakes for future uses within LCRA's service area indefinitely, as reflected in current LCRA Board of Directors policy.

20) On March 29, 1996 the Commission issued its Order severing a portion of the water rights authorized by Certificate No. 14-2564 (Hudson et ux) and combining it with all of the water rights authorized by LCRA's Certificate No. 14-5478, (Lake Buchanan) as amended. Certificate No. 14-5478C was issued to LCRA on the same date and authorizes LCRA to transfer downstream 532 acre-feet of water for use by LCRA out of Lake Buchanan with consumption use limited to 500 acre-feet per year.

21) Because the priority date of the water severed from Certificate No. 14-2564 and purchased by LCRA is 1929, senior to the 1938 Lake Buchanan priority date, LCRA is requesting that the WMP be amended to reflect an increase of 500 acre-feet in the Combined Firm Yield of Lakes Buchanan and Travis from 535,812 acre-feet to 536,312 acre-feet.

22) On June 2, 1997, the Commission issued its Order severing the water rights authorized by Certificate No. 14-5477B from Certificate No. 14-5477(Pierce Ranch), as amended, and combined it with LCRA's water rights authorized by Certificate No. 14-5475. (LCRA's Lakeside Irrigation Service Area)

23) LCRA proposed amendments to the WMP reflect the Commission's June 2, 1997 Order.

24) LCRA is proposing throughout the current WMP several non-substantive amendments to reflect factual changes that have occurred during the period 1993-1997 relating to water demands, both actual and projected; changes to models; operations procedures; LCRA Board Policy and general background information. All of these proposed non-substantive amendments to the current WMP are detailed in mark-ups of the current WMP dated May 28, 1997, December 29, 1997 and September 29, 1998 that have been filed with the Commission by the LCRA.

CONCLUSIONS OF LAW

1) The Commission considered this Order under the authority and in accordance with Chapter 11 of the Texas Water Code, as amended, and 30 Texas Administrative Code ("TAC") § 295 et. al.

2) The Commission has jurisdiction to consider and take action on LCRA's application to amend its Water Management Plan.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS NATURAL CONSERVATION COMMISSION THAT:

1) LCRA's proposed amended Water Management Plan, which includes LCRA's amended Drought Management Plan as reflected in LCRA's detailed mark-ups of the current WMP dated May 28, 1997, December 29, 1997 and September 29, 1998, is approved with the following conditions:

   a) LCRA's amended Water Management Plan is subject to all findings, conclusions, and conditions contained in the Commission's September 20, 1989 Order approving the Plan, except to the extent specifically provided otherwise by this Order.

   b) LCRA's amended Drought Management Plan is subject to all findings, conclusions, and conditions, contained in the Commission's December 23, 1991 Order approving the Plan, except to the extent specifically provided otherwise by this Order.

   c) LCRA's amended Water Management Plan, including LCRA's amended Drought Management Plan, is subject to all findings, conclusions, and conditions contained

in the Commission's December 18, 1992 Agreed Order approving amendments to the Plans, except to the extent specifically provided otherwise by this Order.

d) Any party shall have the right, at any time, to petition the Commission to seek to amend or clarify any issue in connection with LCRA's amended Water Management Plan, which includes LCRA's amended Drought Management Plan. Nothing in this Order shall be construed to impair any party's right to contest or seek clarification of, at anytime, any issue in connection with LCRA's amended Water Management Plan, which includes LCRA's amended Drought Management Plan.

e) The Commission takes notice that in 1993 the Sierra Club contested the issue of priority of use of interruptible water and that contest has been remanded to the State Office of Administrative Hearings ("SOAH") for hearing and is still pending.

f) Nothing in this Order shall be construed as deciding the issue pending at SOAH. Furthermore, if as a result of that hearing, the priority of use for interruptible water, as it relates to instream flows, is determined by the Commission to be different than that set forth in these Plans, any party shall have the express right to reopen the issue of instream flow and bay and estuary inflow requirements by submitting a written request for hearing to the Commission.

2) The Chief Clerk of the Texas Natural Resource Conservation Commission shall forward a copy of this Order subject to the filing of motions for rehearing, to all parties.

3) If any part of this Order is for any reason held to be invalid, the invalidity of any portion shall not affect the validity of the remainder of the Order.

4) If the Texas Parks and Wildlife Department, the Texas Water Development Board, or the Commission, acting on their own motion or as a result of a petition filed by any party, shall

determine that there is a need for any updates to the freshwater inflow needs as a result of a new study for the Matagorda Bay System, the LCRA shall amend its amended Water and Drought Management Plans and submit these proposed amendments to the Commission for review and approval within one (1) year of completion of such new studies. Any party may reopen the issue of bay and estuary inflows by submitting a written request for hearing to the Commission within thirty (30) days of receiving notice of the filing of the new studies or any proposed amendment to the Plans.

5) Nothing in LCRA's Amended Water Management Plan and Amended Drought Management Plan or this Order shall be construed to impair, or to authorize LCRA or any other person or entity to impair, senior or superior water rights in the Colorado River Basin.

ISSUED: MAR 01 1999

TEXAS NATURAL RESOURCE

CONSERVATION COMMISSION

Robert J. Huston, Chairman

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AGREED ORDER APPROVING AMENDMENTS TO LOWER COLORADO RIVER AUTHORITY'S WATER MANAGEMENT PLAN

On the 27th day of January, 2010, the Texas Commission on Environmental Quality ("Commission") considered the Lower Colorado River Authority's ("LCRA") application (Application No. 5838) to amend its Water Management Plan (WMP) and having heard evidence and arguments concerning Application No. 5838 and the proposed order, the Commission makes the following Findings of Fact and Conclusions of Law:

FINDINGS OF FACT

1) LCRA's Application No. 5838 to amend the WMP was received by the Commission on May 16, 2003, and was declared administratively complete on May 7, 2004.

2) Notice of the application to amend the WMP and of the public meeting on the proposed amendments to the WMP was published on September 27, 2004, in the Austin American-Statesman, a newspaper regularly published and generally circulated in Travis County, Texas; on September 29, 2004, in the Colorado County Citizen, a newspaper regularly published and generally circulated in Colorado County, Texas; on October 10, 2004, in the Matagorda County Tribune, a newspaper regularly published and generally circulated in Bastrop County, Texas; on October 10, 2004, in the Bay City Tribune, a newspaper regularly published and generally circulated in Matagorda County, Texas; on October 1, 2004, in the Fayette County Record, a newspaper regularly published and generally circulated in Fayette County, Texas; on September 29, 2004, in the El Campo Leader-News, a newspaper regularly published and generally circulated in Wharton County, Texas; and on September 25, 2004, in the Bastrop Advertiser, a newspaper regularly published and generally circulated in Bastrop County, Texas. These counties are the only counties in which persons reside who may be affected by action taken by the Commission on the proposed amendments.

3) On September 14, 2004, notice of an application to amend the WMP and notice of the public meeting was sent by first-class mail to the water right holders of record in the Colorado River Basin as required by law.

4) On November 8, 2004, the Commission held a public meeting. One person presented oral comments, and five (5) entities provided written comments in opposition to the proposed amendments.

5) The following persons/entities filed protests and requested a contested case hearing with the Commission regarding the proposed amendments: STP Nuclear Operating Company; City of Austin; Texas Parks and Wildlife Department; Sierra Club, Lone Star Chapter; and the National Wildlife Federation.

6) The applicant, LCRA, has requested numerous editorial and organization changes to the WMP designed to correct errors, improved readability and achieve internal consistency in the documents. All of these proposed non-substantive amendments to the WMP are detailed in mark-ups of the existing approved WMP dated May 16, 2003, June 10, 2004, April 29, 2005, March 1, 2006, April 24, 2009, November 25, 2009, and December 17, 2009, that were filed with Commission by the LCRA.

7) LCRA's proposed amendments to the WMP fall within four areas: curtailment policy for interruptible stored water supplies; allocation of stored water for environmental protection; incorporation of LCRA's Drought Contingency Plan into the WMP; and update of the WMP Appendices.

8) LCRA's proposed amendments to the WMP show the 2000 reported surface water demands by its firm customers from all sources of supply as approximately 296,600 acre-feet annually. The ten-year projected firm demands (through 2010), developed in 2000, were approximately 360,071 acre-feet per year - an increase of 63,471 acre-feet per year. The primary reason for this projected increase is additional water use around the Highland Lakes. Since LCRA filed its application in 2003, its obligations to provide firm supply to the STP Nuclear Operating Company (STPNOC) have been clarified in an Amended and Restated Contract which, among other things, obligates LCRA to provide no more than 20,000 acre-feet per year (rolling five-year average) of firm supply for up to two nuclear generating units and up to 40,000 acre-feet per year (rolling five-year average) of firm supply for more than two generating units, with staged deliveries based on STPNOC's reservoir level subject only to LCRA bay and estuary restrictions and according to a Water Delivery Plan. Contractual Permit No. 327A was issued by the Commission on August 31, 2009, based on the Amended and Restated Contract and the included Water Delivery Plan. The total estimated firm demands for all LCRA customers to be satisfied under this WMP are sufficient to address any additional firm demand that STPNOC might have in the timeframe for which these present amendments to the WMP are intended to be effective, after taking into consideration firm water allocated for environmental purposes.

9) With this large projected increase in firm water demand, and because firm water demands take priority over all other uses, LCRA requested the proposed amendments to the WMP to provide a compensating reduction in interruptible supplies. This reduction will be achieved by revising the annual interruptible water supply curtailment policy. LCRA's proposal to amend curtailment policy is as follows:

   (a) If the total water in storage in either Lakes Buchanan or Travis is less than 94% on January 1 or June 1, then interruptible water supplies will not be made available to any customers located outside the four downstream irrigation operations (Pierce Ranch, Garwood, Gulf Coast, and Lakeside).

   (b) If the total combined water in storage in Lakes Buchanan and Travis on January 1 is equal to or greater than 1,400,000 acre-feet, then LCRA will supply the interruptible stored water demands of the downstream four irrigation operations. This is based on the assumption that the maximum annual demand for the interruptible stored water acreage of 83,700 acres projected for 2010, under a 1 in 5 dry year condition, was 273,000 acre-feet. Using that as the greatest interruptible stored water demand, a set of smaller interruptible stored water supplies were assumed to generate a set of first and second crop acreages expected to be cultivated by each particular irrigation operations.

(c) Curtailment of interruptible supply to the irrigation operations will commence when the total combined January 1 storage in Lake Buchanan and Travis is less than 1,400,000 acre-feet. When the combined storage in Lakes Buchanan and Travis on January 1 is between 1,400,000 acre-feet and 1,150,000 acre-feet, the interruptible stored water supply available will vary beginning at 273,000 acre-feet available at 1.4 million acre-feet of storage and decreasing at a rate of approximately 31,200 acre-feet for each 100,000 acre-foot decrease in combined storage until a value of 195,000 acre-feet available at a combined storage of 1.15 million acre-feet. When the combined storage in Lakes Buchanan and Travis on January 1 is less than 1,150,000 acre-feet, the interruptible stored water supply made available to the irrigation operations will vary beginning at 195,000 acre-feet available at 1.15 million acre-feet of storage and decreasing at a rate of approximately 4,250 acre-feet for each 100,000 acre-foot decrease in combined storage until a value of 160,000 acre-feet available at a combined storage of 325,000 acre-feet. This curtailment is depicted in Figure 4-1 of the Water Management Plan.

(d) Cutoff of the interruptible stored water supply for any purpose for the coming year will occur when the combined storage in Lakes Buchanan and Travis on January 1 is less than or equal to 325,000 acre-feet.

(e) If at any time during the year the total storage in Lakes Buchanan and Travis, combined, is less than or equal to 200,000 acre-feet, then all use of interruptible stored water will be stopped.

(f) During any period of curtailment or cutoff of interruptible supplies to the irrigation operations that is instituted on January 1, LCRA will cancel such curtailment at any time during the year prior to July 31, if the combined storage in Lakes Buchanan and Travis is projected to be equal to or greater than 1,400,000 acre-feet anytime in July. Further, the remaining available interruptible stored water supplies for the year may be reallocated, at this time, between irrigation operations if such allocations do not adversely affect any irrigation operation.

(g) During periods of curtailment, LCRA will allow each irrigation operation the option of either: (1) using up to a maximum authorized volume of interruptible stored water allocated to that operation, or (2) using sufficient water to cultivate a level of acreage agreed upon among the customers within each irrigation operation and LCRA.

10) LCRA's proposed amendments to the WMP also include a change in the procedure for supplying water for instream flow needs at certain locations downstream of Lady Bird Lake.

(a) To the extent that inflows are legally available for storage in Lakes Buchanan and Travis, LCRA will release such inflows to help satisfy target instream flow needs, as set out in Table 2-1 of the WMP, whenever the combined water storage in Lakes Buchanan and Travis on January 1 is at or above 1,400,000 acre-feet.

(b) LCRA will make such releases from Lakes Buchanan and Travis as are needed to help maintain critical instream flows, as set out in Table 2-1 of the WMP, at certain locations downstream of Lady Bird Lake. The level of releases to help maintain critical instream flows will not be limited by the inflows that are legally available for storage in Lakes Buchanan and Travis.

(c) In rare instances, LCRA's ability to meet the instream flow requirements set forth in this WMP may be impaired by certain unavoidable constraints such as the capacity of its hydro-generation units and hydro-generation scheduling mandates as well as unforeseen diversions, unforeseen changes in flow conditions downstream, and adjustments to the ratings of the applicable gages.

11) LCRA's proposed amendments to the WMP include a change in the reservoir operation procedure for providing water for estuarine fresh water inflow needs. The proposed amendment adds an intermediate level of supply for estuarine freshwater inflows that provides for a slightly more gradual reduction of the supply made available to Matagorda Bay than contained in the previously approved WMP. LCRA is required to release water from Lakes Buchanan and Travis to help maintain monthly estuarine inflows in accordance with the following procedure only to the extent that inflows are legally available for storage in Lake Buchanan and Travis as measured at the upstream gages:

(a) when the combined storage in Lakes Buchanan and Travis on January 1 is greater than or equal to 1,700,000 acre-feet, LCRA will release those storable inflows up to but not exceeding the amount needed to provide target freshwater inflow needs; and

(b) when the combined storage in Lakes Buchanan and Travis on January 1 is less than 1,700,000 acre-feet and greater than 1,100,000 acre-feet, LCRA will release those storable inflows up to but not exceeding the amount needed to provide one hundred and fifty percent of the critical freshwater inflow needs; and

(c) when the combined storage in Lakes Buchanan and Travis on January 1 is equal to or less than 1,100,000 acre-feet, LCRA will release those storable inflows up to but not exceeding the amount needed to provide critical freshwater inflows in all years.

12) The proposed amendments are deemed by LCRA as a balance between a modest incremental decrease in irrigation water supplies during drought conditions and modest increased inflow to Matagorda Bay during non-drought years to help maintain ecologically important freshwater inflows to the Bay.

13) Based on LCRA's determination of a balance of environmental and irrigation impacts, the recommended amendments to the WMP include an increase of stored water released for estuarine freshwater inflow. This increase would be provided in years when the January 1 storage level in Lakes Buchanan and Travis is between 1,100,000 and 1,700,000 acre-feet (55 and 86 percent full, respectively).

14) Among the issues raised in the hearing requests filed regarding the proposed amendments was the degree to which the amendments reflected consideration of the best information on environmental flow needs available at that time. While that issue remains in dispute, all parties agree that credible and extensive scientific information relating to environmental flow needs is available at

this time that is not incorporated in this order, but should be considered in developing and implementing an updated version of the WMP in the near future. That credible scientific information includes but is not limited to the August 2006 Matagorda Bay Freshwater Inflow Needs Study; the October 10, 2008 Matagorda Bay Health Evaluation; the March 31, 2008 Lower Colorado River, Texas Instream Flow Guidelines; and data collected by LCRA, TPWD, TWDB, and other agencies and researchers.

15) During the critical drought, LCRA proposes that the total stored water provided for environmental protection remain essentially the same as provided under the previously approved WMP. However, LCRA's proposed amendments provide that more of this commitment be met with firm, rather than interruptible stored water. The firm stored water so designated would increase from 16,950 acre-feet to 33,440 acre-feet. This additional firm commitment would be provided from available, but uncommitted supplies from Lakes Buchanan and Travis.

16) The LCRA Drought Contingency Plan (DCP), as required by Commission rules (30 Texas Administrative Code §§ 288.20 *et seq.*), was approved by the LCRA Board of Directors and submitted to the Commission in April 2000. The 2000 DCP was based on Chapter 4 of the WMP. Under current Commission rules, the DCP must be updated every five years. The DCP filed by LCRA with the Commission in 2000 was updated and approved by the LCRA Board of Directors and submitted to the Commission in April 2005. Consistent with the requirements of Chapter 288 of the Commission rules, LCRA also reviewed its DCP prior to May 1, 2009, but did not make any further changes to the DCP at that time. In December 2009, the LCRA Board approved further modifications to the DCP to reflect customer comment received in response to recent severe drought conditions. LCRA has submitted redline changes to Chapter 4 of the WMP that incorporates these recent changes.

17) On March 29, 1996 the Commission issued an Order severing a portion of the water rights authorized by Certificate of Adjudication No 14-2564 and combining them with LCRA's Certificate of Adjudication No. 14-5478 (Lake Buchanan). Certificate of Adjudication 14-5478C was issued to LCRA on the same date and authorized LCRA to transfer 532 acre-feet of water downstream to Lake Buchanan and consumptively use 500 acre feet per year of this water. Because the priority date of the severed water was senior to LCRA's rights to divert water from Lake Buchanan, LCRA requested and was granted on March 4, 1999, an increase in the Combined Firm Yield of Lakes Buchanan and Travis from 535,812 acre-feet to 536,312 acre-feet.

18) On August 29, 2003, LCRA filed a request with the Commission to cancel Certificate of Adjudication 14-5478C and for the Commission to rescind the March 29, 1996 Order severing water rights from Certificate Adjudication 14-2564 and combining them with LCRA's water rights authorized by Certificate of Adjudication 14-5478. On March 22, 2004, LCRA filed a Request to Abandon Certificate of Adjudication 14-5478C. Based on the abandonment, LCRA proposes that the WMP be amended to reflect a Combined Firm Yield of 535,812 acre-feet of water, which is the amount of the Combined Firm Yield prior to the issuance of Certificate of Adjudication 14-5478C.

19) The WMP contains two appendices: Volume 1, which includes relevant LCRA Board policies, and Volume II, which contains technical information on the WMP and previous amendments. Changes to Volume I will reflect revisions made to LCRA Board polices since 1999. Changes to Volume II will reflect changes in agreements between LCRA and the Colorado River Municipal Water District, delete obsolete appendices, and update LCRA's standard form contracts and raw water contract rules.

20) LCRA supports this Order. In order to provide some certainty and to ensure prompt action on a new revision to the WMP, each of the parties identified in Finding of Fact No. 5 agree not to oppose the approval of this Order.

CONCLUSIONS OF LAW

1) The Commission considered this Order under the authority and in accordance with Chapter 11 of the Texas Water Code, as amended, and 30 Texas Administrative Code ("TAC") Chapter 295.

2) The Commission has jurisdiction to consider and take action on LCRA's application to amend the WMP.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY THAT:

1) LCRA's amended Water Management Plan is approved with the following conditions:

   a) LCRA's amended Water Management Plan is subject to all findings, conclusions, and conditions contained in the Commission's Order dated September 20, 1989, December 23, 1991, December 18, 1992 and March 1, 1999, approving and amending the WMP, except to the extent that this Order specifically provides otherwise.

   b) Notwithstanding any other provision in the revised Water Management Plan, for purposes of establishing LCRA's obligations to supply interruptible stored water for agricultural use within the four major irrigation operations and to provide water for instream flows and freshwater inflows in calendar year 2010, the following shall apply:

      1. LCRA's obligations to provide water for instream flows and freshwater inflows in January 2010 shall be governed by the Water Management Plan in effect on January 1, 2010.

      2. From February 1, 2010 through December 31, 2010, LCRA's obligations shall be governed by the WMP in effect on February 1, 2010. In providing interruptible stored water for agricultural use within the four major irrigation operations and in providing water for instream flows and freshwater inflows during this period, LCRA's obligations shall be determined based on the combined storage in Lakes Buchanan and Travis on February 1, 2010.

   c) LCRA shall implement the provisions of the amended Water Management Plan regarding the provision of instream flows in a manner so as maintain, on an instantaneous basis, instream flows of 46 cfs and 500 cfs critical flows as set forth in Table 2-1 during the times those respective flow values are in effect. During those times when the target instream flow requirements as set forth in Table 2-1 of the WMP are in effect, LCRA will schedule the passage of inflows to lakes Buchanan and Travis that are legally available for storage to maintain the target flows as a daily average. Furthermore, during those times when target instream flow requirements are in effect and when such inflows are sufficient to allow LCRA to satisfy the daily target flow requirement at the Bastrop gage, LCRA will also schedule the passage of

these inflows to maintain the following minimum flows, as measured at any time at the Bastrop gage:

Month	Minimum Flow (cfs) 100% of the time	Minimum Flow (cfs) 95% of the time
January	266	
February	269	
March	233	
April	244	287
May	492	579
June	355	418
July	295	347
August	165	
September	201	
October	208	
November	241	
December	264	

It is hereby recognized that, in rare instances, LCRA's ability to meet the instream flow requirements set forth in this WMP may be impaired by certain unavoidable constraints such as the capacity of its hydro-generation units and hydro-generation scheduling mandates as well as unforeseen diversions, unforeseen changes in flow conditions downstream, and adjustments to the ratings of the applicable gages.

d) For purposes of estimating required releases of water from Lakes Buchanan and Travis to meet the instream flow or freshwater inflow requirements of this WMP, LCRA shall rely on stage data obtained from the gaging system jointly maintained and operated by the U.S. Geological Survey and LCRA for determining these requirements. If the ratings used to convert stage to flow published by LCRA and the USGS are not identical at the time required releases are estimated, LCRA shall have discretion to rely on the latest updated rating of the gage.

e) The approval of the amended WMP does not reflect a final determination, or create a presumption, that the environmental flow provisions contained therein are adequate or appropriate based upon more recent information available at this time.

f) Because of the importance of updating the environmental flow and drought curtailment provisions of the WMP to reflect the best available science and information, LCRA shall promptly initiate, by not later than July 1, 2010, a revision process designed to develop further proposed amendments to the Water Management Plan. The revision process should be reasonably calculated to allow meaningful participation by interested basin stakeholder groups and to achieve regional consensus, where possible.

LCRA shall file an application for approval of proposed amendments with the Executive Director by not later than July 1, 2013. That application shall include a summary of the steps taken by LCRA to further public participation and to achieve consensus, where possible, in developing the proposed amendments. To the extent that the Executive Director determines such application is not administratively complete, LCRA shall make reasonable and good faith efforts to timely provide any

additional information necessary to have the application declared administratively complete at the earliest possible time.

Those proposed amendments shall address, at a minimum, the following:

1. Interruptible curtailment procedures needed to ensure that LCRA can satisfy projected firm customer demand should intense drought conditions such as those experienced over the past several decades recur;

2. An evaluation of the adequacy of the criteria for declaring a drought worse than drought of record;

3. An evaluation of the minimum combined storage of water in Lakes Buchanan and Travis necessary or appropriate to protect firm customers through a repeat of the drought of record or under conditions worse than a drought of record;

4. Incorporation of appropriate changes to reflect LCRA's agreements and obligations to STPNOC under the Settlement Agreement and Amended and Restated Contract, including the Water Delivery Plan;

5. LCRA's agreement with the City of Austin regarding return flows, consistent with Section VIII(C)(1) of the Settlement Agreement by and between the City of Austin and the LCRA Regarding Joint Water Resource Management and the Resolution of Certain Regulatory Matters Pending at the TCEQ, dated June 18, 2007;

6. Revisions to provisions governing the manner in which LCRA provides water from Lakes Buchanan and Travis to address environmental flow needs that shall use the best available scientific information, including the information referenced in Finding of Fact 15, and shall provide water for such needs to the maximum extent reasonable and practicable when considering all public interests as set forth in Texas Water Code §11.147 and any applicable environmental flow standards adopted pursuant to Texas Water Code § 11.1471. Such revisions shall include:

    i. a mechanism for adjusting the manner in which LCRA provides water for environmental flow needs that addresses significant improvements in storage conditions during the course of a year;

    ii. a mechanism for limiting harmful intra-daily fluctuations of instream flows to prevent significant adverse impacts from periods of low flows; and

iii. specification, to the maximum extent reasonable, of an overall instream flow regime.

The Commission hereby directs the Executive Director's staff to make all reasonable efforts to complete its technical review of the application for proposed amendments to the Water Management Plan by not later than one year after the date of LCRA's application is declared administrative complete and, as part of that staff review process, to allow other interested persons who request the opportunity to do so to submit, consistent with the timeline established by Commission staff, information regarding environmental flow issues and other issues addressed by the amendments for consideration. To facilitate the prompt completion of the technical review, LCRA shall respond fully to all requests from the Executive Director's staff for additional information within 30 days after receipt of those requests unless otherwise agreed upon by the Executive Director's staff. Upon completion of the technical review, the application and associated hearing requests, if any, on that application will be given high priority and set for prompt consideration and action by the Commission.

g) Consistent with 30 Tex. Admin. Code Ch. 288, LCRA shall review and update, as appropriate, in accordance with the schedule required by such rules, those portions of Chapter 4 that relate to its Drought Contingency Plan (DCP) that do not change the triggers or amount of curtailment of interruptible supply or the triggers related to instream flows and bay and estuary inflows. Changes to other portions of the DCP, including any changes to LCRA's specific, quantified targets for water use reductions of firm customers required by chapter 288, do not constitute an amendment to the Water Management Plan requiring notice and an opportunity for contested case hearing, but must otherwise comply with the public notice requirements of Chapter 288 of the Commission's rules. Prior to implementing any mandatory firm water customer curtailment allowed under Texas Water Code section 11.039, LCRA shall work with its firm customers to develop a specific water curtailment plan, which must be approved by the LCRA Board and the Commission pursuant to other applicable procedures.

h) Nothing in this Order shall be construed to impair or limit any party's right to contest the LCRA's proposal for incorporating the results of existing or future freshwater inflow or instream flow studies in any future proceedings relating to amendments of the Water Management Plan.

i) Nothing in this Order, other than Findings of Fact 17 and 18, shall be construed as addressing the calculation of the combined firm yield of Lakes Buchanan and Travis and no party shall be deemed to have waived the right to contest in any future proceeding the calculation of the combined firm yield of Lakes Buchanan and Travis solely as a result of this Order.

j) The Commission acknowledges the challenges to the adequacy of the environmental flow provisions included in the proposed amendments to the Water Management Plan previously raised by the Texas Parks and Wildlife Department, National Wildlife Federation, and the Lone Star Chapter of the Sierra Club. Those parties have agreed that compliance by LCRA with the provisions of this Order would eliminate the need for a Commission proceeding

to resolve those challenges. However, in the event that LCRA fails to meet any requirement set out in decretal paragraph (f) above, the Commission expressly recognizes that the issues raised by those challenges will again require consideration. Accordingly, any of those parties may, if it has reason to believe LCRA has failed to meet any such requirement, file, with the Office of the Chief Clerk, a written request seeking a hearing on the adequacy of environmental flow provisions approved by this Order and detailing the alleged failure by LCRA to comply with the requirements of decretal paragraph (f). Any such hearing request shall be set for prompt consideration by the Commission and, subject to compliance with routine requirements for hearing requests, shall be granted unless the Commission determines that LCRA has fully complied with the requirements of decretal paragraph (f).

k) LCRA agrees to be bound by the terms, conditions and provisions contained herein and such agreement is a condition precedent to the approval of the proposed amendments.

l) LCRA shall conform the text of the Water Management Plan to be consistent with the provisions of this Order.

2) The Chief Clerk of the Texas Commission on Environmental Quality shall forward a copy of this Order, to all parties.

3) If any part of this Order held to be invalid, the invalidity of any portion shall not affect the validity of the remainder of the Order.

4) Nothing in LCRA's Water Management Plan, as amended, or this Order shall be construed to impair, or to authorize LCRA or any other person or entity to impair, senior or superior water rights in the Colorado River Basin.

For the Commission

DATE ISSUED JAN 27 2010

NO. 115,414-A-1

IN RE: THE EXCEPTIONS OF THE LOWER COLORADO RIVER AUTHORITY AND THE CITY OF AUSTIN TO THE ADJUDICATION OF WATER RIGHTS IN THE LOWER COLORADO RIVER SEGMENT OF THE COLORADO RIVER BASIN	§ § § § § § §	IN THE DISTRICT COURT OF BELL COUNTY, TEXAS 264TH JUDICIAL DISTRICT

FINAL JUDGMENT AND DECREE

BE IT REMEMBERED that on the 20 day of April, 1988 came on to be heard the Joint Motion to Enter Final Judgment and Decree of the Texas Water Commission (the "Commission"), the Lower Colorado River Authority ("LCRA"), and the City of Austin (the "City"), and the Court being of the opinion that said motion should be granted, it is therefore,

ORDERED, ADJUDGED AND DECREED as follows:

I.

The City's water rights are defined by the findings of fact and conclusions of law found on pages 21-23 of the Final Determination entered by the Commission on July 29, 1985 in this matter (the "Final Determination"). These findings and conclusions are hereby modified in their entirety to read as set forth in Attachment No. 1 hereto.

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II.

LCRA's water rights with respect to the Highland Lakes are defined by the findings and conclusions found on pages 89-96 of the Final Determination. The findings and conclusions found on pages 90-91 relating to the Highland Lakes generally are hereby deleted in their entirety, and the remaining findings and conclusions relating to each of the Highland Lakes specifically are hereby modified in their entirety to read as set forth in Attachment No. 2 hereto.

III.

LCRA's water rights with respect to its Lakeside Water Division are defined by the findings and conclusions found on pages 76-77 of the Final Determination. These findings and conclusions are hereby modified in their entirety to read as set forth in Attachment No. 3 hereto.

IV.

LCRA's water rights with respect to its Gulf Coast Water Division are defined by the findings and conclusions found on pages 82-84 of the Final Determination. These findings and conclusions are hereby modified in their entirety to read as set forth in Attachment No. 4 hereto.

V.

All other portions of the Final Determination which define water rights of the City and LCRA are hereby affirmed.

VI.

This Final Judgment and Decree is final and conclusive as to all water rights and claims to water rights of the City and LCRA in the Lower Colorado River Segment, Colorado River Basin, as adjudicated herein. This Judgment is without prejudice to any further permits or amendments to the water rights of the City and LCRA issued by the Texas Water Commission after January 1, 1983. Such amendments shall be treated as if issued under § 11.336 of the Texas Water Code. All claims of water rights of the City and LCRA as of January 1, 1983 which were made under § 11.303 or § 11.307 of the Texas Water Code and which are not recognized herein or in other orders of the Court are hereby denied.

VI.

The Texas Water Commission is directed to take such action as is required by the Texas Water Rights Adjudication Act, §§ 11.301 et seq., Texas Water Code, to implement this Final Judgment and Decree.

SIGNED this 20 day of April, 1988.

/s/ J. F. CLAWSON
JUDGE PRESIDING

MODIFIED FINDINGS AND CONCLUSIONS DEFINING LCRA'S WATER RIGHTS WITH RESPECT TO THE HIGHLAND LAKES

WATER RIGHT CLAIMS

OF THE

LOWER COLORADO RIVER AUTHORITY (LCRA)

IN

THE HIGHLAND LAKES

LOWER COLORADO RIVER

SEGMENT ADJUDICATION

ATTACHMENT NO. 2 TO JUDGMENT
IN CAUSE NO. 115,414-A-1

DIVERSION POINTS NOS. (MCRS): 2280 and 2290 (Lake Buchanan)
TRACT NO: None

OWNERSHIP: Lower Colorado River Authority (LCRA)

IR. (MCRS): 250-252
APP. (MCRS): 25-26
XII/II SF 1-1128
(MCRS) II Contest SF 95-138
(LCRS) Contest SF Vols. III, IV, V and VII

SECTION 11.307 CLAIM: Under Permits Nos. 954 and 1259 and Section 11.303 Claim No. 5550 to maintain a dam and 992,475 acre-foot capacity reservoir on the Colorado River (Lake Buchanan) and to impound, divert and use therefrom 1,391,530 acre-feet of water per year at a maximum diversion rate of 3630 cfs for "hydroelectric, municipal, domestic, industrial, etc." purposes, with a priority date of June 29, 1913 and prior. (Exh. J8)

FINDINGS:

1. The LCRA is the owner of Permit No. 1259, which authorized the construction and maintenance of a dam and approximately 1,000,000-acre-foot capacity reservoir on the Colorado River in Llano and Burnet Counties and the impoundment, diversion and use therefrom of 1,391,530 acre-feet of the ordinary and storm and flood flows of the Colorado River for domestic, municipal, (industrial), irrigation, mining and hydroelectric power purposes. (Exh. 10a)

2. A special condition in Permit No. 1259 authorizes the LCRA to use the bed and banks of the Colorado River for the purpose of conveying the impounded water to diversion points downstream for the uses authorized. (Exh. J10a)

3. Another special condition in the permit concerns Permit No. 954:

> The dam for which this permit is granted has been constructed by virtue and under the terms of Permit No. 954, heretofore granted by the Board to the Syndicate Power Company of Dallas, Texas, and the alterations and modifications thereof heretofore set out by declarations filed with the Board, as prescribed by Statute, and this permit shall be cumulative of and in addition to said Permit No. 954, and of the rights covered by said permit; provided that the total quantity of water to be impounded, diverted and appropriated shall not exceed the quantity set out in paragraph four of this permit.

(Exh. J10a)

4. Paragraph four of Permit No. 1259 recites that of the 1,391,530 acre-feet authorized to be appropriated by the permit, ". . . 1,225,700 acre-feet per annum have heretofore been granted under Permit

No. 954, the total amount to be appropriated under both permits not to exceed. . .1,391,530 acre-feet per annum." (Exh. J10a)

5. Application No. 1345 for Permit No. 1259 was filed with the Board of Water Engineers on March 7, 1938, and the permit was issued on May 25, 1938. (Exh. J10a)

6. The LCRA is the owner of Permit No. 954, which authorized the construction and maintenance of a dam and 831,020 acre-foot capacity reservoir on the Colorado River in Llano and Burnet Counties and the impoundment, diversion and use therefrom of 1,225,700 acre-feet of water per year for "power development" (hydroelectric) purposes. (Exh. J13a)

7. Application No. 1024 for Permit No. 954 was filed with the Board of Water Engineers on March 29, 1926, and the permit was issued on May 15, 1926. (Exh. J13a)

8. Lake Buchanan is located on the Colorado River in Burnet and Llano Counties. Buchanan Dam is located at diversion point D-2280 on the Colorado River in Survey No. 32, Burnet County, and Survey No. 12, Llano County, at the site authorized by Permit No. 1259 and approximately 4.5 miles upstream of the site authorized by Permit No. 954. (Exhs. 7 at p. 26, J10a, J13a; SF 105-106, 110-111)

9. Construction was commenced on Buchanan Dam about April, 1931, and was completed in 1938 with the first deliberate impoundment of water on May 20, 1937. The first hydropower generating unit was placed in operation in January, 1938. (Exhs. J13d-e, J90; SF 361, 379-381)

10. The impounding capacity of Lake Buchanan, as constructed, was approximately 992,000 acre-feet. (Exhs. J87, J90, 1231; SF 106-114, 293-294; Contest SF 105-106)

11. Permit No. 1259 authorized a dam 160 feet high and 11,000 long. Permit No. 954 authorized a dam 165 feet high and 2,500 feet long. (Exhs. J10a, J13a)

12. Buchanan Dam is 145.5 to 150.5 feet high and approximately 11,200 feet long. (Exhs. J90, J120; SF 106)

13. A "Statement of Proposed Alteration of Plans under Permits to Appropriate Public Waters of the State of Texas," dated April 25, 1931, was filed with the Board of Water Engineers by the Emery, Peck and Rockwood Development Company, transferee of several permits, including Permit No. 954, from the Syndicate Power Company. The statement purported to be filed under TEX. REV. CIV. STAT. ANN. article 7495, repealed, Tex. Laws 1971, ch. 58 at 658. The statement proposed to construct the dam authorized under Permit No. 954 at a location on the Colorado River different from

that specified by the permit. The dam was proposed to be built at a height of 137 feet and length of 9,000 feet and having a storage capacity of 1,000,000 acre-feet. The statement further proposed to construct another dam approximately 70 feet high at the location specified by Permit No. 954. The statement recited that construction had begun on the larger dam; that a plan of the construction had been filed with the statement; and that additional detailed plans would be filed with the Board showing the size, location and character of the two additional dams to be constructed under Permits Nos. 954 and 955. (Exh. J13d)

14. On some date subsequent to November 3, 1936, the LCRA filed a request for extension of time for commencing or completing work under Permits Nos. 951, 952, 953, 954, 955 and 998. In this request, it was stated that construction of Buchanan Dam had begun about the month of April, 1931, and was nearing completion. It was further declared that Buchanan Dam had been built to a height of approximately 160 feet and a length of approximately 11,000 feet and would impound approximately 1,000,000 acre-feet of water. The location of the dam was shown on an attached plat. The request stated that complete plans and specifications of Buchanan Dam were on file with the Board of Water Engineers and that construction was nearing completion of a dam at the original site authorized by Permit No. 954, which was being called Inks Dam. (Exh. J13e)

15. Lake Buchanan is a variable level lake which was constructed primarily for hydropower generation and water supply, rather than flood control. There are three hydropower turbines located at Buchanan Dam with a discharge capacity of 1210 cfs each and a maximum hydropower generation capability of 36 megawatts. Due to the limited capacity of the Inks Dam turbines, normal operation is the generation of 24 megawatts with a 2420 cfs discharge rate through the turbines. (SF 323-328, 356, 375, 776-778, 785, 852)

16. There is a pump-back unit installed at diversion point D-2290 on Inks Lake just downstream from Buchanan Dam. The purpose of this unit is to pump water from Inks Lake back into Lake Buchanan to be reused for hydroelectric purposes. There are no interjacent appropriators between Buchanan Dam and D-2290. LCRA is authorized to use water at Buchanan and Inks Dams for hydroelectric generation and to use the bed and banks of the Colorado River to convey water for that purpose, among others. (Exhs. 7 at 25, J10a, J11, J13a, J13d-e; SF 110-111, 828-829)

17. The maximum amount of water used for hydropower purposes at Buchanan Dam was 1,679,300 acre-feet in 1958. (Exhs. J51a-jj, J136)

18. Permit 1259B, granted April 25, 1985, is a contractual amendment to Permit 1259 authorized under

the Texas Water Commission's Rules. Permit 1259B authorizes the Colorado River Municipal Water District (CRMWD) to divert at Stacy Reservoir water to which LCRA would otherwise be entitled under Permit 1259. Permit 1259B authorizes the diversion of 88,000 acre-feet per year for domestic and municipal use, and 25,000 acre-feet per year for industrial purposes. Permit 1259B was issued pursuant to a Settlement Agreement dated February 26, 1985 between CRMWD and LCRA, and the authorization to divert water at Stacy Reservoir shall remain effective only so long as the Settlement Agreement remains in effect. Permit 1259B contains the following language (paragraph 1(b)).

> Under Permit No. 1259 and this amendment, the maximum combined diversions of LCRA at or below Lake Buchanan for domestic, municipal, industrial, irrigation, mining and hydroelectric generation purposes and that of CRMWD at Stacy Reservoir for domestic, municipal and industrial purposes shall not exceed 1,391,530 acre-feet of water per annum, or such amount as may be finally determined in the proceedings of adjudication of all claims of water rights in the Lower Colorado River Segment.

Permit No. 1259, as amended by Permit No. 1259B, is hereinafter referred to as "Permit No. 1259."

19. The Highland Lakes and the Colorado River above and below the Highland Lakes should be managed together as a single system for water supply purposes. Major goals in the management of the system include maximizing the beneficial use of water derived from inflows below the Highland Lakes, and stretching and conserving the water stored in the Highland Lakes. In order to achieve these goals, the system should be managed in accordance with the following general guidelines:

    a. To the extent allowed by law, all demands for water from the Colorado River downstream of the Highland Lakes should be satisfied first pursuant to water rights to the run-of-river flow of the Colorado River.

    b. Inflows should be passed through the Highland Lakes to honor downstream senior water rights only to the extent that demands under those rights cannot be satisfied by the inflows below the Highland Lakes.

    c. Water should be released from conservation storage in Lakes Travis and Buchanan to satisfy downstream demands for authorized purposes (municipal, industrial, irrigation and mining) only to the extent that such demands cannot be satisfied pursuant to independent run-of-river water rights.

    d. Firm, uninterruptible commitments of water from conservation storage in Lakes Travis and

Buchanan should not exceed the Combined Firm Yield of such lakes (hereinafter defined).

e. Water from conservation storage in Lakes Travis and Buchanan may be available for supply on an interruptible basis at any time that the actual demand for stored water under firm, uninterruptible commitments is less than the Combined Firm Yield. To the extent that a demand for water may exist on a non-firm, interruptible basis, such stored water should be made available.

f. The supply of stored water pursuant to non-firm, interruptible commitments should be interrupted or curtailed to the extent necessary to allow LCRA to satisfy all existing and projected demands for stored water pursuant to all firm, uninterruptible commitments.

g. Water should not be released through any dam solely for hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for stored water from Lakes Travis and Buchanan pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments.

20. Water is supplied from conservation storage in Lakes Travis and Buchanan by the direct diversion of stored water from such lakes, the release of stored water from such lakes for downstream delivery, and the impoundment, diversion or use of the flows of the Colorado River and its tributaries upstream of such lakes pursuant to subordination and other agreements. Under the basic system management plan outlined above, the demand for stored water from Lakes Travis and Buchanan will be erratic. The demand for such water will vary greatly from year to year, depending upon the climatic conditions and the locations, amounts and distributions of demands during each year. It is currently estimated that the peak annual demand for stored water in the reasonably foreseeable future will not exceed 1,500,000 acre-feet in any year. Such a demand may occur during years in which the inflows below the Highland Lakes are very low. Such a demand may also occur in other years, if a large demand for water on a non-firm, interruptible basis should develop.

21. The amount of water that the Highland Lakes/Colorado River system can supply each year on a firm basis through a repeat of the drought of record will vary greatly from time to time in the future, depending upon factors such as the locations of points of diversion and the demand for water at each diversion point. Generally, in order to provide a firm supply of water for a given annual demand, less stored water is needed to firm up the run-of-river supply as the point of diversion is

moved farther downstream. Assuming that large municipal, industrial and irrigation demands will continue to exist downstream of the Highland Lakes, the firm yield of the entire system will exceed the Combined Firm Yield of Lakes Travis and Buchanan.

22. The Combined Firm Yield is less than the Combined Theoretical Yield. The "Combined Theoretical Yield" is the amount of water that could be supplied from conservation storage in Lakes Travis and Buchanan during each year of a simulated repeat of the drought of record, as calculated pursuant to studies that assume the following:

    a. Inflows to Lakes Travis and Buchanan are those flows that would occur in the Colorado River at the site of Mansfield Dam if the Highland Lakes did not exist and there were no other impoundment, diversion or use of the flows of the Colorado River and its tributaries upstream of that point.

    b. No portion of the inflows will be passed through Mansfield Dam to honor downstream senior water rights.

    c. Lakes Travis and Buchanan will be operated together as a system so as to maximize the yield of that system.

    The "Combined Firm Yield" is that portion of the Combined Theoretical Yield remaining after it is assumed that inflows will be reduced by honoring upstream senior water rights and/or passed through Mansfield Dam to honor downstream senior water rights, in accordance with the relative priorities of such rights, except to the extent that the holder of any such right may agree otherwise. In determining the Combined Firm Yield, it is assumed that each senior water right will be exercised to the full extent authorized, except to the extent that the holder of such right may agree otherwise, or unless the Commission otherwise approves. The Combined Firm Yield may be expressed as a constant amount of water annually, or as an average annual amount of water over a defined period of years. The Combined Firm Yield cannot be determined until after the Adjudication is final, and such yield may change from time to time in the future. However, at the present time it is estimated that the Combined Firm Yield is not less than 500,000 acre-feet of water per year. As discussed above, this amount may also be expressed as an average of 500,000 acre-feet per year over any five consecutive calendar-year period, or a total of 2,500,000 acre-feet over any such period. The Commission will determine the Combined Firm Yield, and whether such yield is expressed as an average annual amount of water over a defined period of years, in its adoption of a Management Plan (hereinafter defined).

23. Subordination of hydroelectric rights will greatly increase the amount of water that LCRA has

available to supply from Lakes Travis and Buchanan for other purposes of use. LCRA in the past has subordinated its own hydroelectric rights to its rights to store and use water for other purposes. The City of Austin's early-priority hydroelectric right at Tom Miller Dam under C.F. 330 is the only hydroelectric right in the basin that is senior to Permit Nos. 1260 and 1259 for Lakes Travis and Buchanan, other than those held by LCRA. The City leased such right to LCRA pursuant to the 1938 and 1966 Agreements between the City and LCRA. LCRA in the past has also subordinated the C.F. 330 hydroelectric right that it leased from the City to LCRA's rights to store and use water for other purposes.

24. The extent to which additional stored water will be available in any year, after satisfying all existing and projected demands for stored water pursuant to all firm, uninterruptible commitments, can be defined at the beginning of that year pursuant to a rule curve or other analysis based on conditions that exist at that time. The availability of such additional stored water can be confirmed or redefined at other times during that year by one or more additional analyses at other times during that year based on conditions that exist at such times.

25. LCRA's right to use water from Lakes Travis and Buchanan for purposes other than hydroelectric generation, and the initial conditions for the commitment and supply of such water, should be defined as follows:

> LCRA is recognized a right under Permits Nos. 1260 and 1259 to divert and use water from Lakes Travis and Buchanan for municipal, industrial, irrigation and mining purposes, with a priority date of March 7, 1938. LCRA may diligently develop such right to a maximum aggregate diversion and use of water for such purposes from Lakes Travis and Buchanan of not to exceed 1,500,000 acre-feet in peak-use years, with a priority date of March 7, 1938, subject to the following conditions:
>
> (a) LCRA shall prepare and submit to the Commission, on or before December 31, 1988, a proposed reservoir operation plan which shall include such studies and other information as may be required by the Commission to determine the Combined Firm Yield of Lakes Travis and Buchanan (as defined in Finding 22, above) and demonstrate LCRA's compliance with, and its ability to comply with, these special conditions (the "Management Plan"). In making its decision on the adoption of an Management Plan, the Commission shall consider all relevant public policies including, without limitation, the following:

(1) recognition of the necessity of beneficial inflows from the Colorado River into the Lavaca-Tres Palacios Estuary consistent with § 11.147 of the Texas Water Code;

(2) protection of fish and wildlife habitats consistent with § 11.147 of the Texas Water Code;

(3) consideration of the effects, if any, on existing instream uses and water quality consistent with § 11.147 of the Texas Water Code;

(4) mitigation of adverse impacts, if any, on wildlife habitats inundated by new reservoir construction;

(5) mitigation of adverse environmental impacts, if any, caused by new projects taking, storing or diverting in excess of 5,000 acre-feet per year consistent with § 11.152 of the Texas Water Code; and

(6) recognition of the Commission's statutory authority to require water conservation under § 11.134(b)(4).

The Commission shall consider LCRA's proposal prior to adopting the initial Management Plan. The Management Plan may be amended from time to time upon the request of LCRA or on the Commission's own motion. The initial proceeding to consider the adoption of the Management Plan, and any major amendment thereof, shall be pursuant to contested case procedures. Any proceeding to consider the adoption or major amendment of the Management Plan shall be preceded by notice and opportunity to request a hearing in accordance with the Commission's regulations applicable to water rights permitting proceedings. The Texas Parks and Wildlife Department, at its option, may be a party in any such proceeding, in the same manner as it would be a party to a proceeding before the Commission incident to an application for a permit governed by Section 11.147 of the Texas Water Code. The Commission shall name as other parties persons that establish a justiciable interest in the proceeding. In making a final decision on the adoption of a Management Plan and any amendment thereof, the Commission, in addition to other information, evidence, and testimony presented, shall consider all information, evidence, and testimony presented by the Texas Parks and Wildlife Department, including, without

limitation, any memorandum of understanding between LCRA and Texas Parks and Wildlife Department relating to the management of the Highland Lakes.

(b) LCRA shall prepare and submit to the Commission, on or before March 1 of each year beginning with March 1, 1990, a report which documents compliance with the Management Plan and these special conditions during the previous year. Such report shall be in a form approved by the Executive Director.

(c) Except as provided in Special Condition (i), below, LCRA shall not supply or commit to supply any water under Permits Nos. 1260 or 1259 to any other party except pursuant to a written contract between LCRA and such party that defines such commitment.

(d) LCRA shall not supply or commit to supply any water under Permits Nos. 1260 or 1259 to itself for use by itself or other parties except pursuant to resolution adopted by LCRA's Board of Directors that defines such commitment.

(e) Each commitment by LCRA to supply water under Permits Nos. 1260 or 1259 shall be considered to be on a firm, uninterruptible basis unless the contract, resolution or special condition defining such commitment specifically provides that such commitment "is subject to interruption or curtailment."

(f) LCRA shall not commit to supply water under Permits Nos. 1260 and 1259 on a firm, uninterruptible basis in excess of the Combined Firm Yield of Lakes Travis and Buchanan. During the period beginning as of January 1, 1988 until such time as the Management Plan is submitted and approved by the Commission, LCRA shall not enter into any contract or adopt any resolution by which it commits to supply any water under Permits Nos. 1260 or 1259 on a firm, uninterruptible basis, unless:

(1) the aggregate of all firm, uninterruptible commitments of water under Permits Nos. 1260 or 1259, including the commitment made pursuant to such contract or resolution, does not exceed 2,500,000 acre-feet over any five consecutive calendar-year period; or

(2) the commitment made pursuant to such contract or resolution is for municipal use, and such commitment does not exceed 10,000 acre-feet of water per year; or

(3) such contract or resolution is specifically approved by either the Executive Director or the Commission pursuant to this special condition (f).

(g) LCRA shall interrupt or curtail the supply of water under Permits Nos. 1260 and 1259 pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demands for water under such permits pursuant to all firm, uninterruptible commitments. Commitments to supply water on a non-firm, interruptible basis may be interrupted or curtailed as necessary either on a pro-rata basis or in accordance with a system of priorities, as may be set forth in the various contracts and resolutions that define such commitments.

(h) LCRA shall not impose its priority under Permits Nos. 1260 and 1259 against any junior permanent water right with a priority date senior to November 1, 1987, except to the extent that:

(1) LCRA would have the right to impose such priority against such water right if LCRA's right under Permits Nos. 1260 and 1259 to divert and use water from Lakes Travis and Buchanan were limited to the Combined Firm Yield of such lakes; or

(2) the holder of such water right has agreed, or in the future agrees, otherwise.

(i) LCRA shall supply water under Permits Nos. 1260 and 1259 to or for the benefit of any downstream water right with a priority date junior to December 1, 1900 and senior to November 1, 1987 that authorizes the diversion of not more than 3000 acre-feet of water per year, to the extent that:

(1) the holder of such water right applies to the Commission for release of such water; and

(2) the Commission finds that, but for the exercise of priority claims under Certified Filings Nos. 44, 107, 330 and 376:

[a] water would be available for diversion from the natural flow of the Colorado River or tributary thereof at an

authorized point of diversion under such water right; and

[b] applicant's water right would entitle him to divert such water;

provided, however, that LCRA shall not be obligated to supply more than 20,000 acre-feet of water in any year pursuant to this Special Condition (i); that this commitment is subject to interruption or curtailment pro rata with other long-term interruptible commitments of LCRA; and that LCRA shall not be obligated to supply water under this special condition to or for the benefit of a temporary or term permit beyond the initial term thereof.

(j) LCRA may from time to time apply to the Commission for amendment of the above special conditions pursuant to Commission rules.

Additionally, LCRA's rights to use water for hydroelectric generation should include conditions that generally subordinate such rights to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, irrigation or industrial purposes. Such conditions should specifically prohibit the release of water through its dams solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments.

CONCLUSIONS:

1. The alterations in the location and specifications of Buchanan Dam and Lake Buchanan from those originally authorized by Permit No. 954 were authorized by the substantial compliance with TEX. REV. CIV. STAT. ANN. art. 7495, repealed, Tex. Laws 1971, ch. 58 at 658.

2. LCRA is recognized a right under Permits Nos. 954 and 1259 to maintain an existing dam (Buchanan Dam) at diversion point D-2280 on the Colorado River in Survey No. 32, Burnet County, and Survey No. 12, Llano County, creating a reservoir (Lake Buchanan) with an impounding capacity of 992,475 acre-feet and to use the impounded water for recreation purposes without right of diversion, with a priority date of March 29, 1926.

3. LCRA is recognized a right under Permits Nos. 954 and 1259 to divert and use water through Buchanan

Dam at a maximum rate of 3630 cfs for the purpose of hydroelectric generation, with a priority date of March 29, 1926, subject to the following conditions:

(a) Such right is subordinated to the extent set forth in TEX. REV. CIV. STAT. ANN. art. 8280-107, as amended, Tex. Laws 1975, ch. 74 at 179, as such act may be amended from time to time (the "LCRA Act").

(b) Such right is further subordinated, to the extent that it may not be subordinated pursuant to the LCRA Act, as follows:

(1) LCRA shall not release water through Buchanan Dam solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments; and

(2) To the extent that water is released through Buchanan Dam solely for the purpose of hydroelectric generation, such right is specifically subordinated, as to priority, to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, industrial, irrigation and/or mining purposes, except during emergency shortages of electricity, and during other times to the extent that the holder of any such upstream right has agreed, or in the future agrees, otherwise.

4. LCRA is recognized a right under Permits Nos. 1260 and 1259 to divert and use water from Lakes Travis and Buchanan for municipal, industrial, irrigation and mining purposes, with a priority date of March 7, 1938. LCRA may diligently develop such right to a maximum aggregate diversion and use of water for such purposes from Lakes Travis and Buchanan of not to exceed 1,500,000 acre-feet in peak-use years, with a priority date of March 7, 1938, subject to the following conditions:

(a) LCRA shall prepare and submit to the Commission, on or before December 31, 1988, a proposed reservoir operation plan which shall include such studies and other information as may be required by the Commission to determine the Combined Firm Yield of Lakes Travis and Buchanan (as defined in Finding 22, above) and demonstrate LCRA's compliance with, and its ability to comply with, these special conditions (the

"Management Plan"). In making its decision on the adoption of an Management Plan, the Commission shall consider all relevant public policies including, without limitation, the following:

(1) recognition of the necessity of beneficial inflows from the Colorado River into the Lavaca-Tres Palacios Estuary consistent with § 11.147 of the Texas Water Code;

(2) protection of fish and wildlife habitats consistent with § 11.147 of the Texas Water Code;

(3) consideration of the effects, if any, on existing instream uses and water quality consistent with § 11.147 of the Texas Water Code;

(4) mitigation of adverse impacts, if any, on wildlife habitats inundated by new reservoir construction;

(5) mitigation of adverse environmental impacts, if any, caused by new projects taking, storing or diverting in excess of 5,000 acre-feet per year consistent with § 11.152 of the Texas Water Code; and

(6) recognition of the Commission's statutory authority to require water conservation under § 11.134(b)(4).

The Commission shall consider LCRA's proposal prior to adopting the initial Management Plan. The Management Plan may be amended from time to time upon the request of LCRA or on the Commission's own motion. The initial proceeding to consider the adoption of the Management Plan, and any major amendment thereof, shall be pursuant to contested case procedures. Any proceeding to consider the adoption or major amendment of the Management Plan shall be preceded by notice and opportunity to request a hearing in accordance with the Commission's regulations applicable to water rights permitting proceedings. The Texas Parks and Wildlife Department, at its option, may be a party in any such proceeding, in the same manner as it would be a party to a proceeding before the Commission incident to an application for a permit governed by Section 11.147 of the Texas Water Code. The Commission shall name as other parties persons that establish a justiciable interest in the proceeding. In making a final decision on the adoption of a

Management Plan and any amendment thereof, the Commission, in addition to other information, evidence, and testimony presented, shall consider all information, evidence, and testimony presented by the Texas Parks and Wildlife Department, including, without limitation, any memorandum of understanding between LCRA and Texas Parks and Wildlife Department relating to the management of the Highland Lakes.

(b) LCRA shall prepare and submit to the Commission, on or before March 1 of each year beginning with March 1, 1990, a report which documents compliance with the Management Plan and these special conditions during the previous year. Such report shall be in a form approved by the Executive Director.

(c) Except as provided in Special Condition (i), below, LCRA shall not supply or commit to supply any water under Permits Nos. 1260 or 1259 to any other party except pursuant to a written contract between LCRA and such party that defines such commitment.

(d) LCRA shall not supply or commit to supply any water under Permits Nos. 1260 or 1259 to itself for use by itself or other parties except pursuant to resolution adopted by LCRA's Board of Directors that defines such commitment.

(e) Each commitment by LCRA to supply water under Permits Nos. 1260 or 1259 shall be considered to be on a firm, uninterruptible basis unless the contract, resolution or special condition defining such commitment specifically provides that such commitment "is subject to interruption or curtailment."

(f) LCRA shall not commit to supply water under Permits Nos. 1260 and 1259 on a firm, uninterruptible basis in excess of the Combined Firm Yield of Lakes Travis and Buchanan. During the period beginning as of January 1, 1988 until such time as the Management Plan is submitted and approved by the Commission, LCRA shall not enter into any contract or adopt any resolution by which it commits to supply any water under Permits Nos. 1260 or 1259 on a firm, uninterruptible basis, unless:

(1) the aggregate of all firm, uninterruptible commitments of water under Permits Nos. 1260 or 1259, including the commitment made pursuant to such contract or resolution, does not exceed 2,500,000 acre-feet over

any five consecutive calendar-year period; or

(2) the commitment made pursuant to such contract or resolution is for municipal use, and such commitment does not exceed 10,000 acre-feet of water per year; or

(3) such contract or resolution is specifically approved by either the Executive Director or the Commission pursuant to this special condition (f).

(g) LCRA shall interrupt or curtail the supply of water under Permits Nos. 1260 and 1259 pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demands for water under such permits pursuant to all firm, uninterruptible commitments. Commitments to supply water on a non-firm, interruptible basis may be interrupted or curtailed as necessary either on a pro-rata basis or in accordance with a system of priorities, as may be set forth in the various contracts and resolutions that define such commitments.

(h) LCRA shall not impose its priority under Permits Nos. 1260 and 1259 against any junior permanent water right with a priority date senior to November 1, 1987, except to the extent that:

(1) LCRA would have the right to impose such priority against such water right if LCRA's right under Permits Nos. 1260 and 1259 to divert and use water from Lakes Travis and Buchanan were limited to the Combined Firm Yield of such lakes; or

(2) the holder of such water right has agreed, or in the future agrees, otherwise.

(i) LCRA shall supply water under Permits Nos. 1260 and 1259 to or for the benefit of any downstream water right with a priority date junior to December 1, 1900 and senior to November 1, 1987 that authorizes the diversion of not more than 3000 acre-feet of water per year, to the extent that:

(1) the holder of such water right applies to the Commission for release of such water; and

(2) the Commission finds that, but for the exercise of priority claims under Certified Filings Nos. 44, 107, 330 and 376:

[a] water would be available for diversion from the natural flow of the Colorado River or tributary thereof at an authorized point of diversion under such water right; and

[b] applicant's water right would entitle him to divert such water;

provided, however, that LCRA shall not be obligated to supply more than 20,000 acre-feet of water in any year pursuant to this Special Condition (i); that this commitment is subject to interruption or curtailment pro rata with other long-term interruptible commitments of LCRA; and that LCRA shall not be obligated to supply water under this special condition to or for the benefit of a temporary or term permit beyond the initial term thereof.

(j) LCRA may from time to time apply to the Commission for amendment of the above special conditions pursuant to Commission rules.

The rights recognized in this Conclusion 4 are duplicative of, and are not in addition to, those rights recognized in Conclusion 6 relating to LCRA's rights in Lake Travis, below.

5. LCRA is recognized a right to use the bed and banks of the Colorado River to convey water released from Lake Buchanan for use by LCRA or others entitled to use such water in the amounts and for the purposes recognized herein.

6. LCRA is recognized a right to maintain and operate its existing pump-back unit at diversion point D-2290, as an aid in utilizing the water authorized in Permits Nos. 954 and 1259 for hydroelectric purposes.

DIVERSION POINTS NOS. (MCRS): 2290 and 2380 (Inks Lake)
TRACT NO: None

OWNERSHIP: Lower Colorado River Authority (LCRA)

IR. (MCRS): 260-261
APP. (MCRS): 25-26
XII/II SF 1-1128
(MCRS) II Contest SF 95-138
(LCRS) Contest SF Vols. III, IV, V and VII

SECTION 11.307 CLAIM: Under Permit No. 1259A and Section 11.303 Claim No. 5549 to maintain a dam and a 17,545 acre-foot capacity reservoir on the Colorado River and to impound, divert and use therefrom 1,391,530 acre-feet of water per year at a maximum diversion rate of 2600 cfs for hydroelectric purposes at an unspecified diversion rate, with a priority date of June 29, 1913 and prior. (Exh. J8)

FINDINGS:

1. The LCRA is the owner of Permit No. 1259A, which authorized the construction and maintenance of a 16,400 acre-foot capacity reservoir on the Colorado River in Llano and Burnet Counties and the impoundment, diversion and use therefrom of 1,391,530 acre-feet of water per year for hydroelectric power purposes.

2. A special condition in the permit concerns Permit No. 954:

> The dam for which this permit is granted has been constructed by virtue and under the terms of Permit No. 954, heretofore granted by the Board to the Syndicate Power Company of Dallas, Texas, and the alterations and modifications thereof heretofore set out by declarations filed with this Board, as prescribed by Statute, and this permit shall be cumulative of and in addition to said Permit No. 954, and of the rights covered by said permit; provided that the total quantity of water to be impounded, diverted and appropriated shall not exceed the quantity set out in paragraph four hereof.

   (Exh. J11)

3. Paragraph four of Permit No. 1259A declares that of the 1,391,530 acre-feet authorized to be appropriated, ". . . 1,225,700 acre-feet of water per annum have heretofore been granted under Permit No. 954, the total amount to be appropriated under both such permits not to exceed . . . 1,391,530 acre-feet per annum." (Exh. J11)

4. Application No. 1345 for Permit No. 1259A was filed with the Board of Water Engineers on March 7, 1938, and the permit was issued on May 25, 1938. (Exh. J11)

5. The LCRA is the owner of Permit No. 954, which authorized the construction and maintenance of a dam and 831,020 acre-foot capacity reservoir on the Colorado River in Llano and Burnet Counties and the impoundment, diversion and use therefrom of 1,225,700 acre-feet of water per year for "power development" (hydropower) purposes. (Exh. J13a)

6. Application No. 1024 for the permit was filed with the Board of Water Engineers on March 29, 1926, and Permit No. 954 was issued on May 15, 1926. (Exh. J13a)

7. Inks Lake is located on the Colorado River in Llano and Burnet Counties. Inks Dam is located at diversion point D-2380 on the Colorado River in Survey No. 531, Burnet County, and Survey No. 8, Llano County, at the site authorized by Permit No. 1259A and approximately 1.5 miles upstream of the site authorized by Permit No. 954. (Exhs. 7, p. 26, J11, J13a; SF 114-117)

8. Construction of Inks Dam began in 1936 and was completed in 1938 with the first deliberate impoundment of water in 1938. Hydropower generation began in June, 1938. (Exh. J90; SF 361-362)

9. The impounding capacity of Inks Lake is approximately 17,545 acre-feet. (Exh. J90, SF 114-117)

10. Permit No. 1259A authorized a dam 102 feet high and 1500 feet long. Permit No. 954 authorized a dam 165 feet high and 2500 feet long. (Exhs. J11, J13a)

11. Inks Dam is 98.5 feet to 100 feet high and 1550 feet long. (Exh. J90; SF 115-116)

12. A "Statement of Proposed Alteration of Plans under Permits to Appropriate Public Waters of the State of Texas" dated April 25, 1931, was filed with the Board of Water Engineers by the Emery, Peck and Rockwood Development Company, transferee of several permits including Permit No. 954, from the Syndicate Power Company. The statement purported to be filed under TEX. REV. CIV. STAT. ANN. art. 7495, repealed, Tex. Laws 1971, ch. 58 at 658. The statement proposed to construct the dam authorized under Permit No. 954 at another location upstream (Buchanan Dam) and to construct another dam at the location authorized by Permit No. 954. This dam would be approximately 70 feet in height. The statement further proposed to reduce the capacity of a reservoir authorized under Permit No. 955 (cancelled on February 7, 1967) so as not to result in an increased appropriation of water. The statement further declared that additional detailed plans would be filed with the Board showing the size, location and character of the two additional dams to be constructed under Permits Nos. 954 and 955. (Exh. J13d)

13. On some date subsequent to November 3, 1936, the LCRA filed a request for extension of time for

commencing or completing work under Permits Nos. 951, 952, 953, 954, 955 and 998. In this request, it was stated that construction had begun by the LCRA on Inks Dam at the site described in Permit No. 954. It was stated that the dam would be built to a height of approximately 102 feet and a length of approximately 1500 feet, creating a reservoir with a surface area of approximately 830 acres and storage capacity of approximately 16,400 acre-feet. The request stated that complete plans and specifications of Inks Dam were on file with the Board of Water Engineers. (Exh. J13e)

14. There are two turbines located at Inks Dam with a discharge capacity of 1300 cfs each and a maximum hydropower generation capability of 24 megawatts. Normal operation is a generation of 24 megawatts with a 2600 cfs discharge rate through the turbines. Operation at Inks Dam is coordinated closely with operation at Buchanan Dam, with Inks functioning primarily as a pass-through of flows released from Buchanan Dam and is essentially a limiting factor on releases from Buchanan Dam. Excess flows are routed through a gravity section in the dam. (SF 776-782, 852)

15. The maximum amount of water used for hydropower purposes at Inks Dam was 1,015,400 acre-feet in 1946. (Exhs. J52a-jj, J136)

16. LCRA's rights to use water for hydroelectric generation should include conditions that generally subordinate such rights to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, irrigation or industrial purposes. Such conditions should specifically prohibit the release of water through its dams solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments.

CONCLUSIONS:

1. The alterations in the location and specifications of Inks Dam and Inks Lake from those authorized by Permit No. 954 were authorized by the substantial compliance with TEX. REV. CIV. STAT. ANN. art. 7495, repealed, Tex. Laws 1971, ch. 58 at 658.

2. LCRA is recognized a right under Permits Nos. 954 and 1259A to maintain an existing dam (Inks Dam) at diversion point D-2380 on the Colorado River in Survey No. 531, Burnet County, and Survey No. 8, Llano County, creating a reservoir (Inks Lake) with an impounding capacity of 17,545 acre-feet of water and to use the impounded water for nonconsumptive recreation with no right of diversion or release for this purpose, with a priority date of March 29, 1926.

3. LCRA is recognized a right under Permits Nos. 954 and 1259A to divert and use water through Inks Dam at a maximum rate of 2600 cfs for the purpose of hydroelectric generation, with a priority date of March 29, 1926, subject to the following conditions:

(a) Such right is subordinated to the extent set forth in TEX. REV. CIV. STAT. ANN. art. 8280-107, as amended, Tex. Laws 1975, ch. 74 at 179, as such act may be amended from time to time (the "LCRA Act").

(b) Such right is further subordinated, to the extent that it may not be subordinated pursuant to the LCRA Act, as follows:

(1) LCRA shall not release water through Inks Dam solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments; and

(2) To the extent that water is released through Inks Dam solely for the purpose of hydroelectric generation, such right is specifically subordinated, as to priority, to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, industrial, irrigation and/or mining purposes, except during emergency shortages of electricity, and during other times to the extent that the holder of any such upstream right has agreed, or in the future agrees, otherwise.

DIVERSION POINT NO. (MCRS): 2650 (Lake Lyndon B. Johnson)
TRACT NO: None

OWNERSHIP: Lower Colorado River Authority (LCRA)

IR. (MCRS): 301-302
APP. (MCRS): 26
XII/II SF 1-1128
(MCRS) II Contest SF 95-138
(LCRS) Contest SF Vols. III, IV, V and VII

SECTION 11.307 CLAIM: Under Permits Nos. 953 and 953A and Section 11.303 Claim No. 5547 to maintain a 138,460 acre-foot capacity reservoir on the Colorado River and to impound, divert and use therefrom 1,305,000 acre-feet of water per year for hydroelectric purposes at a maximum diversion rate of 9,000 cfs and to divert 68,400 acre-feet and consume 15,700 acre-feet of water per year for industrial purposes at a maximum diversion rate of 5270 cfs. Claimed priority date is June 29, 1913 and prior. (Exh. J8)

FINDINGS:

1. The LCRA is the owner of Permit No. 953, which authorizes the construction and maintenance of a dam and 28,750 acre-foot capacity reservoir on the Colorado River in Llano and Burnet Counties and the impoundment, diversion and use therefrom of 1,305,000 acre-feet of water per year for power development (hydroelectric) purposes. The permit authorized the construction of the dam at about the southwest corner of Survey No. 509, Burnet County, at a height of 40 feet. (Exh. J19a)

2. The maximum rate of flow set out in Permit No. 953 for water through the turbines for generation of hydroelectric power is 1810 cfs (814,500 gpm). (Exh. J19a)

3. Application No. 1023 for Permit No. 953 was filed with the Board of Water Engineers on March 29, 1926, and the permit was issued on May 15, 1926. (Exh. J19a)

4. The LCRA is the owner of Permit No. 953A, which amends Permit No. 953 to authorize a point of diversion on Lake Lyndon B. Johnson and the diversion of an unspecified amount of water at this diversion point at a maximum diversion rate of 5270 cfs (2,370,000 gpm) for the circulation and recirculation of cooling water in the operation of a thermal-electric power plant. (Exh. J23a)

5. Application No. 1023A for Permit No. 953A was filed with the Commission on August 24, 1970, and the permit amendment was issued on September 22, 1970. (Exh. J23a)

6. Lake Lyndon B. Johnson is located on the Colorado River in Llano and Burnet Counties. Wirtz Dam is located at diversion point D-2650 on the Colorado River in Surveys Nos. 18 and 4, Burnet County, approximately 6.5 miles downstream of the site

authorized by Permit No. 953. (Exhs. 7 at p. 26, J19a; SF 117-122)

7. Construction began on Wirtz Dam and Lake Lyndon B. Johnson in September, 1948 and was completed in 1951, with the first impoundment of water in May, 1951. Hydroelectric generation commenced on June 25, 1951. (Exh. J90; SF 362)

8. The impounding capacity of Lake Lyndon B. Johnson, as-built, was approximately 138,500 acre-feet. (Exh. J90; SF 122)

9. Permit No. 953 authorized a dam 40 feet high and 1200 feet long. (Exh. J19a)

10. Wirtz Dam is 100 to 127.5 feet high, and its length consists of 1,146 feet of concrete plus 3,670 feet of rolled earth and rock with a concrete core. (Exh. J90; SF 118)

11. By order dated December 11, 1970, the Texas Water Rights Commission approved modifications in Wirtz Dam pertaining to (1) alteration of the spillway gates to provide for the installation of stop logs, and (2) construction of a new gated overflow section in the south abutment of the dam. The order did not mention the location, size or impounding capacity of the dam. (Exh. 1230)

12. There are two hydroelectric turbines located at Wirtz Dam with a total discharge capacity of 9000 cfs and a maximum hydropower generation capability of 52 megawatts. When operating proportionally with flows released from Inks Dam, 20 megawatts are generated. Excess flows are routed through floodgates in the dam. (SF 781-784)

13. The maximum amount of water used for hydropower purposes at Wirtz Dam was 1,533,300 acre-feet in 1957. (Exhs. J53a-jj, J136)

14. The thermal-electric plant, known as the Ferguson Plant, on Lake Lyndon B. Johnson went into operation in 1974. There are three circulating water pumps in the plant which pump 92,000 gpm each of condenser water. There are three half-capacity cooling water pumps for plant cooling water which pump 3500 gpm each, with two being operated at any one time. Each year approximately 68,400 acre-feet of water is diverted out of Lake Lyndon B. Johnson at a maximum diversion rate of 630 cfs (283,000 gpm), with 15,000 to 15,700 acre-feet of water being consumed in this process by forced evaporation. (Exhs. J8, J23d, J55jj; SF 119, 1004-1007)

15. LCRA's rights to use water for hydroelectric generation should include conditions that generally subordinate such rights to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, irrigation or industrial purposes. Such conditions should specifically prohibit the

release of water through its dams solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments.

CONCLUSIONS:

1. The alterations in the location and impounding capacity of Wirtz Dam and Lake Lyndon B. Johnson, as-built, from the location and impounding capacity set out in Permit No. 953 are substantial and required approval by the Board of Water Engineers pursuant to TEX. REV. CIV. STAT. ANN. art. 7492, repealed, Tex. Laws 1971, ch. 58 at 658. (Supp. 1984-1985)

2. By issuing Permit 953A and its subsequent order dated December 11, 1970, the Texas Water Rights Commission approved the alterations in the location and impounding capacity of Wirtz Dam and Lake Lyndon B. Johnson as they presently exist.

3. LCRA is recognized a right under Permits Nos. 953 and 953A to maintain the existing Wirtz Dam and Lake Lyndon B. Johnson on the colorado River, with a capacity of 138,500 acre-feet, and to use the impounded water for recreation purposes with no right of diversion or release for this purpose, with a priority date of March 29, 1926.

4. LCRA is recognized a right under Permit No. 953 to divert and use water through Wirtz Dam at a maximum rate of 9000 cfs for the purpose of hydroelectric generation, with a priority date of March 29, 1926, subject to the following conditions:

   (a) Such right is subordinated to the extent set forth in TEX. REV. CIV. STAT. ANN. art. 8280-107, as amended, Tex. Laws 1975, ch. 74 at 179, as such act may be amended from time to time (the "LCRA Act").

   (b) Such right is further subordinated, to the extent that it may not be subordinated pursuant to the LCRA Act, as follows:

      (1) LCRA shall not release water through Wirtz Dam solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments; and

(2) To the extent that water is released through Wirtz Dam solely for the purpose of hydroelectric generation, such right is specifically subordinated, as to priority, to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, industrial, irrigation and/or mining purposes, except during emergency shortages of electricity, and during other times to the extent that the holder of any such upstream right has agreed, or in the future agrees, otherwise.

5. LCRA is recognized the right under Permit No. 953A to divert, circulate and recirculate water for industrial (power plant cooling) purposes from Lake Lyndon B. Johnson at its Ferguson Power Plant at a maximum diversion rate of 5270 cfs, and to consumptively use not to exceed 15,700 acre-feet of such water per annum in forced evaporation, with a priority date of August 24, 1970.

DIVERSION POINT NO. (MCRS): 3060 (Lake Marble Falls)
TRACT NO: None

OWNERSHIP: Lower Colorado River Authority (LCRA)

IR. (MCRS): 315-316
APP. (MCRS): 28
XII/II SF 1-1128
(MCRS) II Contest SF 95-138
(LCRS) Contest SF Vols. III, IV, V and VII

SECTION 11.307 CLAIM: Under Permit No. 998 and Section 11.303 Claim No. 5546 to maintain a dam and 8,760 acre-foot capacity reservoir on the Colorado River and to impound, divert and use therefrom 1,305,000 acre-feet of water per year at a maximum diversion rate of 9600 cfs for hydroelectric purposes with a priority date of June 29, 1913 and prior. (Exh. J8)

FINDINGS:

1. The LCRA is the owner of Permit No. 998 which authorizes the construction and maintenance of a dam and 23,640 acre-foot capacity reservoir and a 6723 acre-foot capacity reservoir on the Colorado River in Burnet County and the impoundment, diversion and use therefrom of 1,305,000 acre-feet per year of the ordinary and storm and flood flow of the Colorado River for power development (hydroelectric) purposes. (Exh. J26a)

2. The maximum rate of flow set out in Permit No. 998 for water through the turbines for hydropower purposes is 1800 cfs (810,000 gpm). (Exh. J26a)

3. Application No. 1022 for Permit No. 998 was filed with the Board of Water Engineers on March 29, 1926 and the permit was issued on November 4, 1927. (Exh. J26a)

4. Lake Marble Falls is located on the Colorado River in Burnet County. Starcke Dam is located at diversion point D-3060 on the Colorado River in Surveys Nos. 606 and 15, Burnet County, at the site authorized by Permit No. 998. (Exhs. 7 at p. 26, J26a; SF 126-127)

5. Construction began on Starcke Dam and Lake Marble Falls in November, 1949, and was completed in October, 1951. Deliberate impoundment of water began in July, 1951, and power generation commenced on September 25, 1951. (Exh. J90; SF 362)

6. The impounding capacity of Lake Marble Falls as built was approximately 8760 acre-feet. (Exh. J90; SF 127-128)

7. Permit No. 998 authorized a dam 70 feet high and 748 feet long. (Exh. J26a)

8. Starcke Dam is 98 to 100 feet high and 860 feet long. (Exh. J90; SF 127)

9. The record does not reflect that any statement and plans of the alterations in the specifications of Starcke Dam and Lake Marble Falls from those specified in Permit No. 998 were ever filed with the Board of Water Engineers or its successor agencies. (Exhs. J124, J125)

10. The alterations of Starcke Dam and Lake Marble Falls from the specifications authorized by Permit No. 998 resulted in a smaller storage capacity of the reservoir from that authorized in the permit.

11. There are two hydropower generating turbines located at Starcke Dam with a total discharge capacity of 8120 cfs and a maximum generating capacity of 32 megawatts. When operating proportionally with flows released from Inks Dam, the turbines generate approximately 10 megawatts. The power generation at Starcke Dam is coordinated closely with that at Wirtz Dam and the additional flows of the Llano River through Wirtz Dam are released through the turbines at Starcke Dam. Excess flows are routed through floodgates in the dam. (Exh. J90; SF 781-785)

12. The maximum amount of water used for hydropower purposes at Starcke Dam was 1,409,700 acre-feet in 1957. (Exh. J55a-jj, J136)

13. LCRA's rights to use water for hydroelectric generation should include conditions that generally subordinate such rights to all present and future upstream rights to use the waters of the

Colorado River and its tributaries for municipal, domestic, irrigation or industrial purposes. Such conditions should specifically prohibit the release of water through its dams solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments.

CONCLUSIONS:

1. The alterations of Starcke Dam and Lake Marble Falls from the specifications authorized by Permit No. 998 were insubstantial and did not result in an increased appropriation of State water.

2. Starcke Dam and Lake Marble Falls were constructed in substantial compliance with Permit No. 998.

3. LCRA is recognized a right under Permit No. 998 to maintain an existing dam (Starcke Dam) at diversion point D-3060 on the Colorado River in Surveys Nos. 606 and 15, Burnet County, creating a reservoir (Lake Marble Falls) with an impounding capacity of 8760 acre-feet of water and to use the impounded water for nonconsumptive recreation with no right of diversion or release for this purpose, with a priority date of March 29, 1926.

4. LCRA is recognized a right under Permit No. 998 to divert and use water through Starcke Dam at a maximum rate of 8120 cfs for the purpose of hydroelectric generation, with a priority date of March 29, 1926, subject to the following conditions:

   (a) Such right is subordinated to the extent set forth in TEX. REV. CIV. STAT. ANN. art. 8280-107, as amended, Tex. Laws 1975, ch. 74 at 179, as such act may be amended from time to time (the "LCRA Act").

   (b) Such right is further subordinated, to the extent that it may not be subordinated pursuant to the LCRA Act, as follows:

      (1) LCRA shall not release water through Starcke Dam solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments; and

      (2) To the extent that water is released through Starcke Dam solely for the

> purpose of hydroelectric generation, such right is specifically subordinated, as to priority, to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, industrial, irrigation and/or mining purposes, except during emergency shortages of electricity, and during other times to the extent that the holder of any such upstream right has agreed, or in the future agrees, otherwise.

DIVERSION POINTS NOS. (MCRS): 9999 (Lake Travis)
TRACT NO: None

OWNERSHIP: Lower Colorado River Authority (LCRA)

IR. (MCRS): 341-344
APP. (MCRS): 34-35
XII/II SF 1-1128
II Contest SF 95-138

SECTION 11.307 CLAIM: Under Permits Nos. 951, 952 and 1260 and Section 11.303 Claim No. 5551 to maintain a dam and 1,170,752 acre-foot capacity reservoir on the Colorado River (Lake Travis) and to impound, divert and use therefrom 1,500,000 acre-feet of water per year at a maximum diversion rate of 5529 cfs for "hydroelectric, municipal, domestic, industrial, etc." purposes, with a priority date of June 29, 1913 and prior. (Exh. J8)

FINDINGS:

1. The LCRA is the owner of Permit No. 1260, which authorizes the construction and maintenance of a dam and 600,000 acre-foot capacity reservoir on the Colorado River in Travis County and the impoundment, diversion and use therefrom of 1,500,000 acre-feet per year of the ordinary and storm and flood flows of the Colorado River for domestic, municipal, (industrial), irrigation, mining and hydroelectric power purposes. (Exh. J41a)

2. A special condition in Permit No. 1260 authorizes the LCRA to use the bed and banks of the Colorado River for the purpose of conveying impounded water to diversion points downstream for the uses authorized. (Exh. J41a)

3. Another special condition in the permit concerns Permits Nos. 951 and 952:

   > The dam for which this permit is granted is being constructed by virtue and under the terms of Permits Nos. 951 and 952,

> heretofore granted by this Board to the Syndicate Power Company of Dallas, Texas, and the alterations and modifications thereof heretofore set out by declarations filed with this Board, as prescribed by Statute, and this permit shall be cumulative of and in addition to Permits Nos. 951 and 952 and of the rights covered by said permits; provided, that the total quantity of water to be impounded, diverted and appropriated shall not exceed the quantity set out in paragraph four of this permit.

(Exh. J41a)

4. Paragraph four of Permit No. 1260 recites that of the 1,500,000 acre-feet authorized by the permit to be appropriated, ". . . 1,391,530 acre-feet have heretofore been granted under Permits Nos. 951 and 952, the total amount to be appropriated under all such permits not to exceed . . . 1,500,000 acre-feet per annum." (Exh. J41A)

5. Application No. 1346 for the permit was filed with the Board of Water Engineers on March 7, 1938, and Permit No. 1260 was issued on May 25, 1938. (Exh. J41a)

6. The LCRA is the owner of Permit No. 951 which authorized the construction and maintenance of a dam and 196,708 acre-foot capacity reservoir on the Colorado River and the impoundment, diversion and use therefrom of 1,391,530 acre-feet of water per year for "power development" (hydropower) purposes. (Exh. J36a)

7. Application No. 1020 for the permit was filed with the Board of Water Engineers on March 29, 1926, and Permit No. 951 was issued on May 15, 1926. (Exh. J36a)

8. The LCRA is the owner of Permit No. 952, which authorized the construction and maintenance of a dam and 718,429 acre-foot capacity reservoir on the Colorado River and the impoundment, diversion and use therefrom of 1,391,530 acre-feet of water per year for power development (hydropower) purposes. (Exh. J31a)

9. Application No. 1021 for the permit was filed with the Board of Water Engineers on March 29, 1926, and Permit No. 952 was issued on May 15, 1926.

10. Lake Travis is located on the Colorado River in Travis and Burnet Counties, Texas. Mansfield Dam is located at diversion point D-9999 on the Colorado River in Surveys Nos. 461 and 192, Travis County, at the site authorized by Permit No. 1260 and approximately one mile downstream of the site authorized by Permit No. 952. (Exhs. 7 at p. 34-35, J41a, J36a, J31a; SF 135-136)

11. Construction began on Mansfield Dam in March, 1937. The first stages of the dam were completed

in July, 1939. After the flood of 1938, the LCRA decided to extend the dam to its present height to provide additional flood control capacity. The present structure was completed May 17, 1942. Deliberate impoundment of water began on September 9, 1940 and the first hydroelectric generation unit was placed in operation on July 27, 1941. (Exh. J90a; SF 357-360, 382)

12. The impounding capacity of Lake Travis as constructed was approximately 1,170,752 acre-feet at normal maximum operating level (681 feet above m.s.l.). (Exh. J90; SF 136-137)

13. Permit No. 1260 authorized a dam 180 feet high and 2,325 feet long. Permit No. 951 authorized a dam 75 feet high and 1,102 feet long. Permit No. 952 authorized a dam 125 feet high and 3,200 feet long. (Exhs. J41a, J36a, J31a)

14. Mansfield Dam is 239.5 to 278 feet high and 2,423 feet long. (Exh. J90; SF 136)

15. On some date subsequent to November 3, 1936, the LCRA filed a request for an extension of time to commence or complete the construction of works authorized by Permits Nos. 951-955 and 998, including a request to extend the time for completion of Mansfield Dam. The request declared that construction had begun on the dam. The location and specifications of the dam and reservoir were the same as those which were later set out in Permit No. 1260. (Exhs. J13e, J41a)

16. By letter dated October 2, 1941, the LCRA sent to the Board of Water Engineers several construction plans. One plan clearly depicted Mansfield Dam at the height at which it was later constructed. (Exh. 1232, J122; Contest SF 112-113)

17. The LCRA secured federal funding to construct Mansfield Dam to its present height. In a March 13, 1941 contract, the Secretary of the Interior designated the LCRA as his agent to operate and maintain the dam upon its completion, solely for the purposes of regulating the flow of the Colorado River below the dam and controlling the floods of the river. The agreement further required that when there was no flood in progress in the river system above the dam, the storage capacity in the reservoir above elevation 681 feet m.s.l. would be available primarily for flood control and stream regulation and such capacity below this elevation would be primarily for power production; provided that the water surface elevation in the reservoir must never, under ordinary conditions when no flood is in progress, exceed elevation 691 feet m.s.l. The LCRA was further obligated by this agreement to release water impounded in the reservoir in anticipation of floods originating in the watershed above the dam and to be responsible for the time and manner of releasing stored waters in anticipation of floods, giving due regard to channel capacities of the river below the dam in making such releases.

Other agreements were later made between the parties concerning construction costs. (Exhs. J62a-c; SF 357-359)

18. Federal regulation of the flood control function of Mansfield Dam eventually passed to the U.S. Army Corps of Engineers. In regulations effective from May 15, 1951 to April 1, 1976, when the surface water elevation of Lake Travis was below 681 feet m.s.l., the LCRA was not permitted to make releases which would result in a flow at Columbus, Texas in excess of 50,000 cfs, provided that no curtailment of normal hydropower releases were required. During periods when the surface water elevation in Lake Travis was above elevation 681 feet m.s.l., a minimum release of 5,000 cfs was required. Above elevation 691 feet m.s.l., releases were required at the maximum possible discharge rate without exceeding a flow of 50,000 cfs at Columbus, provided that no curtailment of normal hydropower operation would result thereby. Above elevation 722 feet m.s.l., the LCRA was authorized to discharge water at the rate necessary to protect the dam and appurtenances from major damage. (Exh. J131; SF 359)

19. At the time of the adjudication hearing, the LCRA was operating Mansfield Dam pursuant to interim regulations adopted by the Corps of Engineers on April 1, 1976. These regulations were similar to the 1951 regulations except that the minimum release rate of water from Lake Travis between surface water elevation 681 and 683 feet m.s.l. was reduced to 3,000 cfs. (Exh. J130; SF 359-360, 377, 786-787, 816-822, 1091-1096)

20. Mansfield Dam is the only significant flood control structure in the Highland Lakes. There are 40 floodgates in the dam with a gravity section at elevation 714 feet m.s.l. The maximum surface water elevation of Lake Travis to date is 707 feet m.s.l., which occurred July, 1963. The capacity of the flood pool between elevation 681 feet and 691 feet m.s.l. is approximately 780,000 acre-feet. All discharges from Mansfield Dam are through the hydropower turbines unless the turbines are not capable of routing the excess flows. (Exh. J90; SF 786-787, 816-822)

21. There are three hydropower generating turbines located at Mansfield Dam with a total discharge capacity of 5530 cfs and a maximum generating capability of 84 megawatts. When operating proportionally with flows released through the other Highland Lakes, the turbines generate approximately 20 megawatts. The variable lake level of Lake Travis permits 24-hour-a-day operation of the turbines. (Exh. J90; SF 783, 785-786)

22. The maximum amount of water used for hydropower purposes at Mansfield Dam was 2,063,185 acre-feet in 1968. (Exhs. J55a-jj, J136)

23. Permit No. 4007, which was issued to the City of Cedar Park, Texas on August 23, 1983, authorizes

the City of Cedar Park to transfer from the Colorado River Basin not to exceed 7000 acre-feet per annum from the perimeter of Lake Travis on the Colorado River at a maximum diversion rate of 21,700 gpm (48.4 cfs) to the environs of the City of Cedar Park for municipal purposes, pursuant to the water supply contract dated May 24, 1983 between LCRA and the City of Cedar Park. (Exh. No. 1406)

24. Special Conditions in Permit No. 4007 provide that (1) water diverted to the City under the authority of Permit No. 4007, but not consumed, shall be returned at a designated point on Brushy Creek in the Brazos River Basin; and (2) that the authorization for the transbasin diversion is contingent upon the existence of a valid permit between LCRA and the City of Cedar Park. (Exh. No. 1406)

25. The City of Cedar Park will require all water authorized under Permit No. 4007 to meet future water demands, based on projected growth in the city over the next thirty years. (III Contest 21-27)

26. The Highland Lakes and the Colorado River above and below the Highland Lakes should be managed together as a single system for water supply purposes. Major goals in the management of the system include maximizing the beneficial use of water derived from inflows below the Highland Lakes, and stretching and conserving the water stored in the Highland Lakes. In order to achieve these goals, the system should be managed in accordance with the following general guidelines:

    a. To the extent allowed by law, all demands for water from the Colorado River downstream of the Highland Lakes should be satisfied first pursuant to water rights to the run-of-river flow of the Colorado River.

    b. Inflows should be passed through the Highland Lakes to honor downstream senior water rights only to the extent that demands under those rights cannot be satisfied by the inflows below the Highland Lakes.

    c. Water should be released from conservation storage in Lakes Travis and Buchanan to satisfy downstream demands for authorized purposes (municipal, industrial, irrigation and mining) only to the extent that such demands cannot be satisfied pursuant to independent run-of-river water rights.

    d. Firm, uninterruptible commitments of water from conservation storage in Lakes Travis and Buchanan should not exceed the Combined Firm Yield of such lakes (hereinafter defined).

    e. Water from conservation storage in Lakes Travis and Buchanan may be available for supply on an interruptible basis at any time that the actual demand for stored water under

firm, uninterruptible commitments is less than the Combined Firm Yield. To the extent that a demand for water may exist on a non-firm, interruptible basis, such stored water should be made available.

f. The supply of stored water pursuant to non-firm, interruptible commitments should be interrupted or curtailed to the extent necessary to allow LCRA to satisfy all existing and projected demands for stored water pursuant to all firm, uninterruptible commitments.

g. Water should not be released through any dam solely for hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for stored water from Lakes Travis and Buchanan pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments.

27. Water is supplied from conservation storage in Lakes Travis and Buchanan by the direct diversion of stored water from such lakes, the release of stored water from such lakes for downstream delivery, and the impoundment, diversion or use of the flows of the Colorado River and its tributaries upstream of such lakes pursuant to subordination and other agreements. Under the basic system management plan outlined above, the demand for stored water from Lakes Travis and Buchanan will be erratic. The demand for such water will vary greatly from year to year, depending upon the climatic conditions and the locations, amounts and distributions of demands during each year. It is currently estimated that the peak annual demand for stored water in the reasonably foreseeable future will not exceed 1,500,000 acre-feet in any year. Such a demand may occur during years in which the inflows below the Highland Lakes are very low. Such a demand may also occur in other years, if a large demand for water on a non-firm, interruptible basis should develop.

28. The amount of water that the Highland Lakes/Colorado River system can supply each year on a firm basis through a repeat of the drought of record will vary greatly from time to time in the future, depending upon factors such as the locations of points of diversion and the demand for water at each diversion point. Generally, in order to provide a firm supply of water for a given annual demand, less stored water is needed to firm up the run-of-river supply as the point of diversion is moved farther downstream. Assuming that large municipal, industrial and irrigation demands will continue to exist downstream of the Highland Lakes, the firm yield of the entire system will exceed the Combined Firm Yield of Lakes Travis and Buchanan.

29. The Combined Firm Yield is less than the Combined Theoretical Yield. The "Combined Theoretical Yield" is the amount of water that could be supplied from conservation storage in Lakes Travis and Buchanan during each year of a simulated repeat of the drought of record, as calculated pursuant to studies that assume the following:

a. Inflows to Lakes Travis and Buchanan are those flows that would occur in the Colorado River at the site of Mansfield Dam if the Highland Lakes did not exist and there were no other impoundment, diversion or use of the flows of the Colorado River and its tributaries upstream of that point.

b. No portion of the inflows will be passed through Mansfield Dam to honor downstream senior water rights.

c. Lakes Travis and Buchanan will be operated together as a system so as to maximize the yield of that system.

The "Combined Firm Yield" is that portion of the Combined Theoretical Yield remaining after it is assumed that inflows will be reduced by honoring upstream senior water rights and/or passed through Mansfield Dam to honor downstream senior water rights, in accordance with the relative priorities of such rights, except to the extent that the holder of any such right may agree otherwise. In determining the Combined Firm Yield, it is assumed that each senior water right will be exercised to the full extent authorized, except to the extent that the holder of such right may agree otherwise, or unless the Commission otherwise approves. The Combined Firm Yield may be expressed as a constant amount of water annually, or as an average annual amount of water over a defined period of years. The Combined Firm Yield cannot be determined until after the Adjudication is final, and such yield may change from time to time in the future. However, at the present time it is estimated that the Combined Firm Yield is not less than 500,000 acre-feet of water per year. As discussed above, this amount may also be expressed as an average of 500,000 acre-feet per year over any five consecutive calendar-year period, or a total of 2,500,000 acre-feet over any such period. The Commission will determine the Combined Firm Yield, and whether such yield is expressed as an average annual amount of water over a defined period of years, in its adoption of a Management Plan (hereinafter defined).

30. Subordination of hydroelectric rights will greatly increase the amount of water that LCRA has available to supply from Lakes Travis and Buchanan for other purposes of use. LCRA in the past has subordinated its own hydroelectric rights to its rights to store and use water for other purposes. The City of Austin's early-priority hydroelectric right at Tom Miller Dam under C.F. 330 is the only hydroelectric right in the basin that is senior to

Permit Nos. 1260 and 1259 for Lakes Travis and Buchanan, other than those held by LCRA. The City leased such right to LCRA pursuant to the 1938 and 1966 Agreements between the City and LCRA. LCRA in the past has also subordinated the C.F. 330 hydroelectric right that it leased from the City to LCRA's rights to store and use water for other purposes.

31. The extent to which additional stored water will be available in any year, after satisfying all existing and projected demands for stored water pursuant to all firm, uninterruptible commitments, can be defined at the beginning of that year pursuant to a rule curve or other analysis based on conditions that exist at that time. The availability of such additional stored water can be confirmed or redefined at other times during that year by one or more additional analyses at other times during that year based on conditions that exist at such times.

32. LCRA's right to use water from Lakes Travis and Buchanan for purposes other than hydroelectric generation, and the initial conditions for the commitment and supply of such water, should be defined as follows:

LCRA is recognized a right under Permits Nos. 1260 and 1259 to divert and use water from Lakes Travis and Buchanan for municipal, industrial, irrigation and mining purposes, with a priority date of March 7, 1938. LCRA may diligently develop such right to a maximum aggregate diversion and use of water for such purposes from Lakes Travis and Buchanan of not to exceed 1,500,000 acre-feet in peak-use years, with a priority date of March 7, 1938, subject to the following conditions:

(a) LCRA shall prepare and submit to the Commission, on or before December 31, 1988, a proposed reservoir operation plan which shall include such studies and other information as may be required by the Commission to determine the Combined Firm Yield of Lakes Travis and Buchanan (as defined in Finding 29, above) and demonstrate LCRA's compliance with, and its ability to comply with, these special conditions (the "Management Plan"). In making its decision on the adoption of an Management Plan, the Commission shall consider all relevant public policies including, without limitation, the following:

(1) recognition of the necessity of beneficial inflows from the Colorado River into the Lavaca-Tres Palacios Estuary consistent with § 11.147 of the Texas Water Code;

(2) protection of fish and wildlife habitats consistent with § 11.147 of the Texas Water Code;

(3) consideration of the effects, if any, on existing instream uses and water quality consistent with § 11.147 of the Texas Water Code;

(4) mitigation of adverse impacts, if any, on wildlife habitats inundated by new reservoir construction;

(5) mitigation of adverse environmental impacts, if any, caused by new projects taking, storing or diverting in excess of 5,000 acre-feet per year consistent with § 11.152 of the Texas Water Code; and

(6) recognition of the Commission's statutory authority to require water conservation under § 11.134(b)(4).

The Commission shall consider LCRA's proposal prior to adopting the initial Management Plan. The Management Plan may be amended from time to time upon the request of LCRA or on the Commission's own motion. The initial proceeding to consider the adoption of the Management Plan, and any major amendment thereof, shall be pursuant to contested case procedures. Any proceeding to consider the adoption or major amendment of the Management Plan shall be preceded by notice and opportunity to request a hearing in accordance with the Commission's regulations applicable to water rights permitting proceedings. The Texas Parks and Wildlife Department, at its option, may be a party in any such proceeding, in the same manner as it would be a party to a proceeding before the Commission incident to an application for a permit governed by Section 11.147 of the Texas Water Code. The Commission shall name as other parties persons that establish a justiciable interest in the proceeding. In making a final decision on the adoption of a Management Plan and any amendment thereof, the Commission, in addition to other information, evidence, and testimony presented, shall consider all information, evidence, and testimony presented by the Texas Parks and Wildlife Department, including, without limitation, any memorandum of understanding between LCRA and Texas Parks and Wildlife Department relating to the management of the Highland Lakes.

(b) LCRA shall prepare and submit to the Commission, on or before March 1 of each year beginning with March 1, 1990, a report which documents compliance with the Management Plan and these special conditions during the previous year. Such report shall be in a form approved by the Executive Director.

(c) Except as provided in Special Condition (i), below, LCRA shall not supply or commit to supply any water under Permits Nos. 1260 or 1259 to any other party except pursuant to a written contract between LCRA and such party that defines such commitment.

(d) LCRA shall not supply or commit to supply any water under Permits Nos. 1260 or 1259 to itself for use by itself or other parties except pursuant to resolution adopted by LCRA's Board of Directors that defines such commitment.

(e) Each commitment by LCRA to supply water under Permits Nos. 1260 or 1259 shall be considered to be on a firm, uninterruptible basis unless the contract, resolution or special condition defining such commitment specifically provides that such commitment "is subject to interruption or curtailment."

(f) LCRA shall not commit to supply water under Permits Nos. 1260 and 1259 on a firm, uninterruptible basis in excess of the Combined Firm Yield of Lakes Travis and Buchanan. During the period beginning as of January 1, 1988 until such time as the Management Plan is submitted and approved by the Commission, LCRA shall not enter into any contract or adopt any resolution by which it commits to supply any water under Permits Nos. 1260 or 1259 on a firm, uninterruptible basis, unless:

(1) the aggregate of all firm, uninterruptible commitments of water under Permits Nos. 1260 or 1259, including the commitment made pursuant to such contract or resolution, does not exceed 2,500,000 acre-feet over any five consecutive calendar-year period; or

(2) the commitment made pursuant to such contract or resolution is for municipal use, and such commitment does not exceed 10,000 acre-feet of water per year; or

(3) such contract or resolution is specifically approved by either the Executive Director or the

Commission pursuant to this special condition (f).

(g) LCRA shall interrupt or curtail the supply of water under Permits Nos. 1260 and 1259 pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demands for water under such permits pursuant to all firm, uninterruptible commitments. Commitments to supply water on a non-firm, interruptible basis may be interrupted or curtailed as necessary either on a pro-rata basis or in accordance with a system of priorities, as may be set forth in the various contracts and resolutions that define such commitments.

(h) LCRA shall not impose its priority under Permits Nos. 1260 and 1259 against any junior permanent water right with a priority date senior to November 1, 1987, except to the extent that:

(1) LCRA would have the right to impose such priority against such water right if LCRA's right under Permits Nos. 1260 and 1259 to divert and use water from Lakes Travis and Buchanan were limited to the Combined Firm Yield of such lakes; or

(2) the holder of such water right has agreed, or in the future agrees, otherwise.

(i) LCRA shall supply water under Permits Nos. 1260 and 1259 to or for the benefit of any downstream water right with a priority date junior to December 1, 1900 and senior to November 1, 1987 that authorizes the diversion of not more than 3000 acre-feet of water per year, to the extent that:

(1) the holder of such water right applies to the Commission for release of such water; and

(2) the Commission finds that, but for the exercise of priority claims under Certified Filings Nos. 44, 107, 330 and 376:

[a] water would be available for diversion from the natural flow of the Colorado River or tributary thereof at an authorized point of diversion under such water right; and

[b] applicant's water right would entitle him to divert such water;

provided, however, that LCRA shall not be obligated to supply more than 20,000 acre-feet of water in any year pursuant to this Special Condition (i); that this commitment is subject to interruption or curtailment pro rata with other long-term interruptible commitments of LCRA; and that LCRA shall not be obligated to supply water under this special condition to or for the benefit of a temporary or term permit beyond the initial term thereof.

(j) LCRA may from time to time apply to the Commission for amendment of the above special conditions pursuant to Commission rules.

Additionally, LCRA's rights to use water for hydroelectric generation should include conditions that generally subordinate such rights to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, irrigation or industrial purposes. Such conditions should specifically prohibit the release of water through its dams solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments.

CONCLUSIONS:

1. The alterations in the location and specifications of Mansfield Dam and Lake Travis as set out in Permit No. 1260 from those authorized by Permits Nos. 951 and 952 were authorized by the substantial compliance with TEX. REV. CIV. STAT. ANN. art. 7495, repealed, Tex. Laws 1971, ch. 58 at 658.

2. A plan of alterations of Mansfield Dam from the specifications set out in Permit No. 1260 was filed with the Board of Water Engineers in substantial compliance with TEX. REV. CIV. STAT. ANN. art. 7495, repealed, Tex. Laws 1971, ch. 58 at 658.

3. The construction of Mansfield Dam to its present height and impounding capacity was authorized by the substantial compliance with TEX. REV. CIV. STAT. ANN. art. 7495, repealed, Tex. Laws 1971, ch. 58 at 658.

4. LCRA is recognized a right under Permits Nos. 951, 952 and 1260 to maintain a dam (Mansfield Dam) at Diversion Point No. 9999 on the Colorado River in Surveys Nos. 461 and 192, Travis County, creating a reservoir (Lake Travis) with an impounding capacity of 1,170,752 acre-feet and to use the impounded water for recreation purposes without right of diversion, with a priority date of March 29, 1926.

5. LCRA is recognized a right under Permits Nos. 951, 952 and 1260 to divert and use water through Mansfield Dam at a maximum rate of 5,530 cfs for the purpose of hydroelectric generation, with a priority date of March 29, 1926, subject to the following conditions:

   (a) Such right is subordinated to the extent set forth in TEX. REV. CIV. STAT. ANN. art. 8280-107, as amended, Tex. Laws 1975, ch. 74 at 179, as such act may be amended from time to time (the "LCRA Act").

   (b) Such right is further subordinated, to the extent that it may not be subordinated pursuant to the LCRA Act, as follows:

      (1) LCRA shall not release water through Mansfield Dam solely for the purpose of hydroelectric generation, except during emergency shortages of electricity, and during other times to the extent that such releases will not impair LCRA's ability to satisfy all existing and projected demands for water from Lakes Travis and Buchanan under Permits Nos. 1260 and 1259 pursuant to all firm, uninterruptible commitments and all non-firm, interruptible commitments; and

      (2) To the extent that water is released through Mansfield Dam solely for the purpose of hydroelectric generation, such right is specifically subordinated, as to priority, to all present and future upstream rights to use the waters of the Colorado River and its tributaries for municipal, domestic, industrial, irrigation and/or mining purposes, except during emergency shortages of electricity, and during other times to the extent that the holder of any such upstream right has agreed, or in the future agrees, otherwise.

6. LCRA is recognized a right under Permits Nos. 1260 and 1259 to divert and use water from Lakes Travis and Buchanan for municipal, industrial, irrigation and mining purposes, with a priority date of March 7, 1938. LCRA may diligently develop such right to a maximum aggregate diversion and use of water for such purposes from Lakes Travis and Buchanan of not to exceed 1,500,000 acre-feet in peak-use years, with a priority date of March 7, 1938, subject to the following conditions:

(a) LCRA shall prepare and submit to the Commission, on or before December 31, 1988, a proposed reservoir operation plan which shall include such studies and other information as may be required by the Commission to determine the Combined Firm Yield of Lakes Travis and Buchanan (as defined in Finding 29, above) and demonstrate LCRA's compliance with, and its ability to comply with, these special conditions (the "Management Plan"). In making its decision on the adoption of an Management Plan, the Commission shall consider all relevant public policies including, without limitation, the following:

(1) recognition of the necessity of beneficial inflows from the Colorado River into the Lavaca-Tres Palacios Estuary consistent with § 11.147 of the Texas Water Code;

(2) protection of fish and wildlife habitats consistent with § 11.147 of the Texas Water Code;

(3) consideration of the effects, if any, on existing instream uses and water quality consistent with § 11.147 of the Texas Water Code;

(4) mitigation of adverse impacts, if any, on wildlife habitats inundated by new reservoir construction;

(5) mitigation of adverse environmental impacts, if any, caused by new projects taking, storing or diverting in excess of 5,000 acre-feet per year consistent with § 11.152 of the Texas Water Code; and

(6) recognition of the Commission's statutory authority to require water conservation under § 11.134(b)(4).

The Commission shall consider LCRA's proposal prior to adopting the initial Management Plan. The Management Plan may be amended from time to time upon the request of LCRA or on the Commission's own motion. The initial proceeding to consider the adoption of the Management Plan, and any major amendment thereof, shall be pursuant to contested case procedures. Any proceeding to consider the adoption or major amendment of the Management Plan shall be preceded by notice and opportunity to request a hearing in accordance with the Commission's regulations applicable to water rights permitting proceedings. The Texas Parks and Wildlife Department, at

its option, may be a party in any such proceeding, in the same manner as it would be a party to a proceeding before the Commission incident to an application for a permit governed by Section 11.147 of the Texas Water Code. The Commission shall name as other parties persons that establish a justiciable interest in the proceeding. In making a final decision on the adoption of a Management Plan and any amendment thereof, the Commission, in addition to other information, evidence, and testimony presented, shall consider all information, evidence, and testimony presented by the Texas Parks and Wildlife Department, including, without limitation, any memorandum of understanding between LCRA and Texas Parks and Wildlife Department relating to the management of the Highland Lakes.

(b) LCRA shall prepare and submit to the Commission, on or before March 1 of each year beginning with March 1, 1990, a report which documents compliance with the Management Plan and these special conditions during the previous year. Such report shall be in a form approved by the Executive Director.

(c) Except as provided in Special Condition (i), below, LCRA shall not supply or commit to supply any water under Permits Nos. 1260 or 1259 to any other party except pursuant to a written contract between LCRA and such party that defines such commitment.

(d) LCRA shall not supply or commit to supply any water under Permits Nos. 1260 or 1259 to itself for use by itself or other parties except pursuant to resolution adopted by LCRA's Board of Directors that defines such commitment.

(e) Each commitment by LCRA to supply water under Permits Nos. 1260 or 1259 shall be considered to be on a firm, uninterruptible basis unless the contract, resolution or special condition defining such commitment specifically provides that such commitment "is subject to interruption or curtailment."

(f) LCRA shall not commit to supply water under Permits Nos. 1260 and 1259 on a firm, uninterruptible basis in excess of the Combined Firm Yield of Lakes Travis and Buchanan. During the period beginning as of January 1, 1988 until such time as the Management Plan is submitted and approved by the Commission, LCRA shall not enter into any contract or adopt any resolution by which it commits to supply any water under Permits

Nos. 1260 or 1259 on a firm, uninterruptible basis, unless:

(1) the aggregate of all firm, uninterruptible commitments of water under Permits Nos. 1260 or 1259, including the commitment made pursuant to such contract or resolution, does not exceed 2,500,000 acre-feet over any five consecutive calendar-year period; or

(2) the commitment made pursuant to such contract or resolution is for municipal use, and such commitment does not exceed 10,000 acre-feet of water per year; or

(3) such contract or resolution is specifically approved by either the Executive Director or the Commission pursuant to this special condition (f).

(g) LCRA shall interrupt or curtail the supply of water under Permits Nos. 1260 and 1259 pursuant to commitments that are specifically subject to interruption or curtailment, to the extent necessary to allow LCRA to satisfy all demands for water under such permits pursuant to all firm, uninterruptible commitments. Commitments to supply water on a non-firm, interruptible basis may be interrupted or curtailed as necessary either on a pro-rata basis or in accordance with a system of priorities, as may be set forth in the various contracts and resolutions that define such commitments.

(h) LCRA shall not impose its priority under Permits Nos. 1260 and 1259 against any junior permanent water right with a priority date senior to November 1, 1987, except to the extent that:

(1) LCRA would have the right to impose such priority against such water right if LCRA's right under Permits Nos. 1260 and 1259 to divert and use water from Lakes Travis and Buchanan were limited to the Combined Firm Yield of such lakes; or

(2) the holder of such water right has agreed, or in the future agrees, otherwise.

(i) LCRA shall supply water under Permits Nos. 1260 and 1259 to or for the benefit of any downstream water right with a priority date junior to December 1, 1900 and senior to November 1, 1987 that

authorizes the diversion of not more than 3000 acre-feet of water per year, to the extent that:

(1) the holder of such water right applies to the Commission for release of such water; and

(2) the Commission finds that, but for the exercise of priority claims under Certified Filings Nos. 44, 107, 330 and 376:

[a] water would be available for diversion from the natural flow of the Colorado River or tributary thereof at an authorized point of diversion under such water right; and

[b] applicant's water right would entitle him to divert such water;

provided, however, that LCRA shall not be obligated to supply more than 20,000 acre-feet of water in any year pursuant to this Special Condition (i); that this commitment is subject to interruption or curtailment pro rata with other long-term interruptible commitments of LCRA; and that LCRA shall not be obligated to supply water under this special condition to or for the benefit of a temporary or term permit beyond the initial term thereof.

(j) LCRA may from time to time apply to the Commission for amendment of the above special conditions pursuant to Commission rules.

The rights recognized in this Conclusion 6 are duplicative of, and are not in addition to, those rights recognized in Conclusion 4 relating to LCRA's rights in Lake Buchanan, above.

7. LCRA is recognized a right to use the bed and banks of the Colorado River to convey water released from Lake Travis for use by LCRA or others entitled to use such water in the amounts and for the purposes recognized herein.

APPLICATION OF THE LOWER COLORADO RIVER AUTHORITY FOR EMERGENCY AUTHORIZATION	§ § § §	**BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

AFFIDAVIT OF RYAN ROWNEY

THE STATE OF TEXAS §
§
COUNTY OF TRAVIS §

Before me, the undersigned authority, personally appeared Ryan Rowney, 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.

3. I, Ryan Rowney, am an individual residing in Burnet, Texas.

4. A true and correct copy of my resume, detailing my prior work history, is attached hereto under Tab 1.

5. I have worked for LCRA for 31 years. For the last 31 years, I have worked in LCRA's Water Operations. My current title is Vice President, Water Operations.

6. As part of my duties at LCRA, my department provides planning services for the water utility and I am responsible for all operations within Water Operations including operations of the dams forming the Highland Lakes and operations of LCRA's Gulf Coast, Lakeside, and Garwood irrigation divisions. In addition, staff under my supervision is responsible for ensuring compliance with LCRA's instream flow and freshwater inflow obligations under the Water Management Plan.

7. My opinions stated herein are based on my familiarity with LCRA's operations, as well as my understanding of LCRA's contractual obligations to the farmers within LCRA's Garwood division and to Pierce Ranch, a wholesale interruptible irrigation customer. I also have a general familiarity with LCRA's firm customers' operations. 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 either attached or referenced to other portions of LCRA's emergency request and incorporated by reference herein:

a. Affidavit of Ron Anderson, including attachments

b. Affidavit of Bob Rose, including attachments

c. Affidavit of David Wheelock, including attachments

d. Affidavit of Nora Mullarkey Miller, including attachments

8. IMPACTS OF DROUGHT ON IRRIGATION OPERATIONS.

a. Over the past three years, LCRA has significantly cut back the water supply available to downstream irrigation customers who rely on interruptible water supplies. In 2012, 2013 and 2014, consistent with emergency relief granted by TCEQ, LCRA did not supply any water from the Highland Lakes to the Gulf Coast and Lakeside irrigation divisions. These actions preserved a significant amount of supply in lakes Buchanan and Travis. For example, if LCRA had followed the 2010 WMP in 2014, LCRA would have made available for diversion about 160,000 acre-feet of additional stored water from lakes Buchanan and Travis for the downstream irrigation operations at diversion points from the river. To make such water available, assuming an additional 20 percent would need to be released to account for delievery losses, following the 2010 could have resulted in LCRA releasing up to an additional 190,000 acre-feet in 2014.

b. LCRA typically begins supplying water for downstream irrigation operations in March.

c. Each of LCRA's irrigation divisions (Gulf Coast, Lakeside, and Garwood) and Pierce Ranch need to know the amount of water that will be made available to determine the amount of acreage that can be supported and to make crop choices.

d. To the best of my knowledge, our customers have very few, if any, alternative sources of water readily available. Though some irrigation customers have drilled groundwater wells in recent years, this is not a feasible option for all customers due to various factors, such as costs, water quality or permitting issues.

e. Management and operation of a canal system used for irrigated agriculture depends heavily on a reliable, continuous supply of water. These systems cannot be operated based on a sporadic supply of water, such as that which is available based only on run-of-river supplies. For LCRA's operations, LCRA needs to be able to operate at least one pump at each pumping facility at all times to ensure a dependable supply. Moreover, without a continuous flow of water, LCRA cannot maintain canal levels, the accuracy of water measurement would be adversely affected, and some of our customers' crops would be in jeopardy.

f. If releases of interruptible stored water are suspended in the middle of the growing season, the farmers will likely sustain losses to their crops.

g. It is my opinion that LCRA will be able to operate the Garwood irrigation division at some level, depending on run-of-river water, with some interruptible stored water available to Garwood consistent with LCRA's prior agreements with the Garwood Irrigation Company.

h. Based on my experience with the irrigation operations, including under emergency orders in 2012, 2013 and 2014, it is my opinion that it is appropriate to wait to establish the amount of interruptible stored water supply based on the March 1 combined storage in lakes Buchanan and Travis for the 2014 crop year:

(1) LCRA has determined that it can wait until as late as March 1 to determine the amount of interruptible stored water to be made available and still provide irrigators sufficient time to make planting decisions.

(2) If interruptible stored water is availabile for diversion to the Gulf Coast, Lakeside and Pierce Ranch operations, LCRA will allocate the available interruptible stored water to the irrigation operations and work with its customers to allocate the available interruptible stored water within each irrigation operation on a pro rata basis consistent with the procedures set forth in the 2010 Water Management Plan.

i. To conserve water and create efficiencies to maximize the amount of acreage that can be served given the limited amount of water available, LCRA has made changes to some of its contracting processes, as follows:

(1) If interruptible stored water is available, each irrigation division will be limited to a 145 day period for the first crop irrigation season. This fixed period will reduce the potential for canal and delivery losses.

(2) Deliveries of interruptible stored water to customers within a given irrigation operation will cease the earlier of: (A) 145 days from the start of deliveries within that customer's irrigation operation; (B) diversion of interruptible stored water to the customer's irrigation operation reaches that operation's allocation of interruptible stored water; (C) deliveries of water to the customer are in an amount that exceeds the acre-foot per acre duty limit specified in customer's contract; or (D) combined storage reaches 600,000 acre-feet. Rice fields requiring a longer growing season or more water will be subject to cut-off and are planted at the producers' own risk.

(3) During the contracting period, if interruptible stored water is available LCRA will initially only commit to providing water for first crop. If interruptible stored water becomes available for second crop, LCRA

will enter into separate contracts or contract amendments for second crop.

(4) LCRA has established in its contracts a surcharge structure based upon the water use amount or duty (acre-feet per acre) to grow first crop. High water use will be subject to higher rates.

(5) LCRA requires that all privately owned laterals be cleaned to LCRA's specifications or water service will not be delivered down those laterals.

j. If combined storage on Jan. 1, 2014 is at about the current level (about 690,000 acre-feet), the 2010 WMP requires that LCRA make available about 175,000 acre-feet for the downstream irrigation operations at diversion points from the river. To make such water available, an additional 20 percent would need to be released to account for losses in delivering water from Lake Travis to the irrigation operations. Thus for the storage levels above, the 2010 WMP could result in the need to release up to about 210,000 acre-feet of water.

9. IMPACTS OF DROUGHT ON FIRM WATER CUSTOMERS.

a. Ensuring adequate supply for LCRA's firm customers is critical. The maximum historical annual amount of reported water use to meet firm customer demands from the firm supplies of lakes Buchanan and Travis during 2000 through 2013 was approximately 247,000 acre-feet in 2011. In addition, about 33,000 acre-feet of firm water was supplied to help meet environmental flow needs in 2011. The maximum amount of interruptible water released from lakes Buchanan and Travis during this same period occurred in 2011 and totaled about 433,000 acre-feet. The maximum total amount released or used from the Highland Lakes, about 714,000 acre-feet, occurred in 2011. In 2012, firm water use from lakes Buchanan and Travis by LCRA customers was about 148,000 acre-feet; about 31,000 acre-feet was supplied to help meet environmental flow needs; and about 9,000 acre-feet of interruptible water was supplied to farmers in the Garwood irrigation division. Total use of water from lakes Buchanan and Travis in 2012 was about 188,000 acre-feet. In 2013, water use from lakes Buchanan and Travis by LCRA's firm water customers was about 173,148 acre-feet; about 33,465 acre-feet was supplied to help meet environmental flow needs; and about 22,346 acre-feet of interruptible water was released to supply farmers in the Garwood irrigation division. Total use of water from lakes Buchanan and Travis in 2013 was about 228,959 acre-feet. Water use for 2014 is expected to be similar to 2013, with the notable exception that the amount of water supplied to help meet environmental flow needs has been lower in part due to the emergency relief granted by TCEQ in April 2014 which reduced the instream flow requirement associated with the blue sucker fish from 500 cubic feet per second to 300 cubic feet per second. That relief preserved about 17,000 acre-feet in storage in lakes Buchanan and Travis that otherwise would have been released.

b. Under permits that allowed LCRA to use its downstream Gulf Coast water right to meet some needs of LCRA firm water customers downstream of the Highland Lakes, LCRA was able to divert about 7,000 acre-feet and 1,000 acre-feet in 2012 and 2013 respectively. Under a permanent amendment to the Gulf Coast water right, LCRA was also available to divert for industrial customers located in the Gulf Coast canal system about 9,800 acre-feet and 10,200 acre-feet in 2012 and 2013 respectively.

c. Until earlier this year, LCRA owned four water treatment plants whose raw water supply is Lake Travis or Lake Buchanan as noted in Table 1

Table 1. Water Treatment Plants Previously Owned by LCRA Supplied from Lakes Buchanan or Travis

System Name	Intake Location	Estimated Population Served	Service Area
Paradise Point Water System	Lake Buchanan	350	Paradise Point
Lake Buchanan Water System	Lake Buchanan	1,410	Service area around the south and west sides of Lake Buchanan
Smithwick Mills Water System	Lake Travis	160	Smithwick Mills
Ridge Harbor Water System	Lake Travis	400	Ridge Harbor

d. LCRA also owned the Spicewood Beach Water System. This system had relied on groundwater influenced by the water levels in Lake Travis. As a result of the low lake levels, the production of the groundwater wells had diminished significantly and the system is now supplied with surface water from Lake Travis.

e. Based on my knowledge of the treatment systems in and around lakes Buchanan and Travis, these systems are representative of the types of potable water systems that obtain raw water from the lakes.

f. LCRA has 18 customers that currently take raw water for municipal purposes from Lake Travis. I reviewed information maintained by LCRA that identifies what LCRA believes to be the elevations of our customers' intake structures. The depth of those intakes ranges from about 545 feet mean sea level (msl) to 645 feet msl on Lake Travis.

g. If the levels in Lake Travis or Lake Buchanan drop below the current lowest pumping elevations, temporary measures would likely need to be taken by

LCRA's raw water customers to extend their intake facilities to reach water at lower elevations. It is my understanding that firm customers are actively spending or planning to spend funds to allow their intakes to operate at lower elevations.

h. Based on this information, it is my opinion that the current drought presents an imminent threat to public health and safety for several of LCRA's raw water customers if the lake levels or releases drop more quickly than arrangements for alternative intakes or supplies can be implemented.

10. IMPACT OF DROUGHT ON HIGHLAND LAKES INFLOWS.

a. Inflows to the Highland Lakes over the past several years are among the lowest on record. The average annual inflows over the past six years, from 2008 through 2013, have been about 416,336 acre-feet per year, or about 33.8 percent of the long-term average from 1942 through 2013.

b. Shown in Table 2 is a comparison of the lowest ten years of gauged inflows into lakes Buchanan and Travis with the 2014 year-to-date inflows through November and the average annual inflows since 1942. Inflows for 2011 into the lakes were the lowest annual inflows on record, about 10% of average inflows. Calendar years 2008, 2009, 2011, 2012 and 2013 are all among the lowest 10 years of inflows to the Highland Lakes and 2014 is on pace to be among the three lowest on record. Inflows from just one year from the historic Drought of Record (1950) fall within the 10 years of lowest inflows.

Table 2. Ten Lowest Annual Inflows into the Highland Lakes (acre-feet per calendar year)

Year	Amount
2014 (Jan.-Nov.)	197,339
2011	127,802
2013	215,138
2008	284,462
2006	285,229
1963	392,589
2012	393,163
1983	433,312
1999	448,162
2009	499,732
1950	501,926
Average (1942-2013)	1.23 million

c. The total combined storage in lakes Buchanan and Travis on December 1, 2014 was the lowest combined storage on December 1 since the reservoirs

were constructed, lower than on December 1 in any of the previous three years as shown in Table 3.

Table 3. Recent December 1 Combined Storage Levels

Year	Combined Storage in Lakes Buchanan and Travis on December 1 (acre-feet)
2011	736,046
2012	845,060
2013	746,279
2014	691,132

d. Monthly inflows have been below average in 54 of the past 55 months as shown in Table 4.

Table 4. Monthly Inflows to Lakes Buchanan and Travis from May 2010 to November 2014

Month	Inflows (acre-feet)	Percent of Monthly Average	Month	Inflows (acre-feet)	Percent of Monthly Average
May 2010	95,821	47.2%	Sept 2012	12,006	11.8%
June 2010	33,517	20.6%	Oct 2012	19,338	16.0%
July 2010	59,905	70.6%	Nov 2012	6,042	8.7%
Aug 2010	10,783	17.0%	Dec 2012	6,854	10.0%
Sept 2010	86,952	85.7%	Jan 2013	15,117	23.3%
Oct 2010	14,385	11.9%	Feb 2013	8,792	10.4%
Nov 2010	13,899	20.0%	Mar 2013	10,741	11.9%
Dec 2010	16,845	24.7%	Apr 2013	11,127	10.7%
Jan 2011	21,158	32.6%	May 2013	29,265	14.4%
Feb 2011	16,306	19.3%	June 2013	5,608	3.4%
Mar 2011	13,811	15.3%	July 2013	17,423	20.5%
Apr 2011	9,175	8.9%	Aug 2013	1,593	2.5%
May 2011	11,182	5.5%	Sept 2013	30,161	29.7%
June 2011	1,340	0.8%	Oct 2013	48,444	40.1%
July 2011	734	0.9%	Nov 2013	18,092	26.1%
Aug 2011	403	0.6%	Dec 2013	18,775	27.5%
Sept 2011	922	0.9%	Jan 2014	12,270	18.9%
Oct 2011	29,927	24.8%	Feb 2014	9,505	11.2%
Nov 2011	6,874	9.9%	Mar 2014	8,376	9.3%
Dec 2011	15,969	23.4%	Apr 2014	6,183	6.0%
Jan 2012	35,178	54.2%	May 2014	74,274	36.6%
Feb 2012	74,699	88.2%	June 2014	23,542	14.5%
Mar 2012	112,517	124.7%	July 2014	13,893	16.4%
Apr 2012	19,477	18.8%	Aug 2014	4,478	7.1%
May 2012	83,699	41.2%	Sept 2014	12,180	12.0%
June 2012	12,599	7.7%	Oct 2014	9,242	7.7%
July 2012	8,712	10.3%	Nov 2014	23,396	33.7%
Aug 2012	2,041	3.2%			

e. Additionally, the inflows in the current drought over periods ranging from 12 months to 84 months are lower than lowest such periods within the historical Drought of Record as shown in Table 5.

Table 5. Comparison of inflows in current drought to Drought of Record

	Lowest inflows for time period in ongoing drought		**Lowest inflows for time period in 1950s Drought of Record**	
Time Period	Period ending	Inflows (acre-feet)	Period ending	Inflows (acre-feet)
12 months	Sept. 2011	120,160	Apr. 1951	408,784
24 months	May 2014	393,337	Mar. 1952	1,006,681
36 months	Sept. 2013	695,920	Aug. 1952	1,636,088
48 months	Oct. 2014	940,789	Aug. 1952	3,035,846
60 months	Nov. 2014	1,952,879	Aug. 1952	4,128,806
72 months	Apr. 2014	2,374,126	Apr. 1955	5,193,016
84 months	Nov. 2014	2,738,953	Aug. 1952	6,050,804

f. As a result of extremely low inflows into the lakes, record high temperatures, high evaporation rates, and higher than anticipated interruptible demands, the combined storage in the lakes dropped significantly in 2011, and in a very short timeframe. In 2012, 2013, and 2014 even with interruptible stored water cut off from the Gulf Coast, Lakeside and Pierce Ranch irrigation divisions, the lake levels have not recovered. (*See* Tab 2.) The combined storage in lakes Buchanan and Travis fell to the lowest level in the current drought, 637,123 acre-feet or 31.7 percent capacity on Sept. 19, 2013. As of December 1, 2014, combined storage was 691,132 acre-feet or 34 percent capacity. The last time both lakes Buchanan and Travis were simultaneously at their maximum allowable conservation storage was February 13, 2005.

g. Recent low inflows to the Highland Lakes even with widespread rain events are symptomatic of the drought's serverity which has included dry soils that absorb most of the rainfall that does occur.

(1) Heavy, widespread rainfall in the Llano River and San Saba River watersheds above the Highland Lakes on Sept. 19 and 20, 2013 averaged two to three inches, with some rain gages reporting totals as high as six or seven inches. (*See* Affidavit of Bob Rose.) However, this rain event only yielded approximately 24,000 acre-feet of inflow to the lakes.

(2) A widespread, light to moderate intensity rain event on November 4, 5 and 6, 2014 included rainfall totals averaging two to three inches above the Highland Lakes but only yielded about 4,000 acre-feet of inflow to the lakes. (*See* Affidavit of Bob Rose.)

(3) An rain event on November 21 and 22, 2014 included rainfall totals averaging one to three inches above the Highland Lakes but only yielded about 17,000 acre-feet of inflow to the lakes. (*See* Affidavit of Bob Rose.)

(4) By comparison, an event in March 2007 with two to four inches of widespread moderate to heavy rainfall yielded almost 100,000 acre-feet of inflows to lakes Buchanan and Travis. A later event in March 2007 with another two to four inches of widespread moderate to heavy rainfall produced about 275,000 acre-feet of inflows to the lakes. (*See* Affidavit of Bob Rose.)

h. Two large rain events occurred in the lower Colorado River Basin watershed in October 2013. However the majority of rainfall and runoff occurred below the watersheds of lakes Buchanan and Travis. Gauged inflows to lakes Buchanan and Travis for October and November totaled about 69,000 acre-feet, as compared to flow that originated downstream and went past Bay City, totaling 355,000 acre-feet for those two months.

11. EVAPORATION FROM THE HIGHLAND LAKES

a. Annual evaporation from the six Highland Lakes (lakes Buchanan, Inks, LBJ, Marble Falls, Travis and Austin) during 2010, 2011, 2012 and 2013 are presented below:

Year	Total Evaporative Loss (acre-feet per year)
2010	183,923
2011	192,404
2012	144,759
2013	120,899

12. LCRA'S RELEASES FOR INSTREAM FLOW NEEDS

a. The 2010 Water Management Plan includes an obligation to make storable inflows and previously stored water from lakes Buchanan and Travis available to help meet instream flow needs below Lady Bird Lake. The current obligation is to maintain instream flows of 120 cubic feet per second (cfs), with a six-week requirement of 500 cfs, from Bastrop to Eagle Lake. (*See* 2010 Water Management Plan at 2-17, 4-12.)

b. In 2012, LCRA released 31,285 acre-feet of water from lakes Buchanan and Travis for environmental flow needs. This included 28,235 acre-feet to meet instream flow obligations and 3,050 acre-feet to meet bay and estuary inflow obligations. Of the 28,235 acre-feet for instream flow obligations, 22,991 acre-feet was released to meet the 500 cfs requirement.

c. In 2013, LCRA released 33,465 acre-feet of water from lakes Buchanan and Travis for environmental flow needs. This included 18,779 acre-feet to meet instream flow obligations and 14,686 acre-feet to meet bay and estuary inflow obligations. Of the 18,779 acre-feet for instream flow obligations, 15,678 acre-feet was released to meet the 500 cfs requirement.

d. In 2014, LCRA obtained emergency relief from TCEQ which reduced the required flow for the blue sucker from 500 cfs to 300 cfs. In 2014 through November, LCRA has released about 4,600 acre-feet of water from lakes Buchanan and Travis for environmental flow needs. This includes about 4,400 acre-feet to meet instream flow obligations and about 200 acre-feet to meet bay and estuary inflow obligations. The amount released for instream flow obligations was all released to meet the 300 cfs requirement. If the requirement had been 500 cfs, about 17,000 acre-feet of additional water would have been released.

e. A 500 cfs requirement for the Blue Sucker in 2015 could result in a release of up to about 21,000 acre-feet if conditions are similar to the past three years. Reducing the requirement to 300 cfs could reduce the amount released by about 17,000 acre-feet.

f. The 2010 WMP includes annual and multi-year caps on the amount of firm water to be made available for instream flow needs. The one year cap is 51,100 acre-feet; the two year cap is 85,700 acre-feet; the three year cap is 114,200 acre-feet; and the four year cap is 147,700 acre-feet. (*See* 2010 WMP at 3-5.) Based on the amount of dedicated releases for instream flows in 2012 and 2013, and estimated for 2014, the operative cap is the one year cap.

13. EFFICIENCY IMPROVEMENTS. In 2012, LCRA implemented process improvements that have improved the efficiency of releases from the Highland Lakes for downstream water needs. These include: 1) a smaller increment of instantaneous releases from Tom Miller Dam, which allows for more precisely meeting instream flow requirements as well as other demands; and 2) improvements to models and procedures for determining the downstream demand and the estimated amount of flows originating downstream.

14. It is my opinion that the current drought continues to present an imminent threat to public health and safety because the lake levels could drop more quickly than arrangements can be made to extend intakes or obtain alternate water supplies. In light of the ongoing drought conditions and lack of recovery in the Highland Lakes, it is my opinion that it is prudent to seek relief from the provisions of the 2010 WMP regarding releases of interruptible stored water for downstream irrigation customers and to reduce the instream flow requirement for the Blue Sucker from 500 cfs to 300 cfs.

Further affiant sayeth not.

RYAN ROWNEY, AFFIANT

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

TABETHA JASKE
Notary Public, State of Texas
My Commission Expires
January 11, 2018

Notary Public in and for the State of Texas

My Commission Expires: 1-11-2018

Tab 1

Ryan B. Rowney
P.O. Box 220
Austin, TX 78767
(512)730-6874

EXPERIENCE

LOWER COLORADO RIVER AUTHORITY, Austin, TX **October 1983 to Present**

Vice President, Water Operations (Sept. 2011 to Present)
Responsible for all areas of Water Operations including Hydro Operations, Irrigation Operations, River Operations, Water and Wastewater Operations, Water Surface Management and Water Customer Support. Provides safety oversight for Water Operations and reports directly to the Executive Vice President of Water.

Responsible for the operations and maintenance of LCRA's six dam and 13 hydroelectric (hydro) generation units, 1,100 miles of irrigation canals, nine irrigation pump stations, LCRA's system of rain and stream gauges, and LCRA water and wastewater systems.

Responsible for the development and reporting of drought and lake conditions to the General Manager and the LCRA Board of Directors on a monthly basis.

Manager of Dam & Hydroelectric Operations (Mar. 2004 to Sept. 2011)
Operate and maintain LCRA's network of dam and hydro generating assets while providing leadership and direction to staff. Manage flood operations. Develop strategic and operating goals and objectives in line with LCRA's overall goals and objectives. Ensure adherence to safety procedures and policies. Provide leadership and direction to dam and hydro related utility maintenance activities.

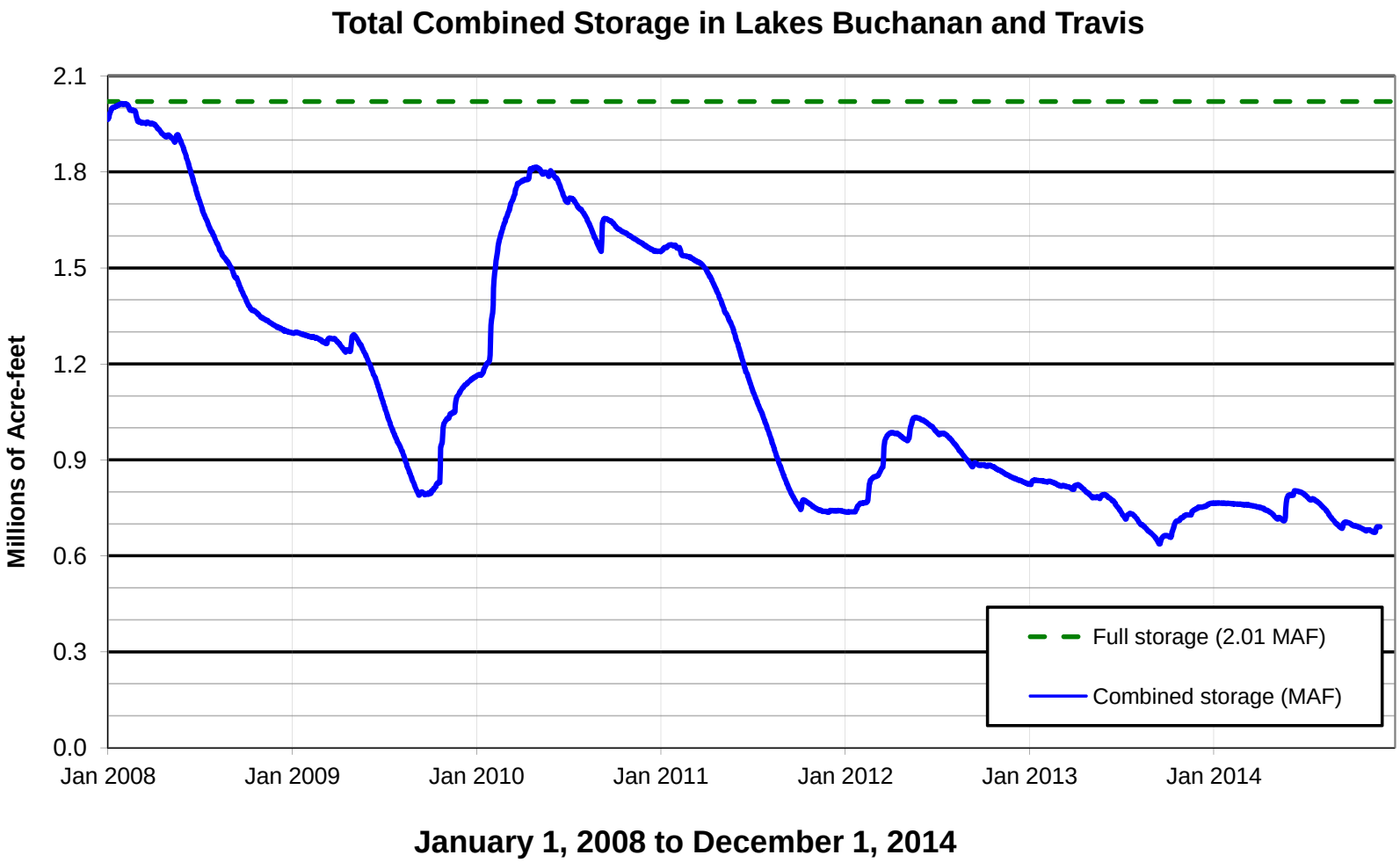
Superintendent of Dam & Hydroelectric Operations (May 2001 to Mar. 2004)
Supervise, coordinate and direct activities of dam and hydro staff. Act as liaison with the LCRA River Operations Center (ROC), LCRA Generation Desk (GenDesk) and LCRA System Operations Control Center (SOCC) to ensure the most efficient use of Hydro unit operations and flood management. Supervise the overall maintenance of the six Highland Lakes dams, the Lometa reservoir and pump station, thirteen hydroelectric turbine generators and all WWW treatment plants and associated water lines. Supervise the overall maintenance of all LCRA floodgates and related equipment.

Area Supervisor, Wirtz and Starcke Dams (Feb. 1997 to May 2001)
Supervise, coordinate and direct overall activities of staff responsible for monitoring and operating all LCRA dams and hydro generators. Lead and ensure communication and coordination of work activities with LCRA's Generation Desk (GenDesk) and the River Operations Center (ROC) to meet generation demand load requirements. Lead and ensure communication and coordination with the ROC to manage the lake levels of the six Highland Lakes, during normal, emergency and flood conditions.

Planner / Scheduler, Dam & Hydroelectric Operations (Aug. 1994 to Feb. 1997)
Develop and maintain departmental work plan and project schedules, time and cost estimates, work orders, work authorizations, requisitions, bid evaluations, pertinent records and logs, including ProCard documentation.

Electrician, Dam & Hydroelectric Operations (Oct. 1983 to Aug. 1994)
Responsible for repair, installation, replacement and testing electrical circuits, equipment and appliances in a facilities or other non-energy services environment. Isolate defects in wiring, switches, motors and other electrical equipment using testing instrument. Replace faulty switches, sockets and other elements of electrical systems. Dismantle electrical machinery and replaces defective electrical or mechanical parts such as gears, brushes and armatures. Mount motors, transformers and lighting fixtures into position and completes circuits according to diagram specifications.

Tab 2


Total Combined Storage in Lakes Buchanan and Travis
Millions of Acre-feet
2.1
1.8
1.5
1.2
0.9
0.6
0.3
0.0
Jan 2008
Jan 2009
Jan 2010
Jan 2011
Jan 2012
Jan 2013
Jan 2014
Full storage (2.01 MAF)
Combined storage (MAF)
January 1, 2008 to December 1, 2014

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER approving the Lower Colorado River Authority's Water Curtailment Plan for its Firm Water Customers; Docket No. 2011-2097-WR

On December 7, 2011, the Texas Commission on Environmental Quality ("TCEQ" or "Commission") considered the request for approval of its Water Curtailment Plan, filed on October 21, 2011. LCRA's firm Water Curtailment Plan is an amendment to LCRA's Raw Water Drought Contingency Plan, which is included in LCRA's Water Management Plan, Permit No 5838. LCRA's Water Management Plan, required by its Certificates of Adjudication Nos. 14-5478 and 14-5482, provides how LCRA makes water available from Lakes Buchanan and Travis to meet "firm" water customer needs, downstream interruptible irrigation demands, and environmental flow needs of Matagorda Bay and the lower Colorado River. It also provides how LCRA will manage and curtail supplies from the lakes during times of drought including through a repeat of the Drought of Record. LCRA's Water Management Plan additionally requires that this Water Curtailment Plan be prepared before the LCRA implements mandatory firm water customer curtailment under Tex. Water Code § 11.039, and that this plan be approved by the LCRA Board and the Commission.

The Commission finds that the plan meets the requirements of Texas Water Code § 11.039 and 30 Tex. Admin. Code Chapter 288.

THEREFORE, THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY ORDERS THAT:

Lower Colorado River Authority's Water Curtailment Plan filed October 21, 2001, is approved.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Bryan W. Shaw
For the Commission

Issue Date: DEC 12 2011

THE STATE OF TEXAS
COUNTY OF TRAVIS
I hereby certify that this is a true and correct copy of a Texas Commission on Environmental Quality document, which is filed in the permanent records of the Commission. Given under my hand and the seal of office on

Bridget C. Bohac DEC 14 2011

Bridget C. Bohac, Chief Clerk
Texas Commission on Environmental Quality

APPLICATION OF THE LOWER COLORADO RIVER AUTHORITY FOR EMERGENCY AUTHORIZATION RELATED TO WATER MANAGEMENT PLAN	§ § § § §	**BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

AFFIDAVIT OF NORA MULLARKEY MILLER

THE STATE OF TEXAS §
§
COUNTY OF TRAVIS §

Before me, the undersigned authority, personally appeared Nora Mullarkey Miller, 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.

3. I, Nora Mullarkey Miller, am an individual residing in Austin, Texas.

4. I have a Bachelor of Arts degree in Sociology from the University of Texas at Austin and a Master of Public Health degree from the University of Texas Health Science Center in Houston.

5. I have worked for the Lower Colorado River Authority (LCRA) for over 27 years. My current title is Manager, Water Contracts and Conservation. My experience is further detailed in the attached resume, attached under Tab 1.

6. As part of my duties at LCRA, I am responsible for managing LCRA's firm water contracts and helping to prepare and implement LCRA water conservation plans and drought contingency plans.

7. I have had experience implementing mandatory water restrictions for the City of Austin, as well as for the water utilities previously owned and operated by LCRA.

8. The Drought Contingency Plan (DCP) for LCRA's firm water customers establishes the measures LCRA will take during times of drought. (The DCP is included in Chapter 4 of LCRA's Water Management Plan. *See* 2010 Water Management Plan at 4-32.) Those measures are: 1) when combined storage in lakes Travis and Buchanan is at or below 1.4 million acre-feet, LCRA encourages all of its customers to implement voluntary water conservation measures; 2) when combined storage in lakes Travis and Buchanan is at or

below 900,000 acre-feet of water, LCRA asks its firm water customers to implement mandatory water restrictions, with a goal of decreasing water use by 10-20%; and 3) when combined storage in lakes Travis and Buchanan reaches 600,000 acre-feet of water, and upon a declaration of a Drought Worse than Drought of Record (DWDR) by the LCRA Board of Directors, LCRA will implement pro rata curtailment of its firm customers' water use, with a goal of reducing water use by 20% initially. If combined storage continues to drop below 600,000 acre-feet, the Board may implement further mandatory reductions. LCRA's rules provide for a temporary variance from these requirements only in circumstances where a customer can demonstrate that the public health, welfare or safety is threatened. (*See* LCRA Water Contract Rules, Article 11, rule 11.14 available at: http://www.lcra.org/water/water-supply/water-supply-contracts/.)

9. Further, pursuant to action by the LCRA Board of Directors in November 2013 (and reaffirmed in November 2014), the LCRA Board of Directors temporarily amended the firm customer Drought Contingency Plan to require that firm customers limit outdoor ornamental landscape irrigation to no more than once per week beginning March 1, 2014 as long as the combined storage in lakes Buchanan and Travis is below 1.1 million acre-feet and interruptible stored water supply to customers in LCRA's Gulf Coast and Lakeside divisions and Pierce Ranch is suspended. This drought response measure does not require that customers achieve a specific percentage savings. The combined storage in lakes Buchanan and Travis was below 1.1 million acre-feet on March 1, 2014 and has not increased above 1.1 million acre-feet since that date, and interruptible stored water supply to customers in LCRA's Gulf Coast and Lakeside divisions and Pierce Ranch was cut off for all of 2014. As a result, the no more than once per week landcscape irrigation restriction is currently in effect. The restriction will remain in effect in 2015 if interruptible supply for the Gulf Coast and Lakeside divisions and Pierce Ranch is suspended and storage remains below 1.1 million acre-feet.

10. To conserve water, LCRA has engaged in extensive water conservation efforts since 1989. Attached under Tab 2 is LCRA's Ongoing Water Conservation Initiatives and Drought Response Efforts Report, which provides more details about LCRA's water conservation and drought contingency planning and response efforts. Additional information can also be found in the 2014 LCRA Raw Water Conservation Plan, which is available electronically on LCRA's website at: http://www.lcra.org/water/save-water/.

11. All of LCRA's firm customers that currently divert and purchase water from LCRA are required to have a drought contingency plan. As of December 1, 2014, 100% of those customers (other than those with "temporary" contracts of up to three years and up to 10 acre-feet per year) have plans on file. LCRA has implemented a separate drought contingency plan for its domestic use and irrigation customers which fall under the temporary contract category. (*See* http://www.lcra.org/water/water-supply/water-supply-contracts/Documents/DU-Temp-DCP-with-Amendment.pdf.) Further, LCRA has a drought contingency plan that applies to its irrigation operations. (*See* 2010 WMP pp. 4-23 to 4-31.)

12. On August 23, 2011, combined storage in lakes Travis and Buchanan dropped below 900,000 acre-feet. LCRA has asked firm customers to implement their mandatory drought

measures with a goal of reducing water use by 10-20%, as specified in LCRA's DCP. The response of these customers is summarized under Tab 2, attached to my affidavit.

13. In the summer of 2008, the City of Austin, the LCRA West Travis County System, and Travis County Water Control and Improvement District No. 17 began requiring their retail customers to limit outdoor watering to twice a week. The City of Austin moved to require limits on landscape watering to once per week during the fall of 2009, when LCRA asked customers to implement mandatory water restrictions as a result of reaching the 900,000 acre-feet combined storage trigger. Once the 2009 drought eased, the City of Austin decided to move back to the required twice weekly limit on landscape irrigation, but continued this on a year-round basis. In September of 2011, the City of Austin once again implemented the limitation on landscape irrigation to once per week for its retail customers due to hitting the 900,000 acre-feet combined storage trigger. Except for about a six week period in the summer of 2012, City of Austin customers have stayed in once a week restrictions for the past two years.

14. If a Drought Worse than Drought of Record is declared, LCRA's 2010 Water Management Plan provides that the firm customers' supply be curtailed on a pro rata basis, consistent with state law. In December 2010, LCRA obtained approval from the Texas Commission of Environmental Quality of its Water Curtailment Plan for Firm Customers. As of December 1, 2014, LCRA has pro rata plans for all of its firm water customers who are actively diverting water.

15. In evaluating potential water savings from drought response measures, I have reviewed a 2009 study by the Texas Water Development Board, "Drought Management in the Texas Regional and State Water Process." (Available at: http://www.twdb.state.tx.us/publications/reports/contracted_reports/doc/0804830819_DroughtMgmt.pdf.) The report estimates that implementation of the drought of record stage in the drought contingency plans of all municipal providers across Texas would reduce annual water demands by between 15 and 20 percent (based on information in the drought plans). According to the TWDB study, the measures required to achieve this level of savings would have some onerous effects on customers and would affect customers' quality of life and local economic conditions. The study team stated that some of the goals listed in the water suppliers' drought contingency plans were unrealistic and most were untested. For most providers in Texas who have implemented their drought contingency plans, there is limited or no data available regarding actual water savings during drought conditions.

16. In 2011 and 2013, LCRA conducted benchmarking research throughout the United States as well as Australia, to assess the effectiveness of drought response measures. The water providers interviewed stated that water savings between 15 to 40 percent were realized from implementation of mandatory drought restrictions. The timeframe for savings varied from six months to three years for wholesale providers and less for smaller, mainly retail providers. For some water suppliers such as the City of Atlanta, East Bay Municipal Utility District, and North Texas Municipal Water District water savings were below 15 percent for the first year of implementation. Atlanta had an initial reduction of 10 percent during the first year of drought restrictions but was able to receive an additional 14 percent when the state of Georgia declared a statewide drought emergency. A 40 percent savings was

achieved in Australia after an extended period and included a ban on outdoor watering. Information obtained during the benchmarking effort can be found under Tab 3 and Tab 4.

17. Some LCRA customers have reported their estimated savings from drought restrictions imposed over the past two years. Those customers implementing the once per week limit on landscape irrigation are estimating savings of 15% or greater on an annual basis. This savings estimate is consistent with calculations performed by LCRA using 2007-08 winter water use compared with 2008 summer water use to develop a proxy of how much water might be used outdoors. Many municipal customers' DCPs eliminate all outdoor spray irrigation under pro rata curtailment. Assuming winter use represents only indoor use for municipal customers, eliminating all outdoor water use might save somewhere between 15% to 25% on an annual basis. Completely eliminating outdoor water use is expected to create significant financial hardship for the landscape and irrigation community.

18. LCRA's TCEQ-approved Water Curtailment Plan for Firm Customers considers the extent to which customers have already implemented conservation and drought contingency measures in determining their effective required pro rata curtailment. Many of LCRA's customers sought and obtained modifications to their required curtailment based on a variety of factors, including conservation savings. In addition, some of the customers, including the City of Austin, have already implemented drought response measures that may bring them close to meeting the initial required reduction. However if water supplies continue to decline, the LCRA Board could adopt more stringent water reductions, thus requiring customers to implement additional measures.

19. LCRA continues to work with its firm customers in preparation for the possible implementation of pro rata curtailment.

Further affiant sayeth not.

Nora Mullarkey Miller

NORA MULLARKEY MILLER, AFFIANT

SWORN TO AND SUBSCRIBED before me on the 18th day of December, 2014.

Tabetha Jaske

Notary Public in and for the State of Texas

My Commission Expires: 1-11-2018

TABETHA JASKE
Notary Public, State of Texas
My Commission Expires
January 11, 2018

Tab 1

Nora Mullarkey Resume

Nora Mullarkey has 30 years of experience in water conservation. She began her work as a conservation coordinator at the City of Austin, where she oversaw water conservation plumbing retrofit programs and evaluated programs for water savings and cost effectiveness. For the past 27 years, Nora has been with the Lower Colorado River Authority (LCRA), and currently manages its raw water contracts and water conservation program. In this capacity, Nora oversees the planning and implementation of conservation programs for LCRA firm and interruptible raw water customers, and provides planning and policy oversight on conservation issues affecting the LCRA and its customers. During this historic drought, Nora has managed the pro rata curtailment process for firm water in anticipation of reaching a drought worse than the drought of record.

While at the LCRA, Nora has also been responsible for environmental education programs and special community events such as volunteer water quality monitoring, household hazardous waste collections and river and lake cleanups. Before joining the LCRA, Nora worked as a water conservation specialist for the City of Austin and as a socioeconomic and land use specialist for Espey, Huston and Associates.

Nora is or has been involved in the following local, state and national water conservation professional activities:

- TCEQ Irrigation Advisory Council member
- TWDB Water Conservation Advisory Council, alternate
- Texas AWWA Water Conservation and Reuse Division Past Chair and current Water Conservation Subcommittee Chair
- Texas Legislative Task Force on Rainwater Harvesting member
- American Rainwater Catchment Systems Association Board member
- City of Austin Citizen's Water Conservation Advisory Committee

Nora received a Bachelor of Arts degree in Sociology and a Master of Public Health degree- both from the University of Texas.

Tab 2
Lower Colorado River Authority
On-going Water Conservation Initiatives and Drought Response Efforts Report

LCRA Water Conservation Overview

LCRA believes that water conservation will benefit its customers and is necessary for the long-term quality and sustainability of the lower Colorado River basin's water supply. LCRA has coordinated, and will continue to coordinate, with its customers and the public to implement innovative, effective and cost-efficient water conservation practices. LCRA has focused its conservation efforts on reducing the water used for irrigated agriculture, providing public awareness through outreach and education, and providing technical assistance and incentives to wholesale customers.

Municipal customers in the lower Colorado River basin also have been leaders in water conservation. As LCRA's largest municipal customer serving more than 80 percent of the population in the basin, the City of Austin has maintained one of the most comprehensive water conservation programs in the state for more than two decades. Austin's conservation efforts combine incentive programs with customer education, conservation ordinances and rules. In recent years, additional municipal customers in the basin such as Travis County Water Control and Improvement District (WCID) No. 17 have implemented irrigation evaluation programs and other water conservation efforts to effectively lower water use in their service areas.

Ongoing LCRA Water Conservation Efforts

Agricultural water conservation strategies
As the largest user of water from the lower Colorado River system, irrigated agriculture has provided one the best opportunities for LCRA to reduce the overall water demand through conservation programs. Beginning in 1986, LCRA initiated a major program to increase irrigation water use efficiency in rice irrigation systems. Between 1989 and 1997, the introduction of volumetric pricing and canal rehabilitation are estimated to have saved approximately 13 percent or about 41,500 acre-feet annually, of the projected water use that would have occurred without conservation practices in place.

House Bill 1437, passed by the Texas Legislature in 1999, authorizes LCRA to provide funds for the development of water resources or other water-use strategies to replace or offset up to 25,000 acre-feet per year of surface water transferrable to Williamson County. Guided by the HB 1437 implementation plan, a grant program was initiated in 2006 to help finance agricultural water conservation strategies both for structural improvements within LCRA irrigation divisions and for grants to agriculture producers. One of the main priorities on the list of conservation strategies to implement has been precision laser land leveling. Between 2006 and 2013, LCRA provided up to 30 percent of the costs to the farmers for the implementation of this conservation measure on more than 30,000 acres of land.

In 2009, LCRA completed a short-term strategy report update, which recommended two major capital projects in the irrigation divisions in addition to continuation of the precision land leveling program. These projects are: 1) implementing volumetric measurement in the Garwood Irrigation Division, and 2) retrofitting and automating in-canal gate structures in the LCRA Irrigation Divisions. In late 2009, LCRA began implementation of a $1 million Garwood volumetric measurement project. Through this project, over 400 standardized water delivery and flow management structures were installed in the Garwood canal system, and 85 miles of canal laterals have been cleaned or rehabilitated. In addition, 139 miles of existing canals formerly managed by land owners are now managed by LCRA. Installation of 36 walk bridges and measurement piers at every delivery structure allow staff to collect accurate daily water measurements. Volumetric pricing was implemented for the first time in the 2012 irrigation season after two test seasons of daily water measurement throughout the Garwood canal system. A $100,000 grant was secured from TWDB in 2009 to assist with the Garwood measurement project.

In 2010, LCRA received a nationally competitive grant from the U.S. Bureau of Reclamation (USBR) to fund $257,000 or almost half of the Gulf Coast Gate Rehabilitation and Control project. This project replaced and automated eleven canal check structure sites (22 gates) within the eastern canal system of the Gulf Coast Irrigation Division. The grant funds allowed LCRA to pursue the installation of a supervisory control and data acquisition (SCADA) system to remotely monitor and control canal water levels at the gates. Three spill monitoring sites were also equipped to be remotely monitored to quantify water loss from the canal system. The project construction, SCADA software interface, and radio communications testing were completed in 2012.

Three additional gate rehabilitation projects have been initiated since that original project was completed. In June 2013, TWDB awarded LCRA $101,700 to assist with automating the nine remaining main gate structures needed to extend automated gates to the end of the eastern canal system line started with the original 2010 Gulf Coast project. This project was completed in June 2014 along with an additional gate project to automate five gates leading to the diversion point of a major industrial customer served from the Gulf Coast Irrigation Division eastern canal system. In July 2014, another gate rehabilitation project began to automate ten additional sites (21 gates), beginning automation on the western canal system of the Gulf Coast Irrigation Division. These gates will also automate the canal line serving the other major industrial customer on the Gulf Coast Irrigation Division western canal system.

Due to curtailment of irrigation operations in two of LCRA's three irrigation divisions, actual savings from all agricultural conservation measures was estimated to be 6,200 acre-feet per year at the end of 2013. However, if curtailment had not been in place, LCRA estimates that savings would be about 9,800 acre-feet per year. Savings have not yet been calculated for the 2014 irrigation season in Garwood.

Municipal and Industrial Water Conservation Strategies

As a major water rights holder, the Lower Colorado River Authority (LCRA) is required to develop and implement a water conservation plan. In 1989, prior to the Texas Administrative Code, Chapter 288 rules, LCRA developed Rules for Water Conservation and Drought Contingency and required all new firm water customers applying for a new or modified water supply contract to develop plans in accordance with these rules.
As a wholesale provider of water, LCRA must work through its wholesale customers to save water at the end-user level. LCRA offers a variety of strategies to save water such as incentive programs through which LCRA partners with its customers to offer water-saving fixtures such as high-efficiency toilets or other technologies; requirements that new or updated contracts include conservation best management practices; and an expansion of LCRA's education outreach efforts to provide useful information to consumers. In the fall of 2009, LCRA modified its water conservation rules to require all customers have water conservation coordinators and provide annual plan implementation reports to LCRA. A Conservation Coordinator Committee now works in concert with LCRA to implement programs.

Beginning in 2010, several new incentives programs were implemented, including a residential indoor plumbing fixture replacement program; a firm water customer cost-share program; rebates for irrigation technologies and other commercial measures, and irrigation evaluation training. All of these programs are available to water users that directly or indirectly receive water from LCRA. A summary of the program results include:

- Partnered with 14 firm water customers:
  - 5,000 high-efficiency toilets
  - 2,700 low-flow showerheads.
- Awarded rebates to retrofit plumbing fixtures in 22 schools and four hotels
- Partnered with customers to perform about 850 irrigation evaluations
- Awarded ten cost share grants to eight retail customers totaling almost $300,000

LCRA's cost share grant program pays up to $151 per acre-foot saved, assuming a 10-year project life, or 50 percent of the cost, whichever is less. Ten projects have been awarded cost share grants and have included several reuse projects for converting raw water to reuse water to irrigate parks and athletic fields, utility water loss projects, and irrigation technology upgrades for golf courses.

LCRA estimates that approximately 2,700 acre-feet (450 million gallons) of water is saved annually from implementation of firm water strategies since 2009. These savings do not include those associated with temporary water restrictions that are in affect due to the current drought. Municipal customer mandatory requirements such as irrigation standards and permanent landscape watering schedules account for nearly 50 percent of the savings.

LCRA has received several awards for its firm water conservation incentives programs. In 2013, LCRA was selected as a finalist for the Texas Commission on Environmental

Quality (TCEQ) Texas Environmental Excellence Awards, and was awarded a Blue Legacy Award by the Water Conservation Advisory Council in the river authority category.

LCRA administers an annual progress report survey to its customers and uses the Alliance for Water Efficiency water savings tracking tool to determine the progress of the conservation programs.

LCRA power plants have been implementing water conservation measures as well. Combined, direct reuse and conservation measures implemented mainly at Fayette Power Plant have resulted in an estimated 560 acre-feet per year of water savings.

Finally, LCRA has been educating customers in its service area about water conservation through its public awareness efforts. Conservation articles with supporting how-to videos and videos highlighting cost-share projects are made available through LCRA WaterSmart Web site. In addition, the LCRA conservation team regularly staffs events and gives presentations with an emphasis on efficient outdoor irrigation and other water conservation tips throughout LCRA's service area. LCRA will be launching a new outreach program in the coming months called **"Water My Yard"** developed by Texas Agrilife. A website will be available that provides a weekly schedule for how much water to use on the landscape, based on a once a week water schedule. It will use weather-based data, and will use LCRA's existing Hydromet stations.

The LCRA Board approved a new LCRA's Water Conservation Plan in April of 2014. The plan includes a continuation of current programs, consisting of a combination of regulatory, incentives, customer service and education to LCRA firm water customers and the public.

Drought Response Efforts

As a wholesale water supplier, LCRA requires all of its firm municipal, industrial and irrigation water customers to prepare and submit drought contingency plans. The drought contingency plans are designed to reduce water demands through supply and demand management measures as a result of water supply conditions. Since it began requiring drought plans as part of its contract rules, LCRA has provided technical assistance and other relevant information to its wholesale customers during the planning process. In November 2010, LCRA staff began actively working with customers to update their drought contingency plans to be consistent with the LCRA drought plan. As of December 2014, 100 percent of customers who are actively diverting water have plans on file with LCRA.

Some measures thought of as drought response measures have the potential to become permanent water demand management measures. Four wholesale customers – Travis County WCID #17, Lakeway Municipal Utility District, West Travis County Public Utility Authority, and the City of Pflugerville – have adopted permanent landscape water restrictions from May through September each year. Their end users must follow a mandatory water schedule that limits outdoor landscape irrigation to no more than twice

weekly and are prohibited from irrigating between the hours of 10 a.m. and 7 p.m. except with a hand-held hose. The City of Austin implemented a mandatory schedule in 2008 that corresponds to the same landscape restrictions, but is in effect year-round.

LCRA stepped up domestic use customer enforcement efforts in the summer of 2014 to ensure compliance of the mandatory once-per-week limit on landscape water use. The results of this effort included over 100 first-warning violations and five surcharges. LCRA also entered into about 200 new domestic use contracts during this period. An email was sent to customers in December 2014 reminding them to turn off sprinkler systems for the winter time.

LCRA Drought Response—Customer Communications and Support

LCRA strives to maintain open lines of communication with all of its water customers. During the 2009 drought, LCRA hosted several work sessions with its firm water customers, particularly in the fall and winter of 2009 and in January 2010. The goals of the work sessions were for customers to share information on their mandatory drought response efforts and learn from each others' experiences and challenges, and for LCRA staff to introduce pro rata curtailment. Customers provided feedback on proposed pro rata curtailment rules, some of which were incorporated into the final pro rata contract rules.

As drought conditions worsened in 2011, LCRA focused on providing up-to-date, clear information to its customers and assistance with drought restriction implementation through sharing of resources and technical information. LCRA has held four customer meetings with its customers since July of 2011 to keep them updated regarding drought conditions.

July 2011 meeting
This meeting between LCRA and water customers focused on the seriousness of drought conditions, importance of water conservation, and timeframe for potential mandatory water restrictions. LCRA staff met with more than 60 people who represent many of LCRA's municipal and industrial raw water customers. Presentations included updates on the ongoing drought conditions throughout the lower Colorado River watershed, water storage projections, water conservation, and measures that LCRA has taken and will take under its state-approved plan if drought conditions worsen. LCRA informed its customers of what actions will occur when water storage levels fall below set triggers, including reducing releases for environmental needs, cutting back water for agricultural customers, and working with its wholesale municipal and industrial customers to implement mandatory water-use restrictions.

October 2011 meeting
The primary purpose of this meeting was to prepare customers for the possibility of pro rata curtailment in 2012. LCRA shared information on the current drought and water supply, explained the history and reasons for pro rata curtailment, and reviewed the process and procedures for implementing pro rata curtailment, and. Customers had the

opportunity to express their challenges and issues with implementing pro rata curtailment.

January 2012 meeting
Almost 90 customers attended this customer meeting and were updated on a number of issues, including the drought, the weather outlook, the Water Management Plan and a new conservation incentive program. Those that attended also took part in a roundtable discussion on topics including: 1) the need to coordinate drought messages; 2) the importance of conservation education; 3) the challenges of enforcing drought measures; and 4) the benefits and challenges of having a uniform watering schedule throughout the region.

August 2012 meeting
The drought was again on the agenda for this customer meeting. LCRA staff provided an update on the current drought and water supply situation, gave an update on the pro rata curtailment plan review process, and gathered customer feedback on the pro rata curtailment process. Over sixty customers attended this meeting.

Meetings in 2013
LCRA has held firm customer meetings on May 2, June 28, August 29 and November 15 of this year. The May meeting focused on customer curtailment plans and the possibility of mandatory pro rata curtailment later this year. At the June meeting, LCRA and its customers shared and discussed lessons learned from drought response benchmarking, approaches taken by various LCRA customers to implement drought response measures, and the additional steps that may be taken if pro rata is triggered and conditions continue to worsen. The August meeting continued the discussion of pro rata curtailment, including clarification that customers could modify current pro rata plans on file to add demand growth in 2012. Finally, at the November meeting, the 2014 emergency relief proposal as well as proposed changes to LCRA drought contingency plan rules for customers were discussed.

Meetings in 2014
Two firm water customer meeting were held in 2014 – on January 31 and June 5. The meetings included continuing discussions of the water supply outlook and drought response measures. Customers were also told that they could update their pro rata baseline to include 2013 growth. Other topics included a discussion on the update of the LCRA water conservation plan and possible rate increases.

Other communication efforts
Combined storage of lakes Travis and Buchanan, two reservoirs constructed to store water supply, reached the milestone storage volume trigger of 900,000 acre-feet on August 24, 2011 under LCRA's Water Management Plan. As a result, the following day LCRA called on its wholesale firm water customers to implement mandatory water use restrictions under their individual drought contingency plans to reduce their water use by 10 to 20 percent. Information was sent out via a direct e-mail newsletter to customers, and certified letters. LCRA created a section titled "Water Use Restrictions" on the

LCRA Web site that provides links to individual customers' water restrictions, including restrictions for LCRA water utility customers.

LCRA sent out a notice to customers on April 26, 2012 stating that while the combined storage levels had risen to over 1.0 million acre-feet, LCRA was requesting that customers continue implementing mandatory water restrictions until the combined storage increased to at least 1.1 million acre feet. When the combined storage dropped once more to less than 900,000 acre-feet on September 3, 2012, LCRA sent out a reminder to customers to implement mandatory restrictions. LCRA continues to update the Water Use Restrictions page on the LCRA web site. The page shows which customers are in various stages of restrictions.

Customer drought response efforts

In September of 2011, 21 LCRA municipal customers and LCRA's retail water utilities began implementing mandatory water restrictions. Currently, all major municipal water customers are in mandatory restrictions. In November 2013, the LCRA Board approved a resolution to require firm water customers to limit ornamental landscape spray irrigation at homes and businesses to watering a maximum of once per week beginning March 1, 2014 subject to combined storage levels and curtailment of interruptible customers. As of February 2014, customers representing nearly 95% of the total population served by the LCRA were already limiting outdoor water use with a hose-end sprinkler or automatic system, not including drip irrigation, to no more than once per week. Other non-essential uses have also been curtailed. Major customers that have been in once per week watering drought restrictions even before required to do so by LCRA include Austin, Cedar Park, Pflugerville, Travis County WCID 17, Lakeway MUD and the West Travis County Public Utility Authority. Except for about a six week period in 2012, the City of Austin has been under once per week water restrictions since the fall of 2011.

Many irrigation and recreation customers also informed LCRA of the water reduction measures they have implemented to cut back their water use by 10 to 20 percent. Most golf courses reduced their overall water budget and have prioritized areas to irrigate. Many irrigation customers have reduced irrigated acreage temporarily, and eliminated over-seeding. Irrigated acreage has been reduced temporarily on 320 acres collectively due to drought restrictions. Several customers have permanently decreased the size of irrigated areas (usually roughs, which are non-playable areas).

LCRA industrial customers, who consist of power plants and a few large industries along the Gulf Coast, cut back on non-essential water uses, such as outdoor watering. One industrial customer has made substantial equipment upgrades and land use changes to capture rainwater runoff, recycle more wastewater effluent, and recycle more process water. However, outdoor water use is only a small percentage of most industrial customers' use, so that measure alone results in very minimal savings. Any further cutbacks for industrial customers could result in a decrease in production.

Based on progress report surveys submitted in June/July 2014, customer compliance to the mandatory once weekly watering restrictions has been high and resulted in substantial savings. Nine customers reported spending 10 hours or more per week on enforcement during the irrigation season, and many customers are using billing software to identify irrigation schedule violations. Some customers have had to adopt drought rates to recover costs due to revenue loss related to drought restrictions.

Pro rata curtailment preparation

The LCRA Water Management Plan requires LCRA to begin working with customers to develop pro rata curtailment plans once the 900,000 acre-feet combined storage trigger has been reached. As stated earlier, a customer meeting was held in October 2011 to begin this process and provide the customers with an opportunity to ask questions.

Customers were sent letters with their proposed water allotment, assuming a 20% curtailment, and given a deadline of February 15, 2012 to submit their plans. Those that did not submit plans by that time were automatically assigned a 20% pro rata allotment.

LCRA water conservation staff met with customers in person as well over the phone, and also responded to hundreds of emails to answer questions and assist customers in the development of their plans. Eighty-four customers submitted plans and 54 of those customers requested modifications. Customers were allowed to modify their water demand baseline for conservation, reuse, growth, outage, and alternative water supply. The last of the customer plans was accepted in July, 2012. In early 2013 customers were asked to update growth modifications to reflect actual growth in 2012, and in early 2014, customers were allowed to submit growth modifications to reflect actual growth in 2014 if relevant. Because of growth and water-savings measures that have already been implemented, under the initial stage of pro rata, the required reduction in use for many customers would not be a full 20 percent as compared to their most current use. However, if water supplies continue to decline, the LCRA Board could adopt more stringent water reductions.

LCRA met with its firm water customers in May, June, August and November of 2013, and January and June of 2014 in further preparation for the possibility of the implementation of pro rata curtailment as discussed above.

Tab 3

Benchmarking Research on Drought Restrictions implemented in other Communities (Compiled in 2011)

	Atlanta, Georgia	Georgia (state-wide)	Aurora Water, Colorado	Denver Water, Colorado	Corpus Christi, Texas	North Texas Municipal Water District, Texas	East Bay MUD, California
Timeframe drought response measures implemented	2006-2009	9/1/2007 -2009	2002-2003	2002-2003	1984-1986, 1996, 2001	2005 -2006	1977, Late 1990s, Summer 2008-2009
Water Savings							
Percent Reduction Goal (overall)	10%	10%	Undefined ("as much as possible")	30% by Stage 3 (10%-20% previous stages)	Current goals (1%-5%-10%-15%) 1996 plan (10-5-10%) for stages 1-3	5%	15% Overall (Mandatory savings goals varied depending on customer class)
Percent Reduction Achieved (overall)	14-24% (water use remains at 17% below pre-drought)	~10%	32%	29%	30% (off of peak summer usage in 1980s) 11% savings in 1996 (although the goal at that time was 25%)	10-15%	12%
Tracking Water Savings	Monthly comparison to pre-drought for savings	Reports required of water providers	Monthly comparison to pre-drought for savings	Annual comparison to pre-drought for savings	Monthly	Monthly tracking of water use & reduction goal was emailed out to all member cities	Savings triggers were based off of expected production for that timeframe
Drought Response Measures							
Mandatory Watering Schedule	No Outdoor Watering (with exceptions)	No Outdoor Watering (with exceptions)	Twice weekly, no more than 15 minutes per zone	Twice weekly	Once every 5-day or 14-day schedule (depending on stage)	Varied depending on Member City	Recommended Schedule (no more than 3 days/week)
New Landscapes	Allowed if installed by professional & green industry certification received	Allowed (green industry represents significant jobs and impact on the economy)	Not allowed	Allowed (soil restrictions added)	Allowed, landscape plan must be submitted in advance	Member Cities Allowed	Allowed (New connections limited sod & required efficient irrigation systems)
Restrictions on Golf Courses	Tees and Greens exempt	Stage 4 – greens only (95% curtailment)	No more than twice weekly watering allowed	Difficulty with compliance	Time of day and day of the week restrictions	Tees and Greens exempt	30% Reduction Goal

	Atlanta, Georgia	Georgia (state-wide)	Aurora Water, Colorado	Denver Water, Colorado	Corpus Christi, Texas	North Texas Municipal Water District, Texas	East Bay MUD, California
Restrictions on Industrial Customers	10% reduction goal included industrial (large success from customers such as Delta Airlines, Georgia Aquarium)	10% reduction goal included industrial	Outdoor water use restrictions (Surcharges likely prompted conservation)	Surcharges & aggressive attempts to get reductions (plus rebates) led to process improvements for customers including Pepsi & Frito Lay	Surcharges for industrial customers if use is in excess of baseline minus a pre-defined percentage reduction goal	Only on outdoor water use	Industrial 5% Reduction Goal
Enforcement							
Enforcement Actions (for violations)	Fines (surcharges) on water bills	NA	Fines (surcharges) on water bills	Fines (surcharges) on water bills and flow restrictors	Citations	NA	EBMUD investigates customers who have not saved and installed flow restrictors
Surcharges as a Result of Excess Use	No	NA	Surcharges were added to bills (30% reduction applied to outdoor historical use)	Surcharges were added to bills for Denver retail (flat gallon amount applied)	Surcharges added to bills (for residential, commercial, industrial customers)	Some member cities added surcharges to bills	Drought rate structure took effect in 2008
Additional Staff Needed	5 inspectors plus hotline staff added	NA	Aurora: 8 hotline and 15 patrol staff added	Denver added ~10 staff for enforcement	Staff were pulled from other areas and deputized by the court	Many member cities added staff for enforcement	Staff shifted responsibilities to add enforcement
Public Information							
Marketing Campaign	Relied heavily on free media and state-wide campaign	Georgia "Water Smart Campaign: Save Water, Save Time, Save Money"	"Use Only What You Need" Regional Campaign	"It's a Drought…Do Something!" Campaign	"Have You Saved Water Today?" and "If We All Save a Little, We Save A Lot"	"Water IQ: Know Your Water Campaign"	"Save Water. Beat the Drought. This is a job for everyone: be a water saving hero" (Bay Area Water Savings Partnership)
Stakeholder meetings	Yes	Yes	Yes	Golf Course associations, etc.	Yes	Water IQ helped facilitate & organize	Yes

	Atlanta, Georgia	Georgia (state-wide)	Aurora Water, Colorado	Denver Water, Colorado	Corpus Christi, Texas	North Texas Municipal Water District, Texas	East Bay MUD, California
Customer Council/ Advisory Group	Yes	No response	12-person Customer Advisory formed during drought (appointments by City Council)	Customer Advisory Council in place since 1970s	Water Use Allocation Committee formed (of Council/ Mayoral appointees) to assist with industrial reduction	NTMWD held monthly meetings with member cities to provide drought updates and exchange of information	
Technical Presentations given to End-use Customers	Top 50 Customer Workshop held to help encourage water use reduction for these high water use customers	Throughout the state, particularly with industrial customers	Yes	Yes	Yes	NTMWD gave presentations throughout member cities' service areas	Speakers Bureau available

Benchmarking Conclusions

Drought conditions and the implementation of mandatory, rather than voluntary, drought response measures can result in water savings. The water providers interviewed stated that water savings between 10 to 30 percent were realized once mandatory drought restrictions were put in place. All programs were supported by large-scale public awareness efforts, and most water suppliers implemented a surcharge system in addition to outdoor restrictions to help achieve water savings.

Aurora Water Supply, Denver Water Supply, East Bay Municipal Utility District (EBMUD), Corpus Christi and a number of member cities served by North Texas Municipal Water District (NTMWD)implemented a water use allocation system that charged customers for additional water use above and beyond a specified amount. EBMUD allocated a monthly water use amount based on historical use minus the percent reduction goal; for residential, the goal was 19 percent. Residential customers using less than 100 gallons per capita per day were not penalized for their low-water use habits and were exempt from the drought charges.

All water providers interviewed stated that water savings had a significant impact on revenue in the short term. In addition to water savings achieved during the time of drought restrictions, a "drought-shadow" effect also occurred for nearly all of the water providers, where water use remained low after restrictions were lifted. Nearly all the water providers interviewed stated that some level of water use reduction remained after the drought as a result of changed behaviors, new programs implemented, and greater public awareness. For EBMUD, water use restrictions were lifted in late 1977 after a multi-year drought; however, water use levels by the mid-1980s had not returned to pre-drought levels despite a steadily growing population.

A number of the water suppliers interviewed provided water directly to industrial customers. For these large industrial customers, limitations on outdoor water use alone could not achieve the water savings goals set by the water suppliers. In addition, the possibility of surcharges forced some industrial customers to threaten relocation. By offering technical expertise and significant rebates for water saving initiatives, Denver and Atlanta were able to partner with their industrial customers such as Pepsi, Frito Lay, Xcel Energy, the Georgia Aquarium, and others to evaluate the way they used water and help the customers put in place process changes that often resulted in substantial water savings with no negative impact to production.

Individual Water Providers' Drought Response Overview

Corpus Christi, Texas

Corpus Christi implemented drought response measures in 1984-1986, in 1996, and again in 2001. In 1986, as a result of the multi-year drought where the City was faced with less than a one-year water supply, the water supplier developed its first drought contingency

plan. The plan currently includes four stages that correspond to the percentage of combined reservoir levels. The following triggers and drought response measures are included in the latest version of the drought plan:

- 50% capacity triggers City-wide voluntary water conservation (1% reduction goal)
  - ✓ Municipal operations on mandatory conservation
- 40% capacity triggers community-wide mandatory conservation (5% reduction goal)
  - ✓ No lawn or vegetation watering between 10 am to 6 pm
  - ✓ Large parcels of land must obtain approval for watering plan
  - ✓ Commercial nurseries must use hand-held, drip or sprinkler system to irrigate stock
  - ✓ Use of wastewater effluent permitted; sign must be posted on property
- 30% capacity triggers the five-day outdoor watering schedule (10% reduction goal)
  - ✓ Irrigation of golf courses permitted at a minimum rate
  - ✓ Suspend targeted inflows when reservoir below 30% of capacity
  - ✓ Violations punishable by $500 per day
- 20% capacity triggers the monthly residential household water allocation (15% reduction goal)
  - ✓ Each household is allotted 6,000 gallons/month (unless a customer can verify that she or he has more than 2 people living there). Water use in excess of this amount is charged at an aggressive increasing rate per 1,000 gallons (with additional use being charged $5-$8-$13-$40 per each 1,000 gallons above the customers' water use allotment).

In Corpus Christi, a multi-stage conservation program was imposed during the 1984 drought to extend dwindling supplies. Water use restrictions were first implemented during the summer of 1984 and remained in effect through the rest of 1984 and into 1985. During this time, three separate stages, or conditions, of water use restrictions were implemented: (1) condition 1 called for voluntary limitations on outdoor water use; (2) condition 2 restrictions put mandatory limits on allowable watering hours and limited watering to a designated day, once every ten days; and, (3) condition 3 restrictions implemented water rationing on a monthly basis; also, during 1984, under condition 3 a total ban on outdoor water use was implemented.

Corpus Christi Drought Trigger	**Date Initiated**	**Effect on Water Use**
Voluntary Conservation (Stage 1)	May 17, 1984	Little to no effect
Mandatory Conservation (Stage 2)	July 1, 1984	28.6 MGD daily reduction
Mandatory Water Rationing (Stage 3)	August 25, 1984	25.4 MGD daily reduction
Some Condition 3 Restrictions Lifted	October 30, 1984	----
Mandatory Water Rationing Lifted	September 24, 1984	----
Return to Condition 2 Restrictions	January 22, 1985	----

When mandatory drought restrictions were implemented in 1984 and 1985, the restrictions reduced water use in Corpus by approximately 30 percent of peak summer usage, according to a study by David Maidment and D.T. Shaw. The study's analysis also showed there to be an average reduction of 27.2 MGD during the period of July through November 1984. Lastly, the analysis showed that the voluntary restrictions, implemented during the early stages of the drought, had little effect in the city.

More than 40 percent of the annual water use in the City of Corpus Christi is for industrial purposes. City staff has worked closely in the past with the large industrial customers to help them determine ways to reduce their water use and a number of industrial representatives are included on the City's Water Resources Advisory Committee. Industrial customers have made significant strides in reducing their water use—with some refineries averaging 50 gallons of water use per barrel of crude oil refined compared to refineries in California who use from 90-100 gallons of water per barrel on average.

During times of serious drought, the City creates a Water Use Allocation and Review Committee, comprised of mayoral and city council appointees who are charged with the task of granting variances and evaluating industrial, commercial, and institutional (ICI) water needs, among other tasks. Similar to residential customers, the ICI customers are limited to water use allocations when the combined reservoir storage drops to 20 percent or below. The committee helps to determine those allocations and reviews variances to the allocation amounts. New services are also prohibited during this stage, unless approved by the Allocation and Review Committee.

Lastly, to help set an example during drought times, the City developed a water diverter to be used in the field during line flushing to divert water to landscaped areas rather than run it down the storm drains.

City of Atlanta, Georgia

The City of Atlanta implemented drought response measures in 2006. The state of Georgia implemented its drought response plan, finally declaring a Stage IV Drought Emergency in September 2007. The City of Atlanta restrictions mirrored the state restrictions, with the greatest emphasis on outdoor water use reduction.

Stage IV of the Georgia Drought Emergency Plan called for a ban on most outdoor watering with a few exceptions. According to City of Atlanta staff, there was some reluctance on the part of the state to declare a Stage IV Drought Emergency until absolutely and completely necessary, due to the projected impact on the landscaping industry, which is estimated to employ more than 75,000 Georgians.

Stage IV set a statewide goal of 10 percent reduction in overall water use by water providers. Savings amounts varied between regions, with nearly 15 percent monthly savings for northern Georgia. For the City of Atlanta, although the drought restrictions

were officially lifted in January 2009, the current water use remains below 17 percent of 2006 use—which savings are thought to be a result of awareness, an increase in alternative water use, conservation initiatives, and the downturn in the economy.

The City of Atlanta brought together its top 100 largest customers, a group that included hotels, hospitals, office complexes, a federal prison, Pepsi bottling company, airline corporate headquarters and others, for a workshop on the potential impact of the drought measures and ways to reduce water use. Nearly 90 percent of the customers attended the meeting where case studies and other information were presented. The state also offered support by performing audits on large Industrial Commercial and Institutional (ICI) customers. According to the City of Atlanta, all of its high water use customers saved water.

New landscape installations were allowed under the restrictions; however, a partnership was formed with the Metro Atlanta Lawn and Turf Association (MALTA) to help increase water use efficiency for new landscape installations. In order to be issued the variance by the City of Atlanta to water outdoors, a landscaper had to first take a course on proper watering and design administered by MALTA.

Denver Water, Colorado

Denver's Drought Response Plan called for percentage reductions based on reservoir levels; however, it quickly found itself in a drought worse than the drought of record in 2002 after significant snowfall reductions. Denver Water's Board of Directors changed Denver's Drought Response Plan regularly as the drought became more severe—as a planning document, it had never been implemented and so much of what came up, according to staff, was unexpected and unplanned.

The public awareness campaign, "It's a Drought. Do Something!" used humor to help increase awareness of the drought. Advertisements included sayings like "no need to wash your clothes, just don't wear any" or "don't wash your dishes, just get a dog." Denver Water staff stated that while funny and entertaining, there might not have been enough of an emphasis on the importance of saving water and other messages that needed to be communicated during the drought.

A lot of the challenges faced by Denver Water included managing public expectations. Significant backlash was received from the public concerning what was perceived to be a lack of planning on Denver Water's part that resulted in the implementation of restrictions. Some neighboring communities who relied on groundwater supplies were not as heavily impacted during the 2002-2003 drought, adding to the lack of public understanding about water resource planning and availability. Other challenges included budget reductions as a result of the drought having an impact on CIP funding.

Aurora Water Supply, Colorado

Aurora Water Supply provides water to a primarily residential community. With the first in time, first in right priority water right system in Colorado, Aurora's water supply reservoirs were nearly 26 percent full as a result of severely reduced snowfall from 2002-

2004. Mandatory restrictions were put in place with a no more than twice weekly watering schedule and limits on the times that individual irrigation zones could run (no more than 15 minutes per zone). The installation of new landscaping was not allowed, which resulted in significant push-back from home builders and the landscaping industry. Other drought restriction requirements included restrictions on car washes that mandated recycling or ceasing operation, prohibiting the use of all fountains (unless supporting aquatic habitat), and limiting golf courses and parks to the mandatory watering schedule. While some of these measures were not thought to achieve significant water savings, the issue of public perception was linked to the individual measures and provided as the reason for implementation.

As a result of the drought, long-term changes to outdoor landscape codes for new development were put in place such as minimum soil requirements, limitations on turf grass, and an efficient irrigation system design requirement.

East Bay Municipal Utility District

Rebates, incentives, and regulations have been a part of East Bay Municipal Utility District's (EBMUD) conservation program for years to help encourage efficient water use practices. EBMUD has put in place mandatory drought response measures a number of times since the 1970s. In August 2008, EBMUD declared a severe water shortage emergency as a result of consecutive dry years. The District implemented drought response measures designed to achieve an overall water savings goal of 15 percent.

A number of water efficiency measures were required of customers during this time including a provision on prohibiting water waste (allowing water to run off a property), and requiring shut-off nozzles on all hoses. The main focus of the drought response measures in 2008, however, was a water use customer allocation. Baseline water use for customers was calculated using monthly billing information from the previous three years. Customer allocations were then calculated according to the percentage reduction goals included in Table 2. Surcharges for water use in excess of the allocated amounts were charged at an increasing rate for single family residential customers and a flat rate for all others. Customers using less than 100 GPCD were not penalized for their low-water use habits and were exempt from the drought charges.

EBMUD Customers' Water Use Reduction Goals

Customer Group	**Water Use Reduction Goal**
Single Family Residential	19%
Multi-family Residential	11%
Irrigation	30%
Commercial	12%
Institutional	9%
Industrial	5%
Overall Goal	**15%**

In addition to the surcharges, flow restrictors were used for customers who were found to be wasting water. A regional public awareness campaign also complimented these measures. The implementation of drought response and conservation measures were estimated to reduce water use by 12 percent or nearly 26,000 acre-feet of water.

North Texas Municipal Water District

The North Texas Municipal Water District (NTMWD) implemented drought restrictions in 2005. Stage 1 voluntary restrictions began in October 2005 and the stages implemented increased in severity until mandatory restrictions were lifted in 2007. Stage 3, the first stage that required mandatory measures, set a 5 percent overall reduction goal for its member cities. Savings numbers were tracked on a monthly basis—with NTMWD setting the 5% goal off of previous water use prior to the drought. Water use by the member cities was e-mailed to the cities every month along with information on what was being saved and whether or not the savings exceeded or fell short of the 5 percent savings goal.

Member cities implemented various drought contingency measures, including mandatory watering schedules with time of day and day of the week water restrictions, limitations on ornamental fountains, prohibiting car washes without shut-off nozzles, and adding surcharges to water bills if water use exceeded a pre-determined amount. The watering schedule varied between the member cities depending on their specific system needs—for instance, the City of Frisco implemented a restriction on outdoor water use between 5am and 8am due to capacity and pumping issues when indoor use was at its highest, while others promoted a schedule that allowed watering on your trash day to make it easy for customers to remember. Nearly all the member cities' schedules did not allow outdoor watering to occur between the hours of 10 am and 6 pm, which consistency aided regional messaging efforts.

A representative from NTMWD stated that the system was able to shave off approximately 200 MGD during the summer when drought restrictions were in place. Overall, water savings were an average of 10-15 percent. Moreover, some level of water savings has continued despite restrictions being lifted. The NTMWD representative said this is thought to be in part due to increased awareness in addition to member cities implementing conservation incentive programs and keeping the watering schedule in place on a permanent basis.

NTMWD played an active role in helping its customers with their drought response efforts. Staff served as a technical resource, and they made themselves available to give presentations and other talks throughout the member cities' service areas. In addition, NTMWD brought together its member cities on a monthly basis to give them an update on the drought situation, Water IQ efforts, the likelihood of advancing to the next drought emergency stage, and to provide a forum for members to voice questions and concerns. Member cities were made aware of the change in drought stages (from Stage I to Stage II to Stage III) 30 days in advance of it being declared.

Stakeholder meetings were held with the help of Enviromedia, who assisted in advanced outreach to stakeholder groups, securing locations, and coordinating the meetings for groups of irrigators, landscapers, pool maintenance specialists and others. Member cities were always informed in advance of any presentation, speaking event, or stakeholder meeting if it was to be held in their service area.

After the drought ended, NTMWD revised its model drought contingency plan to reduce the number of voluntary stages to one rather than two and to add a restriction on cool season rye grass.

Tab 4

Benchmarking Research on Mandatory Drought Restrictions implemented in other Communities (Compiled in 2013)

	Barton Springs Edwards Aquifer Authority	**San Antonio Water System**	**Melbourne Water, Australia**	**Seqwater, Queensland, Australia**	**Metropolitan Water District, CA**	**Sonoma County Water Authority, CA**	**Southern Nevada Water Authority, NV**
Timeframe drought response measures implemented	2011-2012	2012-2013	Nov 2002-Feb 2005 and Sept 2006- Nov 2012	2005-2009	July 2009- June 2010	2009	2002-2003, 8 of last 11 years dry
Type of Water Use Provider	Wholesale and Retail	Mostly retail, some wholesale ~1.6 million end users	Wholesale to 3 large municipal retailers ~4 million end-users	Wholesale- State Govt owned entity responsible for managing regional water supply	Wholesale only, 26 member cities/districts, 19 million end-users	Wholesale only to 9 retail cities/districts 600,000 end-users	Wholesale only to 7 member cities/districts ~2 million end-users
Water Savings							
Percent Reduction Goal (overall)	20% - 6 months 30% - 4 months	26-36% (varies based on aquifer level)	18% Stage 4 (outdoor water bans) 25% over ~10 years by 2015	Targets in per capita use instead of % reduction	15% wholesale 10% retail	25%	Mandatory 10% first year
Percent Reduction Achieved (overall)	10-38% monthly	25% off permitted volume, required reduction 22%, normal year use 80-85% of permit	44% since 1997	41-43% achieved by 2009	15%	25%	16% first year, 34% by 2011
Baseline used to cut back from	Permitted volume	Permitted volume	None specified- recent use, changed over time	2004-2005 (pre-restriction average rainfall year)	Past three years of pre-drought water sales (2004-2006)	2004 baseline (state mandate)	N/A
Driver of Water Use Reduction Efforts	Edwards Aquifer Authority mandated reduction permitted volume	Edwards Aquifer Authority mandated reduction permitted volume	Yearly supply available, State regulatory entity required specific mandatory retail restrictions	State Govt required mandatory specific water use restriction measures	Yearly April 1st Board declaration of available water supply/need for allocation	State regulatory entity mandated cutback of 25%	Supply allocation capped at 300,000 acft
Timeframe reduction goal achieved	2 months for 20% 1 months for 30%	Ongoing, met target aquifer levels	Target 155 goal lcd (41 gpcd) achieved in 1 yr (7% decrease)	3 years	One year	6 months	One year

	Barton Springs Edwards Aquifer Authority	San Antonio Water System	Melbourne Water, Australia	Seqwater, Queensland, Australia	Metropolitan Water District, CA	Sonoma County Water Authority, CA	Southern Nevada Water Authority, NV
Tracking Water Savings	Monthly tracking of goals, high level management meetings if goal exceeded	Weekly meetings/internal projection updates	Responsibility on retail side, yearly outlook issued forecasting supply capacity zone and action plan	Weekly, retail customers supplied water use weekly,	Monthly reports given to each member agency during allocation, Local ordinance database compiled	Collected reports from retailers bi-weekly, Monthly tracking of water use & reduction goal	No formal process
Modification credits	N/A	N/A	Time/volume offsets w/ water use plan for some large community use like sports fields, one/one w/ industries	N/A	Conservation (only equipment change outs), Reuse, Growth, Local supply	No	N/A
Before/after per capita use, residual effect of drought		N/A- complicated by merger with Bexar Met	423 lcd in 1990s (112 gpcd) to 240 lcd (63 gpcd) in 2010	475 lcd in 2004 (126 gpcd), 225 lcd (59 gpcd) in 2008	1990- 205 gpcd 2008-185 gpcd	2007- 139 avg gpcd 2012- 119 avg gpcd (high 160 gpcd)	2002- 314 gpcd 2013- 219 gpcd
Drought Response Measures							
Mandatory Watering Schedule	20% 5 day schedule 7pm-10am 30%- hand-hold only irrigation	Once every other week in Stage 3 (640 msl), Stage 2 once weekly w/ restricted hours (650 msl)	Critical (Stage 4) bans outdoor water use except for food gardens w/ water use plan	Stage 4- outdoor bucket watering only, 4 hrs, 3x/wk, Stage 5, gardens only, Stage 6, gardens, 3 hrs, 1x/week	None mandated at wholesale level, request 1 day/wk reduction	Varied depending on Member City	Recommended Schedule (no more than 3 days/week)
New Landscapes	30%- all outdoor use except with hand held hose banned	Max 10,000 sq ft irrigated area, 4 in soil, Variance permitted Stage 2- for 5 wks Stage 3- less than 50% turf	Not allowed	Stages 4-6- hand held only 1 hr/day for 2 wks	No restrictions at wholesale level	Member Cities decide	New homes turf not allowed in front yards

	Barton Springs Edwards Aquifer Authority	San Antonio Water System	Melbourne Water, Australia	Seqwater, Queensland, Australia	Metropolitan Water District, CA	Sonoma County Water Authority, CA	Southern Nevada Water Authority, NV
Restrictions on Commercial Outdoor Irrigation		Golf courses- Stage 2- 20% less than ET rates or <= 1.6x base usage, Stage 3, 30% less than ET rates or <=1.4x base usage	Same as residential, exemptions for public gardens or sports fields at discretion of retail provider	25% reduction in water use from baseline, potable water not allowed for parks in later restriction levels	No restrictions at wholesale level	50% reduction required on all commercial irrigation by 2014	Water budgets imposed for golf courses- 10% reduction goal 1st year
Enforcement							
Enforcement Actions (for violations)	$250-$500/day, 2x during critical stage (30%), board order/hearing, ultimately law suit	Strict, consistent enforcement, off-duty police officer patrol all hours, 75-200 citations per month year round	Retail only: Fines, daily penalties, disconnection, imprisonment	$150K wholesale non-compliance, Retail level fines ranged from $90-$200	Fines (surcharges) <10% over – 2-3x base rate >10% over – 4-5x base rate	Enforced by state water resources control board	Fines for commercial users for exceeding budget, individual retail agency fine structures
Allotment	20%- max use/mo 12,000 gal/conn 30%- max use/mo 9,000 gal/conn		N/A		Level 2 of 10 levels Regional shortage 10%, wholesale <=15%		No formal allotment process at wholesale level
Surcharges as a Result of Excess Use	Has not been needed, high level meetings effective deterrent	In the plan, not implemented since 1996	N/A	Surcharges added to bills	Surcharges added to bills	Member cities discretion	No formal surcharge process at wholesale level
Additional Staff Needed	No additional staff, enforcement mostly rests on retailers to achieve reduction	NA	Not at wholesale level	Not substantial, but some at wholesale level due to formation of new regulatory entity	No, staff resources reallocated to drought activities	Member cities discretion	N/A

	Barton Springs Edwards Aquifer Authority	San Antonio Water System	Melbourne Water, Australia	Seqwater, Queensland, Australia	Metropolitan Water District, CA	Sonoma County Water Authority, CA	Southern Nevada Water Authority, NV
Public Information							
Public Awareness outreach	Supplied retailers with flags, road signs (and require use in DCP), car magnets, bill inserts, relatively small service area	Media partnership critical (weather people, local news), scorecard for media	Weekly reports to mass media, Newspaper, radio, TV, billboards etc, public forum & surveys, phone hotline, social media, website		Bill boards, radio, local news spots, partnership campaigns w/ member agencies	High profile regional water awareness campaign	Contact public information division for more info
Communication efforts/ challenges	Streamlined messaging, repeatable messaging	Messaging confusion w/ Edwards Aquifer Authority, Ongoing, high level of awareness		Consistent messaging over a broad area initially a challenge	Participation in rebate programs increased to 3x more than budgeted	Working through state mandated commercial use reduction	
Lessons Learned	Ask for evidence of letters sent to violators, ask for list of top users		Rapid Climate Shift created uncharted territory. Need flexibility of stages within state mandated DCP	Critical need for consistency, community must be engaged & understand severity of situation to achieve targets	Have a robust appeals process that is defined well, plan ahead for refinement process after drought ends	Effectively engaged landscape community through landscaper training, landscape water advisory group	Avoid outright bans that affect economic interests- can still achieve target water savings. Public perception about small volume but highly visible water uses matters.

2013 Benchmarking Conclusions

Drought conditions and the implementation of mandatory drought response measures during severe droughts can result in substantial water savings. The water providers interviewed stated that water savings between 15 to 40 percent were realized from implementation of mandatory drought restrictions. The timeframe for savings varied from six months to three years for wholesale providers and less for smaller, mainly retail providers. However, several wholesale water providers did not have the actual percent reduction achieved, just that the goals were met. The driving force behind the mandated water use reductions was either imposed by a regulatory authority or self-driven due to a water shortage or system constraint. The baseline water use varied from a permitted annual water volume, to a recent period of use where weather conditions were average and mandatory restrictions were not in place.

Most programs required a specific percent reduction goal and gave retail providers the latitude to determine specific drought response measures. The exception was in Australia, where template retail drought plans were mandated by the state, in some cases with minimal options. A few wholesale providers had different goals by customer class, with a per capita use goal for the municipal sector.

All wholesale programs included three key components: large-scale public awareness efforts, significant effort to partner with customers; and supported the compilation and sharing of information regionally. Regional awareness campaigns were a cornerstone of successful plan implementation for most water providers surveyed, and for all with service over a large geographic area. Those campaigns helped achieve water savings faster as drought conditions worsened, provided consistent messaging, and drove increased participation in conservation programs. Most water suppliers implemented a surcharge system in addition to outdoor restrictions to help achieve water savings.

Lessons learned from the implementation of mandatory drought response measures to achieve significant water use reduction included having consistent regional messaging, using a variety of approaches to achieve desired water use reductions, using outright bans on specific types of water use as a last resort, partnering closely with retail customers, and assisting with information sharing among customers. Most wholesale water providers interviewed did not significantly increase staff but reallocated staff time and other resources to fund awareness campaigns.

In addition to water savings achieved during the time of drought restrictions, a “drought-shadow” effect also occurred for nearly all of the water providers, where water use remained low after restrictions were lifted. Nearly all the water providers interviewed stated that some level of water use reduction remained after the drought as a result of changed behaviors, new programs implemented, and greater public awareness.

Allocation systems were not utilized by many of the wholesale providers interviewed, although Metropolitan Water District of Southern California (MWD) required its

wholesale customers to cut back purchases from a growth-adjusted pre-drought baseline. Metropolitan's Water Supply Allocation Plan formula, which accounted for local alternative supplies and included credits for conservation and reuse. MWD went through an extensive revision process of its allocation plan after the first time it was fully implemented in 2009-2010. One of the changes was to allow for a minimum per capital threshold of 100 total gpcd and 55 indoor gpcd to address significant variation in per capita use among its customers.

STATE OF TEXAS
OFFICE OF THE GOVERNOR

RICK PERRY
GOVERNOR

December 22, 2014

FILED IN THE OFFICE OF THE
SECRETARY OF STATE
3:30 PM O'CLOCK

DEC 22 2014
NANDITA BERRY
Secretary of State

The Honorable Nandita Berry
Secretary of State
State Capitol Room 1E.8
Austin, Texas 78701

Dear Madam Secretary:

Pursuant to his powers as Governor of the State of Texas, Rick Perry has issued the following proclamation:

> A proclamation renewing the certification that exceptional drought conditions pose a threat of imminent disaster in a specified number of counties in the State of Texas.

The original proclamation is attached to this letter of transmittal.

Respectfully submitted,

Gregory S. Davidson
Executive Clerk to the Governor

GSD/gsd

Attachment

P. O. Box 12428 • Capitol Station • Austin, Texas 78711

PROCLAMATION

BY THE

Governor of the State of Texas

TO ALL TO WHOM THESE PRESENTS SHALL COME:

I, RICK PERRY, Governor of the State of Texas, issued an Emergency Disaster Proclamation on July 5, 2011, certifying that exceptional drought conditions posed a threat of imminent disaster in specified counties in Texas.

WHEREAS, significantly low rainfall has resulted in declining reservoir and aquifer levels, threatening water supplies and delivery systems in many parts of the state; and

WHEREAS, prolonged dry conditions continue to increase the threat of wildfire across many portions of the state; and

WHEREAS, these drought conditions have reached historic levels and continue to pose an imminent threat to public health, property and the economy; and

WHEREAS, this state of disaster includes the counties of Archer, Armstrong, Bandera, Baylor, Bexar, Bosque, Briscoe, Burnet, Carson, Childress, Clay, Collin, Collingsworth, Colorado, Comal, Comanche, Cottle, Crosby, Dallam, Dallas, Denton, DeWitt, Dickens, Donley, Eastland, Edwards, El Paso, Erath, Fannin, Floyd, Foard, Frio, Garza, Gillespie, Gray, Hall, Hansford, Hardeman, Hartley, Haskell, Hemphill, Hidalgo, Hill, Hood, Hopkins, Hudspeth, Hutchinson, Irion, Jack, Johnson, Karnes, Kaufman, Kendall, Kerr, King, Knox, Lamb, Lipscomb, Llano, Matagorda, McLennan, Medina, Montague, Moore, Motley, Oldham, Palo Pinto, Parker, Parmer, Potter, Real, Rockwall, Shackelford, Sherman, Somervell, Stephens, Stonewall, Tarrant, Throckmorton, Tom Green, Travis, Uvalde, Val Verde, Victoria, Walker, Wharton, Wheeler, Wichita, Wilbarger, Willacy, Williamson, Wise, Young and Zavala.

THEREFORE, in accordance with the authority vested in me by Section 418.014 of the Texas Government Code, I do hereby renew the disaster proclamation and direct that all necessary measures, both public and private as authorized under Section 418.017 of the code, be implemented to meet that threat.

As provided in Section 418.016 of the code, all rules and regulations that may inhibit or prevent prompt response to this threat are suspended for the duration of the state of disaster.

In accordance with the statutory requirements, copies of this proclamation shall be filed with the applicable authorities.

IN TESTIMONY WHEREOF, I have hereunto signed my name and have officially caused the Seal of State to be affixed at my office in the City of Austin, Texas, this the 22nd day of December, 2014.

Rick Perry

RICK PERRY
Governor

FILED IN THE OFFICE OF THE SECRETARY OF STATE
3:30pm O'CLOCK

DEC 22 2014

ATTESTED BY:

NANDITA BERRY

NANDITA BERRY
Secretary of State

FILED IN THE OFFICE OF THE
SECRETARY OF STATE
3:30pm O'CLOCK

DEC 22 2014

APPLICATION OF THE LOWER COLORADO RIVER AUTHORITY FOR EMERGENCY AUTHORIZATION	§ § § §	**BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

AFFIDAVIT OF RON ANDERSON

THE STATE OF TEXAS §
§
COUNTY OF TRAVIS §

Before me, the undersigned authority, personally appeared Ron Anderson, 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, Ron Anderson, am an individual residing in Austin, Texas.

4. I have a Bachelor of Science in Engineering and a Master of Business Administration from the University of Texas at Austin. I am a Registered Professional Engineer in the State of Texas with specialization in Civil and Software Engineering. I am recognized as a Diplomate in Water Resources Engineering by the American Academy of Water Resource Engineers. A true and correct copy of resume, detailing my prior work history and education, is included as Tab 1.

5. I have worked for the Lower Colorado River Authority (LCRA) for thirteen years where I have worked on water supply planning issues for Central Texas. My current title is Chief Engineer.

6. As part of my duties at the LCRA, I track current issues affecting water supply, manage studies and modeling projects related to water supply quality and availability, enhance water supply forecasting capabilities, and evaluate water management procedures.

7. My opinions stated herein are based on my familiarity with LCRA's water supply operations and my evaluation of potential future inflows to the Highland Lakes. 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 either attached or referenced to other portions of LCRA's emergency request and incorporated by reference herein:

a. Affidavit of Bob Rose, including attachments;

b. Affidavit of Ryan Rowney, including attachments;

c. Affidavit of David Wheelock, including attachments;

d. Affidavit of Nora Mullarkey Miller, including attachments.

8. The 2010 Water Management Plan includes three criteria, all of which must be met at the same time for the LCRA Board to make a declaration of Drought Worse than Drought of Record (DWDR). (*See* 2010 WMP at p.4-34.) These criteria are indicators that can be evaluated in real-time. The three criteria are:

   i. Duration of drought is more than 24 months, which is determined by counting the number of consecutive months since both lakes Buchanan and Travis were last full (i.e. "duration" criterion);

   ii. Inflows to the lakes are less than inflows during the Drought of Record (i.e. "intensity" criterion); and

   iii. Lakes Buchanan and Travis combined storage is less than 600,000 acre-feet of water.

9. One of the three criteria for the LCRA Board to make a DWDR declaration is the drought intensity as compared to the Drought of Record. Specifically, the inflow deficit must be at least five percent worse than the average inflow deficit over a similar period of time during the Drought of Record for at least six months. As part of my job responsibilities at LCRA, I track this criterion, which is depicted in the graphic under Tab 2. Based on this analysis, the current inflow deficit has exceeded the inflow deficit of the Drought of Record by at least five percent for more than six months. In fact, at times during the current drought, the inflow deficit has been as much as 90 percent more than the standard from the Drought of Record. (*See* Tab 2.) The intensity of the current drought can also be seen by a more simplified comparison of the cumulative inflows since 2008 which are significantly lower than those from the Drought of Record. (*See* Tab 3.)

10. As shown in the Affidavit of Ryan Rowney, additional inflow statistics demonstrate the severity of the ongoing drought over the past seven years as compared to any period of up to seven years in the Drought of Record. (*See* Affidavit of Ryan Rowney.)

11. The inflow deficit and the inflow statistics for the past seven years reveal a hydrologic condition that, for the past seven years, is more severe than any hydrologic condition evaluated as part of the 2010 WMP.

12. I have evaluated the likelihoods of lake contents dropping to 600,000 acre-feet and the drought intensity criteria continuing to qualify for a DWDR declaration using multiple hydrologic scenarios representing potential future inflows. (*See* Tab 4 for a description of the modeling tool.) Modeling methods are generally consistent within +/- 2 percent.

13. Based on my analysis and the foregoing review, it is my expert opinion that:

    a. As of December 1, 2014, if severe drought conditions continue, the criteria for a DWDR declaration (including combined storage in lakes Buchanan and Travis falling below 600,000 acre-feet) may be met as early as March 2015. (*See* Tab 5.)

    b. As of December 1, 2014, if LCRA were to follow the 2010 WMP in 2015, there is about a 33 percent chance of triggering a DWDR declaration by the end of 2015. (*See* Tab 5.)

    c. As of December 1, 2014, if LCRA obtains emergency relief that suspends the supply of interruptible stored water to the Gulf Coast and Lakeside agricultural operations and Pierce Ranch and LCRA obtains emergency relief that reduces the instream flow requirement for the Blue Sucker from 500 cubic feet per second (cfs) to 300 cfs, the chance of triggering a DWDR declaration by the end of 2015 is reduced to about 8 percent.

    d. As of December 1, 2014, for the ongoing drought, actual inflows into the Highland Lakes and the combined storage in Lakes Buchanan and Travis have trended close to the 99th percentile exceedance trace for extended periods.

    e. As of December 1, 2014, the likelihoods of combined storage increasing to certain levels by March 1, 2015 are as presented in the table below. For example, as of December 1, 2014, there is only a 12 percent change that combined storage would be at or above 1.0 million acre-feet on March 1, 2015.

Combined storage level	Likelihood of being at or above the specified storage level on March 1, 2015
1.0 million acre-feet	12%
1.1 million acre-feet	7%
1.2 million acre-feet	5%
1.3 million acre-feet	4%
1.4 million acre-feet	3%
1.5 million acre-feet	3%

f. If combined storage on March 1, 2015 was at certain levels and LCRA were to operate under the 2010 WMP, the likelihoods of combined storage falling to 600,000 acre-feet by the end of 2015 are presented in the table below. The table also presents the date at which storage could fall to 600,000 acre-feet if conditions follow the 99% exceedance trace. For example, if combined storage was 1.0 million acre-feet on March 1, 2015 and LCRA were to operate under the 2010 WMP, the likelihood of DWDR by the end of 2015 is 6 percent and DWDR could be declared as soon as September 2015.

Combined storage level on March 1, 2015	Likelihood of storage falling to 600,000 AF by the end of 2015	Date of reaching 600,000 AF following 99% exceedance trace
1.0 million acre-feet	4%	Sept 2015
1.1 million acre-feet	>1%	Nov 2015
1.2 million acre-feet	<1%	May 2016
1.3 million acre-feet	0%	June 2016
1.4 million acre-feet	0%	July 2016
1.5 million acre-feet	0%	August 2016

14. If conditions similar to 2011 were to occur over the next 12 months, total evaporation from lakes Buchanan, Inks, LBJ, Marble Falls, Travis, Austin and Lady Bird Lake over the next 12 months would be between 150,000 and 160,000 acre-feet.

Further affiant sayeth not.

Ron Anderson

RON ANDERSON, AFFIANT

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

TABETHA JASKE
Notary Public, State of Texas
My Commission Expires
January 11, 2018

Tabetha Jaske

Notary Public in and for the State of Texas

My Commission Expires: 1-11-2018

Tab 1

Ronald E. Anderson, PE, MBA, D.WRE

LCRA, P.O. Box 220, MS L210 phone: (512) 578-3572
Austin, Texas 78767-0220 e-mail: ron.anderson@lcra.org

EXPERIENCE
2001-present

Lower Colorado River Authority
Chief Engineer/Water Resources Managment

Water Supply Forecasting
- Develops stochastic model to forecast water supply availability.
- Communicates water supply forecasts online through custom reports.
- Collaborates with academic researchers to enhance forecast methods.

Lower Basin Reservoir Project, Project Sponsor
- Maintain project direction and benefits of developing 90,000 AF/yr of new supply
- Communicate project needs and obtain timely decisions to maintain schedule
- Communicate project benefits
- Support the Project Manager and the project team.

New Supply Development, Modeling Lead
- Overseeing consultant evaluation of lower basin balancing reservoirs reliability.
- Developing models to optimally size off channel storage reservoirs in irrigation divisions.
- Providing technical expertise in facility planning, siting and preliminary design for balancing reservoir projects.

2010-2014 Drought Response
- Develop scenario responses for drought response consideration.
- Provide stakeholders with updated reservoir level projections and risk assessment.
- Communicate with stakeholders about potential impacts.

Highland Lakes Water Management Plan Update. Technical Lead
- Procured and managed professionals to review drought of record monitoring methods
- Procured and managed professionals to develop simulation models
- Developed quality assurance procedures for project team
- Review water supply simulations and provide technical documentation.

Emerging Issues
- Responsible for scanning the political and scientific developments that might impact the future operations of the Colorado River and development of power generation.

Water Supply Model Development Project. Project Manager
- Coordinated development of the new innovative water rights solver feature to support daily river operations and allocation simulation.
- Chartered and developed project controls for the $1 million water supply planning mode development using the RiverWare platform.
- Procured engineering professionals to conduct the work.
- Conducted workshops for internal and external training.

Water Supply Reliability Team Lead

- Lead a team of internal and external professionals to review and evaluate existing and proposed plans for water supply management.
- Developed a stochastic forecasting model of the water supply for medium range planning of response to drought conditions.
- Evaluated procedures for management and operations under a drought conditions worse than the drought of record.

LCRA-SAWS Water Project

- Project Manager during pre-planning period. Responsible for project costs estimation, project controls, project consultant procurement, and project communications coordination.
- Project Controls Manager during project planning period. Responsible for setting up project financial, document, and communication controls for over $1 million in planning activities.
- Project Engineer and Technical Studies Coordinator for project study period. Responsible for quality assurance of key study scopes and products. Responsible for coordination and integration of related LCRA Projects with technical studies as well as assisting with public, stakeholder, and agency communications.
- Responsible for review and evaluation of technical studies' consultant performance.
- Studies activities include: surface water modeling, groundwater modeling, agricultural conservation, facilities engineering, environmental assessment, water quality assessment, bay health, socio-economic, waterfowl, climate change, uncertainty, and permitting.

Brazos River Authority

1998-2001 *Senior Planning Manager*
1997-1998 *Senior Water Resources Planner*

HDR Engineering, Inc.

1995-1997 *Project Manager*
1986-1995 *Engineer/Computer Modeler*

EDUCATION

Master of Business Administration, University of Texas at Austin, 1993
Post Graduate Studies, Free Surface Flow, 1987, Operations Research, 1988, University of Texas
Bachelor of Science in Engineering, University of Texas at Austin, 1986

PROFESSIONAL CREDENTIALS & ASSOCIATIONS

- Registered Software Engineer, State of Texas
- Registered Civil Engineer, State of Texas
- Member, American Society of Civil Engineers, Environmental and Water Resources Institute
- Diplomate, American Academy of Water Resources Engineers

SELECTED PUBLICATIONS & PRESENTATIONS

Anderson, R.E. and Rose, B. *Searching for Predictive Climate Signals for River Flows in the Lower Colorado River Basin,* USCID Water Resources World Congress 2012.

Anderson, R.E. and Gooch, T. *Review of Drought Worse Than Drought of Record Monitoring Methods for the Lower Colorado River in Texas,* ASCE/EWRI Water Resources World Congress 2011.

Anderson, R.E. and Walker, D. *Use of Stochastic Modeling during the 2008 and 2009 Drought on the Lower Colorado River in Texas*, ASCE/EWRI Water Resources World Congress 2011.

Water Resource Implications of Climate Change in Central Texas, Austin Climate Protection Conference & Expo 2010

Beyond the Drought of Record: Supply Forecasting for Difficult Times, Texas Water Conservation Association Fall Meeting, 2009.

Anderson, R.E. and Walker, D. *Stochastic Forecasting of Conservation Storage on the Lower Colorado River in Texas*, Texas Water 2009.

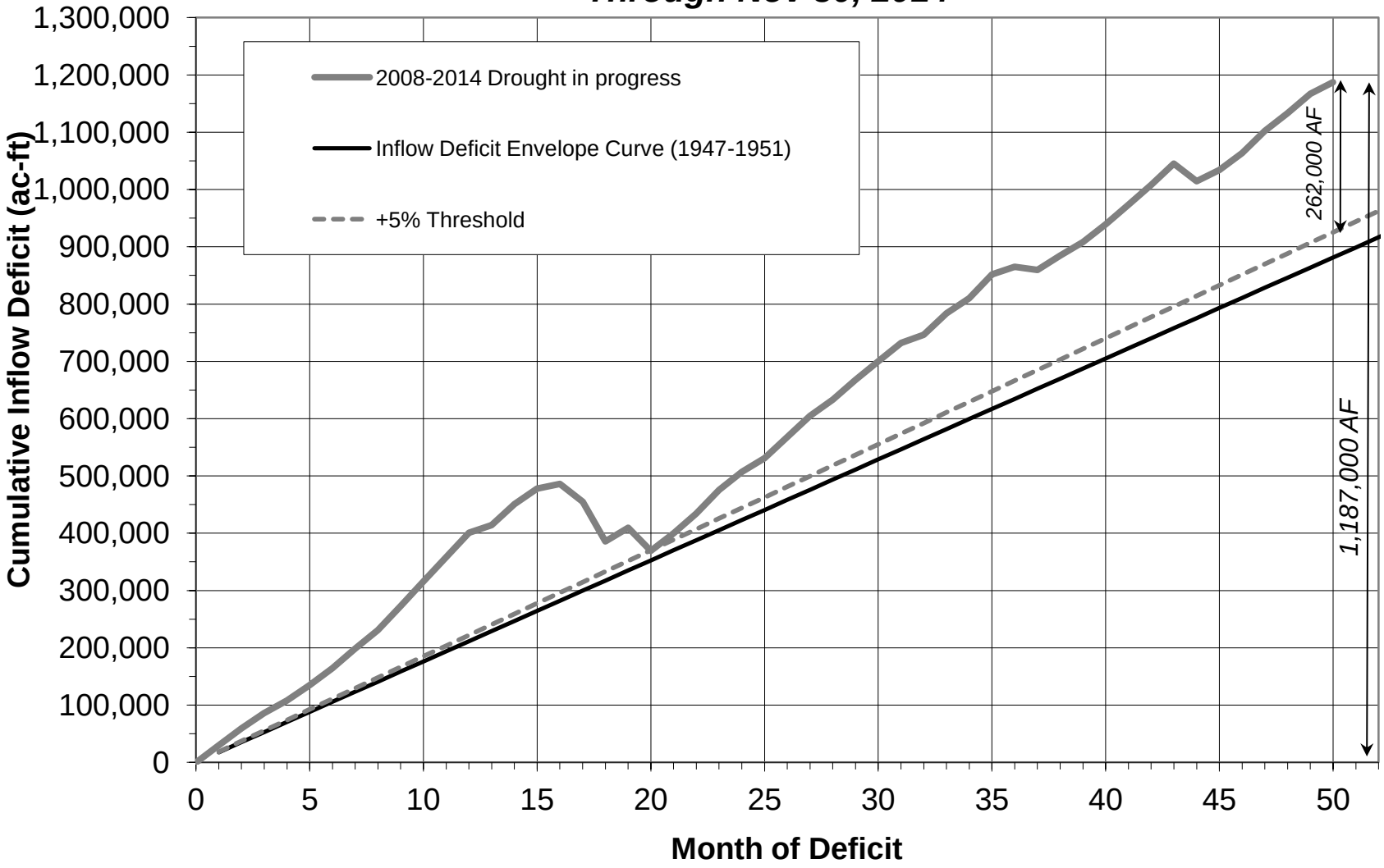
Co-Author, *Assessing Potential Implications of Climate Change for Long-Term Water Resources Planning in the Colorado River Basin, Texas*, American Geophysical Union Annual Conference Poster, 2008.

Current and Future Drought Assessment Activities, Drought Benchmarking Conference, 2007.

Co-Author, *Matagorda Bay Freshwater Inflow Needs Study*, LCRA, TCEQ, TPWD, and TWDB, August 2006.

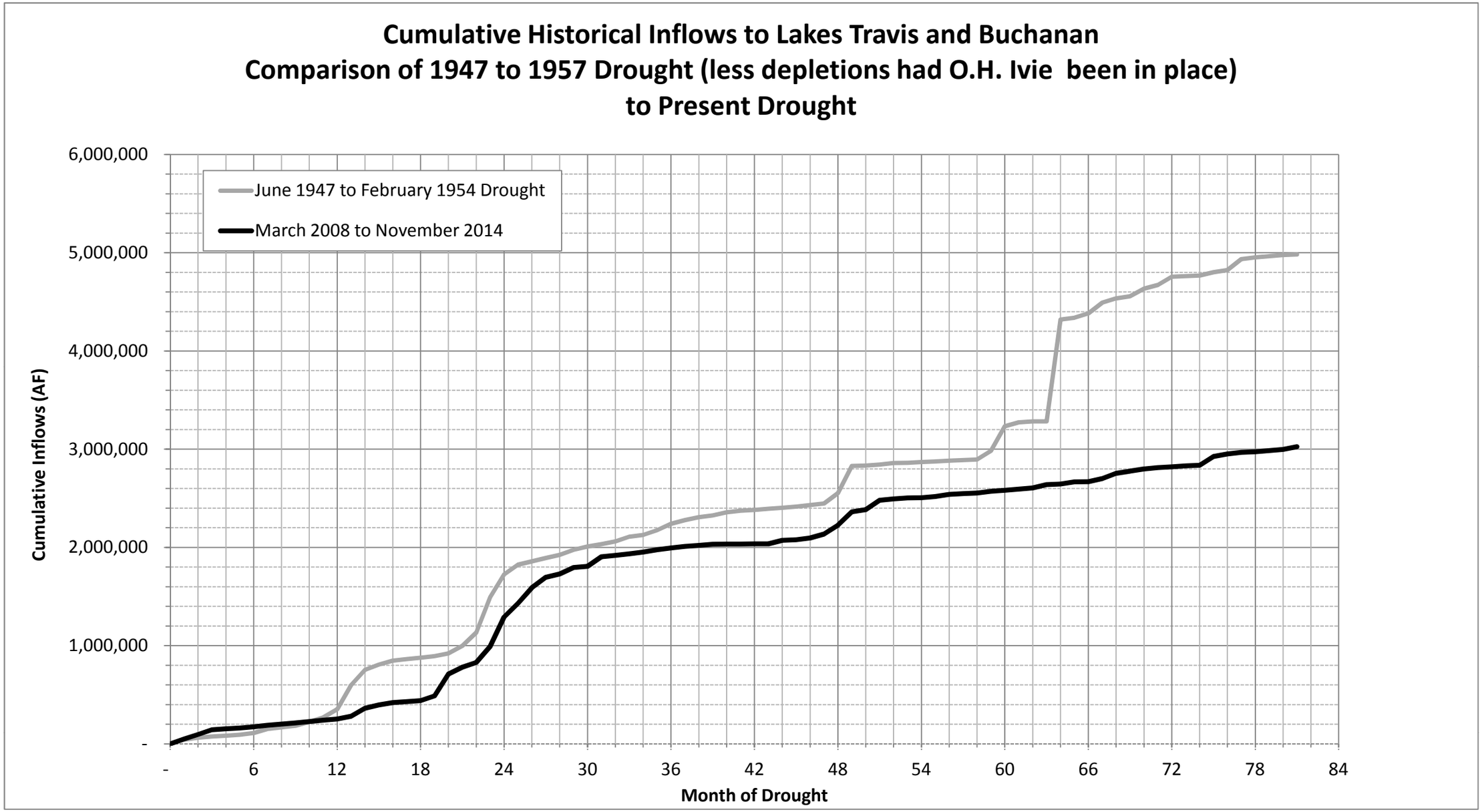
Tab 2

Comparison of Present Drought to the Inflow Deficit Envelope Curve
Through Nov 30, 2014



12/1/2014
Subject to Revision

Tab 3



12/18/2014

Tab 4

LCRA's Use of Stochastic Modeling to Forecast Future Combined Storage
December 18, 2014

Introduction

No one can predict the future, but decision makers in all walks of life have to make judgments based on their best analysis of likely future conditions. This can be particularly difficult in situations where multiple factors and their interplay can influence the outcome of important events.

Because of the complications involved in this type of decision making, many industries rely on computer models called stochastic models to evaluate the likelihood of future conditions. This type of model is able to take a number of factors and data into account to generate a large number of potential future outcomes. Each individual outcome is as statistically likely as any other. Therefore, when all outcomes are plotted on a graph, areas where potential outcomes are denser depict a range of future results that is more likely. Conversely, areas on the graph where potential outcomes are less dense depict a range of future results that is less likely. The number of outcomes in a range can be expressed as a statistical probability for the future.

The insurance and financial industries are among those that use this type of computer model to help make their decisions. LCRA has been using and refining its stochastic modeling for six years to help inform water management decisions. LCRA's model has been reviewed internally by staff and externally by Dr. John Carron of Hydros Consulting and Dr. David Watkins of the Michigan Technological University. The methods have also been peer reviewed and published at multiple professional conferences of the American Society of Civil Engineering, American Water Works Association, and U.S. Committee on Irrigation and Drainage.

LCRA uses the model to show possible future combined storage levels of lakes Travis and Buchanan. LCRA also uses the results of the model to calculate potential future lake elevations. During drought, this is a popular tool for many of our firm water customers with intakes on the lakes. These customers use future lake level probabilities in their decision making process when evaluating whether or not to extend or move their intake structures.

What goes into LCRA's model?
LCRA uses the following sets of data in its stochastic model:

Current conditions: Each month when the projections are updated, the current levels of Travis and Buchanan serve as the starting point for the model.

Historical hydrology: LCRA currently uses the hydrological record from 1940 to 2014. Upstream inflows, downstream run-of-river flows and evaporation records for every month of that period are incorporated into the model. This includes the 10-year drought of the 1950s known as the state's Drought of Record and the drought of 2011, which is the most severe single-year drought on record. This data set is updated as each year of data becomes available.

Drought year firm customer demands: LCRA uses firm customer base demands in its model that are similar to demands experienced in 2008 and 2012 (no major new firm customers have entered into agreements since then). Drought year demands are appropriate when evaluating the impacts of drought on the water supply because drought conditions increase the demand for stored water that would otherwise be met through rainfall.

Interruptible customer requests: LCRA uses the 2011 planted acreage in the four irrigation operations to determine how much water downstream interruptible customers would require if all agricultural irrigation demands are met. This acreage is used to determine demands under an open supply scenario as well as to evaluate the level of curtailment under conditions that do not allow open supply.

2010 Water Management Plan: When determining how much interruptible stored water will be provided to the downstream irrigation operations, LCRA uses the assumptions of the current Water Management Plan. If a new Water Management Plan is approved or TCEQ approves an amendment to the current plan such as emergency relief, LCRA would use the new management assumptions in the model.

A measurement of El Niño/Southern Oscillation index: The El Niño/Southern Oscillation is a cyclic warming and cooling of the sea surface temperatures in the Pacific Ocean near the equator that can affect the weather in Texas. If the Pacific warms enough, it can produce an El Niño weather pattern that increases the chances of wetter than normal weather in Central Texas, particularly during the fall and winter. If the Pacific is cool enough, it can produce a La Niña weather pattern that increases chances of dry weather in central Texas. The El Niño/Southern Oscillation index (ONI) is a measurement of this cycle. LCRA uses the measurement in its model to help predict whether future conditions should be weighted toward a wet, dry or

neutral scenario. Current conditions and future ensembles of the index are provided by the Climate Prediction Center and updated monthly.

Last two months of inflows: As explained above, LCRA's model uses historical inflow data for the last 75 years to help evaluate the likelihood of possible future conditions. The model specifically uses inflow data from the last two months to help determine one very important factor: the chances that the region's weather pattern could change significantly from one month to the next.

Historical data shows the tendency for the weather to stay the same from one month to the next in Texas, particularly during the winter months and to a lesser extent in May and October. If the weather is wet one month, it tends to stay wet the next month. Conversely, if it is dry one month, it tends to stay dry the next. This is the norm, but of course, it doesn't always hold true. As we all know, the weather does eventually change.

Through years of improving the model, LCRA staff has found that the best way to evaluate the likelihood of a significant change in the weather is to (1) use the most recent two months of inflows to determine if there is a wet, dry or neutral weather pattern and (2) look at the historical record to determine how often the weather pattern has changed from one month to the next. The model is able to use this data to determine the probability that the local weather will change significantly from one month to the next (from wet to dry, dry to wet, neutral to dry, etc.).

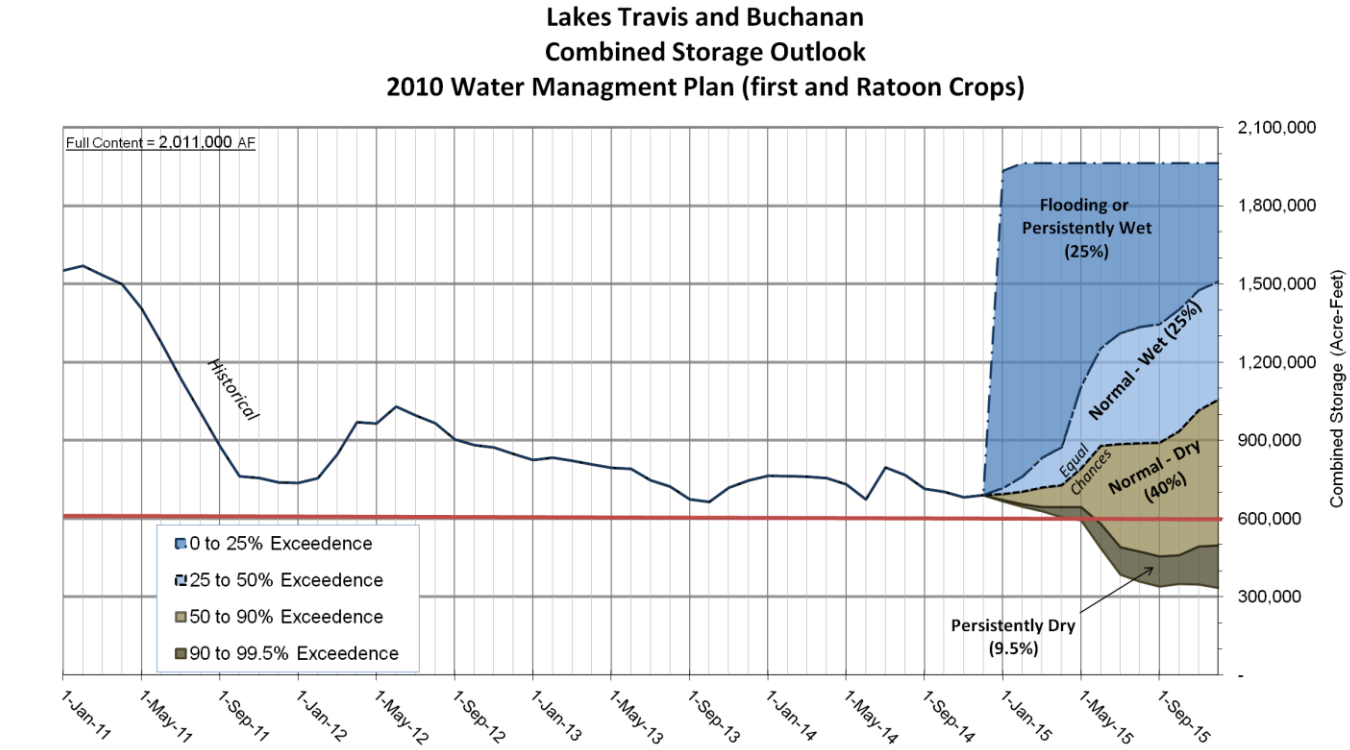
How does the model work?

The model proceeds month by month re-ordering the historical hydrology according to a rational method that preserves the historical observed switching patterns (wet, neutral, dry) and preserves the cumulative historical frequency of inflows to the highland lakes. That is the stochastic part of the model. Then it simulations operations of the system to meet demands and determines the monthly lake storage. That is the accounting part of the model. The model does this 2,000 times. These multiple scenarios are then summarized into graphical products.

What comes out of the model?

As discussed above, LCRA's stochastic model uses the factors we've described to calculate a large number (2,000) of possible future scenarios for the combined storage of lakes Travis and Buchanan. By plotting those 2,000 points on a graph, we are able to determine ranges that are more likely and less likely. LCRA uses that information to produce a graph that shows future combined storage ranges under different inflow conditions and management actions.

Consider the following graphic produced from the results of our model:



Notes:
1. Buchanan maximum pool of 1018 for maintenance for forecasted period.

This graphic depicts potential future combined storage scenarios. It is divided into four ranges associated with the general weather conditions that would lead to the ranges of combined storage. We have titled them: Flooding or Persistently Wet; Normal-Wet; Normal-Dry; and Persistently Dry.

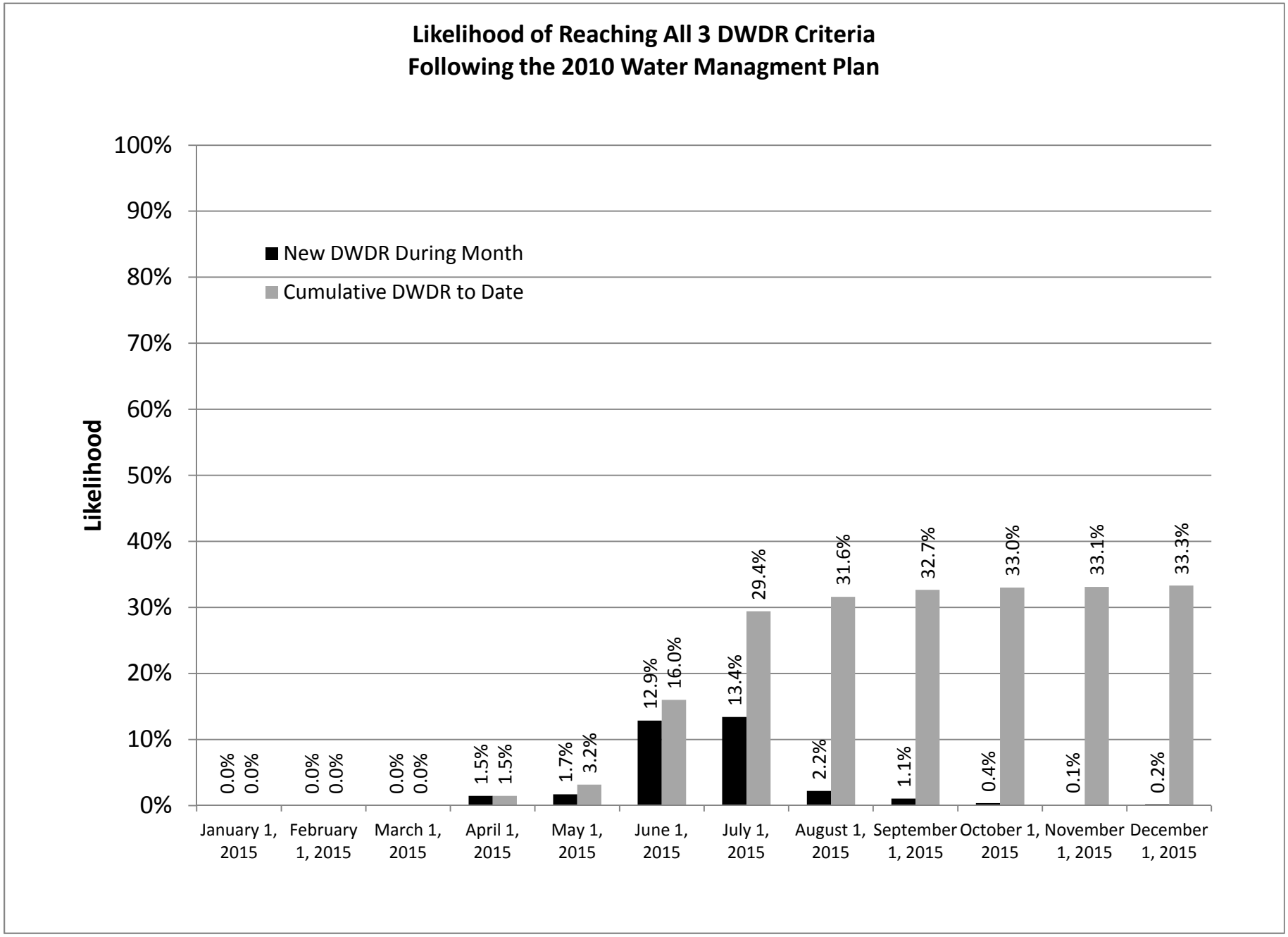
The legend with the graphic contains a percentage range associated with each category. This range corresponds with the percentage of the 2,000 future scenarios that falls into each category. Here's what it tells us:

- The Flooding or Persistently Wet range contains 25 percent, or 500, of the potential outcomes;
- The Normal-Wet range contains 25 percent, or 500, of the potential outcomes;
- The Normal-Dry range contains 40 percent, or 800, of the potential outcomes;
- The Persistently Dry range contains 9.5 percent, or 190, of the potential outcomes; and
- The Equal Chances line means that 50 percent of the potential outcomes, or 1,000, are above the line and 50 percent are below.

- A small number of outliers, 0.5 percent or 10 of the potential outcomes, are not depicted on the graphic.

As the graphic shows, the model cannot predict the future. What it does show is how likely a range of combined storage is in the future based on the historical hydrological record and other information contained in the model. This information is intended to help LCRA staff, Board members, and stakeholders make informed water management decisions.

Tab 5



12/19/2014

APPLICATION OF THE LOWER COLORADO RIVER AUTHORITY FOR EMERGENCY AUTHORIZATION	§ § § §	**BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

AFFIDAVIT OF BOB ROSE

THE STATE OF TEXAS §
§
COUNTY OF TRAVIS §

Before me, the undersigned authority, personally appeared Robert H. Rosenzweig, also known as Bob Rose, 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.

3. I, Bob Rose, am an individual residing in Austin, Texas.

4. I am the Chief Meteorologist for the Lower Colorado River Authority (LCRA). I have held this position since 1995. I have worked as a meteorologist in Texas for 30 years. A true and correct copy of my resume, detailing my prior work history and education, is attached hereto under Tab 1.

5. As part of my duties at the LCRA, I regularly review and summarize short-term and long-term weather predictions and drought indices for the Central Texas region. My opinion is based on my experience in the field and a review of data and forecasts from the National Weather Service's Climate Prediction Center, National Oceanic and Atmospheric Administration's (NOAA's) Earth System Research Laboratory, Texas State Climatologist Dr. John Nielsen-Gammon and Research Scientist Gregory J. McCabe.

6. Extraordinary drought conditions have gripped much of Texas, including the Colorado River basin for more than four (4) years, dating back to October of 2010. The drought has been unprecedented relative to the long-term climate record in a number of ways: record low precipitation, extreme, record-setting summer heat and enormous wildfires. The drought conditions include both meteorological drought (taking into account rainfall and temperature) and hydrologic drought (taking into account streamflow and evaporation).

7. Rainfall. According to the Texas State Climatologist, Dr. John Nielsen-Gammon, on a statewide basis, rainfall during the 12 month period from Oct. 1, 2010 to Sept. 30, 2011 was the lowest ever recorded, dating back to 1895. (Available at http://climatexas.tamu.edu/files/2011_drought.pdf.) My review of rainfall data indicates the following:

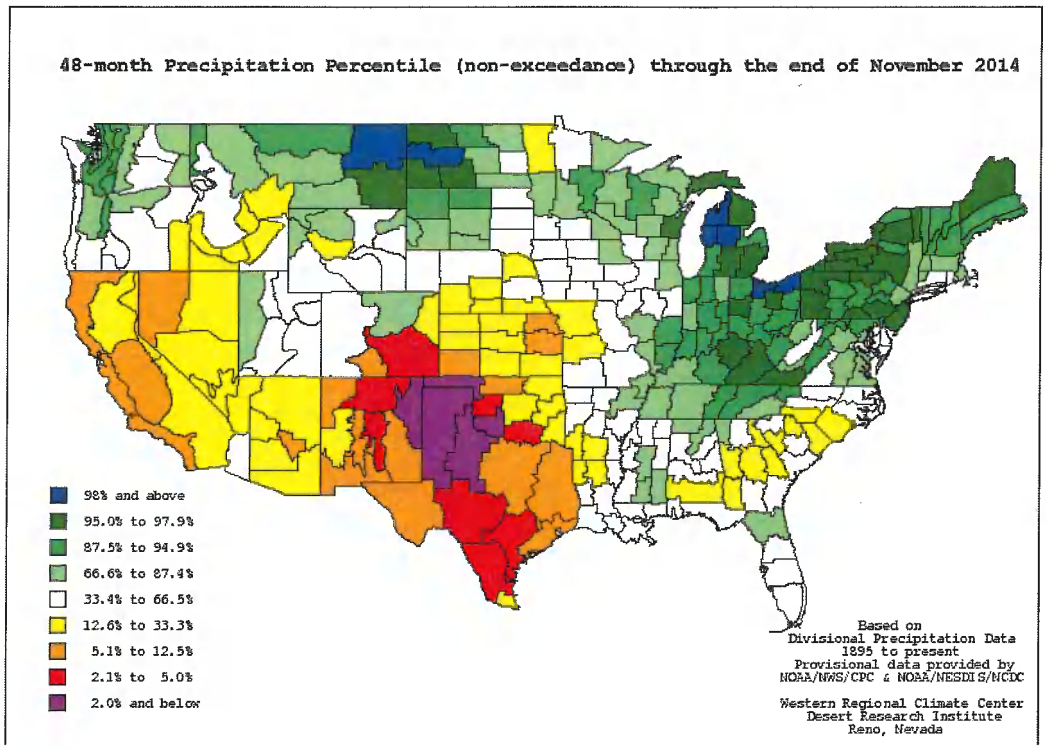
a) Total average rainfall across Texas from Oct. 1, 2010 to Sept. 30, 2011 was 11.18 inches, just 38 percent of the long-term average. This is much lower than the previous record of 13.91 inches occurring between October 1955 and September 1956.

b) While 2014 started off unusually dry, significant rains occurred in the spring and fall months bringing totals close to normal. January through November statewide rainfall totaled 22.70 inches, 2.60 inches below normal. This January through November period is the 36th driest on record, dating back to 1895. (Available at http://www.ncdc.noaa.gov/temp-and-precip/climatological-rankings/index.php?periods%5B%5D=11&parameter=pcp&state=41&div=0&month=11&year=2014 last visited on December 15, 2014.)

c) Statewide rainfall for the four-year period from November 2010 to October 2014 was well below normal, totaling 86.56 inches. This was 21.95 inches below normal, or 80 percent of normal. This is the 4th driest four-year period beginning in November on record dating back to 1895. (Available at http://www.ncdc.noaa.gov/temp-and-precip/climatological-rankings/index.php?periods%5B%5D=48&parameter=pcp&state=41&div=0&month=10&year=2014 last visited Dec. 15, 2014.)

d) According to data provided by NOAA's Western Regional Climate Center, 48 month rainfall (October 2010-November 2014) across the Hill Country and Central Texas regions ranked in the 2.1 to 5.0 percentile for precipitation. In other words, similar 48-month rainfall periods during the period of record were lower than the current period only about two to five percent of the time. *See* Figure 1 below. (Available at http://www.wrcc.dri.edu/cgi-bin/spiFmap.pl?per48 last visited Dec. 15, 2014.)

Figure 1. National Precipiation Percentiles for 48-month period ending November 2014



8. Recent rain events and corresponding runoff and inflows to the Highland Lakes have been compared to events from 2007. The sporadic nature of rain events has produced well below average runoff over the past four years. (*See* Affidavit of Ryan Rowney.)

   a) Heavy, widespread rainfall in the Llano River and San Saba River watersheds above the Highland Lakes on Sept. 19 and 20, 2013 averaged two to three inches, with some rain gages reporting totals as high as six or seven inches.

   b) Two heavy rain events occurred during October 2013, but both of these events occurred primarily downstream of the watershed to the Highland Lakes. The first event occurred on October 12 and 13, producing up to a foot of rain over southwest Austin and southwest Travis County. The second event occurred on October 30 and 31, producing widespread totals of 8 to 12 inches over parts of Travis, Hays and Comal Counties. The majority of the runoff from both rain events drained into the Colorado River below Austin.

   c) Two notable rain events occurred across the Hill Country and Central Texas regions during November 2014. The first event on November 4, 5 and 6th produced a steady light to moderate rain with totals of 2 to 3 inches. The second event, occurring on November 21 and 22 produced moderate to heavy rain with totals in the range of 1-3 inches.

   d) Two notable rain events also occurred in March 2007. The first event, occurring March 11 and 12 caused widespread moderate to heavy rain across

the Hill Country and Central Texas regions, with totals of 2 to 4 inches. The second rain event occurred on March 26 and 27 with widespread moderate to heavy rain. This event also produced fairly widespread totals of 2 to 4 inches across the Hill Country and Central Texas.

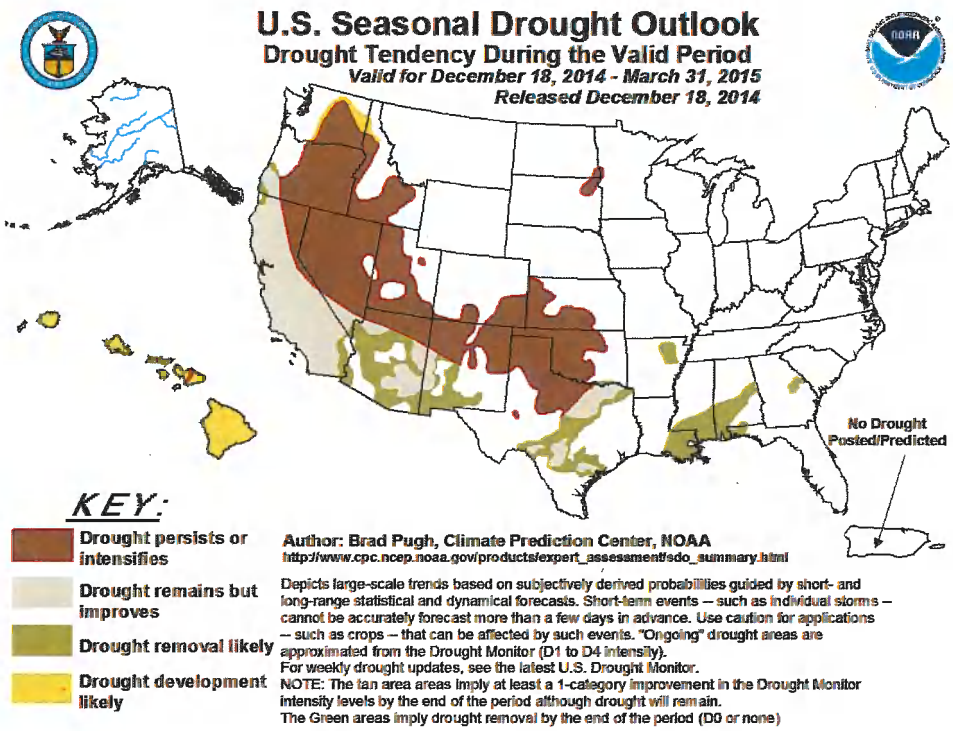
9. According to the mid-December U.S. National Drought Monitor, a product of the National Weather Service, the U.S. Department of Agriculture, and the National Drought Mitigation Center, much of the Texas Hill Country was designated as being in "moderate to severe drought," the first and second of four drought classifications. Much of Central Texas and the coastal plains region were shown as being in moderate drought or "abnormally dry" due to significant rains in Novermber. Note, the Drought Monitor does not specifically depict the state's hydrologic drought, which is considerably worse than depicted. (*See* http://droughtmonitor.unl.edu/Home/StateDroughtMonitor.aspx?TX last visited Dec. 18, 2014.)

10. Heat. Another factor that has contributed to the severity of the ongoing drought has been the unprecedented heat. For Texas, the average temperature between June 1 and August 31 of 2011 was the hottest summer average temperature ever recorded in Texas and the second hottest summer average temperature for any state in the US dating back to 1895. Summer 2011 was also, by far, the hottest summer on record for Austin. Statewide, calendar year 2011 was the second hottest year ever recorded and the hottest year on record for Austin. The combination of well below normal rainfall and unprecedented heat created some of the most severe drought conditions ever recorded. (*See* http://www.ncdc.noaa.gov/sotc/drought/2011/9, last visited July 1, 2013 and http://www.srh.noaa.gov/images/ewx/wxevent/sum2011.pdf, last visited July 1, 2013.) These conditions even surpassed the drought conditions of the 1950s. The unprecedented hot temperatures combined with numerous sunny days to create much higher than normal losses from evaporation. Abnormally warm temperatures also continued in 2012. Statewide, the summer of 2012 was the 10th hottest summer on record. And it was the 11th hottest summer on record for Austin. Statewide, 2012 tied with 1921 for the warmest year ever recorded in Texas history. For Austin, summer temperatures in 2012 were the 9th warmest on record. Summer temperatures for Austin in 2013 were the 5th warmest on record. Summer temperatures for Austin in 2014 were milder than most recent years, ranking as the 34th warmest on record.

11. Weather Forecast Sources. In developing my forecast, I have relied on various sources, including the National Weather Service's Climate Prediction Center, NOAA's Earth Science Research Laboratory, Texas State Climatologist John Nielsen-Gammon and Gregory McCabe, Research Scientist.

    a) The National Weather Service's Climate Prediction Center (CPC) 3-Month Drought Outlook calls for drought improvement and possible drought elimination across the Hill Country, Central Texas and middle Texas coastal regions between the months of December and March. *See* Figure 2.

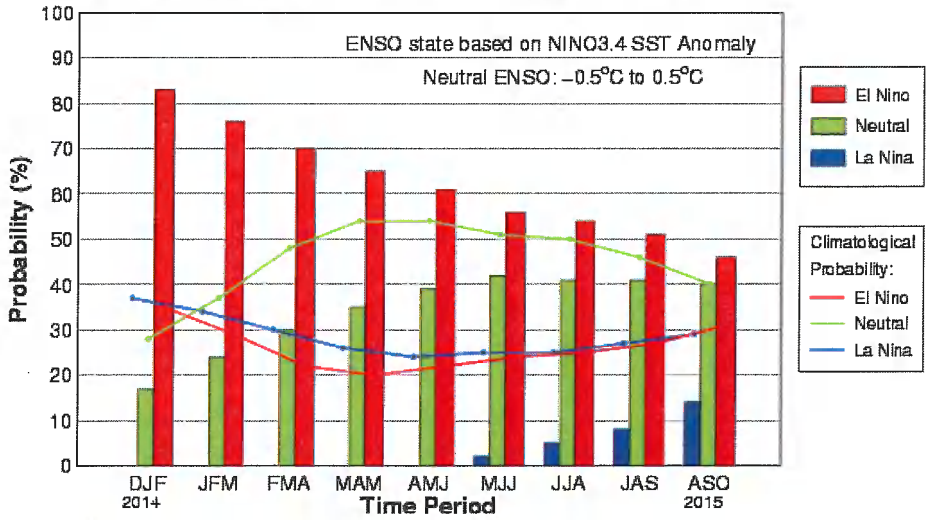
Figure 2.



According to CPC forecasters, "Varying intensity of drought persists across the central and southern Great Plains with exceptional drought centered over southwest Oklahoma and northwest Texas. Although a tilt in the odds towards above-median precipitation during [January-February-March] is forecast for the central and southern Great Plains, a relatively dry climatology favors persistence on a broad scale. (Drought) Improvement and/or removal is forecast for the remaining drought areas of Texas where the climatology during JFM is not as dry (as Kansas, western Oklahoma and northwestern Texas. Forecast confidence for the Kansas, western Oklahoma, and northwest Texas is moderate and low for the remainder of Texas." (Available at http://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_discussion.html.)

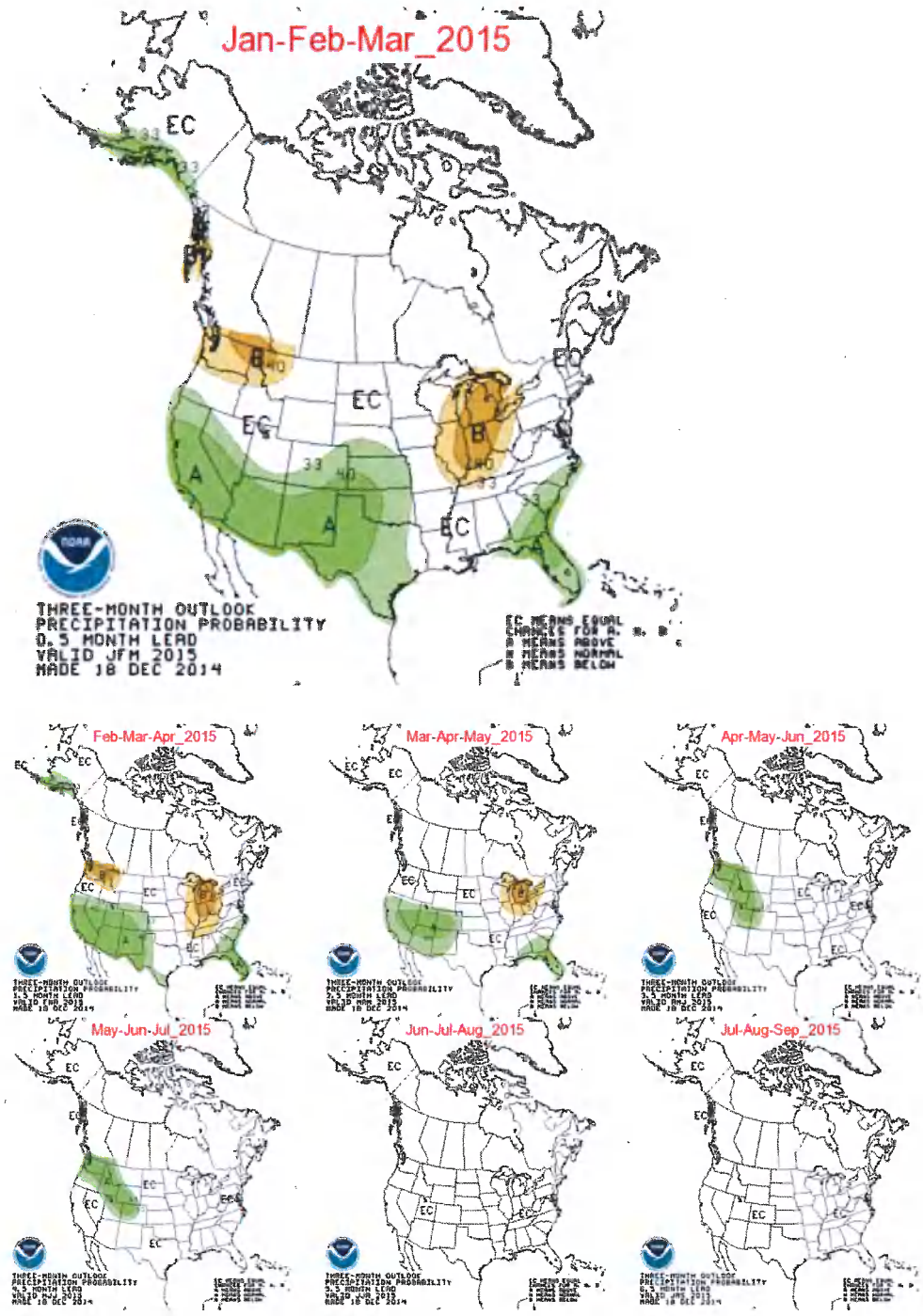
The International Research Institute, a partner of the National Weather Service's Climate Prediction Center, forecasts a 70 to 80 percent probability for El Niño development this winter. A 60 to 70 percent chance for continued El Niño conditions is forecast from late winter through late spring. (*See* Figure 3, available at http://iri.columbia.edu/our-expertise/climate/forecasts/enso/current (last visited Dec. 18, 2014.)

Figure 3.
Mid–Dec IRI/CPC Plume–Based Probabilistic ENSO Forecast



b) The latest National Weather Service precipitation outlook calls for above normal precipitation across Central and South Texas this winter, with conditions becoming more uncertain late winter through spring. No clear trend in precipitation is forecast beyond winter *See* Figures 4 and 5. Climate Prediction Center forecasters state: "The elevated chances for a weak El Niño event influences the precipitation maps through February/March/April 2015. Dynamical model forecasts from the NMME and IMME and their participant models generally support warm event composites. Precipitation forecasts from the global SST based constructed analog tools was also considered. The chances for above median precipitation amounts are elevated for California, across the Southwest parts of the southern Great Basin the southern Plains and the southeast COUNUS from January/February/March through through February/March/April 2015." (*See* http://www.cpc.ncep.noaa.gov/products/predictions/90day/fxus05.html last visited Dec, 18, 2014.)

Figure 4. National Weather Service Precipitation Outlook



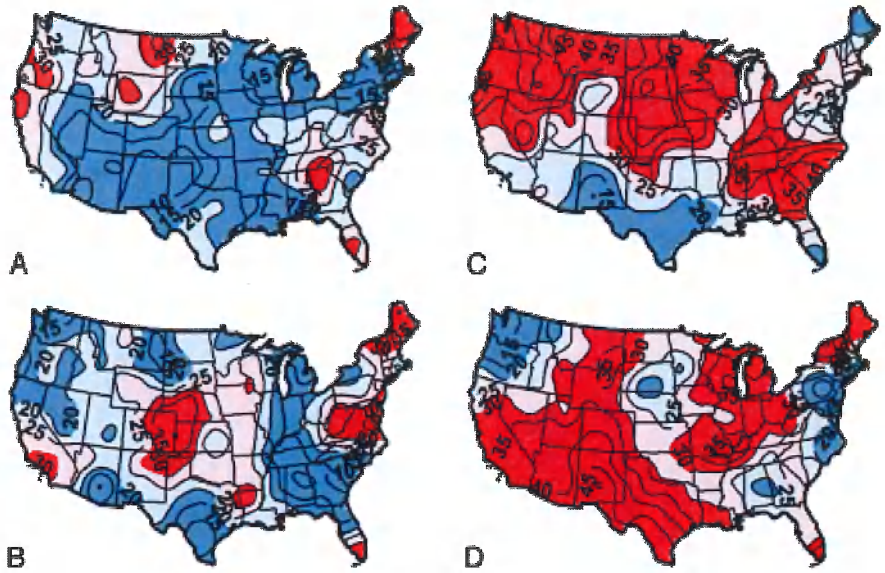
c) Sea surface temperatures in the tropical Pacific are currently wamer than normal and above the threshold necessary for the development of El Niño. Most long-range climate forecast models indicate tropical Pacific waters will remain above the threshold for El Niño through late spring and possibly through summer. An El Niño watch remains posted. But while most indices such as sea surface temperature indicate El Niño, the National Weather

Service has yet to declare the arrival of El Niño conditions. NWS forecasters state "Although the sea surface temperature anomalies alone might imply weak El Niño conditions, the patterns of wind and rainfall anomalies generally do not clearly indicate a coupling of the atmosphere to the ocean. Therefore, despite movement toward El Niño from one month ago, the combined atmospheric and oceanic state remains ENSO-neutral." (*See* http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.html last visited Dec. 15, 2014.) However, National Weather Service forecasters do believe this ocean/atmosphere coupling will develop later this winter, allowing a series of Pacific storm systems to track across Texas and the southern US. The forecasters thus expect a weak El Niño to develop and persist into early spring.

El Niños typically cause a pattern of above normal rainfall across Central Texas during the fall and winter months. But the El Niño influence often weakens during spring. Furthermore, it is important to note that the development of El Niño this winter is still far from certain since the ocean has had a difficult time linking up with the atmosphere. Back in August of 2012, tropical Pacific waters reached the threshold for an El Niño but sea surface temperatures unexpectedly cooled in September and October, and the El Niño failed to develop. By November of 2012, the Climate Prediction Center canceled the El Niño watch as Pacific waters continued to cool.

d) In 2004, McCabe et. al. published a statistical study of drought frequency in the lower 48 states versus the PDO and Atlantic Multidecadal Oscillation (AMO). (*See* Figure 5, below, available at http://www.pnas.org/content/101/12/4136.long.) Currently, the Pacific Ocean is in the midst of a negative phase of the PDO where waters on the eastern side of the Pacific are unusually cool. At the same time, waters in the North Atlantic Ocean are unusually warm, a result of the positive phase of the AMO. Oceanic conditions in both the Atlantic and Pacific Oceans seem to influence long-term drought conditions within the United States. Scientists monitoring both oceans have been able to match the changing phases of multi-decadal oscillations within each ocean to the presence or absence of drought across the US. McCabe pointed out the difference between the dust bowl drought in the 1930s when the PDO and AMO were both positive and the multi-year drought of the 1950s over the south central and southwestern US when the PDO was cold and the AMO was warm.

Figure 5. Drought probability for the four classes of Pacific Decadal Oscillation and Atlantic Multidecadal Oscillation



A is Cold (-)AMO and Warm (+) PDO. B is Cold (-) AMO and Cold (-) PDO.
C is Warm (+) AMO and Warm (+) PDO. D is Warm (+) AMO and Cold (-) PDO.

The current conditions are indicative of classification D which indicates persistent drought for Texas and the southwestern United States. McCabe in 2004 wrote, "Should the current positive AMO (warm North Atlantic) conditions persist into the upcoming decade, we suggest two possible drought scenarios that resemble the continental-scale patterns of the 1930s (positive PDO) and 1950s (negative PDO) drought."

12. While longer-term projections are far from certain, the majority of the long-range dynamic and statistical climate models currently indicate the tropical Pacific waters will remain warmer than normal from late spring through late summer (although below the threshold for El Niño) with some models calling for the development of another El Niño next fall.

13. Weather Forecast. Based on my experience and a review of data and forecasts from the sources listed above, it is my opinion a general pattern of above normal rainfall will be in place across Central and South Texas this winter into early spring due to the possible development of El Niño. However, the forecast beyond early spring is fairly uncertain due to the weakening El Niño (should it actually develop) and few other noteable atmospheric trends. The pattern of above normal rainfall this winter and early spring should lead to drought improvement across much of Texas. However, the pattern isn't expected to be in place long enough to eliminate the long-term effects of the ongoing drought. With similar oceanic conditions in the Pacific and Atlantic to what was in place in the 1950s, it is quite possible that Texas is in the grip of a multi-year drought period, along the lines of what was observed in the drought years of the 1950s.

Further affiant sayeth not.

Bob Rose

BOB ROSE, AFFIANT

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

TABETHA JASKE
Notary Public, State of Texas
My Commission Expires
January 11, 2018

Tabetha Jaske

Notary Public in and for the State of Texas

My Commission Expires: 1-11-2018

Tab 1

BOB ROSE

P.O. Box 220
Austin, TX 78767-0220
bob.rose@lcra.org

EDUCATION

Texas A&M University, College Station, Texas
Bachelor of Science in Meteorology 1979.

PROFESSIONAL EMPLOYMENT

Jan 1995 to Present — *Chief Meteorologist,* **Lower Colorado River Authority, Austin, Texas**

- Responsible for the daily forecast of weather conditions and temperatures affecting the Lower Colorado River Authority's power generation, electrical transmission, flood control and water supply operations.
- Produce a daily weather blog about Central Texas weather: http://www.lcra.org/water/conditions/weather/weather_column.html
- Write daily operational weather briefs to keep all departments of LCRA apprised of expected weather conditions.
- Provide advance notice significant weather event e mails to emergency management officials, county judges along with city and state agencies.
- Present a bi-weekly video weather blog about Central Texas weather. Give numerous talks to various civic groups and organizations about the weather.
- Provide weather information to a number of newspapers and media outlets across Central Texas about regional weather.

Feb 1988 to Jan 1995 — *Meteorologist,* **KVUE-TV (ABC), Austin, Texas**

- Responsible for the morning and midday newscasts for 4 years, weekend newscasts for 3 years.
- Prepared a weekly astronomical report called Skywatch, and did occasional science and environmental reporting.

Sep 1978 to Jan 1988 — *Weekend Meteorologist,* **KBTX-TV, Bryan, Texas (ABC/CBS).**

- Responsible for the forecasting, preparation and presentation of the 10 PM weekend weathercasts.

PROFESSIONAL MEMBERSHIPS

Member, American Meteorological Society. TV Seal #501, AMS Certified Broadcast Meteorologist.
Member, Austin-San Antonio chapter, American Meteorological Society
Currently serving on the Board for Private Sector Meteorology with the American Meteorological Society

RELATED ACTIVITES:

A regular contributor to the National Drought Monitor.
Member of the Southern Climate Impacts Planning Program (SCIPP)
Travis and Williamson County Coordinator for CoCoRaHS

APPLICATION OF THE LOWER COLORADO RIVER AUTHORITY FOR EMERGENCY AUTHORIZATION	§ § § §	**BEFORE THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY**

AFFIDAVIT OF DAVID WHEELOCK

THE STATE OF TEXAS	§
	§
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. <u>LCRA Firm Customer Demands</u>.

      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 Resonable 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 envirionmental flow requirements. Under the recent permits, LCRA was able to divert about 7,000, and 1,000 acre-feet in 2012 and 2013 respsectively. (*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, AFFIANT

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

TABETHA JASKE
Notary Public, State of Texas
My Commission Expires
January 11, 2018

Notary Public in and for the State of Texas

My Commission Expires: 1-11-2018

Tab 1

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

0 25 50 Miles
0 25 50 Kilometers

MAIN MAP
AREA OF DETAIL
LCRA TSC Transmission System Counties
ERCOT Counties (Electric Reliability Council of Texas)

WHOLESALE ELECTRIC CUSTOMERS

ELECTRIC COOPERATIVES
Bandera
Bluebonnet
Guadalupe Valley
Hamilton County
Pedernales

CITY UTILITIES
Bastrop Power & Light
Bellville
Boerne
Brady
Brenham
Burnet
Cuero
Flatonia
Fredericksburg
Giddings
Goldthwaite
Gonzales
Hallettsville
Hempstead
Kerrville Public Utility Board
La Grange
Lampasas
Lexington
Llano
Lockhart
Luling
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
OXEA 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

BURNET COUNTY
*Bonanza Beach Water System
*Quail Creek Water System
*Ridge Harbor Water and Wastewater Systems
*Smithwick Mills Water System
*Spicewood Beach Water System

COLORADO COUNTY
*Alleyton Water and Wastewater Systems

LAMPASAS COUNTY
*Lometa Regional Water and Wastewater Systems

LLANO COUNTY
*Lake Buchanan Water System
*Paradise Point Water System
*Sandy Harbor Water System
*Tow Village Water System

MATAGORDA COUNTY
*Matagorda Dunes Water and Wastewater Systems

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

Central Highland Lakes Area Inset Map

Inset Map Parks
1. Arkansas Bend
2. Bob Wentz/Windy Point
3. Camp Creek
4. Cypress Creek
5. Gloster Bend
6. Granite Beach
7. Grelle
8. Hippie Hollow
9. Mansfield Dam Park
10. Muleshoe
11. Narrows
12. Nightengale Archaeological Center
13. Pace Bend
14. Sandy Creek
15. Shaffer Bend
16. Sunset Point
17. Turkey Bend

0 10 Miles
0 10 km

Tab 2

Updated 5/29/14

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.

LCRA BOARD POLICY

102 - AUTHORITY AND RESPONSIBILITIES

December 14, 2011

102.10 PURPOSE

This policy defines the relationship between the Board of Directors and the management of LCRA through the description of responsibilities and expectations and through the establishment of guidelines for the delegation of certain powers and duties.

102.20 POLICY

102.201 Responsibilities of the Board of Directors. The Board of Directors (Board) will establish the overall goals and objectives of LCRA, review them on an ongoing basis and adopt Board policies setting forth desired direction of management actions to attain such goals and objectives. The Board will approve an annual business plan that provides funding for the realization of those goals and objectives.

The Board will consider and establish policies in the public interest. The Board will faithfully discharge its public trust by conducting its affairs in a highly moral, ethical and sound business manner. Board members, collectively and severally, will not direct the policies and actions of LCRA from perspectives of private gain or personal advantage.

102.202 Delegations to the General Manager. The Board of Directors delegates to the general manager all general powers and duties in the LCRA enabling legislation, other applicable law, LCRA Bylaws and Board Policies necessary to accomplish LCRA's purpose, plans and objectives as approved by the Board, except for those specifically reserved for the Board by provisions of the LCRA enabling legislation, Bylaws, Bond Resolutions and other Board policies. Notable exceptions include:

A. Authorization to borrow money or approve bond resolutions.

B. Approval of agreements related to joint ownership of generating facilities.

C. Setting rates charged for water, power and other services.

D. Approval of sale of any real property.

E. Approval of contracts and purchase orders for consultant services in accordance with related Board policies.

F. Approval of contracts and purchase orders for the acquisition of materials, supplies, equipment, and related services, in accordance with related Board policies (except that the general manager is delegated the authority to approve contracts for capacity and/or energy purchases to replace capacity, for emergency conditions, and for economic advantage related to LCRA electric system operations, provided that any such off-system purchase must be for a term of less than one year).

G. Regardless of delegated authority in this or any other LCRA Board policy, Board approval is required for all decisions where Board policy or direction has not been clearly established.

The Board will articulate clear and coherent goals and statements of its expectations through its policies and plans.

102.203 Responsibilities of the General Manager. The general manager, as the chief executive officer of LCRA, is responsible for carrying out the business and activities of LCRA according to state law, the LCRA Bylaws, and Board policy.

The general manager may delegate in writing any general powers, duties and related authorities, as deemed appropriate, to officers and management staff members.

The general manager is responsible for bringing policy matters to the attention of the Board when its current policies give inadequate direction to LCRA operations or leave LCRA at a disadvantage because of changing conditions. The general manager will provide thorough, well-organized information to the Board in a timely manner. Communications to the Board will be made forthrightly and with candor in the evaluation of the conduct of business and operations of LCRA.

102.30 PROCEDURES

102.301 Goals and Priorities. As provided in the bylaws, the general manager each year will present to the Board objectives, goals and priorities for its consideration. These goals will clearly establish the Board's direction in key areas of LCRA affairs.

102.302 Annual Budget. The general manager will present to the Board an annual Business Plan that will include operating and capital budgets to carry out the Board's goals and priorities. The Business Plan will include projections of LCRA's overall financial performance and capital financing plans, and describe the projects, programs and the associated revenues and expenditures for the next fiscal year.

Adoption of the Business Plan authorizes the general manager to complete work plans and make associated expenditures within budgets as provided for in accordance with Board policies. The general manager will provide quarterly updates that include indicators of performance toward key goals, actual revenues and expenditures compared to budget, future financial performance projections and status of major capital projects. The resolution adopting the budget will establish

the amount that may not be exceeded without Board approval and the guidelines for approving amendments, reallocations or adjustments to the capital and operating budgets.

102.303 Sunset Review of Regulatory Programs. The general manager will review the effectiveness of, and need for, each major regulatory program of LCRA at least once every six years. These programs shall include, but not be limited to, the Highland Lakes Watershed Ordinance, the Highland Lakes Marina Ordinance, the On-Site Sewerage Facilities Rules, the Litter and Illegal Dumping Abatement Ordinance, and the LCRA Land and Water Use Regulations. The general manager shall recommend to the Board whether to abolish, continue or modify each such program.

102.40 AUTHORITY

LCRA enabling legislation, Chapter 8503, Special District Local Laws Code
LCRA Bylaws, Sections 3.02, 6.01, 6.02

EFFECTIVE: December 1984. Amended Dec. 14, 1989; Oct. 25, 1991; Sept. 22, 1994; Dec. 15, 1999; March 22, 2000; July 1, 2002; Nov 19, 2003; and Dec. 14, 2011.

LCRA EMPLOYEE POLICY MANUAL: 100 GENERAL AND ADMINISTRATIVE			
Policy 106: Delegation of Authority			
Approval Date	November 2010	Owner	General Manager
Effective Date	July 1, 2011	Policy Owner Review	Annual
Revision Dates	Nov. 18, 2011 Jan. 30, 2014	Next Executive Team or Designee Review	2017

Purpose
This policy ensures compliance with matters specifically reserved by the Board of Directors and identifies matters either reserved to or delegated by the general manager.

Policy
No employee of LCRA is authorized to take any action reserved to the Board of Directors under Board Policy 102. All other general powers and duties in the LCRA Enabling Act, bylaws, Board policies, and other applicable law necessary to accomplish LCRA's purpose, plans, and objectives are the responsibility of the general manager and those persons to whom the general manager specifically delegates such authority.

106.1 Authority Reserved to General Manager
Authority for the following matters is reserved to the general manager unless specifically delegated to an executive manager/officer or other LCRA employee by separate documented authorization from the general manager:

- Taking a position on matters that significantly affect relations with public or private entities outside of LCRA
- Employing outside legal counsel, in consultation with the general counsel
- Filing, dismissing, or settling a lawsuit, in consultation with the general counsel
- Taking a formal position in the name of LCRA with regard to federal, state, or local legislation consistent with Board Policy 104
- Filing non-routine pleadings before any state or federal administrative agency
- Acquiring interests in real property. However, documents of conveyance or acquisition may be executed by managers or their designees after the transaction or project involving acquisition has been approved by the Board of Directors.

106.2 General Delegation of Authority by General Manager
The general manager delegates to the executive managers/officers any and all powers and duties necessary to manage their respective departments and service areas, except for those matters reserved to the Board of Directors or general manager as specified in this policy and Board Policy 102. Executive managers/officers are further authorized to delegate authority to their respective department managers and staff. Except in cases of unanticipated short-term absences and emergencies, all delegations must be authorized by another policy, or be documented and consistent with this and other policies, including but not limited to policies related to employment, contract administration, and supply management.

106.3 Exception for Unanticipated Short-Term Absence or Emergency
Temporary delegations by the general manager or executive managers/officers, or re-delegations necessitated by short-term absence in the event of an emergency, should be in writing when possible but may be made verbally. For purposes of this exception, an emergency is a condition or circumstance that poses an imminent threat to power generation, transmission, or distribution; environmental quality; flood control; water operations; employee or public safety; or that could result in an immediate, significant financial, or operational loss or damage to property.

See also:
EPM Policy 107: Contract Management
EPM Policy 108: Supply Management
EPM 106R1: Expense Approval Authority
Board Policy 104 - LCRA Board Position on Legislation

LCRA Organizational Overview

Updated Oct. 27, 2014

Phil Wilson
General Manager

Charlie Johnson
General Auditor

Clint Harp
Special Assistant to GM

Ross Phillips
Executive VP, Transmission

- **Stuart Nelson**, Sr. VP, Project Services
  - Transmission Engineering
  - Transmission Asset Development
  - Project Management
  - Surveying, Mapping, GIS
  - Project Inspection
- **Bill Hatfield**, VP, Transmission Operations
  - Telecommunications
  - SOCC Operations
  - Line Operations
  - Energy Management Systems
  - Transmission Customer Support
- **Kendall Berggren**, Mgr. Construction, Fleet and Materials
- **Sergio Garza**, Mgr. Transmission Resource Planning

Ken Price
Chief Commercial Officer

- **Jimmy Havins**, Sr. VP, Generation
  - Power Plants
  - Maintenance and Support Services
  - Gas Storage Operations
  - Rail Fleet Maintenance
- **Michael McCluskey**, Sr. VP, Wholesale Markets and Supply
  - Wholesale Customer Relations
  - Customer Support Services
  - Supply Planning and Analysis
  - Business Development
- **Glenn Williams**, Sr. VP, Commercial Asset Management
  - Commercial Operations
  - Power and Gas Trading
- **Stacey Woodard**, VP, Qualified Scheduling Entity Operations
  - QSE Operations
  - GenDesk
  - Coal and Rail
- **Randa Stephenson**, VP, Wholesale Markets
  - Business Development
  - Advocacy

John Hofmann
Executive VP, Water

- **Karen Bondy**, Sr. VP, Water Resources
  - Water Resource Planning
  - Water Conservation
  - Water Quality Protection
  - Environmental Lab
- **Ryan Rowney**, VP, Water Operations
  - River Operations
  - Irrigation Operations
  - Dam and Hydro
  - Water Surface Management
  - Water Customer Support

John Miri
Chief Administrative Officer

- **Leah Castanet**, Sr. VP, Service Design and Innovation
- **Jenna Adams**, Mgr. Strategic Initiatives
- **Scott Ahlstrom**, Mgr. Engineering
- **Arann Barnett**, Mgr. Enterprise Resources
- **Don Brent**, Chief of Public Safety
- **Rory Dismuke**, Mgr. Supply Management and Strategic Partnerships
- **Rani Johnson**, Chief Information Officer
- **Larry Whiteside**, Chief Information Security Officer
- **Dennis Daniel**, Mgr. Enterprise Risk and Business Strategy
- **John Schneider**, Mgr. Natural Resource Management
- **Tony Troxell**, Mgr. Operational Excellence

Tom Oney
General Counsel

- Legal Services
  - **Lyn Clancy**, Managing Associate General Counsel/Sr. Policy Advisor
  - **Christine Rothe**, Managing Associate General Counsel
  - **Leigh Sebastian**, Managing Associate General Counsel
- **Bill Steinhauser**, Mgr. Environmental Affairs
- **Don Kiser**, Mgr. Regulatory Affairs

Richard Williams
Chief Financial Officer

- **Brady Edwards**, Sr. VP, Finance
  - Treasury
  - Financial Planning
  - Innovative Finance and Debt Management
- **Julie Rogers**, Controller
- **Craig Sloan**, Mgr. Enterprise Performance
- **Joshua Cole**, Mgr. Strategy and Development

Bill Lauderback
Executive VP, Public Affairs

- **Tobin Harvey**, Supv. Strategic Communications
- **Bill Jerram**, Mgr. Governmental Affairs
- **Heather Richardson**, Mgr. Regional Affairs
- **Stefanie Scott**, Mgr. Communication Services and Media Relations
- **Amy Elizondo**, Supv. Meeting Services

Julie Eby
Executive Assistant to GM and Board of Directors

LCRA
ENERGY • WATER • COMMUNITY SERVICES