

LCRA Water Management Plan Update Process: Participant comments through Aug. 31, 2018, and LCRA responses

As part of the process to update its Water Management Plan, the Lower Colorado River Authority is accepting and responding to comments from interested entities and individuals. This document includes comments and responses submitted following the second participant meeting on July 12, 2018, and received by Aug. 31, 2018.

Some comments have been abbreviated. You can read the full comments on the [Updating the 2015 Water Management Plan](#) webpage on [lcra.org](#).

Comment from Tom Harrison:

Last WMP meeting you offered changing the drought criteria from 24 months to 18 to help reduce a rapid decline in lake levels. What criteria are you considering a rapid decline in lake levels to be? What would be the outcome of this change? Is there modeling to show the difference?

LCRA's response: *LCRA staff has proposed to change one of the criteria for entering Extraordinary Drought. The criteria would shorten the minimum number of months since the lakes were last full from 24 months to 18 months. The "rapid decline" would be a drop in storage from full to 1.3 million acre-feet. If that happens in 18 months, we don't think we should delay entering Extraordinary Drought for another six months. The modeling shows this change results in Extraordinary Drought being triggered in first crop of 2012.*

Comments from the National Wildlife Federation, Texas Living Waters Project, Texas Parks and Wildlife Department and Environmental Stewardship:

1. Subsistence Flows at Wharton. [*Comment abbreviated*] ...we propose evaluation of and consideration of the following approach: At any time combined storage in Lakes Buchanan and Travis at the end of previous month is below 900,000 acre-feet, the subsistence flow requirement to be met using stored water at the Wharton gage for the month will be the greater of 107 cfs or 50% of the full subsistence flow criterion for that month. However, if storage remains below 900,000 acre-feet and flows at the Wharton gage are below the full subsistence flow criterion for a period of three consecutive months, then for the following three months, when storage remains below 900,000 acre-feet, the applicable subsistence requirement is the greater of 107 cfs or 80% of the full subsistence flow criterion for the applicable month.

LCRA's response: *LCRA staff will review the suggested approach.*

2. Proposed rule limiting releases of storable inflows to no more than 50% of the amount above 25,000 acre-feet per month. [*Comment abbreviated*] ...we propose consideration of a variation of the proposed rule. Variation: The rule would only apply in a particular month if inflow from the Colorado River to Matagorda Bay for the previous three months exceeds 80,000 acre-feet or if combined storage at the end of the previous month was equal to or less than 1.5 MAF.

LCRA's response: *LCRA staff will review the suggested approach.*

3. Fine-tuning of seasonal environmental flow triggers. [*Comment abbreviated*] ...From a review of the proposed seasonal triggers, there appears to be a significant disparity in applying the same trigger level in March, July, and November. As summarized below, the July and November triggers result in far more reductions in protection levels than the March triggers. There may be multiple explanations for that result, including differences in average storage levels for those different months. As noted in previous comments, to our knowledge, there has not been

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an attempt to analyze appropriate trigger levels for July or November triggers. We do not support the addition of a November trigger without a careful analysis of what storage levels would be appropriate for use...

LCRA's response: *LCRA staff continues to believe the inclusion of a third evaluation date of Nov. 1 is appropriate with the storage level triggers used for the Mar 1 and July 1 evaluation dates. In combination with proposing the third evaluation date, staff also proposes modifying the trigger for switching from Base-Dry to Subsistence from 1.9 million acre-feet to 1.8 million acre-feet.*

Comments from Colorado Water Issues Committee of the Texas Rice Producers Legislative Group:

1. We are in full agreement with staff's decision to weather-vary firm demands in much the same way that interruptible demands have been modeled for some time now. This will move the model one notch closer to the realm of reality. We recognize there may be pushback from some who desire safety factors built upon safety factors in an exercise with such weighty implications, however the Water Management Plan (WMP) and resulting Drought Contingency Plan (DCP) are the appropriate vehicles by which such safety should be achieved, not underlying inflated data and unrealistic modeling.

LCRA's response: *Comment noted.*

2. We are surprised that the addition of Arbuckle has shown such slight improvement in the reliability of interruptible water for agriculture. We believe there may be some changes in assumed policies or curtailment criteria that could be beneficial particularly to our ratoon crop without undue impacts to other stakeholders.

LCRA's response: *Please provide additional information on the approaches or policy changes CWIC would like LCRA staff to consider.*

3. We are especially interested in looking at ways to improve the reliability of our ratoon rice crop, as it is now more than ever the major source of our net income... [*Comment abbreviated*].

LCRA's response: *Please see response to comment 2.*

4. In the modelling results summary, it would be helpful to be able to distinguish between water diverted to Arbuckle for storage and later use and water diverted for immediate use in the irrigation system connected to Arbuckle.

LCRA's response: *LCRA staff will include additional detail related to the Arbuckle Reservoir and the Gulf Coast water right in the model output files.*

5. We assume that the terms "stored water" and "Arbuckle water" do and will continue to refer to different water sources accordingly, however we are still a bit confused going forward how these will be accounted separately and utilized separately or in conjunction with one another. We also recognize that some of these management details may be most appropriately functions of the yet-to-be-considered DCP.

LCRA's response: *LCRA staff will try to be clearer when distinguishing between water from the Arbuckle Reservoir and interruptible stored water from lakes Buchanan and Travis. Accounting of water from LCRA's run-of-river rights, including the Arbuckle Reservoir, will be addressed in revisions to the drought contingency plan.*

6. We believe that stored water commitments from the Highland Lakes should remain the same as they were in modeling for the WMP now in place, yet with the understanding that Arbuckle water will supplant the need to draw fully upon those stored water commitments. Among other things we are concerned about the potential for confusion in future WMP implementation efforts when irrigators are provided with the accounting of their remaining

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stored water allocation, how then they may factor in Arbuckle water availability when they are already having to factor in the unknown of run-of-river availability. This initial model run has reduced available stored water from the Highland Lakes in recognition of a dependence of or reliability on Arbuckle water to make up the deficiency. Without some vehicle by which Arbuckle water can be reliably summed with stored water in reporting availability to the end agricultural user, he is left with insufficient information with which to make cropping and irrigation decisions. One solution seems to be to simply keep the stored water available for agriculture at its prior number and utilize Arbuckle to assure that less than that is drawn upon.

LCRA's response: *Water from LCRA's downstream water rights, including water from the Arbuckle Reservoir, is used to meet demands for agricultural customers before water from lakes Buchanan and Travis is used. The Water Management Plan determines the amount of water that can be supplied from lakes Buchanan and Travis. Through the WMP, LCRA cannot commit to supplying a greater amount from lakes Buchanan and Travis on the expectation that part of the commitment will very likely be satisfied by water from Arbuckle Reservoir. The amount of water available from LCRA's downstream water rights, including Arbuckle Reservoir, will be addressed in revisions to the Drought Contingency Plan.*

Comments from Central Texas Water Coalition:

1. Incorporation of Watershed Changes and Low Inflows. It is our understanding that the Colorado River watershed has experienced major structural changes in terms of land use and development that are contributing to the reduction in runoff response due to rainfall events. How is LCRA incorporating these changes into the water availability model (WAM) being utilized in the WMP revision process? We believe the reduced rainfall/runoff response is not being considered in the flow naturalization process that is fundamental to WAM modeling, and therefore the modeling presented by LCRA will not be representative of likely hydrologic conditions to be experienced in the Highland Lakes region in the future. As a result, we believe that the WAM modeling undertaken by LCRA during this WMP revision process will overstate the availability of interruptible water and will exacerbate future concerns regarding the water supply for LCRA's firm customers. [*Comment abbreviated.*]

Recommendations:

- A. Take a more conservative approach to Demands, as proposed by Firm customers. More conservative options include:
 - Remain with the dry-year basis only for 2025 Demands
 - Use the 2030 Demand numbers, as recommended by City of Austin
- B. If LCRA will not consider the recommendation to extend the Demand Period to 2030, as requested by City of Austin, there should be an automatic adjustment in 2025 to the projected 2030 Demands, if a new WMP is not in place.
- C. As recommended by Ken Gorzycki from Horseshoe Bay and supported by Firm customers: Raise the 600,000 acre-feet minimum combined storage requirement to 750,000 acre-feet to provide a more prudent cushion.
- D. Increase the mandatory Interruptible customer cut-off point from 900,000 acre-feet to 1,000,000 acre-feet of Combined Storage.
- E. Rapid declines in reservoir storage need to be managed in a quicker manner to avoid many issues relating to meeting future needs of water users. This topic should be explored further as a stand-alone discussion. (see item 8)

LCRA's response:

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This WMP revision uses a hydrologic period of record of 1940-2016. That period includes the recent drought years, which included low inflows.

- A. *LCRA staff has developed a weather-varied demand approach for firm water customers that continues to protect firm customers and provides for greater accuracy. This WMP revision is being developed with demands through year 2025, the timeframe through which the plan is expected to be in effect.*
 - B. *LCRA staff anticipates the next WMP revision process will start prior to year 2025, and one factor for when the revision process begins will be whether firm demands are approaching the demand levels used in this revision.*
 - C. *LCRA staff does not recommend changing the 600,000 acre-foot level used for triggering curtailment of firm water customers and for minimum combined storage in the model evaluations. That storage level and trigger is part of the WMP framework that is not changing as part of this revision.*
 - D. *The modeling to date does not indicate a need to modify the storage level for mandatory cutoff of interruptible water during the crop season.*
 - E. *Please see the response to comment 8.*
2. **Impacts of Hydroelectric Power Generation on Water Management.** LCRA reports minimal releases of water on their Annual Water Use Reports for meeting Emergency Shortages or Ancillary Power. However, from study of their Annual Water Use Reports submitted to TCEQ, LCRA is producing large quantities of hydroelectric power when it makes releases through each dam to meet downstream water demands. Is there a conflict between being stewards of the water and generating hydroelectric power? Although CTWC requestors have obtained a limited amount of information from LCRA about its hydroelectric operations, we understand that some of our questions (including requests for financial information) will not receive responses without a legal process.

When stored water is released to generate power, we believe there are significant financial consequences that impact both the water and electric businesses. Disclosure of relevant financial information will allow the public to understand this critical water/electricity interface.

Interface Related Questions:

- A. Why is water used by LCRA in the production of hydroelectric power not included as a Demand?
- B. How is the LCRA Water Business compensated for water used to generate hydroelectricity?
- C. How much revenue does LCRA make each year from generation of hydroelectric power?
- D. How do LCRA decision makers handle the apparent conflict of interest between water needs and electricity production?

LCRA's responses:

- A. *LCRA's modeling includes demands for releases of water to meet downstream customer needs and environmental obligations. Those releases are typically made through hydroelectric turbines, but also can be made through floodgates. The manner in which water is released to meet downstream needs does not represent an additional demand for water from the lakes.*
- B. *LCRA's generation business pays for costs associated with operating the dams on the pass-through lakes, and all costs associated with the powerhouses at Buchanan and Mansfield dams. LCRA's water business is compensated for any water released solely in response to an emergency need for electricity.*
- C. *Questions regarding the revenues of LCRA generation business will not be addressed in the Water Management Plan revision process.*

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D. LCRA only generates hydroelectric power as a byproduct of releases for downstream needs, when passing floodwaters, or during a power emergency recognized by the Electric Reliability Council of Texas.

3. Accounting for Downstream Losses. Please explain how LCRA's water modeling accounts for conveyance and distribution losses for stored water releases to downstream Interruptible irrigation customers. Where and how are downstream losses considered in the modeling? What are the specific assumptions in the WAM modeling for losses in the Colorado River between the storage reservoirs and the downstream diversion points? Based on our review of the recent WAM modeling performed for this LCRA WMP revision, there are no channel losses between Lake Travis and Bay City (as specified on the CP definitions in the WAM input file). Is LCRA accounting for these losses in some other way within the WAM?

LCRA's response: *The model accounts for estimated losses by increasing the amount of water released from lakes Buchanan and Travis for a downstream use by the amount of the estimated loss. Additional details will be provided in a technical paper.*

4. Accountability for Lost Water from Stored Releases. Interruptible stored water allocations should be charged for all Orders from Stored Water versus allowing irrigators to reject the stored water as it passes the Diversion Point. LCRA's stated position that it has always been done this way is not a good business practice as water becomes more precious with reduced inflows being the norm. This would also make the WAM modeling more accurate. At the same time, LCRA may need to increase its oversight over the total volumes of irrigation water that are applied to a customer's fields, to assure that water that is diverted is not wasted and that water conservation efforts are promoted.

LCRA's response: *The model factors in releases of water that are ordered but not diverted. Additional details will be provided in a technical paper.*

5. Water for Emergencies. Wildfires are currently a huge concern for all areas, both urban and rural. Hundreds of acres began burning a few days ago in Burnet County in the Inks Lake State Park area. Public comments made at the July meeting by an Assistant Fire Chief have reminded us that Travis County Emergency Services District 8 relies heavily on the water in Lake Travis in times of emergency, and a fire fighter's ability to access water for firefighting is significantly reduced when Lake Travis falls to 650 feet above mean sea level (msl). Even more frightening, water access for firefighting is primarily limited to only one location on the shores of Lake Travis when lake levels fall to 640 feet above msl (or less). We strongly recommend water management practices that assure that minimum lake elevations are maintained in reservoirs that are potential sources of water for public safety. Please consider methods to address these concerns and to allow water for firefighting to be considered in the modeling results and overall objectives for lake storage. How can the needs for firefighting safety in this basin be factored into water planning in the update of the WMP?

LCRA's response: *LCRA understands the concern. However, Lake Travis is a water supply reservoir designed to fluctuate. LCRA provides up-to-date information regarding lake levels in the [River Operations Report and](#) provides six-month [lake level projections](#) on [lcra.org](#) that can be used for planning purposes.*

6. Modeling Results Showing Lake Elevations. Our review of the recently provided WAM modeling appears to show that Lake Travis would drop to a level of 583 feet above msl (see attached graphic), which would be a detail causing great concern to many, for many reasons, including the devastating impact on the ability of fire fighters to

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access lake water in cases of emergency. Will you please include the lake levels of both Travis and Buchanan in the outputs and narrative explanations of LCRA's modeling runs, so that this impact can be better understood?

LCRA's response: *LCRA will provide lake elevation information with future model results. It is important to note the WAM model's focus is combined storage in lakes Buchanan and Travis, rather than the specific amount of supply or lake elevation for each individual lake.*

LCRA staff has determined the distribution of water between lakes Buchanan and Travis was inconsistent with the expected distribution for some periods in the July 12 and Aug. 10, 2018, WAMs. The WAM model will be adjusted to better reflect the expected distribution of water between lakes Buchanan and Travis, resulting in the minimum lake elevation for Lake Travis being higher.

7. Understanding Irrigation Modeling for Garwood. At the July informational meeting, LCRA presented water modeling and demand information on some of LCRA's irrigation water customers. Would you please provide the corresponding information on the Garwood irrigation operations? And explain how the Garwood demands and commitments are included in the water modeling for the WMP? Also, we wish to thank LCRA for explaining how the Corpus Christi water right is considered in its water modeling.

LCRA's response: *The July 12 and Aug. 10, 2018, model results included Garwood information in the Results Summary but not in the Monthly Output tables. LCRA will include monthly output for Garwood with the next model results. Additional information regarding the modeling of Garwood will be included in the technical paper.*

8. Management of Lake Storage. We urge LCRA to implement changes to allow a faster, more nimble response to rapid declines in lake storage. As an LCRA manager noted in recent discussions, shortening the time period to trigger a drought designation from 24 months to 18 months would be an option. In addition, in view of the almost non-existent inflows to the lakes in recent weeks, it seems appropriate to add a criterion regarding a minimum quantity of inflows over a period of time, so that periods of extremely low inflows will not continue for months before the WMP reacts to this alarming situation. An LCRA Daily River Operations Report, which stated: "Yesterday's total gauged inflows into the Highland Lakes were 15 acre-feet" should trigger an immediate response under the new WMP.

Please continue to evaluate management tools that avoid precipitous drops in reservoir storage; facilitate LCRA's ability to maintain control over this limited water supply; establish minimum combined storage volumes that adequately protect LCRA's Firm customers in future years; and assure that LCRA can satisfy its Firm water commitments without the need for emergency orders or curtailments that pose threats to public health and safety. We believe these topics deserve priority attention and discussion.

LCRA's response: *The WMP framework takes inflows and combined storage levels into consideration for determining of the amount of interruptible stored water available for agricultural customers and environmental flow obligations. This determination occurs on two evaluation dates for interruptible stored water for agriculture. Once the determination is made, interruptible agricultural supplies are subject to being cut off if the entire allocation is used, or if combined storage in lakes Buchanan and Travis drops below specified levels. The current modeling shows this framework to be protective of firm customers through a repeat of recent severe drought conditions. At this time, LCRA staff is not proposing an additional rule under which agricultural supplies would be cut off based solely on inflows and regardless of lake levels.*

Comments from Environmental Stewardship:

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[Comments abbreviated].

1. Environmental Stewardship requests that the LCRA use the improved GMA-12 GAM to better estimate the impacts of groundwater pumping in the Simsboro Aquifer on the Colorado River and its tributaries in the Austin-Bastrop-Smithville reach to inform the current water management planning process on the potential impacts of such pumping on the overall Highland Lakes system.

LCRA's response: *Interactions between groundwater and surface water are outside the scope of the WMP revision.*

2. Environmental Stewardship requests that the LCRA prepare the hydrographic separation as described above for the period January 2011 through December 2013 for the Bastrop and Wilbarger gages of the Colorado River to gain insights on the quantity of groundwater that was being contributed to river flow for this extraordinary drought period.

LCRA's response: *Determining the amount of groundwater that may have contributed to base flows in the Colorado River is outside the scope of the WMP revision. Environmental Stewardship may wish to review the naturalized flows for the Colorado River, which include numerous dry periods over the period of record, including recent drought years.*

3. To what extent, in the modeling tools (WAM) or other management practices, is LCRA considering and using the information from the rainfall/runoff report to adapt its management practices to better predict and improve inflows to the Highland Lake system? Solving the inflow problem is a critical function to improving management of the river and Highland Lakes system.

LCRA's response: *This WMP revision uses a hydrologic period of record of 1940-2016. That period includes the years studied in the rainfall/runoff report, including the recent drought years, which included low inflows. The WMP revision will include curtailment curves for providing interruptible stored water to agricultural customers and levels of environmental flow criteria that allow LCRA to meet the demands of its firm water customers while maintaining a minimum combined storage in lakes Buchanan and Travis of at least 600,000 acre-feet through a repeat of the entire period of record.*

4. To what extent is the LCRA using its Operations Model or other tools to measure and predict the quantity of groundwater outflows to surface waters available to satisfy environmental flows (especially subsistent flows during extraordinary drought)? Could the Operations Model (RiverWare) take data from a Surface Water-Ground Water monitoring system that interfaces with the improved GMA-12 GAM? Would this improve the predictive function of the model for delivering water down-river to users and to meet environmental needs?

LCRA's response: *Groundwater-surface water interaction is outside the scope of the WMP revision.*

5. Are groundwater outflows in "gaining" stream segments, and surface water losses in "losing" stream segments accounted for and considered in decisions to release stored water from the Highland Lakes or to allow storable water to pass through the system? Are there policy questions/decisions that need to be considered or adapted in making such decisions?

LCRA's response: *Groundwater-surface water interaction is outside the scope of the WMP revision.*

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6. In what ways and to what extent is the LCRA taking active measures to manage and protect groundwater inflows from being diminished through groundwater pumping of aquifers that intersect and influence the Colorado River and tributaries?

LCRA's response: *Groundwater-surface water interaction is outside the scope of the WMP revision.*

7. In what ways and to what extent is the LCRA taking active measures to protect historic interactions between groundwater, the Colorado River and its tributaries from unreasonable impacts resulting from groundwater pumping?

LCRA's response: *Groundwater-surface water interaction is outside the scope of the WMP revision.*

Comments from the City of Austin:

1. The City of Austin reuse supply volume should be corrected to better reflect reality. The draft WMP WAM released by LCRA used two types of reuse water: offsetting reuse and non-offsetting reuse. From the City's understanding based on discussions with LCRA, the offsetting reuse volume is used in the model to meet the City of Austin's demand and represents growth in direct reuse, while the non-offsetting reuse represents the City's current direct reuse.

The City recommends that LCRA adjust the reuse supply volumes to better reflect current and projected reclaimed water usage by the City of Austin. [*Comment abbreviated.*]

LCRA's response: *LCRA staff will work with City of Austin staff to make adjustments to more accurately reflect offsetting and non-offsetting reuse.*

2. The effluent assumptions in the draft WMP WAM should be adjusted to better reflect actual observed conditions. In the draft WMP WAM shared with stakeholders, LCRA used a constant effluent production factor for the City for both "hot-dry" and "average" demand years. The constant effluent production factor was based on an average of 2010-2014 actuals. While the City appreciates LCRA's using multiple years to generate an informed effluent production factor, the fact that the effluent production factor is constant creates a situation in the model that is not supported by historical data. Because the draft WMP WAM uses demands fluctuating between "average" and "hot-dry" demands, using a constant effluent production factor results in fluctuating volumes of effluent production in the model, between 112,930 acre-feet per year (AFY) in "average" demand years and 148,630 AFY in "hot-dry" demand years. The graph below shows the total effluent production pattern resulting from LRCA's approach. These large fluctuations are not expected to occur. [*Comment abbreviated.*]

The variable percent factors proposed by the City result in significantly less fluctuation in effluent production volume, as shown in the following figure. An Excel file containing the proposed effluent production factors and monthly pattern information will be emailed along with these comments when they are submitted to LCRA. Using the City's proposed effluent factors addresses the concerns described above.

LCRA's response: *LCRA staff will consider using effluent factors that vary (just as demands vary) for hot/dry demand years versus average demand years.*

3. The City recommends that LCRA consider how conserved water is treated in the WMP process. In LCRA's written responses to WMP participant comments from the first round, they responded to a comment from the City of

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Austin regarding the importance of equitably distributing the benefits of conserved water, saying that, “[a]llocating conserved water in a way that does not allow that water to be considered when determining the available supply for interruptible water would be counter to the intent of the WMP.” This statement is very concerning to the City of Austin as it appears to disincentivize LCRA firm customers from making exceptional efforts to achieve water conservation. The City questions that this is the intent of the WMP, particularly with the continued and increasing emphasis on water conservation from the state legislature, Texas Commission on Environmental Quality (TCEQ), and Texas Water Development Board (TWDB). Without protections for conservation in place, the City of Austin does not appropriately realize the benefits particularly of its exceptional conservation. For example, one-day-per-week watering restrictions for automatic irrigation systems and other conservation programs have significantly reduced City-wide water demand over recent years. The way the current draft WAM is structured, the water saved by the City through its exceptional conservation measures with the purpose of increasing the reliability of municipal water supply by drawing less on lake storage, is made available instead to be used downstream to meet interruptible customer demands. Providing protections in the WMP to retain at least some of the benefit of conservation where the entity performing the conservation can appropriately realize those benefits is a crucial factor in the case for conservation for firm customers. There are a variety of mechanisms that can be considered, which the City would like to discuss with LCRA.

LCRA’s response: *LCRA staff recognizes the City of Austin is a leader in water conservation. Austin’s recent water use trends are indicative of the city’s commitment to conservation. The Austin Water Forward demand values also reflect the city’s near-term and long-term goals with respect to water conservation. LCRA staff is open to discussing Austin’s concepts regarding how exceptional conservation measures could be accounted for in the development and implementation of a WMP.*

4. LCRA should adjust the draft WMP WAM assumptions to better reflect the actual operating conditions of Decker Lake, rather than modeling it as empty for the majority of the period of record. In the draft WMP WAM results, Walter E. Long Lake (Decker Lake) is modeled to empty out before 1 948 and never gets close to refilling for the rest of the period of record. This does not reflect the actual operation of Decker Lake, which fluctuates within a 3-foot range. So that the WAM better reflects what would happen in reality, the City recommends changing the draft WAM to reflect the current operations of Decker Lake and maintain the level within a 3-foot range. This changes slightly raises the minimum combined storage of the Highland Lakes.

LCRA’s response: *The prior WMP models had simulated the expected demand of the Decker Power Plant as a diversion directly from the Colorado River. LCRA staff will work with Austin to update the WAM to reflect an operating range for Decker Lake, with river diversions refilling the lake, and the power plant diverting from the lake.*

5. LCRA should adjust draft WMP WAM assumptions regarding storage allocations between Lakes Travis and Buchanan to better reflect actual operations. In the draft WMP WAM, storage in Lake Travis fluctuates over a much greater range than storage in Lake Buchanan. At the lowest combined storage in the model results, this causes Travis’s level to reach approximately 584.8 FT MSL (141,067 AF of storage), while Lake Buchanan in the model shows 998.5 FT MSL (469,154 AF). This is an unprecedentedly low lake level for Lake Travis, since the lowest real-world storage of the lake in the recent drought was approximately 61 8.6 FT MSL (343,192 AF), resulting in a 33 .8 FT difference in lake elevation between the model and actual observations. This extremely low lake level would be anticipated to cause negative impacts on and around the lake. These impacts could include exposed water supply intakes, firefighting concerns, and many others.

The City acknowledges that operating decisions about how lake storage is distributed are not made through the WMP process, and is not suggesting that they should be. However, the lake balancing should be corrected in the

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model not to inform operational decisions, but to better reflect reality and accurately model how much empty storage is likely to be available to capture rain events. The City recommends that LCRA change the draft WMP WAM assumptions to better reflect LCRA's guidelines, documented in "LCRA Highland Lakes Operating Guidelines: Buchanan-Travis Release Allocation Guidelines" so that fluctuations in storage are more evenly distributed between Lakes Travis and Buchanan, thereby more accurately reflecting what the real-world storage would be in the Highland Lakes and providing more accurate estimates of how much runoff could be captured in storm events.

LCRA's response: *The WAM model will be adjusted to better reflect the expected distribution of water between lakes Buchanan and Travis.*

6. Additional supplemental documentation of the draft WMP WAM provided in a timely manner would be helpful given the compressed timeline of this WMP process. The City appreciates supporting documentation provided thus far. The City asks LCRA to continue to provide as much supporting documentation for their draft WMP WAM as early in the process as possible, as there is a short timeline for analysis and comments. Early documentation regarding assumptions made about key items would greatly expedite the process of analyzing the draft WMP WAM in order to provide comments to LCRA in a timely manner.

LCRA's response: *LCRA staff will provide a technical paper with additional details regarding the WAM with the next model update.*

7. The City recommends that LCRA clarify its comments regarding changes in stored water available to irrigators. An initial analysis of the model results provided by LCRA for the current update of the Water Management Plan (WMP) indicates that overall more stored water will be available to agricultural irrigators than under the 2015 WMP. Some key indicators of the proposed WMP's increase in irrigators' water supply are found in model results which currently show under the new plan that the average annual stored water supply to irrigators will increase to about 143,000 acre-feet a year from 118,000 acre-feet a year under the current plan. Over the period of record, this average of approximately 25,000 AF a year more of stored water appears to represent about 2 million acre-feet more water—or about the full volume of Lakes Travis and Buchanan. *[Remainder of comment omitted.]*

LCRA's response: *LCRA staff understands the concern that prior presentations drew attention to the reduced amount of interruptible stored water supply available from lakes Buchanan and Travis as compared to the 2015 Water Management Plan, and did not place as much attention to the total supply made available from all sources (including Arbuckle Reservoir), which was similar to the amounts in the 2015 WMP. The supply available from each source (and the sum from all sources) is available in the Results Summary. Water from LCRA's downstream water rights (including from Arbuckle Reservoir) helps meet agricultural demands that would otherwise call on water from lakes Buchanan and Travis. However, the supply of water from the Arbuckle Reservoir and downstream water rights is distinct from the supply of interruptible stored water from lakes Buchanan and Travis, which is governed by the Water Management Plan. A shortage in supply from Arbuckle Reservoir would not result in the ability to draw more water from lakes Buchanan and Travis than the amounts specified under the WMP.*