CENTRALTEXAS WATERCOALITION

VIA EMAIL TO LCRAWMP@lcra.org

June 20, 2018

CENTRAL TEXAS WATER COALITION'S COMMENTS ON LCRA'S MAY 2018 DRAFT TECHNICAL PAPERS PREPARED FOR UPDATE OF 2015 WATER MANAGEMENT PLAN

The Central Texas Water Coalition (CTWC) greatly appreciates the opportunity to provide these comments on the Draft Technical Papers that LCRA has developed in conjunction with its work toward the preparation and submittal of its next Water Management Plan (WMP).

GENERAL OBSERVATIONS AND QUESTIONS:

1. What is the objective of LCRA's development and application of a "weather-varied" methodology to calculate Demands for various types of water uses? To assist our understanding of the impacts of these proposed numbers and methods, would you please provide a reference chart that compares the Demands proposed under these Draft Technical Papers against: 1) the Demand assumptions used in the 2015 WMP; and 2) to the extent they are comparable, to the Projected Demands approved by the Texas Water Development Board (TWDB) for use by Region K?
2. How does LCRA's "weather-varied" methodology account for the trend toward warmer temperatures that this region is experiencing? How does the methodology recognize and adjust for the extremely low inflows to the Highland Lakes that are now the "new normal"?
3. How is LCRA using the findings and conclusions of the August 2017 "Evaluation of Rainfall/Runoff Patterns in the Upper Colorado River Basin," prepared for the TWDB by the Kennedy Resource Company, to adjust for the alarming declines in inflows to the Highland Lakes?
4. Will LCRA be using reduced inflows in its Water Availability Modeling to reflect the harsh reality of the present situation in the watersheds that feed the Highland Lakes? In the last few days, the LCRA River Operations Reports have indicated that gauged flows upstream of Lake Buchanan are ranging from 0 to 19 cubic feet per second. Such horribly low numbers should have significant consequences in the development of this WMP.
5. Where do you account for potential Emergency Hydroelectric Releases?
6. How do you account for orders placed by Agricultural Interruptible customers that are not diverted when it passes by the irrigation division's diversion point on the river, leaving those volumes of water available to be "re-ordered"?

7. How does LCRA utilize water pricing as a method to encourage conservation and reduce demands?
8. What is the total volume of water allocated under Firm Domestic Use Contracts on the Highland Lakes? What is the total volume of water held under Firm Domestic Contracts that are not diverting from the Highland Lakes? The observed growth and development around the Highland Lakes suggests that these numbers are trending upward at a noticeable pace, and it would be helpful to confirm that the Draft Demand numbers for these customers is generous enough to account for the apparent increase in Domestic Use Contracts.
9. How is the 50,000 acre-feet/year LCRA Board "Reserve" accounted for in the Demand numbers described in these Technical Papers? What is the purpose of the Board Reserve number?

SPECIFIC COMMENTS ON DRAFT TECHNICAL PAPERS:

Development of Projected Agricultural Demands by Downstream Irrigation Operations

It is unclear how LCRA's Draft Downstream Agricultural Demands compare to the Region K 2020 Demands, since the Region K Irrigation Demand Projections appearing in Table 1 of this Draft Paper appear to be presented somewhat differently from the tables that were discussed by the Region K Population and Water Demand Committee. If LCRA can provide a reference chart to facilitate the comparison and understanding of its latest Demand proposals, or, if LCRA can point us to the identical "Table 1" within the Region K documents, that would be very helpful.

Please provide information on the estimation of and accounting for the conveyance losses that occur between the point where stored water is released from an upstream reservoir to the point that the water is diverted from the river. In other words, what is the magnitude of the conveyance losses for releases of stored water from the Highland Lakes? How is LCRA compensated for the value of the water that is lost along the way?

In its development of Table 2 of the Draft Paper, LCRA briefly describes the components of its demand methodology for Downstream Agricultural Operations, but it is not clear that such calculations could be validated or repeated without more information. Most importantly, the Total Demands presented in Table 2 are huge numbers (indicating a maximum total annual demand of 422,001 acre-feet/year), likely exceeding the Combined Firm Yield of Lakes Buchanan and Travis, and possibly calculated without assurance that such water will be used beneficially and without waste. It is unclear whether such water would be supplied from the storage reservoirs or from LCRA's run-of-river water rights. Although LCRA proposes to respect the maximum year demands that Region K is using for this Water User Group as an upper limit on its own demand projections, CTWC remains concerned that Region K's Agricultural Demand numbers are far too high to be used as guidance in this process.

Development of Projected Firm Demands for Municipal and Other Firm Uses (excluding Power Plants)

Several of the projected water demands for LCRA's Firm customers seem to be understated, including: 1) the City of Cedar Park (recently approved contract for 20,500 with optional 2,500 acre-feet; but listed as having a 20,000 acre-feet/year demand in the year 2025); and 2) Domestic Use on Highland Lakes (listed as 5,100 acre-feet/year in 2025, but existing Domestic Use customers (grouped with other small or temporary customers) is already reported as having contracts for 4,574 acre-feet/year (perhaps these other customers are not located on the Highland Lakes?).

It does not seem appropriate to "mix" the City of Austin's average and high-use Demand projections by using the Austin Water Forward numbers AND the Region K numbers, respectively. These two numbers were derived in very different ways, and it does not seem technically correct to choose them for this purpose without converting them into comparable numbers. We recall that the City of Austin representatives on Region K expressed concerns about the inadequacy of Austin's projected demands in view of its continuing economic and population growth, and the City raised concerns about other aspects of the Municipal Demand methodology utilized by Regional Water Planning Groups. The City of Austin's water customers have been conserving water, and we expect that to continue, but Austin should not be singled out and selectively chosen as an entity with lower water demands until Austin's representatives confirm that such a projection is reasonable and justified.

As with the other Demand projections, it would be extremely helpful to have a reference table to compare the numbers derived using LCRA's proposed methods against the Demands presented in the 2015 WMP and in the working draft of the 2021 Region K Plan. We are concerned that the new methodology allows LCRA to lower the projected Demands for Firm customers in ways that could threaten the long-term sustainability of water supply in this river basin.

In addition to these comments, we would appreciate your response to these questions:

1. Why was the period from 2012 to 2016 chosen for Municipal Demand Projections? During most of that time period, LCRA's Firm customers were operating under restrictions or prohibitions on outdoor watering due to the continuing drought. As a result, Municipal and Manufacturing customers may have reported artificially low demands.
2. According to the Summary Table of "Preliminary Projected 2025 Demands," it appears that LCRA is proposing to rely on water use numbers <u>since 2010</u> as the basis for its high-use demands for the non-City of Austin Municipal/Manufacturing customers not individually reported in the Region K planning work. Please explain how this approach will protect the future demands of these Firm customers, since water use was curtailed during many of those years.
3. Where is the discussion on Environmental Flow Demands? Where are these demands acknowledged as Firm commitments, possibly released from lake storage if needed?
4. Please provide a copy of the Technical Paper regarding the City of Corpus Christi water right that is referenced in this document.

Development of Projected Firm Demands for Power Plants

It is unclear why the volumes of water used by the various power plants exclude the demand in 2011 at some power plants and include the year 2011 at others. The Decker and Fayette Power Plants diverted very high volumes of water in 2011, yet the year 2011 is not used in LCRA's calculation of a minimum annual demand level. Please explain the basis for that decision, which apparently lowers the demand projections for these power plants. We are not aware of weather-related circumstances that would justify omission of 2011 data. If the power plants diverted unusually high volumes of water in 2011 because such water was being released from storage for LCRA's downstream agricultural irrigation customers, this interrelationship should be explained.

Again, thank you for the opportunity to provide comments on these Draft Technical Papers, and we look forward to obtaining answers to our questions at your convenience. As it develops its Demand numbers, we urge LCRA to take a very conservative approach, so that sufficient Firm Water supplies can be reliably provided in times of epic drought. In other words, Firm Water Demands should err on the side of being overstated, not underestimated. Please call me at 512-755-4805 if I can be of assistance in this process.

Sincerely,

Jo Karr Tedder

Jo Karr Tedder
CTWC President
Jokarrtedder.ctwc@gmail.com

Feedback of National Wildlife Federation, Texas Living Waters Project, and Texas Parks and Wildlife Department on initial issues related to the 2018 stakeholder process for amendment of the Water Management Plan (WMP).

June 20, 2018

Concerns About Truncated Stakeholder Input Process

We are quite concerned that the stakeholder input process, as currently envisioned, will not provide an adequate opportunity for input on and understanding of proposed revisions to the WMP. WMP revisions involve highly technical issues and the implications of many revisions can only be understood based on a review of complex modeling results. In past revision processes, identification of alternative approaches for achieving desired outcomes, while minimizing unnecessary adverse results, has been possible because adequate opportunity was provided for stakeholders to evaluate initial modeling results, propose alternative approaches, and evaluate modeling results based on those alternative approaches. The truncated stakeholder process currently proposed is not adequate to support a comparably deliberative evaluation of options. As a result, the process is much less likely, even with a more constrained set of proposed changes, to result in a recommendation that carries broad stakeholder support.

We certainly acknowledge that the scope of revisions to the WMP as contemplated in the current round is much narrower than in recent revision processes. However, the addition of the Garwood Amendment and of the Arbuckle Reservoir present significant new complexities to be understood in evaluating modeling results and, particularly for the latter, in understanding the implications of proposed approaches. Also, the proposed introduction of changes to the instream flow compliance approach at the Wharton gage (which, in our initial thinking, raises questions about the potential role of the Arbuckle Reservoir in addressing the impacts of overly large releases to meet instream flow requirements at the Wharton gage), a bay rainfall relief mechanism for freshwater inflow provisions, and the addition of another environmental flow seasonal trigger (which we support in concept), raise issues that require technical evaluation. We do not believe the proposed process provides sufficient time to review initial proposals, with accompanying technical analyses; formulate and evaluate potential variations on those proposals; and present final proposals that the stakeholder committee can understand and discuss.

As we understand the proposed schedule, there are three meetings remaining. The next meeting is only scheduled for three hours. Presumably, we will see initial modeling results at, or slightly prior to, that meeting. It takes time to understand the intricacies of the modeling and to conceptualize potential variations on approaches for consideration, which then must be modeled. That will be particularly true with the addition of the Arbuckle Reservoir to the model. Also, as noted during the last meeting, a number of stakeholders will not be able to attend the next meeting. There is less than a month between the second and third meetings and between the third and final meetings. That will provide very little time for stakeholders to digest information presented at a meeting, formulate potential variations on approaches presented, and provide input to LCRA on the variations so that modeling runs evaluating the variations can be shared in advance of the subsequent meeting.

Although we understand that LCRA has proposed the process it determined appropriate, we believe that all parties would be better served by a more deliberative process that represents a better chance of

achieving broad buy-in prior to presentation to the LCRA Board and submission to TCEQ. Accordingly, we request that the timeline for the stakeholder process be extended at least for an additional month in order to allow for another meeting, with four to five weeks between meetings. Regardless of whether the schedule changes, it will be very important to ensure that modeling results are made available to stakeholders well in advance of the subsequent meeting.

Demand Projections

In general, we believe the concept of incorporating average year demands rather than assuming extreme dry year demands each year is an improvement in the process. The technical paper is quite helpful in explaining how the demand estimates were derived and how the determination is made about which category an individual year falls into. However, it appears that the high-year demands for municipal and industrial customers, which are based on extrapolation from Region K demand projections, ignore the savings achieved through water conservation measures other than the plumbing fixture code measures incorporated into the TWDB demand projections. Because water conservation savings, other than plumbing fixture code implementation, are treated in the planning process as a supply source, the demand analysis appears to include the portion of projected demand expected, pursuant to the regional water plan, to be met through water conservation in the amount of demand expected, in the WMP process, to be met from the Highland Lakes, potentially resulting in overstated demands. The over-estimation of demands likely is highest for high-year demands.

On a related issue, we would appreciate receiving an explanation of the rationales for the changes made in the updated 2025 demand projections since the May 21 presentation.

Requested Outputs for Stakeholder Discussion

Basic Model Outputs

We believe the model outputs provided in the most recent round of the revision process, which includes the types of outputs produced for the initial stakeholder process and those produced for the additional, truncated stakeholder process provided at the Board's direction, provided useful information for understanding and discussing the implications of various approaches. Accordingly, we request that comparable modeling outputs be provided for the current process. The development of summary pages, with additional pages of detailed outputs, helps inform a more complete understanding of the modeling results.

In addition, we request that separate outputs be provided for assumed operations of the Arbuckle Reservoir. Basically, we would like to see a water-balance type of approach to help us understand the amount of water diverted into the reservoir and released from the reservoir for various purposes. That information would help inform understanding of the potential of the reservoir to "fine-tune" river operations. Understanding what bay inflows are coming directly from the river versus from the reservoir, also would be helpful. Although water quality data for reservoir releases currently are lacking, we are interested in understanding the potential for water chemistry to be affected by reservoir operations.

Pulse Flow Analysis

Consistent with the commitment stated on page 4-15 of the current water management plan, we would like to see an analysis of pulse flows in the river below Austin during the period with the new WMP in effect.

Additional Environmental Flow Trigger

Generally, we are supportive of the concept of adding another environmental flow trigger to better reflect seasonal changes in storage. To better understand the role of such seasonal triggers, we recommend undertaking an analysis of how reservoir volumes in March compare to those in July and to those for the proposed new trigger, which we understand might be November. During the last revision process, the July trigger for environmental flow requirements was added fairly late in the process without any consideration, to our knowledge, of whether the reservoir elevations for July triggers should differ from reservoir elevations for March triggers in order to maintain comparable levels of environmental flow attainment. For example, from a cursory review of historical data, it appears that a trigger level of 1.9 MAF in March would be met more often than a trigger level of 1.9 MAF in July. Our initial thinking is that the specific reservoir elevations associated with the various seasonal triggers should be adjusted to maintain the target attainment. That adjustment should apply for the July trigger and for the new trigger, if it is added.

Wharton Gage Instream Flow Compliance

To help inform discussion of a potential new approach for determining compliance with instream flow requirements at the Wharton gage, we would appreciate receiving an analysis illustrating the problem to be addressed. Ideally, such an analysis would be designed to provide an understanding of the extent of the problem, including of whether it applies equally for subsistence and baseflow conditions. In addition, we would appreciate an analysis of the extent to which the Arbuckle Reservoir could be operated to capture instream flow releases from the Highland Lakes that exceed requirements at the Wharton gage. As noted above, we are concerned that the truncated stakeholder process currently proposed will not provide an adequate opportunity to discuss and refine an approach and, as a result, may fail to avoid unnecessary controversy during the Board and/or TCEQ decision process.

Bay Rainfall Inflow Relief Mechanism

If LCRA has a specific approach in mind, we would appreciate seeing a description of that approach and an illustration of how it would have worked with recent hydrology. Once we have a better understanding of the potential approach, we will be able to formulate a response. We also request consideration of a method for carrying forward some level of credit for reservoir inflows retained in storage through implementation of such an approach. The net effect of the approach, as we understand it, would be to reduce bay inflows during months that the rainfall-inflow-relief mechanism is triggered, which would allow more reservoir inflows to be stored for other purposes. We would like to explore a mechanism that would allow a portion of the stored inflows to be available to meet bay needs in subsequent months. As noted above, we are concerned that the truncated stakeholder process currently proposed will not provide an adequate opportunity to discuss and refine an approach and, as a result, may fail to avoid unnecessary controversy during the Board and/or TCEQ decision process.

City of Austin
Austin Water P.O. Box 1088 Austin, Texas 78767 (52) 972-0101

June 20, 2018

John Hofmann, Executive Vice President of Water
Lower Colorado River Authority (LCRA)
P.O. Box 220
Austin, TX 78767

Re: Initial Comments on 2018 LCRA Water Management Plan Update

Dear John:

Attached is the City of Austin, Austin Water's submittal of comments regarding the first stage of the Lower Colorado River Authority's 2018 update to its Water Management Plan (WMP).

We appreciate the opportunity to provide comments. If you have any questions, or need any additional information, I can be reached at 512-972-0108.

Sincerely,

Greg Meszaros, Director
Austin Water

Attachments:
1. City of Austin Initial Comments on 2018 LCRA Water Management Plan Update
2. Alternative Method for Demand Categorization Methodology for Firm Municipal and Other Firm Uses (Excluding Power Plants)
3. Example of WAM Results Summary from 2015 WMP Update
4. Example of Consolidated Monthly Run Summary from 2015 WAM Update

Austin WATER

The City of Austin is committed to compliance with the Americans with Disabilities Act. Reasonable modifications and equal access to communications will be provided upon request.

Attachment 1: City of Austin Initial Comments on 2018 LCRA Water Management Plan Update

The City of Austin ("the City"), through its utility Austin Water serves water to more than a million people, so the responsibility to assure a reliable water supply for its customers is large. Maintaining this reliability is essential, among other reasons, to ensuring public health and safety. As a firm water customer of LCRA, the City appreciates the opportunity to participate in this update of LCRA's Water Management Plan, which plays a vital role in protecting firm water supply and submits the following comments.

1. **In consideration of the short timeline for the proposed 2018 WMP update, the City recommends that LCRA allow substantive stakeholder comment throughout the process**. The City of Austin would like to establish that this comment period (ending June 20, 2018) will not be the only time LCRA will accept comments on items that were discussed at the May 21, 2018 participant meeting (e.g. WMP update process, weather-varied demands) and that other comment periods in the future are treated likewise. Due the compressed nature of the 2018 WMP update timeline, it will be important for LCRA to remain open to substantive comments throughout the development period, not just in the designated comment periods. Enforcing a hard comment deadline limits time for stakeholder review, especially as it is the beginning of the update process and stakeholders are still becoming familiar with the overall process. Additionally, it is possible that information provided in future participant meetings will prompt further comment on items whose initial comment period is past, and the City would like to retain the ability to comment on any previous items that may be affected by new information. For these reasons, among others, the City requests that the comment period deadlines outlined in the WMP timeline will not diminish stakeholders' ability to submit substantive comments on any part of the process as the update progresses.

2. **The City recommends LCRA use 10-year projected demands (2030 demands) rather than 2025 projected demands for the 2018 WMP update**.[1] By TCEQ Order, the WMP must protect firm demand 100% of the time through the drought of record.[2] The 1988 Adjudication[3] requires the protection of both existing and projected firm demand.[4] In previous versions of the WMP, LCRA has used a ten year projection of firm demands.[5] The City believes it is more appropriate

[1] Assuming implementation of the WMP update in 2020.

[2] TCEQ's 1989 WMP Order declares that, "[a] 'firm' demand is a contractual obligation or other commitment of LCRA's which must be met 100% of the time through the drought for record." Texas Water Commission (now TCEQ) Order Approving Lower Colorado River Authority's Water Management Plan and Amending Certificates of Adjudication Nos. 14-5478 and 14-5482, Sept. 20, 1989, p. 15, Finding of Fact No. 81.

[3] *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) (herein "1988 Adjudication").

[4] "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." 1988 Adjudication, Attachment No. 2, Modified Findings and Conclusions Defining LCRA's Water Rights with respect to the Highland Lakes, p. 5, Finding 19.f. (from findings for LCRA's Lake Buchanan water right).

[5] LCRA's 2010 WMP provides that "[t]he 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."

to use 10-year projected demands, rather than the proposed 5-year projected demands. The 2010 WMP explains the need for 10-year projected demands, stating, "[t]his 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…If the critical drought were to repeat itself beginning now, the maximum demands during the drought period would be those in year 2010 [representing the final year in the 2000 -2010 projection period referenced above]. Thus, a ten-year planning period was used."[6] The duration of the recent multi-year drought may be shorter or longer than this 10-year period depending on whether the end of the drought is measured by the complete refill of Lakes Travis and Buchanan or based on the results of the combined firm yield (CFY) analysis with new hydrology. Regardless, the WMP update, for the reasons explained by LCRA in the 2010 WMP, needs, in the projection of firm demand, to account for the duration of both of these major multiyear droughts in the POR.[7]

An argument that the WMP will be updated again in 2025, allowing for an opportunity to update demands again, is problematic in multiple respects. First, it is not a certainty that an update will go into effect in 2025. This typically would require starting an update process a few years in advance of 2025, and still does not account for the possibility of a hearing or other circumstances which may extend this timeframe. More importantly, however, planning for demands only through 2025 will not be protective enough in the case of a repeat of the drought of record (DOR) that starts before 2025. Updating demands in the midst of a multiyear drought cannot retroactively impose curtailments that needed to be already in place early in the drought to be sufficiently protective of firm demand expected to occur over the duration of a major multiyear drought. A key means by which the WMP protects firm demand is by limiting the release of interruptible stored water in a timely manner at the onset of a drought, so that there is enough remaining in storage to meet firm demands without shortage for the remainder of a DOR or major multiyear drought. For these reasons the City recommends a minimum firm demand projection of ten years.

3. **The City recommends LCRA consider using a different methodology to select average vs. hot-dry demand years for firm customers (excluding power plants).** The draft technical paper published to the WMP website at the end of May described the categorization methodology used by LCRA to determine years that firm customers (excluding power plants) would have "average" and "hot-dry" demand. This methodology incorrectly categorizes important drought years as years that would have average demands. The City, working with their hydrology consultant, is proposing an alternative method which the City believes results in a more appropriate representation of the conditions that lead to hot-dry or average demands. This alternative methodology, described in

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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, P-6.

[6] *Id*. at p. 4-9 to 4-10.

[7] Also, it should be noted that San Antonio Water System, in their 2017 Water Management Plan, uses both the duration of the 50's drought and the intensity of the recent multi-year drought for planning purposes. See https://www.saws.org/Your_Water/WaterResources/2017_WMP/docs/20171107_SAWS-2017-Water-Management-Plan.pdf ("One way that SAWS is incorporating these issues is by planning for a more severe, hybrid Drought of Record, which merges the duration of the drought of the 1950s with the intensity of the 2011-2014 drought." P. 8)

more detail in Attachment 2, uses precipitation departure and evaporation as the two categorization variables rather than precipitation and temperature as in the proposed methodology.

4. **The City recommends that LCRA consider adjusting their weather-variable demand volumes for the City of Austin**. The City suggests using different volumes for the projected average demands for the City of Austin. Currently, LCRA has proposed using Water Forward, Austin's Integrated Water Resources Plan (IWRP), projections for average-demand years and Region K projections for hot-dry demand years. The City believes this creates an apples-to-oranges comparison of demands, because the two projections are based on entirely different methodologies. The Region K demands function as conservative planning numbers and are based on the overall per-capita water use in a historically hot-dry year and projected population growth. The Water Forward demands were developed by the utility to represent baseline demands, including passive conservation, implementation of best management practices, such as requiring or incentivizing water efficient fixtures, and relatively new active conservation measures, such as permanent one-day-per week watering restrictions for automatic irrigation systems. The City believes that demands that include these new, and in some regards exceptional, efforts should either not be treated as Austin's demands for the purposes of the WMP or only be incorporated with other adjustments to the plan to assure that the plan does not inappropriately shift a significant portion of the benefit of Austin's efforts to other customers, as further explained in the next section.

The Water Forward demands are calculated differently than Region K projections. They were developed by looking at water use across multiple sectors (e.g. single-family residential, commercial, etc.) and end uses (e.g. irrigation, toilet flushing, etc.). The baseline projections are based on use during 2013, 2014, and 2015, which includes years with drought restrictions in place. Since Water Forward projections include anticipated—but not guaranteed—future water savings, the City believes that it would be more prudent, as well as more consistent, to adjust the Region K projections by an appropriate factor, such as the 85% factor proposed for the other firm customer demands, to obtain a non-hot-dry year projection, rather than using a number developed for a very different planning process.

The City's recommendations in this section are limited to this update and we believe that an approach using weather-varied firm demands should be revisited in the next update. The approach that has always been used for modeling firm demands is to use hot-dry demands for all years. The City has concerns about departing from that method which we believe is appropriately conservative.

5. **The City requests that LCRA seek an ordering provision that would require in the next WMP update that the WMP equitably address reductions in demand due to significant customer conservation and water supply strategies**. Austin Water is currently in the process of finalizing Water Forward, an Integrated Water Resources Plan for the City of Austin. This plan includes new demand management and supply strategies intended to increase Austin's water resiliency, often through conservation, which also helps reduce demand on the Highland Lakes, including during times of drought. Other agencies such as LCRA and TWDB are also proponents of conservation, so the City believes it is appropriate for LCRA to consider a mechanism whereby allocations made by the WMP support conservation efforts and other demand offsets, and do not

discourage these efforts by allocating a significant portion of the benefits to other customers. The City recommends that LCRA include a mechanism in the next WMP update for accounting for firm customer demand reduction and determining the equitable allocation of the benefits generated by that reduction.

6. **The Basin's recent drought experience calls for a conservative approach to planning**. In the recent multiyear drought, the basin experienced a drought that has established a new critical period. Worsening multiyear droughts call for a reexamination of the practice of planning based only on the period of record hydrology, because by experience we have learned that drought hydrology can be worse than what has been planned for. Based on this, the City urges that at the very least the most conservative approaches should be taken in every regard when using period of record hydrology.

7. **Since we are currently in a period of historically low inflows, there is further need for LCRA to plan conservatively**. The last 12-month period, from June 1, 2017-May 31, 2018, was the third-lowest period of historic inflow to the Highland Lakes for that June-May timeframe in the POR. Additionally, calendar year 2017 was the eighth-lowest year in the POR for historic inflows and the inflow hydrology has continued to worsen through 2018. This is important for LCRA to consider as we go through the WMP update process. The historically low inflow may suggest changing hydrology and greater uncertainty in the future, which further reinforces the need to plan conservatively.

8. **The City recommends LCRA consider adjusting their methodology for the look-ahead test**. The City recommends LCRA consider using a WAM-based look-ahead model for the WMP look-ahead test rather than LCRA's existing Excel model. A WAM-based model is more consistent with other planning processes which already use WAM models for their planning purposes, such as TCEQ and regional planning. A WAM-based look-ahead model would be easier for stakeholders to use, and would make the process more transparent and accessible. The City's hydrology consultant has developed a WAM-based look-ahead model that could be shared with LCRA and can accommodate the stochastic elements of LCRA's look-ahead model.

9. **The City requests that LCRA report all the same output parameters used from the modeling that LCRA did for the 2015 WMP**. Specifically, we request that LCRA produce both a "Results Summary" document and a "Consolidated Monthly Run" summary to share with the stakeholders. Examples of both summary products are included as Attachments 3 and 4 in this document.

10. **The City recommends LCRA broadcast and archive WMP update meetings on the internet.** Considering the timing of this update process taking place in part during the summer months when some participants cannot be available regularly, the City recommends broadcasting and archiving the meetings on the internet.

Attachment 2: Alternative Method for Demand Categorization Methodology for Firm Municipal and Other Firm Uses (Excluding Power Plants)

The LCRA draft technical paper, hereafter referred to as the proposed methodology, regarding categorization of firm municipal and other firm uses excluding power plants was published to the Water Management Plan website[8] at the end of May 2018. The following remarks are in reference to the May 2018 version of the technical paper, recognizing it is a draft and subject to revision or changes in methodology.

The proposed methodology uses two weather variables: the total precipitation during a 6-month window spanning April through September, and the average daily maximum temperature per month for the same 6-month window. The monthly data cover the years 1940 through 2016. The PRISM[9] dataset was used to calculate the weather variables. The PRISM data cover the contiguous United States and the specific data used for the proposed methodology have a geographical coverage of Travis County.

The proposed methodology results in a categorization of whole years as either "average use" or a "hot and dry high-use" firm demands. The weather variables are aggregated over the period of April through September as predictors of average or hot-dry demands. Outdoor watering of urban lawns and vegetation are elevated during dry and hot weather conditions, typically in the late spring and summer months when vegetation is the most active. Thus, precipitation and temperature may be reasonable weather variables to consider for capturing the increases above baseline demands that are associated with elevated outdoor watering, however, the City concludes herein that more appropriate weather variables are available.

There are a couple of factors to consider with the proposed methodology. Total precipitation from April through September is used. One or two months of high precipitation can tilt the total precipitation towards "wet" conditions and obscure dry periods. The distribution of rainfall may also be important. Total precipitation may not reflect regular replenishment of soil moisture over the course of the growing season. Soils supporting lawns and vegetation have limited capacity to store moisture between high rainfall events. Secondly, evapotranspiration increases at a faster rate (non-linear increase) as temperature rises.

An evaporation variable may not have been used in the proposed methodology because the PRISM dataset does not include a measure of potential evaporation, also known as free water surface evaporation. Additionally, the Texas Water Development Board's (TWDB) statewide quadrangles of monthly total lake evaporation, which are derived from pan evaporation measurements, only extends back to 1954, whereas the TWDB's quadrangles of monthly total precipitation extends back to 1940. If TWDB's lake evaporation were available back to 1940, the data could be used an indicator of potential evaporation. Potential evaporation can differ from lake evaporation due to heat storage effects of the lake. Potential evaporation is always higher than actual

[8] https://www.lcra.org/water/water-supply/water-management-plan-for-lower-colorado-river-basin/Pages/updating-2015-wmp.aspx

[9] PRISM is an acronym for Parameter-elevation Regressions on Independent Slopes Model. The data can be accessed without cost at http://www.prism.oregonstate.edu/explorer/.

evapotranspiration, but the quantities are related. Monthly estimates of evaporation may be more appropriate than temperature for categorizing years as hot-dry because it captures the non-linear relationship of accelerated land surface evapotranspiration to increasing temperature.

Alternative Criteria

Instead of using total precipitation from April through September, the total departures below average monthly precipitation from April through September could be calculated. First, the average precipitation for each month is calculated. Next, the monthly precipitation is compared to the monthly average. If the monthly precipitation is greater than average, a zero departure is recorded. If the monthly precipitation is less than average, the difference is calculated and recorded as the departure below average. The monthly departures from April through September are summed to the annual value. The individual annual values are compared against a reference value equal to the long-term annual average plus one standard deviation as stated in the proposed methodology. Precipitation departure may be more indicative of urban outdoor watering demands as a result of soil moisture loss during dry months and may be less likely to categorize the entire year as "average use" due to a minority of months with high rainfall.

Temperature could be replaced as a weather variable in the proposed methodology with TWDB's monthly lake evaporation. The TWDB's monthly lake evaporation for 1954-2016 at quadrangle 710 can be extended backward through January 1940. Quadrangle 710 covers Travis county. The quadrangle evaporation can serve as a dataset to calibrate the Hargreaves equation, which requires only inputs for daily minimum and maximum air temperature to estimate evaporation. Extraterrestrial solar radiation is also required by the Hargreaves equation, but it is a fixed value related to latitude and day of the year and is independent of ground measurements. Daily minimum and maximum air temperatures from the Camp Mabry weather station are continuous (no missing data) from 1940 through 2016. The Hargreaves equation parameters can be calibrated using the TWDB monthly quadrangle evaporation data for the entire period of available data, 1954-2017. The calibrated Hargreaves equation is then used to generate estimates of monthly evaporation data for 1940-2016. The Hargreaves estimates for 1940-2016 could be used in their entirety, or, preferably, the Hargreaves lake evaporation estimate could be used for 1940-1953, and the TWDB quadrangle lake evaporation could be used for 1954-2016.

In the same manner as average maximum daily air temperature is compared to a reference value equal to the long-term average[10] in the proposed methodology, the total April through September evaporation can be compared to a reference value equal to the long-term average total evaporation as a decision criterion. If the annual total evaporation is greater than the reference value, it counts towards the hot-dry demand category.

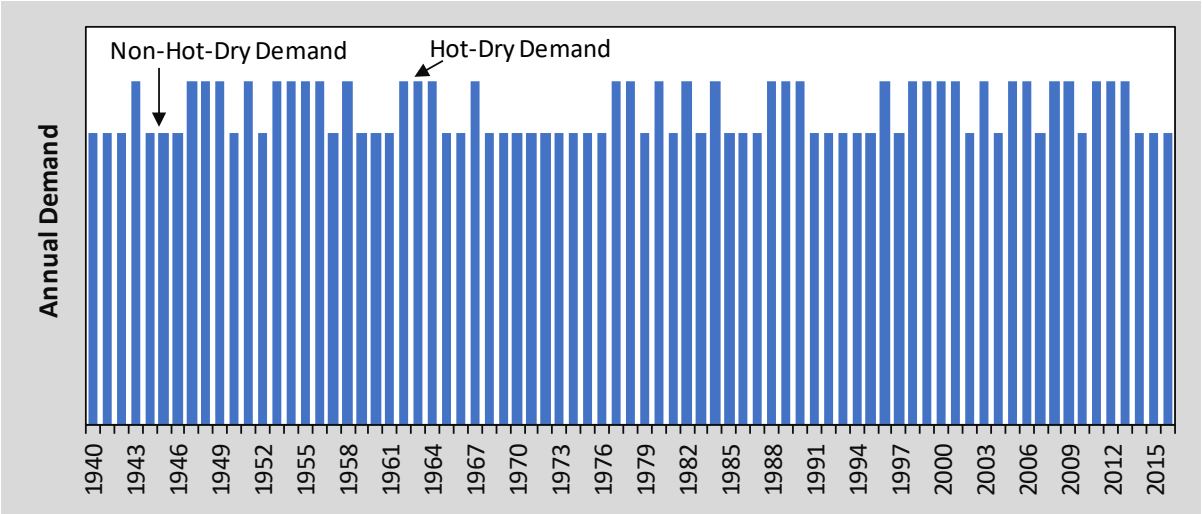
[10] The proposed methodology states that April through September average maximum temperatures are compared to the long-term average minus one standard deviation. However, the computations were performed with only the long-term average as a reference value. Use of the long-term average minus one standard deviation as a reference value for the temperature component of the section criteria results in 60 out of 77 years being classified as hot-dry demands.

In summary, categorization of hot-dry years in the proposed methodology could be enhanced with the following changes to the two components in the selection criteria:

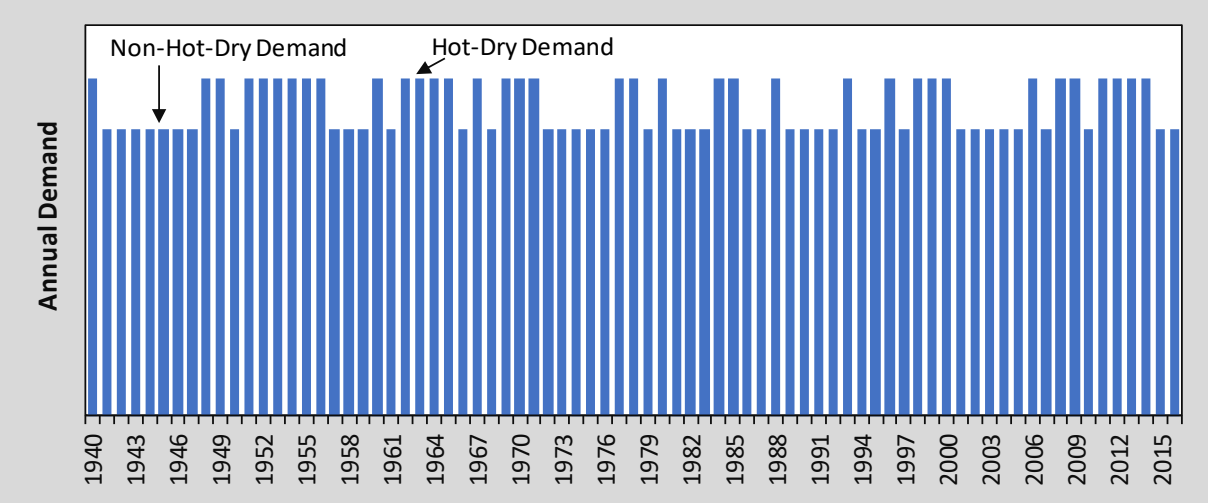
- Apr.-Sep. total precipitation departures are less than the long-term average plus one standard deviation, **and** total evaporation is greater than the long-term average (using quadrangle 710 precipitation and evaporation)

As outlined above, the City recommends that LCRA use the amount that Apr.-Sep. total monthly precipitation departures from average are less than the long-term average plus one standard deviation, and the amount that total evaporation is greater than the long-term average as described above as the criteria for its weather-varied demand categorization. For the purposes of the demand switching criteria, precipitation departure and evaporation more appropriately select the expected hot-dry years.

LCRA PROPOSED CRITERIA (35 of 77 selected as hot-dry) WITH
MODIFIED NON-HOT-DRY DEMANDS



ALTERNATIVE CRITERIA (36 of 77 selected as hot-dry)



The City of Austin is committed to compliance with the Americans with Disabilities Act.
Reasonable modifications and equal access to communications will be provided upon request.

Attachment 3: Example of WAM Results Summary from 2015 WMP Update

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WATER MANAGEMENT PLAN UPDATE
MODEL DEMANDS

DEMAND CATEGORY / PARAMETER	2010 DEMANDS	INTERIM DEMANDS	UNITS
Firm Demands			
City of Austin - Municipal Demand	**182,788**	**193,334**	**ac-ft**
FPP Demand	13,616	13,616	ac-ft
Sim Gideon / Lost Pines Demand	10,750	10,750	ac-ft
Ferguson Demand	1,500	1,500	ac-ft
LCRA - Power Plant Demand	**25,866**	**25,866**	**ac-ft**
City of Austin at FPP Demand	8,500	11,601	ac-ft
City of Austin at Decker Demand	5,000	9,250	ac-ft
City of Austin - Power Plant Demand	**13,500**	**20,851**	**ac-ft**
Miscellaneous Firm Contract Demand	29,652	54,223	ac-ft
BRA - HB 1437 Demand	1,800	6,386	ac-ft
Pflugerville Demand	4,000	5,098	ac-ft
Leander Demand	5,000	5,000	ac-ft
Matagorda Manufacturing and Mining Demand	6,000	8,675	ac-ft
Other Industrial Demand	0	12,870	ac-ft
Other (Conveyance and Emergency Release)	20,000	20,000	ac-ft
Other Municipal and Industrial Demands	**66,452**	**112,252**	**ac-ft**
Total Firm Demand:	**288,606**	**352,303**	**ac-ft**
STPNOC Firm Demand	**20,000**	**20,000**	ac-ft
Corpus Christi Garwood Water Right	**0**	**35,000**	ac-ft
Interruptible Agricultural Demand			
Garwood Irrigation Demand (Dry - 90th percentile)	92,400	92,400	ac-ft
Gulf Coast Irrigation Demand (Dry - 90th percentile)	178,700	178,700	ac-ft
Lakeside Irrigation Demand (Dry - 90th percentile)	139,700	139,700	ac-ft
Pierce Ranch Irrigation Demand (Dry - 90th percentile)	27,700	27,700	ac-ft
Interruptible Agricultural Demand:	**438,500**	**438,500**	**ac-ft**

Note; 2010 Agricultural Demands used in Interim Conditions

This information is for LCRA internal discussion only and represents results from one of the many potential scenarios being evaluated.

WATER MANAGEMENT PLAN - SCENARIO RUNS
***PERIOD-OF-RECORD* QUICK SUMMARY**
Prepared for WMP update

	PERIOD-OF-RECORD RESULTS DEMAND CATEGORY / PARAMETER	[A] 2010 WMP W/2010 DEMANDS (1940 - 2009)	[B] 2012 LCRA APPLICATION INTERIM DEMANDS (1940 - 2013)	[C] 08-20-2014 LCRA PROPOSAL (1940- 2013)	[D] 09-03-2014 RUN 1A Decouple Environmental (1940- 2013)	[E] 09-08-2014 RUN 1B Change Power Demand (1940- 2013)	[F] 09-08-2014 RUN 2A Irrigation 202K to 1.3MAF (1940- 2013)	[G] 09-08-2014 RUN 2B Irrigation EX DRT 1.3MAF (1940- 2013)	[H] 09-08-2014 RUN 2C Irrigation PassThru 1.3MAF (1940- 2013)	[I] 09-08-2014 RUN 2D Carryover for Threshold B&E (1940- 2013)	[J] 09-08-2014 Consolidated Run (1940- 2013)	UNITS
REF	**Firm Demands**											
	Total Firm Demand:	288,606	352,303	352,303	352,303	350,086	352,303	352,303	352,303	352,303	350,086	ac-ft
	Average Total Supply:	**288,606**	**351,001**	**352,303**	**352,303**	**350,086**	**352,303**	**352,303**	**352,303**	**352,303**	**350,086**	ac-ft
[13]	% of months combined storage below 900,000 ac-ft	6.4%	11.0%	4.3%	4.3%	4.2%	4.3%	4.3%	4.3%	4.4%	4.3%	%
[14]	% of months combined storage below 600,000 ac-ft	1.8%	5.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	%
	% of months Lake Buchanan elevation below 1,012 feet msl	29.4%	39.2%	34.5%	34.7%	34.5%	34.6%	34.6%	34.5%	34.5%	34.9%	%
	% of months Lake Travis elevation below 660 feet msl	31.3%	44.6%	38.7%	39.3%	39.0%	38.7%	38.7%	39.2%	38.9%	39.9%	%
REF	**Lake Level**											
[19]	Minimum combined storage in lakes Buchanan and Travis	175,052	290,298	600,008	600,008	605,168	600,008	600,008	600,008	600,008	605,168	ac-ft
[20]	Average monthly Lake Buchanan surface water elevation	1,013	1,011	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,012	ft msl
[22]	Average monthly Lake Travis surface water elevation	662	657	662	662	662	662	662	662	662	662	ft msl
REF	**Interruptible Irrigation - All Divisions**											
[30]	Number of years first crop partially curtailed	0	18	8	8	8	7	8	8	8	7	yr
[31]	Number of years no stored water available for first crop	0	4	14	14	14	14	14	14	14	14	yr
	Number of years first crop cut-off mid-season	0	0	3	3	3	3	3	3	3	3	
[32]	Number of years second crop partially curtailed	10	24	9	9	10	9	10	9	9	10	yr
[33]	Number of years no stored water available for second crop	3	7	20	20	19	20	19	20	20	19	yr
	Number of years second crop cut-off mid-season	0	1	9	9	10	9	10	9	9	10	
REF	**Environmental - Bay and Estuary (B&E)**											
[36]	Average annual Matagorda Bay inflow volume	1,693,534	1,577,606	1,570,089	1,570,340	1,571,081	1,569,541	1,569,313	1,570,035	1,570,138	1,570,818	ac-ft
[37]	Average monthly salinity in Matagorda Bay	20.4	21.0	21.4	21.4	21.4	21.4	21.4	21.4	21.4	21.3	ppt
[39]	Max # of sequential months Matagorda Bay salinity exceeds 27.5 ppt	23	24	27	22	27	27	27	27	27	22	
[40]	% of months only Critical inflow criteria in effect for Matagorda Bay	13%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	%
[43]	% of months Critical inflow criteria met for Matagorda Bay when in effect	87%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	%
[57]	% of months Threshold inflow criteria are met (Goal 100%)	97%	96%	94%	94%	94%	94%	94%	94%	94%	95%	%
[91]	% of months only Critical IF criteria in effect	29%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	%
[95]	% of months 2010 WMP Critical IF criteria met at Columbus when in effect	99%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	%
[107]	% of months Subsistence IF criteria met at Columbus (Goal 100%)	97%	99%	99%	99%	99%	99%	99%	99%	99%	99%	%

This information is for discussion only.
This is not a forecast of future conditions

WATER MANAGEMENT PLAN - SCENARIO RUNS
***DROUGHT-OF-RECORD* QUICK SUMMARY**
Prepared for WMP update

	***DROUGHT-OF-RECORD* RESULTS (June 1945 - May 1957)** DEMAND CATEGORY / PARAMETER	[A] 2010 WMP W/2010 DEMANDS (1940 - 2009)	[B] 2012 LCRA APPLICATION INTERIM DEMANDS (1940 - 2013)	[C] 08-20-2014 LCRA PROPOSAL (1940- 2013)	[D] 09-03-2014 RUN 1A Decouple Environmental (1940- 2013)	[E] 09-08-2014 RUN 1B Change Power Demand (1940- 2013)	[F] 09-08-2014 RUN 2A Irrigation 202K to 1.3MAF (1940- 2013)	[G] 09-08-2014 RUN 2B Irrigation EX DRT 1.3MAF (1940- 2013)	[H] 09-08-2014 RUN 2C Irrigation PassThru 1.3MAF (1940- 2013)	[I] 09-08-2014 RUN 2D Carryover for Threshold B&E (1940- 2013)	[J] 09-08-2014 Consolidated Run (1940- 2013)	UNITS
REF	**Firm Demands**											
	Total Firm Demand:	288,606	352,303	352,303	352,303	350,086	352,303	352,303	352,303	352,303	350,086	ac-ft
	Average Total Supply:	**288,606**	**347,378**	**352,303**	**352,303**	**350,086**	**352,303**	**352,303**	**352,303**	**352,303**	**350,086**	ac-ft
[13]	% of months combined storage below 900,000 ac-ft	30.6%	33.3%	13.2%	13.2%	13.2%	13.2%	13.2%	13.2%	13.9%	13.2%	%
[14]	% of months combined storage below 600,000 ac-ft	10.4%	19.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	%
	% of months Lake Buchanan elevation below 1,012 feet msl	79.9%	76.4%	64.6%	66.0%	64.6%	64.6%	64.6%	64.6%	64.6%	66.0%	%
	% of months Lake Travis elevation below 660 feet msl	75.0%	75.7%	71.5%	74.3%	71.5%	71.5%	71.5%	71.5%	72.2%	74.3%	%
REF	**Lake Level**											
[19]	Minimum combined storage in lakes Buchanan and Travis	175,052	373,075	647,638	647,638	656,434	647,638	647,638	646,616	641,421	649,518	ac-ft
[20]	Average monthly Lake Buchanan surface water elevation	1,003	1,003	1,008	1,007	1,008	1,008	1,008	1,008	1,008	1,007	ft msl
[22]	Average monthly Lake Travis surface water elevation	634	630	649	649	649	649	649	649	649	649	ft msl
REF	**Interruptible Irrigation - All Divisions**											
[30]	Number of years first crop partially curtailed (out of 12 years)	0	6	2	2	2	2	2	2	2	2	yr
[31]	Number of years no stored water available for first crop (out of 12 years)	0	3	7	7	7	7	7	7	7	7	yr
	Number of years first crop cut-off mid-season (out of 12 years)	0	0	0	0	0	0	0	0	0	0	
[32]	Number of years second crop partially curtailed (out of 12 years)	6	5	2	2	2	2	2	2	2	2	yr
[33]	Number of years no stored water available for second crop (out of 12 years)	3	4	6	6	6	6	6	6	6	6	yr
	Number of years second crop cut-off mid-season (out of 12 years)	0	0	0	0	0	0	0	0	0	0	
REF	**Environmental - Bay and Estuary (B&E)**											
[36]	Average annual Matagorda Bay inflow volume	766,204	757,901	761,073	762,222	762,849	761,073	761,073	760,933	761,383	764,107	ac-ft
[37]	Average monthly salinity in Matagorda Bay	25.5	25.3	26.1	26.0	26.1	26.1	26.1	26.1	26.1	25.9	ppt
[39]	Max # of sequential months Matagorda Bay salinity exceeds 27.5 ppt	23	24	27	17	27	27	27	27	27	17	%
[40]	% of months only Critical inflow criteria in effect for Matagorda Bay	53%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	%
[43]	% of months Critical inflow criteria met for Matagorda Bay when in effect	84%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	%
[57]	% of months Threshold inflow criteria are met (Goal 100%)		88%	82%	82%	82%	82%	82%	82%	86%	86%	
[91]	% of months only Critical IF criteria in effect	78%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	%
[95]	% of months 2010 WMP Critical IF criteria met at Columbus when in effect	98%	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	%
[107]	% of months Subsistence IF criteria met at Columbus (Goal 100%)		95%	95%	95%	95%	95%	95%	95%	95%	95%	

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WATER MANAGEMENT PLAN - SCENARIO RUNS
***PERIOD-OF-RECORD* RESULTS SUMMARY**
Prepared for WMP Update

	PERIOD-OF-RECORD RESULTS DEMAND CATEGORY / PARAMETER	[A] 2010 WMP W/2010 DEMANDS (1940 - 2009)	[B] 2012 LCRA APPLICATION INTERIM DEMANDS (1940 - 2013)	[C] 08-20-2014 LCRA PROPOSAL (1940- 2013)	[D] 09-03-2014 RUN 1A Decouple Environmental (1940- 2013)	[E] 09-08-2014 RUN 1B Change Power Demand (1940- 2013)	[F] 09-08-2014 RUN 2A Irrigation 202K to 1.3MAF (1940- 2013)	[G] 09-08-2014 RUN 2B Irrigation EX DRT 1.3MAF (1940- 2013)	[H] 09-08-2014 RUN 2C Irrigation PassThru 1.3MAF (1940- 2013)	[I] 09-08-2014 RUN 2D Carryover for Threshold B&E (1940- 2013)	[J] 09-08-2014 Consolidated Run (1940- 2013)	UNITS
REF	**Firm Demands**											
[1]	City of Austin - Municipal Demand	182,788	193,334	193,334	193,334	193,334	193,334	193,334	193,334	193,334	193,334	ac-ft
[2]	Average annual **run-of-river water** diverted by City of Austin - Municipal	171,742	175,108	175,358	175,358	175,358	175,358	175,358	175,358	175,358	175,358	ac-ft
[3]	Average annual **stored water** diverted by City of Austin - Municipal	11,046	17,270	17,976	17,976	17,976	17,976	17,976	17,976	17,976	17,976	ac-ft
	Average Total Supply:	**182,788**	**192,379**	**193,334**	**193,334**	**193,334**	**193,334**	**193,334**	**193,334**	**193,334**	**193,334**	ac-ft
[5]	LCRA - Power Plant Demand	25,866	25,866	25,866	25,866	25,500	25,866	25,866	25,866	25,866	25,500	ac-ft
[6]	Average annual **stored water** diverted by LCRA - Power	25,866	25,866	25,866	25,866	25,500	25,866	25,866	25,866	25,866	25,500	ac-ft
	Average Total Supply:	**25,866**	**25,866**	**25,866**	**25,866**	**25,500**	**25,866**	**25,866**	**25,866**	**25,866**	**25,500**	ac-ft
[7]	City of Austin - Power Plant Demand	13,500	20,851	20,851	20,851	19,000	20,851	20,851	20,851	20,851	19,000	ac-ft
[8]	Average annual **run-of-river water** diverted by City of Austin - Power	6,591	8,218	8,583	8,583	7,953	8,585	8,565	8,570	8,583	7,944	ac-ft
[9]	Average annual **stored water** diverted by City of Austin - Power	6,909	12,633	12,268	12,268	11,047	12,266	12,286	12,281	12,268	11,056	ac-ft
	Average Total Supply:	**13,500**	**20,851**	**20,851**	**20,851**	**19,000**	**20,851**	**20,851**	**20,851**	**20,851**	**19,000**	ac-ft
[10]	Other Municipal and Industrial Demands	66,452	112,252	112,252	112,252	112,252	112,252	112,252	112,252	112,252	112,252	ac-ft
[11]	Average annual **stored water** diverted by Other M&I	66,452	111,905	112,252	112,252	112,252	112,252	112,252	112,252	112,252	112,252	ac-ft
	Average Total Supply:	**66,452**	**111,905**	**112,252**	**112,252**	**112,252**	**112,252**	**112,252**	**112,252**	**112,252**	**112,252**	ac-ft
	Total Firm Demand:	288,606	352,303	352,303	352,303	350,086	352,303	352,303	352,303	352,303	350,086	ac-ft
	Average Total Supply:	**288,606**	**351,001**	**352,303**	**352,303**	**350,086**	**352,303**	**352,303**	**352,303**	**352,303**	**350,086**	ac-ft
[12]	Average annual **net evaporation** from lakes Buchanan and Travis	79,319	75,492	78,781	78,676	78,870	78,736	78,761	78,770	78,735	78,626	ac-ft
[13]	% of months combined storage below 900,000 ac-ft	6%	11%	4%	4%	4%	4%	4%	4%	4%	4%	%
[14]	% of months combined storage below 600,000 ac-ft	2%	5%	0%	0%	0%	0%	0%	0%	0%	0%	%
	% of months Lake Buchanan elevation below 1,012 feet msl	29%	39%	34%	35%	34%	35%	35%	34%	34%	35%	%
	% of months Lake Travis elevation below 660 feet msl	31%	45%	39%	39%	39%	39%	39%	39%	39%	40%	%
	Average annual **run-of-river** water diverted by STPNOC	57,650	57,652	57,542	57,554	57,549	57,542	57,542	57,542	57,542	57,555	ac-ft
	Average annual **stored water** diverted by STPNOC	86	20	109	97	102	109	109	109	109	97	ac-ft
[16]	Average annual flow at Bay City	1,673,801	1,556,167	1,584,867	1,585,128	1,585,804	1,584,285	1,584,036	1,584,813	1,584,916	1,585,518	ac-ft
	% of months average Bay City flow below 300 cfs	6%	9%	8%	7%	8%	8%	8%	8%	8%	7%	%
	Lake Level											
[17]	Total combined storage in lakes Buchanan and Travis	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	ac-ft
[18]	Average combined storage in lakes Buchanan and Travis	1,586,735	1,490,441	1,563,053	1,559,360	1,564,620	1,561,927	1,562,106	1,562,850	1,562,207	1,557,563	ac-ft
[19]	Minimum combined storage in lakes Buchanan and Travis	175,052	290,298	600,008	600,008	605,168	600,008	600,008	600,008	600,008	605,168	ac-ft
[20]	Average monthly Lake Buchanan surface water elevation	1,013	1,011	1,013	1,013	1,013	1,013	1,013	1,013	1,013	1,012	ft msl
[21]	Minimum elevation of Lake Buchanan	967	977	996	996	996	996	996	996	996	996	ft msl
[22]	Average monthly Lake Travis surface water elevation	662	657	662	662	662	662	662	662	662	662	ft msl
[23]	Minimum elevation of Lake Travis	551	565	590	590	591	590	590	590	590	591	ft msl

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WATER MANAGEMENT PLAN - SCENARIO RUNS
***DROUGHT-OF-RECORD* RESULTS SUMMARY**
Prepared for WMP Update

REF	***DROUGHT-OF-RECORD* RESULTS (June 1945 - May 1957)** DEMAND CATEGORY / PARAMETER	[A] 2010 WMP W/2010 DEMANDS (1940 - 2009)	[B] 2012 LCRA APPLICATION INTERIM DEMANDS (1940 - 2013)	[C] 08-20-2014 LCRA PROPOSAL (1940- 2013)	[D] 09-03-2014 RUN 1A Decouple Environmental (1940- 2013)	[E] 09-08-2014 RUN 1B Change Power Demand (1940- 2013)	[F] 09-08-2014 RUN 2A Irrigation 202K to 1.3MAF (1940- 2013)	[G] 09-08-2014 RUN 2B Irrigation EX DRT 1.3MAF (1940- 2013)	[H] 09-08-2014 RUN 2C Irrigation PassThru 1.3MAF (1940- 2013)	[I] 09-08-2014 RUN 2D Carryover for Threshold B&E (1940- 2013)	[J] 09-08-2014 Consolidated Run (1940- 2013)	UNITS
	Firm Demands											
[1]	City of Austin - Municipal Demand	182,788	193,334	193,334	193,334	193,334	193,334	193,334	193,334	193,334	193,334	ac-ft
[2]	Average annual **run-of-river water** diverted by City of Austin - Municipal	155,033	157,330	158,810	158,810	158,810	158,810	158,810	158,810	158,810	158,810	ac-ft
[3]	Average annual **stored water** diverted by City of Austin - Municipal	27,755	32,391	34,524	34,524	34,524	34,524	34,524	34,524	34,524	34,524	ac-ft
	Average Total Supply:	**182,788**	**189,721**	**193,334**	**193,334**	**193,334**	**193,334**	**193,334**	**193,334**	**193,334**	**193,334**	ac-ft
[5]	LCRA - Power Plant Demand	25,866	25,866	25,866	25,866	25,500	25,866	25,866	25,866	25,866	25,500	ac-ft
[6]	Average annual **stored water** diverted by LCRA - Power	25,866	25,866	25,866	25,866	25,500	25,866	25,866	25,866	25,866	25,500	ac-ft
	Average Total Supply:	**25,866**	**25,866**	**25,866**	**25,866**	**25,500**	**25,866**	**25,866**	**25,866**	**25,866**	**25,500**	ac-ft
[7]	City of Austin - Power Plant Demand	13,500	20,851	20,851	20,851	19,000	20,851	20,851	20,851	20,851	19,000	ac-ft
[8]	Average annual **run-of-river water** diverted by City of Austin - Power	6,355	7,427	8,088	8,088	7,404	8,088	8,088	8,088	8,088	7,404	ac-ft
[9]	Average annual **stored water** diverted by City of Austin - Power	7,145	13,424	12,763	12,763	11,595	12,763	12,763	12,763	12,763	11,595	ac-ft
	Average Total Supply:	**13,500**	**20,851**	**20,851**	**20,851**	**19,000**	**20,851**	**20,851**	**20,851**	**20,851**	**19,000**	ac-ft
[10]	Other Municipal and Industrial Demands	66,452	112,252	112,252	112,252	112,252	112,252	112,252	112,252	112,252	112,252	ac-ft
[11]	Average annual **stored water** diverted by Other M&I	66,452	110,941	112,252	112,252	112,252	112,252	112,252	112,252	112,252	112,252	ac-ft
	Average Total Supply:	**66,452**	**110,941**	**112,252**	**112,252**	**112,252**	**112,252**	**112,252**	**112,252**	**112,252**	**112,252**	ac-ft
	Total Firm Demand:	288,606	352,303	352,303	352,303	350,086	352,303	352,303	352,303	352,303	350,086	ac-ft
	Average Total Supply:	**288,606**	**347,378**	**352,303**	**352,303**	**350,086**	**352,303**	**352,303**	**352,303**	**352,303**	**350,086**	ac-ft
[12]	Average annual **net evaporation** from lakes Buchanan and Travis	94,877	94,166	108,307	107,895	108,716	108,307	108,307	108,255	108,021	107,985	ac-ft
[13]	% of months combined storage below 900,000 ac-ft	31%	33%	13%	13%	13%	13%	13%	13%	14%	13%	%
[14]	% of months combined storage below 600,000 ac-ft	10%	19%	0%	0%	0%	0%	0%	0%	0%	0%	%
	% of months Lake Buchanan elevation below 1,012 feet msl	80%	76%	65%	66%	65%	65%	65%	65%	65%	66%	%
	% of months Lake Travis elevation below 660 feet msl	75%	76%	72%	74%	72%	72%	72%	72%	72%	74%	%
	Average annual **run-of-river** water diverted by STPNOC	58,172	59,144	57,432	57,741	57,476	57,432	57,432	57,432	57,432	57,788	ac-ft
	Average annual **stored water** diverted by STPNOC	500	125	670	600	631	670	670	670	670	600	ac-ft
[16]	Average annual flow at Bay City	792,782	782,295	821,183	822,632	822,963	821,183	821,183	821,043	821,494	824,563	ac-ft
	% of months average Bay City flow below 300 cfs	23%	20%	22%	19%	22%	22%	22%	22%	22%	19%	%
	Lake Level											
[17]	Total combined storage in lakes Buchanan and Travis	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	ac-ft
[18]	Average combined storage in lakes Buchanan and Travis	1,098,646	1,062,686	1,294,289	1,284,823	1,301,492	1,294,289	1,294,289	1,293,464	1,289,071	1,286,237	ac-ft
[19]	Minimum combined storage in lakes Buchanan and Travis	175,052	373,075	647,638	647,638	656,434	647,638	647,638	646,616	641,421	649,518	ac-ft
[20]	Average monthly Lake Buchanan surface water elevation	1,003	1,003	1,008	1,007	1,008	1,008	1,008	1,008	1,008	1,007	ft msl
[21]	Minimum elevation of Lake Buchanan	967	977	996	996	996	996	996	996	996	996	ft msl
[22]	Average monthly Lake Travis surface water elevation	634	630	649	649	649	649	649	649	649	649	ft msl
[23]	Minimum elevation of Lake Travis	551	565	590	590	591	590	590	590	590	591	ft msl

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WATER MANAGEMENT PLAN - SCENARIO RUNS
***PERIOD-OF-RECORD* RESULTS SUMMARY**
Prepared for WMP update

	PERIOD-OF-RECORD RESULTS DEMAND CATEGORY / PARAMETER	[A] 2010 WMP W/2010 DEMANDS (1940 - 2009)	[B] 2012 LCRA APPLICATION INTERIM DEMANDS (1940 - 2013)	[C] 08-20-2014 LCRA PROPOSAL (1940- 2013)	[D] 09-03-2014 RUN 1A Decouple Environmental (1940- 2013)	[E] 09-08-2014 RUN 1B Change Power Demand (1940- 2013)	[F] 09-08-2014 RUN 2A Irrigation 202K to 1.3MAF (1940- 2013)	[G] 09-08-2014 RUN 2B Irrigation EX DRT 1.3MAF (1940- 2013)	[H] 09-08-2014 RUN 2C Irrigation PassThru 1.3MAF (1940- 2013)	[I] 09-08-2014 RUN 2D Carryover for Threshold B&E (1940- 2013)	[J] 09-08-2014 Consolidated Run (1940- 2013)	UNITS
REF	**Interruptible Irrigation - All Divisions**											
[24]	Irrigation demands (90th percentile)	438,960	436,401	436,401	436,401	436,401	436,401	436,401	436,401	436,401	436,401	ac-ft
[25]	Average annual irrigation demands	389,527	389,953	389,953	389,953	389,953	389,953	389,953	389,953	389,953	389,953	ac-ft
[26]	Average annual **run-of-river water** diverted for irrigation	236,098	220,495	193,753	193,715	193,886	194,238	193,933	193,822	193,754	194,399	ac-ft
[27]	Average annual interruptible **stored water** diverted for irrigation	143,518	128,635	117,155	117,031	117,967	117,312	117,908	117,154	117,151	117,996	ac-ft
	Average Total Supply:	**379,616**	**349,130**	**310,908**	**310,746**	**311,853**	**311,551**	**311,841**	**310,976**	**310,905**	**312,395**	ac-ft
[28]	Average % of irrigation demand met	98%	89%	80%	79%	80%	80%	80%	80%	80%	80%	%
[29]	Agricultural reliability:											
	% of months that full irrigation demands are met	93%	66%	64%	64%	64%	65%	64%	64%	64%	65%	%
	% of years that full irrigation demands are met	81%	58%	50%	50%	50%	50%	50%	50%	50%	50%	%
	% of years that full first crop demands are met	100%	70%	68%	68%	68%	69%	68%	68%	68%	69%	%
	% of years that full second crop demands are met	81%	58%	51%	51%	51%	51%	51%	51%	51%	51%	%
[30]	Number of years first crop partially curtailed	0	18	8	8	8	7	8	8	8	7	yr
[31]	Number of years no stored water available for first crop	0	4	14	14	14	14	14	14	14	14	yr
[32]	Number of years second crop partially curtailed	10	24	9	9	10	9	10	9	9	10	yr
[33]	Number of years no stored water available for second crop	3	7	20	20	19	20	19	20	20	19	yr
	Number of years with no first crop curtailment	70	52	52	52	52	53	52	52	52	53	yr
	Number of years curtailed first crop supply factor 75% or more	0	10	3	2	3	2	3	3	3	1	yr
	Number of years curtailed first crop supply factor between 50% and 75%	0	8	5	6	5	5	5	5	5	6	yr
	Number of years curtialed first crop supply factor 50% or less	0	0	0	0	0	0	0	0	0	0	yr
	Number of years no stored water available for first crop	0	4	14	14	14	14	14	14	14	14	yr
	Number of years with no second crop curtailment	57	43	45	45	45	45	45	45	45	45	yr
	Number of years curtailed second crop supply factor 75% or more	4	9	3	2	3	3	3	3	3	2	yr
	Number of years curtailed second crop supply factor between 50% and 75%	1	14	6	7	7	6	7	6	6	8	yr
	Number of years curtialed second crop supply factor 50% or less	5	1	0	0	0	0	0	0	0	0	yr
	Number of years no stored water available for second crop	3	7	20	20	19	20	19	20	20	19	yr

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WATER MANAGEMENT PLAN - SCENARIO RUNS
***DROUGHT-OF-RECORD* RESULTS SUMMARY**
Prepared for WMP update

	***DROUGHT-OF-RECORD* RESULTS (June 1945 - May 1957)** DEMAND CATEGORY / PARAMETER	[A] 2010 WMP W/2010 DEMANDS (1940 - 2009)	[B] 2012 LCRA APPLICATION INTERIM DEMANDS (1940 - 2013)	[C] 08-20-2014 LCRA PROPOSAL (1940- 2013)	[D] 09-03-2014 RUN 1A Decouple Environmental (1940- 2013)	[E] 09-08-2014 RUN 1B Change Power Demand (1940- 2013)	[F] 09-08-2014 RUN 2A Irrigation 202K to 1.3MAF (1940- 2013)	[G] 09-08-2014 RUN 2B Irrigation EX DRT 1.3MAF (1940- 2013)	[H] 09-08-2014 RUN 2C Irrigation PassThru 1.3MAF (1940- 2013)	[I] 09-08-2014 RUN 2D Carryover for Threshold B&E (1940- 2013)	[J] 09-08-2014 Consolidated Run (1940- 2013)	UNITS
REF	**Interruptible Irrigation - All Divisions**											
[24]	Irrigation demands (90th percentile)	438,960	425,677	425,677	425,677	425,677	425,677	425,677	425,677	425,677	425,677	ac-ft
[25]	Average annual irrigation demands	396,405	396,431	396,431	396,431	396,431	396,431	396,431	396,431	396,431	396,431	ac-ft
[26]	Average annual **run-of-river water** diverted for irrigation	232,190	178,775	142,569	142,333	142,569	142,569	142,569	142,768	142,576	142,531	ac-ft
[27]	Average annual interruptible **stored water** diverted for irrigation	115,343	94,143	72,622	71,860	72,648	72,622	72,622	72,621	72,597	71,860	ac-ft
	Average Total Supply:	**347,533**	**272,918**	**215,191**	**214,193**	**215,216**	**215,191**	**215,191**	**215,388**	**215,173**	**214,391**	ac-ft
[28]	Average % of irrigation demand met	63%	54%	44%	43%	44%	44%	44%	44%	44%	43%	%
[29]	Agricultural reliability:											
	% of months that full irrigation demands are met	72%	27%	28%	28%	28%	28%	28%	28%	28%	28%	%
	% of years that full irrigation demands are met	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	%
	% of years that full first crop demands are met	100%	33%	33%	33%	33%	33%	33%	33%	33%	33%	%
	% of years that full second crop demands are met	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	%
[30]	Number of years first crop partially curtailed (out of 12 years)	0	6	2	2	2	2	2	2	2	2	yr
[31]	Number of years no stored water available for first crop (out of 12 years)	0	3	7	7	7	7	7	7	7	7	yr
[32]	Number of years second crop partially curtailed (out of 12 years)	6	5	2	2	2	2	2	2	2	2	yr
[33]	Number of years no stored water available for second crop (out of 12 years)	3	4	6	6	6	6	6	6	6	6	yr
	Number of years with no first crop curtailment	12	3	3	3	3	3	3	3	3	3	yr
	Number of years curtailed first crop supply factor 75% or more	0	2	1	0	1	1	1	1	1	0	yr
	Number of years curtailed first crop supply factor between 50 and 75%	0	4	1	2	1	1	1	1	1	2	yr
	Number of years curtailed first crop supply factor 50% or less	0	0	0	0	0	0	0	0	0	0	yr
	Number of years no stored water available for first crop (out of 12 years)	0	3	7	7	7	7	7	7	7	7	yr
	Number of years with no second crop curtailment	3	3	4	4	4	4	4	4	4	4	yr
	Number of years curtailed second crop supply factor 75% or more	1	1	1	0	1	1	1	1	1	0	yr
	Number of years curtailed second crop supply factor between 50 and 75%	1	4	1	2	1	1	1	1	1	2	yr
	Number of years curtailed second crop supply factor 50% or less	4	0	0	0	0	0	0	0	0	0	yr
	Number of years no stored water available for second crop (out of 12 years)	3	4	6	6	6	6	6	6	6	6	yr

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WATER MANAGEMENT PLAN - SCENARIO RUNS
ADDITIONAL RESULTS
Prepared for WMP update

	ADDITIONAL RESULTS DEMAND CATEGORY / PARAMETER	[A] 2010 WMP W/2010 DEMANDS (1940 - 2009)	[B] 2012 LCRA APPLICATION INTERIM DEMANDS (1940 - 2013)	[C] 08-20-2014 LCRA PROPOSAL (1940- 2013)	[D] 09-03-2014 RUN 1A Decouple Environmental (1940- 2013)	[E] 09-08-2014 RUN 1B Change Power Demand (1940- 2013)	[F] 09-08-2014 RUN 2A Irrigation 202K to 1.3MAF (1940- 2013)	[G] 09-08-2014 RUN 2B Irrigation EX DRT 1.3MAF (1940- 2013)	[H] 09-08-2014 RUN 2C Irrigation PassThru 1.3MAF (1940- 2013)	[I] 09-08-2014 RUN 2D Carryover for Threshold B&E (1940- 2013)	[J] 09-08-2014 Consolidated Run (1940- 2013)	UNITS
REF	**Environmental - Bay and Estuary (B&E)**											
	2008 Matagorda Bay Health Evaluation (MBHE) Criteria:											
[52]	% of months Only Threshold Bay and Estuary inflow criteria in effect	n/a	12%	5%	5%	5%	5%	5%	5%	5%	5%	%
[53]	% of months MBHE-1 Bay and Estuary inflow criteria in effect	n/a	15%	17%	17%	16%	17%	17%	17%	17%	17%	%
[54]	% of months MBHE-2 Bay and Estuary inflow criteria in effect	n/a	12%	9%	10%	10%	9%	9%	9%	9%	10%	%
[55]	% of months MBHE-3 Bay and Estuary inflow criteria in effect	n/a	43%	54%	53%	54%	54%	54%	54%	54%	53%	%
[56]	% of months MBHE-4 Bay and Estuary inflow criteria in effect	n/a	18%	15%	14%	15%	15%	15%	15%	15%	14%	%
[57]	% of months Threshold inflow criteria are met (Study Goal 100%)	97%	96%	94%	94%	94%	94%	94%	94%	94%	95%	%
[67]	% of years All MBHE-1 criteria are met (Study Goal 90%)	81%	80%	73%	74%	73%	73%	73%	73%	73%	74%	%
[68]	% of years All MBHE-2 criteria are met (Study Goal 75%)	64%	65%	59%	59%	59%	59%	59%	59%	59%	59%	%
[69]	% of years All MBHE-3 criteria are met (Study Goal 60%)	51%	51%	49%	49%	49%	49%	49%	49%	49%	49%	%
[70]	% of years All MBHE-4 criteria are met (Study Goal 35%)	41%	41%	39%	39%	39%	39%	39%	39%	39%	39%	%
[70.3]	Total DOR average annual **stored water or storable inflow** released to help meet Environmental Criteria	**42,601**	**60,741**	**62,134**	**68,767**	**61,689**	**62,134**	**62,134**	**61,988**	**62,134**	**68,180**	
[70.6]	Average annual **stored water or storable inflow** released to help meet MBHE criteria (POR/DOR)	4314 / 1400	23263 / 21463	22395 / 19846	25898 / 26393	21964 / 19848	22381 / 19846	21954 / 19846	22347 / 19700	22395 / 19846	25694 / 26253	ac-ft
[71]	Average annual stored water or SI released to help meet MBHE Threshold criteria (POR/DOR)	n/a	1842 / 4475	1804 / 5036	2155 / 5536	1801 / 5038	1804 / 5036	1804 / 5036	1784 / 4915	1804 / 5036	2134 / 5410	ac-ft
[72]	Average annual stored water or SI released to help meet MBHE-1 criteria (POR/DOR)	n/a	3298 / 12983	576 / 3293	576 / 3293	573 / 3283	576 / 3293	576 / 3293	576 / 3293	576 / 3293	573 / 3283	ac-ft
[73]	Average annual stored water or SI released to help meet MBHE-2 criteria (POR/DOR)	n/a	2456 / 2582	1702 / 0	3891 / 13499	1850 / 0	1689 / 0	1844 / 0	1702 / 0	1702 / 0	4029 / 13522	ac-ft
[74]	Average annual stored water or SI released to help meet MBHE-3 criteria (POR/DOR)	n/a	13247 / 1424	17046 / 11517	18010 / 4064	16476 / 11527	17046 / 11517	16464 / 11517	17018 / 11492	17046 / 11517	17694 / 4038	ac-ft
[75]	Average annual stored water or SI released to help meet MBHE-4 criteria (POR/DOR)	n/a	2419 / 0	1266 / 0	1266 / 0	1265 / 0	1266 / 0	1266 / 0	1266 / 0	1266 / 0	1265 / 0	ac-ft
	2006 Freshwater Inflow Needs Study (FINS) Criteria:											
[88]	% of months Critical criteria satisfied	72%	67%	63%	64%	63%	63%	63%	63%	63%	64%	%
[89]	% of months Intermediate criteria satisfied	55%	53%	51%	51%	51%	51%	51%	51%	51%	51%	%
[90]	% of months Target criteria satisfied	34%	32%	32%	32%	32%	32%	32%	32%	32%	32%	%
	Environmental - Instream Flow (IF)											
[108]	% of months Subsistence IF criteria met at Wharton (Study Goal 100%)	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	%
[111]	% of months Base-Dry IF criteria met at Wharton (Study Goal 80%)	88%	84%	81%	81%	81%	81%	81%	81%	81%	81%	%
[114]	% of months Base-Average IF criteria met at Wharton (Study Goal 60%)	70%	65%	62%	63%	62%	62%	62%	62%	62%	63%	%
	Average annual **stored water or storable inflow** released to meet Habitat Team IF criteria (POR/DOR)	46721 / 39761	44129 / 39278	50469 / 42288	50059 / 42374	50072 / 41841	50429 / 42288	50354 / 42288	50469 / 42288	50469 / 42288	49619 / 41927	ac-ft
[115]	Average annual stored water or SI released to meet Habitat Team Subsistence criteria (POR/DOR)	n/a	18912 / 33343	23326 / 42288	23462 / 42374	22958 / 41841	23285 / 42288	23211 / 42288	23326 / 42288	23326 / 42288	23053 / 41927	ac-ft
[116]	Average annual stored water or SI released to meet Habitat Team Base-Dry criteria (POR/DOR)	n/a	6968 / 5935	8351 / 0	8351 / 0	8329 / 0	8351 / 0	8351 / 0	8351 / 0	8351 / 0	8329 / 0	ac-ft
[117]	Average annual stored water or SI released to meet Habitat Team Base-Average criteria (POR/DOR)	n/a	18249 / 0	18792 / 0	18246 / 0	18785 / 0	18792 / 0	18792 / 0	18792 / 0	18792 / 0	18237 / 0	ac-ft

This information is for discussion only.
This is not a forecast of future conditions.

Attachment 4: Example of Consolidated Monthly Run Summary from 2015 WAM Update

The City of Austin is committed to compliance with the Americans with Disabilities Act.
Reasonable modifications and equal access to communications will be provided upon request.

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

09/06/2014
05:21 PM

LCRA SYSTEM END OF MONTH STORAGE

bold/italic lt 900K storage

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVERAGE
1940	1,950,854	1,952,555	1,930,751	1,932,790	1,917,015	1,964,429	1,958,753	1,899,227	1,804,887	1,780,397	1,873,641	1,937,111	1,908,534
1941	1,932,556	1,933,820	1,947,529	1,952,422	1,964,429	1,964,429	1,939,637	1,851,186	1,816,460	1,929,533	1,912,567	1,897,263	1,920,153
1942	1,878,748	1,862,670	1,837,909	1,962,738	1,964,429	1,900,856	1,793,008	1,772,369	1,790,287	1,954,864	1,952,570	1,949,895	1,885,029
1943	1,934,841	1,914,101	1,896,452	1,867,229	1,770,183	1,711,516	1,640,223	1,511,282	1,463,305	1,433,197	1,415,228	1,415,163	1,664,393
1944	1,471,930	1,536,472	1,599,701	1,586,533	1,912,830	1,833,473	1,708,593	1,712,148	1,683,754	1,693,032	1,701,079	1,765,681	1,683,769
1945	1,889,417	1,961,053	1,957,770	1,962,937	1,905,859	1,816,466	1,796,980	1,689,863	1,659,141	1,668,482	1,656,425	1,660,352	1,802,062
1946	1,686,291	1,727,703	1,741,578	1,796,313	1,913,805	1,788,848	1,661,202	1,539,329	1,533,084	1,536,297	1,572,939	1,605,100	1,675,207
1947	1,757,891	1,778,562	1,825,271	1,836,980	1,774,072	1,654,097	1,529,307	1,415,682	1,320,372	1,288,736	1,263,661	1,261,415	1,558,837
1948	1,245,649	1,237,527	1,221,946	1,208,084	1,187,510	1,254,068	1,247,376	1,162,643	1,110,208	1,079,450	1,052,411	1,034,545	1,170,118
1949	1,030,221	1,070,752	1,113,816	1,247,603	1,329,671	1,316,800	1,262,627	1,210,845	1,175,655	1,166,959	1,147,143	1,143,071	1,184,597
1950	1,135,964	1,152,626	1,122,966	1,132,655	1,132,930	1,086,321	1,036,920	976,524	963,513	929,203	904,915	887,566	1,038,509
1951	875,545	863,937	***846,462***	***822,105***	***882,176***	985,338	916,393	***852,860***	***807,715***	***764,488***	737,875	721,822	839,726
1952	704,995	690,392	***665,066***	***712,136***	***814,915***	***772,818***	***722,648***	***649,517***	1,591,265	1,550,816	1,561,583	1,680,927	1,009,757
1953	1,712,299	1,721,237	1,705,072	1,684,378	1,758,745	1,593,125	1,477,807	1,388,946	1,312,196	1,352,250	1,325,420	1,305,484	1,528,080
1954	1,291,565	1,261,629	1,221,446	1,296,481	1,369,861	1,293,261	1,226,933	1,158,289	1,103,709	1,077,418	1,078,458	1,060,300	1,203,279
1955	1,062,150	1,063,711	1,028,885	994,285	1,383,537	1,460,982	1,451,627	1,432,778	1,558,192	1,553,356	1,529,179	1,505,643	1,335,360
1956	1,484,039	1,473,443	1,427,735	1,400,642	1,577,387	1,451,729	1,352,236	1,252,016	1,167,077	1,132,572	1,109,234	1,090,509	1,326,552
1957	1,070,941	1,060,656	1,080,799	1,663,586	1,954,101	1,947,368	1,900,015	1,849,069	1,835,291	1,956,864	1,960,073	1,955,386	1,686,179
1958	1,956,703	1,959,303	1,957,166	1,956,998	1,964,429	1,964,429	1,882,266	1,802,543	1,797,313	1,813,678	1,815,152	1,802,931	1,889,409
1959	1,790,235	1,783,615	1,768,762	1,809,633	1,739,129	1,873,906	1,906,287	1,835,833	1,772,363	1,964,429	1,964,429	1,962,889	1,847,626
1960	1,960,462	1,960,419	1,956,676	1,951,082	1,877,677	1,736,821	1,665,630	1,745,333	1,691,722	1,787,447	1,812,681	1,926,283	1,839,353
1961	1,961,285	1,960,415	1,951,542	1,929,948	1,843,909	1,946,804	1,964,429	1,884,992	1,872,930	1,878,614	1,885,381	1,886,672	1,913,910
1962	1,880,558	1,864,396	1,841,277	1,826,463	1,731,214	1,643,316	1,555,403	1,441,093	1,383,930	1,369,405	1,358,419	1,348,020	1,603,625
1963	1,331,876	1,326,804	1,297,477	1,267,256	1,241,828	1,167,802	1,075,069	1,026,715	989,809	967,879	991,265	989,841	1,139,468
1964	997,721	1,021,580	1,045,264	1,050,154	1,012,010	957,044	***894,040***	***862,058***	1,293,340	1,324,875	1,384,753	1,392,842	1,102,973
1965	1,410,541	1,586,532	1,602,710	1,582,377	1,964,429	1,935,627	1,831,775	1,713,270	1,677,322	1,660,459	1,663,384	1,700,888	1,694,110
1966	1,710,057	1,723,056	1,733,135	1,758,644	1,800,975	1,686,176	1,560,999	1,511,865	1,509,407	1,485,066	1,464,317	1,450,232	1,616,161
1967	1,433,498	1,418,899	1,388,624	1,356,315	1,304,957	1,142,810	1,065,153	1,012,250	1,028,928	1,044,315	1,073,862	1,077,464	1,195,590
1968	1,696,432	1,792,072	1,957,771	1,961,072	1,964,429	1,949,920	1,908,403	1,802,101	1,746,420	1,713,494	1,704,001	1,695,121	1,824,270
1969	1,679,613	1,670,487	1,666,958	1,746,580	1,763,148	1,641,561	1,526,954	1,447,447	1,406,891	1,834,557	1,928,209	1,962,890	1,689,608
1970	1,960,463	1,960,415	1,957,769	1,953,143	1,964,429	1,905,581	1,802,719	1,699,515	1,657,692	1,640,225	1,617,503	1,600,915	1,810,031
1971	1,581,955	1,564,552	1,535,124	1,494,233	1,384,364	1,215,818	1,219,195	1,496,370	1,623,947	1,964,429	1,964,429	1,962,889	1,583,942
1972	1,960,464	1,960,424	1,932,239	1,903,746	1,937,344	1,822,134	1,715,147	1,643,868	1,590,015	1,573,383	1,574,237	1,567,988	1,765,082
1973	1,580,312	1,615,610	1,635,174	1,667,279	1,610,944	1,571,650	1,577,130	1,531,838	1,494,710	1,944,651	1,964,429	1,962,893	1,679,718
1974	1,960,461	1,951,446	1,929,278	1,898,049	1,956,277	1,812,960	1,696,075	1,964,429	1,964,429	1,964,429	1,964,429	1,962,890	1,918,763
1975	1,960,465	1,960,418	1,949,957	1,947,951	1,964,429	1,964,429	1,940,521	1,876,585	1,830,092	1,805,357	1,782,804	1,769,599	1,896,051
1976	1,751,767	1,732,009	1,713,324	1,747,581	1,703,839	1,629,305	1,849,398	1,757,895	1,729,705	1,758,326	1,796,047	1,828,873	1,749,839
1977	1,861,743	1,894,841	1,948,948	1,963,738	1,964,429	1,869,178	1,765,472	1,660,603	1,590,794	1,565,310	1,551,909	1,533,580	1,764,212
1978	1,528,795	1,534,651	1,513,935	1,486,694	1,391,577	1,271,469	1,155,463	1,502,872	1,567,683	1,550,687	1,570,116	1,581,537	1,471,290
1979	1,613,412	1,685,268	1,775,914	1,801,986	1,827,416	1,849,309	1,812,263	1,768,609	1,694,661	1,654,407	1,636,744	1,629,308	1,729,108
1980	1,624,871	1,620,070	1,601,630	1,570,804	1,592,937	1,442,861	1,314,748	1,211,912	1,525,088	1,533,009	1,536,102	1,549,419	1,510,288
1981	1,544,584	1,540,760	1,529,159	1,565,658	1,538,022	1,887,469	1,829,099	1,753,476	1,715,883	1,964,429	1,964,429	1,962,892	1,732,988
1982	1,958,384	1,955,330	1,947,938	1,929,329	1,940,620	1,926,806	1,848,165	1,736,715	1,664,552	1,632,689	1,622,509	1,611,518	1,814,546
1983	1,600,813	1,596,127	1,616,011	1,581,161	1,583,252	1,514,273	1,414,861	1,332,903	1,267,248	1,241,139	1,229,590	1,213,708	1,432,591
1984	1,202,708	1,182,437	1,165,969	1,130,804	1,075,410	1,005,584	941,874	***880,674***	***833,169***	980,651	984,773	1,184,127	1,047,348
1985	1,357,406	1,421,393	1,518,628	1,532,068	1,468,247	1,401,605	1,299,336	1,191,829	1,132,121	1,349,038	1,365,400	1,396,458	1,369,461
1986	1,392,637	1,453,751	1,430,959	1,405,841	1,418,924	1,672,608	1,561,324	1,465,004	1,442,295	1,686,597	1,763,984	1,962,887	1,554,734
1987	1,960,465	1,960,417	1,952,211	1,941,886	1,964,429	1,964,429	1,961,589	1,881,691	1,865,911	1,834,463	1,831,284	1,824,052	1,911,902
1988	1,807,624	1,793,477	1,774,597	1,743,768	1,678,796	1,591,389	1,601,148	1,495,294	1,432,518	1,401,409	1,378,471	1,365,324	1,588,651
1989	1,374,803	1,398,764	1,384,876	1,360,425	1,412,976	1,407,562	1,308,865	1,217,913	1,151,251	1,121,402	1,105,236	1,090,813	1,277,907
1990	1,078,444	1,082,653	1,129,861	1,378,834	1,713,234	1,685,733	1,716,469	1,692,659	1,747,989	1,739,986	1,739,983	1,729,097	1,536,245
1991	1,773,050	1,791,156	1,775,860	1,775,266	1,713,834	1,670,328	1,577,128	1,479,836	1,451,665	1,486,526	1,502,349	1,962,883	1,663,323
1992	1,960,459	1,960,411	1,957,769	1,950,770	1,964,429	1,964,429	1,928,145	1,845,902	1,809,856	1,780,658	1,798,790	1,814,018	1,894,636
1993	1,810,853	1,835,324	1,903,083	1,953,487	1,903,626	1,806,876	1,694,792	1,557,666	1,507,694	1,486,898	1,481,000	1,479,052	1,701,696
1994	1,477,195	1,493,843	1,478,322	1,457,233	1,657,455	1,549,062	1,432,990	1,347,531	1,314,468	1,342,101	1,373,490	1,456,024	1,448,310
1995	1,487,809	1,501,094	1,563,041	1,660,653	1,758,400	1,704,359	1,603,875	1,500,560	1,460,870	1,432,773	1,420,534	1,418,292	1,542,688
1996	1,406,248	1,388,363	1,366,517	1,333,244	1,243,072	1,161,613	1,084,759	1,093,353	1,127,023	1,355,058	1,398,580	1,458,006	1,284,653
1997	1,464,645	1,879,186	1,957,771	1,961,444	1,964,429	1,964,429	1,964,429	1,921,844	1,855,697	1,837,455	1,825,189	1,830,713	1,868,936
1998	1,833,008	1,875,813	1,957,774	1,964,429	1,855,428	1,693,814	1,618,198	1,580,993	1,555,071	1,654,139	1,735,098	1,778,543	1,758,526
1999	1,800,966	1,795,422	1,829,595	1,827,640	1,798,641	1,675,295	1,571,599	1,448,532	1,368,049	1,335,337	1,307,072	1,288,641	1,587,232
2000	1,268,833	1,256,111	1,238,270	1,213,743	1,153,812	1,117,980	1,029,783	969,596	932,291	1,049,427	1,791,534	1,834,171	1,237,963
2001	1,925,368	1,960,420	1,957,761	1,955,343	1,942,674	1,810,454	1,705,038	1,631,272	1,610,017	1,616,495	1,945,207	1,958,213	1,834,855
2002	1,960,465	1,960,422	1,953,250	1,928,381	1,836,344	1,757,427	1,964,429	1,893,135	1,856,279	1,914,224	1,955,661	1,962,889	1,911,909
2003	1,960,464	1,960,413	1,953,503	1,922,747	1,838,138	1,803,585	1,715,831	1,618,740	1,592,395	1,581,236	1,567,890	1,551,156	1,755,508
2004	1,559,556	1,575,669	1,606,667	1,783,823	1,751,419	1,964,429	1,915,964	1,955,638	1,889,642	1,884,053	1,936,084	1,936,108	1,813,254
2005	1,935,663	1,937,401	1,945,807	1,946,119	1,920,135	1,815,488	1,717,667	1,679,546	1,590,874	1,556,768	1,535,684	1,516,559	1,758,143
2006	1,499,854	1,485,520	1,470,294	1,455,126	1,435,218	1,321,348	1,228,661	1,136,339	1,082,829	1,069,000	1,043,798	1,030,235	1,271,519
2007	1,058,179	1,046,792	1,323,226	1,410,881	1,891,012	1,948,163	1,952,691	1,949,270	1,947,032	1,938,370	1,930,097	1,927,707	1,693,618
2008	1,918,057	1,899,969	1,883,566	1,861,085	1,768,082	1,603,828	1,490,855	1,389,321	1,309,890	1,280,019	1,254,840	1,234,001	1,574,459
2009	1,212,986	1,194,936	1,191,874	1,226,794	1,200,127	1,131,316	1,068,804	1,012,708	1,014,891	1,229,456	1,316,306	1,357,795	1,179,833
2010	1,512,557	1,813,344	1,871,027	1,914,368	1,878,820	1,743,352	1,688,367	1,574,124	1,630,377	1,590,004	1,565,413	1,547,014	1,694,064
2011	1,536,274	1,522,171	1,485,215	1,434,579	1,329,553	1,174,996	1,095,643	1,025,352	961,016	939,991	917,405	908,135	1,194,194
2012	910,834	973,387	1,084,542	1,069,660	1,088,756	1,031,252	988,603	928,441	902,543	***877,611***	847,639	822,863	960,511
2013	819,190	799,591	***772,450***	***769,762***	***767,618***	***709,794***	***682,079***	***620,465***	***605,169***	***643,339***	658,662	658,904	708,919
AVG	1,576,756	1,595,973	1,605,530	1,622,135	1,641,547	1,594,296	1,533,917	1,477,472	1,469,782	1,506,474	1,525,040	1,541,838	1,557,563
MAX	1,961,285	1,961,053	1,957,774	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,964,429	1,962,893	1,920,153
MIN	704,995	690,392	665,066	712,136	767,618	709,794	682,079	620,465	605,169	643,339	658,662	658,904	708,919

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

09/06/2014
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TOTAL FLOW TO THE BAY

9,241,832	TOTAL
12.08	YEARS
764,841	DRT AVG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1940	53,485	53,378	14,474	94,701	57,027	257,278	688,182	20,854	11,017	46,979	812,740	688,691	2,798,806
1941	247,941	300,657	455,205	721,958	1,343,610	1,004,352	383,709	112,144	45,754	299,395	122,838	86,548	5,124,109
1942	43,463	46,194	30,287	417,128	226,871	45,651	259,964	68,248	76,595	132,170	118,476	70,432	1,535,480
1943	87,328	78,940	72,117	22,199	25,934	111,914	55,865	17,091	30,586	26,508	30,128	57,164	615,773
1944	168,715	142,464	243,400	43,768	167,463	63,125	42,656	74,344	63,498	23,571	135,907	208,163	1,377,073
1945	322,901	201,483	318,245	596,435	72,551	103,017	66,411	87,846	46,471	53,863	31,509	58,466	1,959,196
1946	150,879	173,633	285,495	68,121	255,334	326,894	152,128	18,694	127,681	65,075	316,471	132,174	2,072,578
1947	257,444	67,520	110,578	60,933	56,179	23,349	28,620	104,723	39,140	20,760	26,003	49,997	845,248
1948	23,836	38,427	34,997	21,173	54,827	21,173	32,827	15,000	11,688	8,880	16,433	16,986	296,247
1949	24,598	145,507	53,316	335,960	70,996	33,656	23,713	12,056	20,241	208,342	28,868	120,621	1,077,873
1950	97,132	208,347	51,296	134,013	78,027	213,105	19,436	12,081	54,215	15,000	16,433	20,235	919,320
1951	17,361	23,015	26,038	19,322	18,199	42,338	15,000	9,398	30,291	20,728	17,315	22,053	261,060
1952	20,982	23,690	20,020	34,493	70,335	19,007	13,176	5,060	16,152	15,000	24,032	100,176	362,122
1953	62,035	52,811	45,528	26,056	273,936	54,120	47,794	18,241	97,486	56,588	46,290	68,719	849,604
1954	41,711	16,372	11,104	15,000	23,001	20,202	11,999	5,300	9,013	10,472	15,000	15,000	194,173
1955	17,282	24,108	15,000	8,257	33,263	21,052	35,429	25,219	54,781	25,219	18,740	20,412	298,761
1956	18,191	29,041	8,835	7,990	97,000	15,687	22,547	9,712	7,961	7,857	13,412	17,226	255,458
1957	14,811	22,926	48,300	194,305	1,008,915	905,765	76,939	26,100	260,251	1,287,596	335,981	194,114	4,376,001
1958	228,225	579,158	283,358	95,597	210,218	154,651	47,148	20,576	184,425	103,907	150,877	78,230	2,136,368
1959	64,867	206,652	50,256	450,226	89,890	68,574	48,426	26,884	19,080	585,654	91,861	161,144	1,863,514
1960	253,393	267,296	86,342	211,614	155,892	531,379	113,425	44,363	17,116	315,790	354,951	248,761	2,600,322
1961	386,301	445,815	149,769	72,813	57,281	723,832	353,461	48,711	594,494	84,159	140,140	82,275	3,139,049
1962	96,473	43,775	23,160	21,845	36,595	68,367	56,458	32,290	43,077	73,923	18,816	51,046	565,825
1963	37,500	63,088	16,577	18,195	20,011	16,401	25,807	17,751	22,918	15,748	15,792	23,177	292,961
1964	20,349	22,141	19,706	15,000	18,896	35,604	21,283	13,008	31,525	24,568	25,863	23,782	271,725
1965	120,135	255,191	33,148	44,716	520,691	122,715	78,433	35,949	52,060	34,180	122,262	195,021	1,614,502
1966	77,450	118,588	77,174	86,827	164,184	51,273	37,681	26,290	90,710	16,764	23,195	24,478	794,612
1967	22,012	21,428	10,861	3,416	20,909	25,356	36,286	12,652	64,770	65,728	79,970	33,030	396,418
1968	340,150	94,169	194,286	302,984	538,756	481,430	165,135	47,805	124,670	47,250	50,035	146,862	2,533,531
1969	66,063	241,315	222,069	203,892	201,536	84,243	60,680	28,437	24,669	92,331	36,791	127,531	1,389,556
1970	115,939	190,867	543,699	146,611	501,860	153,238	95,813	41,899	65,366	252,772	41,953	40,906	2,190,922
1971	23,915	17,914	15,995	4,479	16,732	20,202	33,798	21,556	89,542	22,271	104,076	191,332	561,811
1972	104,132	82,764	41,074	21,356	257,014	76,833	63,380	26,597	32,557	42,670	49,834	29,604	827,814
1973	71,388	127,278	179,100	275,802	85,364	509,924	94,413	30,437	146,146	456,407	123,693	54,106	2,154,057
1974	334,046	68,824	48,148	20,771	105,565	49,686	35,125	145,361	541,315	337,396	553,194	239,231	2,478,660
1975	161,527	450,139	156,799	162,063	807,093	394,830	185,594	86,829	65,543	50,341	56,364	88,449	2,665,571
1976	49,388	40,924	31,424	211,524	253,618	122,232	104,839	42,628	59,957	148,678	133,512	410,811	1,609,534
1977	76,121	237,401	55,041	1,064,196	228,688	80,114	48,781	27,442	32,610	27,610	35,550	40,450	1,954,005
1978	71,026	72,544	19,040	9,900	18,110	36,286	35,856	18,145	129,469	20,525	60,011	52,430	543,339
1979	287,943	226,378	128,789	225,478	409,342	470,896	157,414	34,825	263,362	40,999	32,351	43,649	2,321,426
1980	108,502	58,766	31,333	32,360	160,736	28,693	34,378	16,087	43,627	36,373	26,773	32,538	610,165
1981	36,963	29,837	124,812	39,188	108,704	594,424	203,857	61,030	249,069	66,997	350,672	67,031	1,932,585
1982	56,116	58,308	43,653	31,139	418,711	42,341	51,868	24,340	27,493	35,537	59,770	53,566	902,841
1983	65,909	209,538	238,602	44,542	189,311	68,385	95,375	61,910	147,368	56,338	41,986	35,869	1,255,132
1984	51,789	27,205	21,695	18,857	31,523	25,327	23,591	20,192	19,728	286,643	60,622	77,099	664,270
1985	122,840	115,843	188,808	89,721	45,357	105,729	69,665	18,709	23,888	64,564	275,197	137,147	1,257,466
1986	70,700	61,642	37,008	6,976	124,516	136,520	57,447	20,864	94,168	92,248	118,319	514,776	1,335,183
1987	271,483	294,671	298,415	91,928	145,648	1,559,917	210,340	74,311	58,689	58,459	123,340	109,425	3,296,626
1988	63,047	41,737	60,561	19,303	31,893	32,557	84,443	26,393	20,042	27,556	17,752	23,134	448,418
1989	88,059	48,264	31,792	25,389	98,500	23,525	32,081	18,374	15,844	18,880	20,235	21,974	442,917
1990	22,000	32,241	29,361	22,440	27,055	20,304	69,835	27,047	87,877	23,301	24,914	18,093	404,469
1991	345,348	162,587	36,318	378,591	77,843	65,950	58,377	24,593	82,702	34,298	41,702	1,393,467	2,701,776
1992	1,021,374	2,465,048	1,415,940	691,435	1,485,178	1,357,720	98,294	53,728	60,327	118,124	183,825	137,566	9,088,557
1993	252,586	225,791	189,444	189,845	377,447	471,943	62,541	40,573	21,165	66,627	56,344	35,197	1,989,504
1994	40,803	39,813	49,048	19,882	114,452	111,174	59,430	29,211	40,368	647,573	94,273	234,188	1,480,215
1995	213,959	49,837	233,548	142,784	42,361	332,372	77,107	20,804	14,991	22,260	53,112	113,727	1,316,860
1996	22,475	22,505	17,847	14,120	10,526	48,057	28,800	27,684	95,963	32,754	30,756	49,911	401,401
1997	113,352	42,258	677,162	592,623	307,441	1,291,217	367,248	66,144	51,489	363,752	102,804	160,103	4,135,594
1998	143,184	218,596	292,997	104,652	40,456	33,130	29,864	48,027	177,907	953,031	812,892	255,305	3,110,041
1999	149,149	43,241	120,759	67,187	113,207	119,890	79,157	21,152	20,281	29,479	19,377	22,497	805,376
2000	22,323	32,562	18,876	26,305	29,649	66,740	29,768	12,154	16,481	15,538	203,666	79,816	553,878
2001	141,218	129,023	369,431	125,704	61,943	33,492	44,690	35,729	183,825	124,957	163,858	285,288	1,699,158
2002	106,953	54,254	42,210	54,711	45,835	50,404	941,050	34,646	83,921	211,456	528,435	398,108	2,551,984
2003	236,873	420,747	273,984	62,420	14,511	43,356	77,120	29,231	44,642	72,358	59,058	39,959	1,374,257
2004	87,105	135,701	54,658	109,342	214,991	429,362	210,350	48,575	53,165	119,369	1,486,187	370,834	3,319,639
2005	135,989	338,608	414,011	133,140	73,897	47,179	63,003	53,997	16,757	22,886	22,065	21,814	1,343,346
2006	29,856	20,703	19,540	18,713	51,598	48,598	62,384	17,734	15,682	61,539	32,889	47,561	426,795
2007	295,157	45,458	231,632	145,246	161,697	957,184	959,674	339,544	173,347	71,323	174,849	74,846	3,629,956
2008	97,471	71,414	56,681	7,499	33,850	27,587	33,578	19,048	19,615	13,947	22,298	26,041	429,028
2009	20,753	19,980	20,534	122,138	20,005	21,366	17,923	5,253	26,062	197,826	92,373	114,302	678,514
2010	146,508	251,816	123,645	83,931	79,474	65,345	178,498	27,853	96,432	20,560	18,659	23,546	1,116,267
2011	24,145	20,477	7,717	4,945	15,063	16,433	15,168	5,617	10,958	2,973	10,817	19,338	153,652
2012	73,857	157,928	250,573	31,801	69,157	21,901	39,465	4,533	10,380	15,968	16,240	17,142	708,944
2013	27,225	17,784	17,246	24,272	26,380	20,472	7,932	5,744	11,770	124,410	220,846	47,271	551,353
AVG	126,804	155,221	138,782	136,003	182,441	214,572	112,837	38,019	78,571	125,589	135,062	126,918	1,570,818
MAX	1,021,374	2,465,048	1,415,940	1,064,196	1,485,178	1,559,917	959,674	339,544	594,494	1,287,596	1,486,187	1,393,467	9,088,557
MIN	14,811	16,372	7,717	3,416	10,526	15,687	7,932	4,533	7,961	2,973	10,817	15,000	153,652

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

09/06/2014
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STORABLE INFLOWS BEFORE THRESHOLD

5,556,309	TOTAL
12.08	YEARS
459,832	DRT AVG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1940	0	0	0	13,287	0	0	0	0	0	0	94,422	60,533	168,242
1941	0	0	12,040	0	0	0	0	0	4,571	113,153	3,679	0	133,443
1942	0	0	0	114,710	0	0	0	31,094	47,809	160,492	6,993	5,337	366,435
1943	910	0	415	0	0	64,703	0	0	0	13,710	3,344	10,657	93,739
1944	61,358	70,299	76,678	12,898	313,909	0	0	79,275	16,093	39,944	17,454	73,251	761,159
1945	132,760	69,986	0	0	0	0	32,140	0	10,253	35,068	9,389	18,094	307,690
1946	34,774	51,841	31,786	69,853	116,121	0	0	0	20,318	25,774	49,387	44,107	443,961
1947	156,800	37,500	61,591	32,290	0	0	0	0	0	6,427	0	21,177	315,785
1948	0	1,199	3,735	16,686	17,351	123,059	53,261	0	0	0	0	0	215,291
1949	3,442	47,655	56,685	140,222	104,234	12,798	0	0	0	7,968	2,475	6,558	382,037
1950	5,316	25,003	0	22,055	16,082	0	0	0	10,191	0	0	344	78,991
1951	4,305	0	0	0	76,095	124,889	0	0	0	0	0	0	205,289
1952	0	0	0	58,495	116,797	0	0	0	958,617	0	23,939	126,182	1,284,030
1953	50,490	21,946	26,613	2,116	114,983	0	0	0	0	59,201	0	0	275,349
1954	0	0	0	102,188	93,835	0	0	0	0	0	19,997	0	216,020
1955	12,234	9,065	0	0	402,954	100,704	48,328	31,345	196,668	23,657	0	0	824,955
1956	0	1,517	0	4,263	302,776	0	0	0	0	0	0	0	308,556
1957	0	7,481	31,783	579,394	282,443	0	0	0	0	111,056	0	0	1,012,157
1958	0	0	0	0	0	0	0	0	49,995	26,518	16,566	0	93,079
1959	0	0	8,040	52,553	0	155,951	63,766	0	0	177,990	3,826	0	462,126
1960	0	1,034	0	0	0	0	0	115,870	0	98,493	37,092	118,824	371,313
1961	33,818	0	0	0	0	29,117	0	0	12,820	23,304	17,956	13,644	130,659
1962	7,747	0	0	9,737	0	0	0	0	0	52,818	3,124	5,342	78,768
1963	0	6,264	0	0	15,267	0	0	0	0	0	34,354	10,206	66,091
1964	18,866	34,790	39,582	28,800	0	0	0	8,740	442,328	52,325	71,671	22,151	719,253
1965	28,354	178,133	34,362	24,524	312,490	0	0	0	5,420	2,524	13,733	42,920	642,460
1966	19,147	19,749	29,492	94,566	73,715	0	0	0	85,906	2,725	2,217	2,467	329,984
1967	1,052	8,310	0	0	0	0	0	0	26,969	30,951	39,908	14,255	121,445
1968	614,197	105,744	166,585	5,226	0	0	0	0	0	0	0	4,958	896,710
1969	0	0	10,809	93,170	64,918	0	0	0	0	518,254	107,425	34,377	828,953
1970	0	0	0	0	0	0	0	0	0	0	0	830	830
1971	0	0	0	0	0	0	52,186	302,308	151,161	335,908	5,548	0	847,111
1972	522	9,049	0	0	0	0	0	0	0	6,940	12,685	7,942	37,138
1973	19,054	42,699	36,653	45,608	0	4,173	43,890	2,163	0	453,362	27,578	8,391	683,571
1974	0	11,360	0	0	776	0	0	222,090	0	0	0	0	234,226
1975	2,205	0	0	0	0	0	0	0	0	0	0	0	2,205
1976	0	0	13,480	41,903	0	0	256,700	0	41,120	40,214	51,181	42,682	487,280
1977	42,122	48,229	71,061	5,201	0	0	0	0	0	0	11,265	12,458	190,336
1978	7,958	13,310	6,381	1,012	0	0	0	388,168	86,439	8,381	24,488	22,402	558,539
1979	40,703	79,388	96,654	26,777	0	0	0	1,504	0	0	1,313	7,529	253,868
1980	7,639	7,214	780	0	50,496	0	0	0	361,843	45,063	14,794	25,912	513,741
1981	8,115	7,200	83,018	73,865	9,533	316,824	0	0	0	241,531	6,467	5,509	752,062
1982	3,706	4,896	0	0	0	0	0	0	0	0	0	0	8,602
1983	0	3,790	30,924	0	39,938	0	0	0	0	0	2,740	0	77,392
1984	1,740	0	2,480	0	0	0	0	0	0	150,412	16,638	204,285	375,555
1985	186,065	71,825	110,943	34,377	0	0	0	0	0	226,243	23,290	42,126	694,869
1986	10,721	71,064	10,529	8	41,311	295,596	0	0	45,059	247,283	88,199	193,565	1,003,335
1987	1,665	0	0	0	0	0	0	0	32,126	0	6,446	2,052	42,289
1988	0	0	10,581	0	0	0	98,457	0	0	0	0	3,817	112,855
1989	15,258	34,720	15,808	7,906	85,431	40,138	0	0	0	0	3,009	5,576	207,846
1990	2,030	12,682	57,216	260,028	351,593	8,171	112,828	34,582	150,712	24,799	22,916	9,201	1,046,758
1991	48,029	29,527	6,816	15,524	0	9,291	0	0	65,294	69,653	45,173	438,701	728,008
1992	0	0	0	0	0	0	0	0	14,299	9,951	26,901	23,058	74,209
1993	6,839	33,500	80,096	61,232	0	0	0	0	0	9,902	9,282	12,392	213,243
1994	19,074	25,053	24,355	6,798	241,164	0	0	0	7,346	37,694	43,878	88,926	494,288
1995	42,270	22,591	74,229	116,462	135,947	10,195	0	0	0	1,761	15,533	11,432	430,420
1996	5,296	3,273	0	0	0	0	0	29,826	47,113	245,001	55,943	70,333	456,785
1997	18,362	407,359	80,623	0	0	0	0	0	0	0	0	11,869	518,213
1998	12,837	49,313	85,156	10,433	0	0	0	35,129	0	99,347	91,017	54,378	437,610
1999	39,777	11,198	88,984	21,898	13,857	0	0	0	0	0	0	0	175,714
2000	0	12,907	1,750	0	0	12,061	0	0	0	130,266	744,035	54,572	955,591
2001	87,830	36,396	0	0	0	0	0	0	5,606	25,113	327,970	11,281	494,196
2002	7,048	6,257	0	0	0	0	157,466	0	0	63,478	54,679	4,751	293,679
2003	672	0	0	0	0	0	0	0	10,094	72,163	3,440	738	87,107
2004	16,328	21,334	44,795	206,216	7,543	144,403	0	16,899	0	2,979	41,696	5,659	507,852
2005	0	0	13,028	9,641	0	0	0	37,628	0	0	0	0	60,297
2006	1,287	0	1,832	9,365	24,306	0	0	0	0	0	0	0	36,790
2007	32,301	2,678	277,140	104,448	481,046	47,199	0	6,155	3,297	15,459	7,112	12,338	989,173
2008	5,492	0	16,883	2,492	0	0	0	0	0	0	0	0	24,867
2009	0	0	9,916	49,662	0	0	0	0	10,726	216,795	97,398	50,990	435,487
2010	159,859	307,117	61,981	45,674	0	0	0	0	72,755	0	0	0	647,386
2011	3,950	0	0	0	0	0	0	0	0	0	0	0	3,950
2012	11,936	69,522	118,770	7,966	32,352	0	0	0	0	0	0	0	240,546
2013	4,141	0	0	12,787	12,185	0	0	0	3,973	47,454	25,847	10,239	116,626
AVG	27,816	29,094	28,690	35,869	53,398	20,260	12,419	18,146	40,499	59,588	33,614	28,261	387,654
MAX	614,197	407,359	277,140	579,394	481,046	316,824	256,700	388,168	958,617	518,254	744,035	438,701	1,284,030
MIN	0	0	0	0	0	0	0	0	0	0	0	0	830

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

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TOTAL WATER RELEASED FOR BAY AND ESTUARY

329,274	TOTAL
12.08	YEARS
27,250	DRT AVG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1940	0	0	0	13,287	0	0	0	0	0	0	0	0	13,287
1941	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	415	0	0	64,703	0	0	0	13,710	3,344	0	82,172
1944	0	0	0	0	0	0	0	23,853	0	0	0	0	23,853
1945	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	6,428	0	12,769	19,197
1948	0	1,199	1,867	10,514	8,012	11,310	17,171	1,735	0	0	0	0	51,808
1949	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	3,244	0	0	3,244
1951	0	0	0	0	0	0	1,912	0	0	0	0	0	1,912
1952	0	0	0	0	0	0	0	0	0	2,946	0	0	2,946
1953	0	0	26,613	2,116	0	0	0	0	0	0	0	0	28,729
1954	0	0	0	8,242	0	0	0	0	0	0	3,142	2,076	13,461
1955	0	0	1,561	0	0	0	27,898	21,127	49,560	1,601	0	0	101,746
1956	0	758	758	4,263	92,970	0	0	0	0	0	0	0	98,750
1957	0	7,481	0	0	0	0	0	0	0	0	0	0	7,481
1958	0	0	0	0	0	0	0	0	40,960	0	0	0	40,960
1959	0	0	0	0	0	0	8,315	0	0	0	0	0	8,315
1960	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	9,737	0	0	0	0	0	48,885	0	5,342	63,963
1963	0	0	0	0	10,257	0	0	0	0	0	0	0	10,257
1964	0	0	0	5,379	0	0	0	8,740	0	0	0	0	14,119
1965	0	0	0	24,524	0	0	0	0	5,420	2,524	0	0	32,468
1966	0	0	0	57,192	0	0	0	0	68,714	2,724	2,217	2,467	133,315
1967	1,052	8,310	0	0	0	0	0	0	0	0	0	0	9,362
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	83,278	0	0	83,278
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	807	0	0	0	0	0	807
1972	0	0	0	0	0	0	0	0	0	6,940	0	0	6,940
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	776	0	0	0	0	0	0	0	776
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	13,480	0	0	0	0	0	41,120	0	0	0	54,599
1977	0	0	0	0	0	0	0	0	0	0	11,265	12,119	23,384
1978	0	0	6,381	1,012	0	0	0	1,304	0	0	0	0	8,697
1979	0	0	0	0	0	0	0	0	0	0	1,313	6,347	7,660
1980	0	0	780	0	0	0	0	0	25,000	14,978	0	0	40,758
1981	0	0	83,018	19,482	0	0	0	0	0	0	0	0	102,500
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	10,529	8	0	0	0	0	45,059	0	0	0	55,597
1987	0	0	0	0	0	0	0	0	14,305	0	0	0	14,305
1988	0	0	10,581	0	0	0	47,958	0	0	0	0	3,817	62,357
1989	0	0	15,808	7,906	0	0	0	0	0	0	3,009	5,576	32,298
1990	2,030	0	0	0	0	0	57,993	22,534	77,835	16,498	13,002	6,109	196,001
1991	0	0	0	0	0	0	0	0	65,294	10,859	11,366	0	87,520
1992	0	0	0	0	0	0	0	0	14,299	9,951	0	0	24,250
1993	0	0	0	0	0	0	0	0	0	9,902	0	0	9,902
1994	9,726	0	24,355	6,799	0	0	0	0	7,346	0	0	0	48,226
1995	0	0	0	0	0	0	0	0	0	1,761	15,533	0	17,295
1996	0	3,274	0	0	0	0	0	0	0	0	0	0	3,274
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	35,128	0	0	0	0	35,128
1999	0	0	43,047	0	0	0	0	0	0	0	0	0	43,047
2000	0	12,907	875	0	0	0	0	0	0	0	0	0	13,782
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	10,094	68,407	0	0	78,501
2004	0	0	0	22,193	0	0	0	0	0	0	0	0	22,193
2005	0	0	0	0	0	0	0	33,850	0	0	0	0	33,850
2006	1,287	0	916	5,652	12,153	0	0	0	0	0	0	0	20,009
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	16,883	2,492	0	0	0	0	0	0	0	0	19,375
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	3,950	0	0	0	0	0	0	0	0	0	0	0	3,950
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	3,973	0	0	0	3,973
AVG	244	459	3,485	2,713	1,678	1,027	2,190	2,004	6,338	4,117	867	765	25,886
MAX	9,726	12,907	83,018	57,192	92,970	64,703	57,993	35,128	77,835	83,278	15,533	12,769	196,001
MIN	0	0	0	0	0	0	0	0	0	0	0	0	0

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

09/06/2014
05:21 PM

WATER RELEASED FOR THRESHOLD
(FROM STORABLE INFLOWS CURRENT AND PREVIOUS MONTH)

79,152	TOTAL
12.08	YEARS
6,550	DRT AVG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1940	0	0	0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	2,202	0	0	2,202
1944	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	667	0	0	667
1948	0	0	0	4,341	0	5,138	0	1,735	0	0	0	0	11,214
1949	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	3,244	0	0	3,244
1951	0	0	0	0	0	0	1,912	0	0	0	0	0	1,912
1952	0	0	0	0	0	0	0	0	0	2,946	0	0	2,946
1953	0	0	0	0	0	0	0	0	0	0	0	0	0
1954	0	0	0	8,242	0	0	0	0	0	0	3,142	2,076	13,461
1955	0	0	1,561	0	0	0	7,469	10,908	9,778	0	0	0	29,716
1956	0	0	758	4,263	10,970	0	0	0	0	0	0	0	15,991
1957	0	0	0	0	0	0	0	0	0	0	0	0	0
1958	0	0	0	0	0	0	0	0	0	0	0	0	0
1959	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	2,892	0	0	0	0	0	0	0	0	2,892
1963	0	0	0	0	5,246	0	0	0	0	0	0	0	5,246
1964	0	0	0	5,379	0	0	0	8,740	0	0	0	0	14,119
1965	0	0	0	0	0	0	0	0	0	0	0	0	0
1966	0	0	0	0	0	0	0	0	0	961	0	0	961
1967	0	1,882	0	0	0	0	0	0	0	0	0	0	1,882
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	5,947	0	0	5,947
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	0	0	0	0	0	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	2,342	1,012	0	0	0	0	0	0	0	0	3,354
1979	0	0	0	0	0	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	0	8	0	0	0	0	0	0	0	0	8
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	3,158	10,487	4,958	8,197	3,088	3,016	32,904
1991	0	0	0	0	0	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	1,916	0	0	0	0	0	0	0	0	1,916
1995	0	0	0	0	0	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	2,102	0	0	0	0	2,102
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	11,050	0	0	11,050
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	0	1,939	0	0	0	0	0	0	0	0	1,939
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	0	2,492	0	0	0	0	0	0	0	0	2,492
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	3,973	0	0	0	3,973
AVG	0	25	63	439	219	69	169	459	253	476	84	69	2,326
MAX	0	1,882	2,342	8,242	10,970	5,138	7,469	10,908	9,778	11,050	3,142	3,016	32,904
MIN	0	0	0	0	0	0	0	0	0	0	0	0	0

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

09/06/2014
05:21 PM

WATER RELEASED FOR BAY OPERATIONAL CRITERIA

250,122	TOTAL
12.08	YEARS
20,700	DRT AVG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1940	0	0	0	13,287	0	0	0	0	0	0	0	0	13,287
1941	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	415	0	0	64,703	0	0	0	11,508	3,344	0	79,970
1944	0	0	0	0	0	0	0	23,853	0	0	0	0	23,853
1945	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	5,760	0	12,769	18,530
1948	0	1,199	1,867	6,173	8,012	6,173	17,171	0	0	0	0	0	40,594
1949	0	0	0	0	0	0	0	0	0	0	0	0	0
1950	0	0	0	0	0	0	0	0	0	0	0	0	0
1951	0	0	0	0	0	0	0	0	0	0	0	0	0
1952	0	0	0	0	0	0	0	0	0	0	0	0	0
1953	0	0	26,613	2,116	0	0	0	0	0	0	0	0	28,729
1954	0	0	0	0	0	0	0	0	0	0	0	0	0
1955	0	0	0	0	0	0	20,429	10,219	39,781	1,601	0	0	72,030
1956	0	758	0	0	82,000	0	0	0	0	0	0	0	82,758
1957	0	7,481	0	0	0	0	0	0	0	0	0	0	7,481
1958	0	0	0	0	0	0	0	0	40,960	0	0	0	40,960
1959	0	0	0	0	0	0	8,315	0	0	0	0	0	8,315
1960	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	6,845	0	0	0	0	0	48,885	0	5,342	61,071
1963	0	0	0	0	5,011	0	0	0	0	0	0	0	5,011
1964	0	0	0	0	0	0	0	0	0	0	0	0	0
1965	0	0	0	24,524	0	0	0	0	5,420	2,524	0	0	32,468
1966	0	0	0	57,192	0	0	0	0	68,714	1,764	2,217	2,467	132,354
1967	1,052	6,428	0	0	0	0	0	0	0	0	0	0	7,480
1968	0	0	0	0	0	0	0	0	0	0	0	0	0
1969	0	0	0	0	0	0	0	0	0	77,331	0	0	77,331
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	807	0	0	0	0	0	807
1972	0	0	0	0	0	0	0	0	0	6,940	0	0	6,940
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	776	0	0	0	0	0	0	0	776
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	13,480	0	0	0	0	0	41,120	0	0	0	54,599
1977	0	0	0	0	0	0	0	0	0	0	11,265	12,119	23,384
1978	0	0	4,039	0	0	0	0	1,304	0	0	0	0	5,343
1979	0	0	0	0	0	0	0	0	0	0	1,313	6,347	7,660
1980	0	0	780	0	0	0	0	0	25,000	14,978	0	0	40,758
1981	0	0	83,018	19,482	0	0	0	0	0	0	0	0	102,500
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0	0	0	0	0	0
1986	0	0	10,529	0	0	0	0	0	45,059	0	0	0	55,589
1987	0	0	0	0	0	0	0	0	14,305	0	0	0	14,305
1988	0	0	10,581	0	0	0	47,958	0	0	0	0	3,817	62,357
1989	0	0	15,808	7,906	0	0	0	0	0	0	3,009	5,576	32,298
1990	2,030	0	0	0	0	0	54,835	12,047	72,877	8,301	9,914	3,093	163,097
1991	0	0	0	0	0	0	0	0	65,294	10,859	11,366	0	87,520
1992	0	0	0	0	0	0	0	0	14,299	9,951	0	0	24,250
1993	0	0	0	0	0	0	0	0	0	9,902	0	0	9,902
1994	9,726	0	24,355	4,882	0	0	0	0	7,346	0	0	0	46,310
1995	0	0	0	0	0	0	0	0	0	1,761	15,533	0	17,295
1996	0	3,274	0	0	0	0	0	0	0	0	0	0	3,274
1997	0	0	0	0	0	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	33,027	0	0	0	0	33,027
1999	0	0	43,047	0	0	0	0	0	0	0	0	0	43,047
2000	0	12,907	875	0	0	0	0	0	0	0	0	0	13,782
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	10,094	57,358	0	0	67,451
2004	0	0	0	22,193	0	0	0	0	0	0	0	0	22,193
2005	0	0	0	0	0	0	0	33,850	0	0	0	0	33,850
2006	1,287	0	916	3,713	12,153	0	0	0	0	0	0	0	18,069
2007	0	0	0	0	0	0	0	0	0	0	0	0	0
2008	0	0	16,883	0	0	0	0	0	0	0	0	0	16,883
2009	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	3,950	0	0	0	0	0	0	0	0	0	0	0	3,950
2012	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
AVG	244	433	3,422	2,274	1,459	958	2,020	1,545	6,085	3,641	783	696	23,560
MAX	9,726	12,907	83,018	57,192	82,000	64,703	54,835	33,850	72,877	77,331	15,533	12,769	163,097
MIN	0	0	0	0	0	0	0	0	0	0	0	0	0

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

09/06/2014
05:21 PM

TOTAL WATER PROVIDED FOR INSTREAM FLOW AND BAY AND ESTUARY

832,399	TOTAL
12.08	YEARS
68,888	DRT AVG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1940	13,588	11,866	12,078	31,651	0	0	0	0	0	6,392	28,238	28,347	132,160
1941	31,889	30,595	16,890	13,427	0	0	0	0	5,537	34,899	28,238	27,225	188,699
1942	15,909	10,702	6,661	1,689	0	0	0	0	0	9,561	11,874	11,561	67,956
1943	13,005	8,718	18,975	7,399	0	64,703	0	0	0	13,710	3,344	1,539	131,392
1944	3,967	4,011	6,661	1,030	0	0	0	23,853	0	0	0	1,539	41,060
1945	3,966	4,011	6,661	1,492	0	0	0	0	0	0	0	1,539	17,668
1946	3,967	4,011	6,661	2,115	0	0	0	0	0	0	0	1,539	18,291
1947	3,967	4,011	6,661	1,442	0	0	0	0	0	6,428	0	14,308	36,816
1948	3,967	5,210	8,528	16,250	8,012	11,310	17,171	1,735	0	0	0	1,539	73,721
1949	3,967	4,011	6,661	600	13,530	17,922	6,477	2,400	4,157	0	0	1,539	61,263
1950	3,967	4,011	6,661	600	14,207	19,302	6,779	2,813	6,180	3,244	0	1,539	69,302
1951	3,967	4,011	6,661	600	14,459	17,850	8,891	2,529	5,254	0	0	1,539	65,759
1952	3,967	4,011	6,661	600	13,126	18,257	6,477	3,271	6,565	2,946	0	1,539	67,419
1953	3,966	4,011	33,274	3,274	0	0	0	0	0	0	0	1,539	46,064
1954	3,967	4,011	6,620	9,138	15,192	18,986	8,461	3,490	6,749	0	3,142	3,615	83,371
1955	3,967	4,011	8,221	600	13,756	18,133	34,375	23,716	54,031	1,601	0	1,539	163,951
1956	3,967	4,769	7,095	5,540	92,970	0	0	0	0	0	0	201	114,541
1957	2,629	10,153	6,661	600	10,318	17,072	6,477	1,697	16,677	7,550	4,351	9,050	93,235
1958	8,678	5,120	7,266	7,438	0	0	0	0	49,711	36,028	28,238	28,339	170,818
1959	26,109	26,642	6,661	2,840	0	0	8,315	0	0	0	0	1,539	72,106
1960	3,967	4,011	7,758	13,363	0	0	0	0	0	0	0	1,539	30,637
1961	3,966	4,011	12,906	24,652	0	17,612	0	0	0	12,305	11,874	11,561	98,887
1962	13,005	8,208	6,661	11,155	0	0	0	0	0	48,885	0	6,880	94,793
1963	3,967	4,011	6,628	5,846	10,257	0	0	3,805	7,151	0	0	1,539	43,202
1964	3,967	4,011	6,661	5,979	15,116	19,305	7,497	11,293	4,946	0	0	1,539	80,313
1965	3,967	4,011	6,661	25,575	0	0	0	0	5,420	11,021	11,874	11,561	80,089
1966	13,005	15,952	6,661	59,511	0	0	0	0	68,714	2,724	2,217	4,006	172,789
1967	5,018	12,321	6,661	407	0	0	0	2,433	4,185	0	0	1,539	32,563
1968	3,967	4,011	6,661	3,358	0	0	0	0	0	0	3,805	11,561	33,362
1969	6,023	13,263	6,661	364	0	0	0	0	0	83,278	0	1,539	111,127
1970	3,966	4,011	6,661	11,301	0	0	0	0	0	4,643	3,318	11,561	45,461
1971	7,182	5,136	6,661	0	0	0	807	0	0	0	0	1,539	21,325
1972	3,967	4,011	14,123	5,788	1,452	0	0	0	0	6,940	0	1,539	37,819
1973	3,967	4,011	6,661	2,613	0	0	0	0	0	0	0	1,539	18,790
1974	3,967	4,011	14,152	2,146	8,153	0	0	0	0	0	0	1,539	33,967
1975	3,967	4,011	14,497	16,491	0	0	0	0	0	10,878	17,146	19,182	86,171
1976	17,831	15,349	20,141	2,260	0	0	0	0	41,120	0	0	1,539	98,238
1977	3,966	4,011	6,661	690	0	0	0	0	0	0	11,265	13,658	40,251
1978	3,966	4,011	13,042	1,329	0	0	0	1,304	0	0	0	1,539	25,190
1979	3,967	4,011	6,661	2,728	0	0	0	0	0	0	1,313	7,886	26,565
1980	3,967	4,011	7,440	300	0	0	0	0	25,000	14,978	0	1,539	57,234
1981	3,967	4,011	89,678	22,452	0	0	0	0	0	0	0	1,539	121,646
1982	3,967	4,011	16,510	12,622	0	0	0	0	0	0	2,663	4,885	44,657
1983	6,515	15,952	6,661	1,534	0	0	0	0	0	0	0	1,539	32,201
1984	3,967	4,011	6,661	1,172	16,540	18,770	9,138	2,479	4,311	0	0	1,539	68,587
1985	3,966	4,011	6,661	1,211	0	0	0	0	0	0	0	1,539	17,387
1986	3,966	4,011	17,190	477	0	0	0	0	45,059	0	0	1,539	72,242
1987	3,967	4,011	12,236	22,601	0	0	0	0	17,226	21,398	28,238	28,347	138,023
1988	21,357	17,610	17,242	820	0	0	47,958	0	0	0	0	5,356	110,343
1989	3,967	4,011	22,468	9,600	0	0	0	0	0	0	3,009	7,115	50,169
1990	5,996	4,011	6,661	600	14,679	17,761	65,145	25,013	84,435	16,498	13,002	7,648	261,450
1991	3,967	4,011	6,661	2,315	0	0	0	0	65,294	10,859	11,366	1,539	106,011
1992	3,967	4,011	6,661	13,678	0	0	0	0	18,639	43,245	28,238	28,347	146,785
1993	33,973	32,891	6,661	2,568	0	0	0	0	0	9,902	0	1,539	87,532
1994	13,693	4,011	31,016	8,531	0	0	0	0	7,346	0	0	1,539	66,135
1995	3,967	4,011	6,661	1,073	0	0	0	0	0	1,761	15,533	1,539	34,544
1996	3,967	7,284	6,661	5,487	0	0	0	559	2,610	0	0	1,539	28,106
1997	3,967	4,011	6,661	2,981	0	0	0	0	0	14,930	23,368	28,347	84,264
1998	33,973	32,891	6,661	0	0	0	0	35,128	0	0	0	1,539	110,191
1999	3,967	4,011	49,707	998	0	0	0	0	0	1,424	0	1,539	61,646
2000	3,944	16,918	7,536	4,299	0	0	0	2,769	6,143	0	0	1,539	43,147
2001	3,966	4,011	6,661	9,099	0	0	0	0	0	0	0	1,539	25,276
2002	3,966	4,011	11,192	6,845	0	0	0	0	0	0	0	1,539	27,553
2003	3,967	4,011	10,938	22,931	0	20,937	0	0	10,094	68,407	0	1,539	142,824
2004	3,967	4,011	6,661	25,473	0	0	0	0	0	33,806	28,238	28,347	130,502
2005	28,759	27,754	18,635	18,352	0	0	0	33,850	0	0	0	1,539	128,888
2006	5,254	4,011	7,577	11,534	12,153	0	0	0	0	0	0	1,539	42,068
2007	3,967	4,011	6,661	600	10,318	16,242	11,719	15,186	17,415	7,796	11,874	11,561	117,350
2008	13,005	13,741	23,544	3,429	0	0	0	0	0	0	0	1,539	55,257
2009	3,966	4,011	6,661	1,064	15,192	18,482	8,969	1,676	3,549	0	0	1,539	65,109
2010	3,966	4,011	6,661	854	0	0	0	0	0	0	0	1,539	17,030
2011	7,917	4,011	5,833	2,039	0	0	0	3,374	8,886	0	0	1,539	33,597
2012	3,967	4,011	6,661	600	12,726	19,727	6,477	2,744	6,122	0	0	1,539	64,574
2013	3,967	4,011	6,661	600	13,386	19,722	4,702	3,214	10,104	0	0	1,539	67,905
AVG	7,386	7,481	11,406	7,062	4,399	5,028	3,592	2,842	8,360	7,406	4,537	6,004	75,505
MAX	33,973	32,891	89,678	59,511	92,970	64,703	65,145	35,128	84,435	83,278	28,238	28,347	261,450
MIN	2,629	4,011	5,833	0	0	0	0	0	0	0	0	201	17,030

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

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TOTAL FOR ISF AND B&E WHEN AG IS SHORT

720,513	TOTAL
12.08	YEARS
59,629	DRT AVG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1940			0	0	0	0	0	0	0	0	0	0	0
1941	0	0	0	0	0	0	0	0	0	0	0	0	0
1942	0	0	0	0	0	0	0	0	0	0	0	0	0
1943	0	0	0	0	0	0	0	0	0	0	0	0	0
1944	0	0	0	0	0	0	0	0	0	0	0	0	0
1945	0	0	0	0	0	0	0	0	0	0	0	0	0
1946	0	0	0	0	0	0	0	0	0	0	0	0	0
1947	0	0	0	0	0	0	0	0	0	0	0	0	0
1948	0	0	8,528	16,250	8,012	11,310	17,171	1,735	0	0	0	1,539	64,545
1949	3,967	4,011	6,661	600	13,530	17,922	6,477	2,400	4,157	0	0	1,539	61,263
1950	3,967	4,011	6,661	600	14,207	19,302	6,779	2,813	6,180	3,244	0	1,539	69,302
1951	3,967	4,011	6,661	600	14,459	17,850	8,891	2,529	5,254	0	0	1,539	65,759
1952	3,967	4,011	6,661	600	13,126	18,257	6,477	3,271	6,565	2,946	0	1,539	67,419
1953	3,966	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1954	0	0	6,620	9,138	15,192	18,986	8,461	3,490	6,749	0	3,142	3,615	75,394
1955	3,967	4,011	8,221	600	13,756	18,133	34,375	23,716	54,031	1,601	0	1,539	163,951
1956	3,967	4,769	7,095	5,540	92,970	0	0	0	0	0	0	201	114,541
1957	2,629	10,153	6,661	600	10,318	17,072	6,477	1,697	16,677	7,550	4,351	9,050	93,235
1958	8,678	5,120	0	0	0	0	0	0	0	0	0	0	13,797
1959	0	0	0	0	0	0	0	0	0	0	0	0	0
1960	0	0	0	0	0	0	0	0	0	0	0	0	0
1961	0	0	0	0	0	0	0	0	0	0	0	0	0
1962	0	0	0	0	0	0	0	0	0	0	0	0	0
1963	0	0	6,628	5,846	10,257	0	0	3,805	7,151	0	0	1,539	35,225
1964	3,967	4,011	6,661	5,979	15,116	19,305	7,497	11,293	4,946	0	0	1,539	80,313
1965	3,967	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1966	0	0	0	0	0	0	0	0	0	0	0	0	0
1967	0	0	0	0	0	0	0	2,433	4,185	0	0	1,539	8,157
1968	3,967	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1969	0	0	0	0	0	0	0	0	0	0	0	0	0
1970	0	0	0	0	0	0	0	0	0	0	0	0	0
1971	0	0	0	0	0	0	0	0	0	0	0	1,539	1,539
1972	3,967	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1973	0	0	0	0	0	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	1,304	0	0	0	1,539	2,843
1979	3,967	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1980	0	0	0	0	0	0	0	0	25,000	14,978	0	1,539	41,517
1981	3,967	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1982	0	0	0	0	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0	0	0	1,539	1,539
1984	3,967	4,011	6,661	1,172	16,540	18,770	9,138	2,479	4,311	0	0	1,539	68,587
1985	3,966	4,011	0	0	0	0	0	0	0	0	0	1,539	9,516
1986	3,966	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1987	0	0	0	0	0	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0	0	0	3,009	7,115	10,124
1990	5,996	4,011	6,661	600	14,679	17,761	65,145	25,013	84,435	16,498	13,002	7,648	261,450
1991	3,967	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1992	0	0	0	0	0	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0	7,346	0	0	1,539	8,885
1995	3,967	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1996	0	0	6,661	5,487	0	0	0	559	2,610	0	0	1,539	16,856
1997	3,967	4,011	0	0	0	0	0	0	0	0	0	0	7,977
1998	0	0	0	0	0	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0	0	0	0	0	0
2000	0	0	7,536	4,299	0	0	0	2,769	6,143	0	0	1,539	22,285
2001	3,966	4,011	0	0	0	0	0	0	0	0	0	0	7,977
2002	0	0	0	0	0	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0	0	0	0	0	0
2006	0	0	7,577	11,534	12,153	0	0	0	0	0	0	1,539	32,803
2007	3,967	4,011	6,661	600	10,318	16,242	11,719	15,186	17,415	7,796	11,874	11,561	117,350
2008	13,005	13,741	0	0	0	0	0	0	0	0	0	0	26,745
2009	0	0	6,661	1,064	15,192	18,482	8,969	1,676	3,549	0	0	1,539	57,132
2010	3,966	4,011	0	0	0	0	0	0	0	0	0	0	7,977
2011	0	0	5,833	2,039	0	0	0	3,374	8,886	0	0	1,539	21,670
2012	3,967	4,011	6,661	600	12,726	19,727	6,477	2,744	6,122	0	0	1,539	64,574
2013	3,967	4,011	6,661	600	13,386	19,722	4,702	3,214	10,104	0	0	1,539	67,905
AVG	1,719	1,781	1,954	1,005	4,269	3,633	2,821	1,588	3,943	738	478	1,008	24,891
MAX	13,005	13,741	8,528	16,250	92,970	19,727	65,145	25,013	84,435	16,498	13,002	11,561	261,450
MIN	0	0	0	0	0	0	0	0	0	0	0	0	0

CONSOLIDATED RUN - MONTHLY DETAILED OUTPUT

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STORED WATER ALLOCATED TO AG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1940			202,000					76,500					278,500
1941			202,000					76,500					278,500
1942			202,000					76,500					278,500
1943			202,000					76,500					278,500
1944			202,000					76,500					278,500
1945			202,000					76,500					278,500
1946			202,000					76,500					278,500
1947			202,000					76,500					278,500
1948			115,000					46,000					161,000
1949			0					46,000					46,000
1950			0					0					0
1951			0					0					0
1952			0					0					0
1953			202,000					76,500					278,500
1954			0					0					0
1955			0					57,315					57,315
1956			145,000					57,088					202,088
1957			0					76,500					76,500
1958			202,000					76,500					278,500
1959			202,000					76,500					278,500
1960			202,000					76,500					278,500
1961			202,000					76,500					278,500
1962			202,000					76,500					278,500
1963			130,000					0					130,000
1964			0					0					0
1965			202,000					76,500					278,500
1966			202,000					76,500					278,500
1967			202,000					0					202,000
1968			202,000					76,500					278,500
1969			202,000					76,500					278,500
1970			202,000					76,500					278,500
1971			202,000					46,000					248,000
1972			202,000					76,500					278,500
1973			202,000					76,500					278,500
1974			202,000					76,500					278,500
1975			202,000					76,500					278,500
1976			202,000					76,500					278,500
1977			202,000					76,500					278,500
1978			202,000					46,000					248,000
1979			202,000					76,500					278,500
1980			202,000					56,870					258,870
1981			202,000					76,500					278,500
1982			202,000					76,500					278,500
1983			202,000					58,623					260,623
1984			0					0					0
1985			202,000					55,858					257,858
1986			202,000					76,500					278,500
1987			202,000					76,500					278,500
1988			202,000					76,500					278,500
1989			202,000					56,004					258,004
1990			0					76,500					76,500
1991			202,000					76,500					278,500
1992			202,000					76,500					278,500
1993			202,000					76,500					278,500
1994			202,000					59,477					261,477
1995			202,000					76,500					278,500
1996			130,000					0					130,000
1997			202,000					76,500					278,500
1998			202,000					76,500					278,500
1999			202,000					76,500					278,500
2000			115,000					0					115,000
2001			202,000					76,500					278,500
2002			202,000					76,500					278,500
2003			202,000					76,500					278,500
2004			202,000					76,500					278,500
2005			202,000					76,500					278,500
2006			145,000					46,000					191,000
2007			0					76,500					76,500
2008			202,000					76,500					278,500
2009			0					0					0
2010			202,000					76,500					278,500
2011			155,000					0					155,000
2012			0					0					0
2013			0					0					0
AVG			157,311					58,152					215,463
MAX			202,000					76,500					278,500
MIN			0					0					0

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END OF MONTH STORED WATER REMAINING FOR AG

	NORMAL
	LESS THAN SEVERE
	EXTRAORDINARY(rule)
	LOOK AHEAD

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1940			202,000	200,862	183,523	139,550	113,895	64,894	31,370	30,586		
1941			202,000	202,000	173,389	108,461	91,862	47,598	47,598	47,598		
1942			202,000	201,642	151,670	87,417	46,784	75,705	75,037	74,779		
1943			202,000	200,868	141,701	136,782	112,784	30,889	12,349	11,491		
1944			202,000	201,167	198,469	186,105	142,832	74,662	73,117	72,521		
1945			202,000	201,239	161,724	121,043	119,096	38,537	37,385	36,941		
1946			202,000	202,000	202,000	142,121	102,769	39,834	39,834	39,834		
1947			202,000	200,456	171,052	104,410	57,201	31,832	0	0		
1948			115,000	115,000	111,609	107,057	104,377	19,676	2,345	2,345		
1949			0	0	0	0	0	46,000	46,000	46,000		
1950			0	0	0	0	0	0	0	0		
1951			0	0	0	0	0	0	0	0		
1952			0	0	0	0	0	0	0	0		
1953			202,000	201,040	197,931	113,814	67,898	43,690	14,039	13,470		
1954			0	0	0	0	0	0	0	0		
1955			0	0	0	0	0	57,315	57,315	57,315		
1956			144,749	143,232	138,321	77,555	43,977	24,597	0	0		
1957			0	0	0	0	0	76,500	76,500	76,500		
1958			202,000	201,412	153,752	78,420	45,814	45,214	44,442	44,442		
1959			202,000	202,000	171,949	171,949	171,949	45,179	21,828	21,828		
1960			202,000	202,000	176,968	106,267	77,809	76,500	57,041	57,041		
1961			202,000	202,000	164,766	164,766	149,171	48,652	48,652	48,652		
1962			202,000	200,601	146,247	98,839	64,254	31,619	922	0		
1963			130,000	128,835	123,935	86,513	54,696	0	0	0		
1964			0	0	0	0	0	0	0	0		
1965			202,000	200,903	197,353	123,968	78,284	32,341	30,399	29,650		
1966			202,000	201,323	199,130	132,779	92,060	59,882	58,577	58,073		
1967			202,000	193,083	170,645	76,644	45,772	0	0	0		
1968			202,000	202,000	160,035	101,124	97,635	33,718	6,208	3,401		
1969			202,000	200,783	196,844	146,081	100,408	37,402	27,410	26,529		
1970			202,000	201,936	156,912	98,681	58,989	41,844	22,252	22,215		
1971			202,000	190,419	117,503	17,493	11,299	44,387	43,031	43,031		
1972			202,000	201,217	198,682	149,334	104,088	47,839	28,764	28,248		
1973			202,000	202,000	189,502	189,502	189,502	76,500	60,567	60,567		
1974			202,000	200,951	197,556	111,449	63,893	74,952	48,980	48,315		
1975			202,000	201,830	158,583	90,828	65,708	54,750	40,319	40,176		
1976			202,000	201,924	197,998	182,191	181,995	40,286	40,148	40,095		
1977			202,000	200,388	145,379	69,775	25,346	30,033	0	0		
1978			202,000	199,880	136,415	60,797	7,104	43,884	42,105	42,105		
1979			202,000	202,000	180,477	142,970	117,529	76,500	46,227	44,466		
1980			202,000	196,341	189,113	94,651	40,773	23,974	21,539	21,105		
1981			202,000	202,000	202,000	202,000	197,597	50,985	43,470	43,470		
1982			202,000	200,582	171,816	115,154	92,511	28,500	0	0		
1983			202,000	197,744	196,941	184,483	142,896	29,985	8,890	8,890		
1984			0	0	0	0	0	0	0	0		
1985			202,000	200,999	174,110	151,875	107,163	22,423	0	0		
1986			202,000	200,908	197,372	192,627	144,379	38,820	37,293	36,704		
1987			202,000	200,900	162,793	81,135	49,600	40,929	38,644	37,762		
1988			202,000	198,766	164,881	115,745	110,218	26,194	0	0		
1989			202,000	201,026	197,872	193,639	150,891	22,401	0	0		
1990			0	0	0	0	0	76,500	76,500	76,500		
1991			202,000	201,624	181,817	180,184	142,847	30,161	29,279	28,939		
1992			202,000	202,000	166,177	107,949	94,238	41,866	41,866	41,866		
1993			202,000	201,795	171,416	128,179	92,323	25,537	12,282	12,061		
1994			202,000	201,286	198,975	162,348	119,224	26,441	25,519	25,164		
1995			202,000	201,154	198,416	194,742	153,650	33,461	20,937	20,309		
1996			130,000	128,963	84,687	38,216	4,867	0	0	0		
1997			202,000	202,000	161,063	96,894	87,213	49,409	26,678	26,678		
1998			202,000	199,943	133,838	33,306	0	74,685	73,159	73,159		
1999			202,000	201,166	198,465	138,431	96,986	28,678	0	0		
2000			115,000	115,000	91,128	89,017	64,357	0	0	0		
2001			202,000	201,542	155,835	76,567	31,078	43,223	42,677	42,466		
2002			202,000	201,734	151,673	116,363	115,682	56,316	48,978	48,978		
2003			202,000	201,342	152,901	150,041	106,482	40,213	39,227	38,847		
2004			202,000	202,000	202,000	202,000	182,939	76,500	49,253	49,253		
2005			202,000	200,813	161,870	114,988	69,641	73,737	38,190	34,395		
2006			145,000	145,000	143,305	87,735	59,232	23,524	7,610	7,610		
2007			0	0	0	0	0	76,500	76,500	76,500		
2008			202,000	199,802	141,223	50,195	0	30,810	0	0		
2009			0	0	0	0	0	0	0	0		
2010			202,000	201,071	163,913	94,065	86,237	32,857	30,940	27,657		
2011			154,390	146,999	89,687	12,595	0	0	0	0		
2012			0	0	0	0	0	0	0	0		
2013			0	0	0	0	0	0	0	0		
AVG			157,299	156,236	134,828	96,349	72,295	36,998	26,624	26,304		
MAX			202,000	202,000	202,000	202,000	197,597	76,500	76,500	76,500		
MIN			0	0	0	0	0	0	0	0		

City of Leander 2025 Projected Demands

To whom it may concern,

Leander's 2025 projected demand of 8,500 ac-ft/year appears to be too low in the LCRA's Draft Technical Paper for Development of Projected Firm Demands for Municipal and Other Firm Uses, dated May 2018 (see attached).

2016 TWDB Planning Projections appear to be the basis for the projection; however, 2021 Planning Projections would be more appropriate for the City of Leander, given recent growth since 2016.

Our latest population estimate is 55,682 as of 12/31/2017. The US Census Population Estimate for the City of Leander is 49,234 as of July 2017.

Please consider using the TWDB's 2021 Planning Projections which should yield considerably higher demands for 2025. (It is anticipated that Leander will surpass a population of 59,821 in 2018.)

2016 Regional Water Plan - Municipal Water Demand Projections for 2020-2070
City Summary (in ACFT)

Entity Id	WUGName	2020	2030	2040	2050	2060	2070
2620	LEANDER	6,039	11,053	18,490	27,336	33,347	39,976

2016 Regional Water Plan - Population Projections for 2020-2070
City Summary

Entity Id	City Name	2020	2030	2040	2050	2060	2070
2620	LEANDER	50,562	94,378	158,728	235,142	287,051	344,240

2021 Regional Water Plan - Water Demand Projections for 2020-2070
Municipal Water User Group Summary in Acre-Feet

Entity Id	WUG Name	Region	County	Basin	2020	2030	2040	2050	2060	2070
1310	LEANDER	G	WILLIAMSON	BRAZOS	6,562	9,846	12,920	16,012	19,897	24,500
1310	LEANDER	K	TRAVIS	COLORADO	1,519	3,550	3,747	3,953	4,046	4,222
LEANDER Total Water Demand					**8,081**	**13,396**	**16,667**	**19,965**	**23,943**	**28,722**

Texas Water Development Board April 2018

2021 Regional Water Plan - Population Projections for 2020-2070
Municipal Water User Group Summary

Entity Id	WUGName	Region	County	2020	2030	2040	2050	2060	2070
1310	LEANDER	G	WILLIAMSON	48,575	74,150	97,757	121,365	150,905	185,879
1310	LEANDER	K	TRAVIS	11,246	26,735	28,349	29,963	30,689	32,033
LEANDER Total Population				**59,821**	**100,885**	**126,106**	**151,328**	**181,594**	**217,912**

Texas Water Development Board April 2018

Sincerely,
Pat
Patrick A. Womack, P.E.
Public Works Director
City of Leander

WMP Comment

It seems as demand increases, so should the minimum combined storage to insure sufficient reserves over a similar period of time during extreme droughts. I am not sure this has been taken into consideration or discussed.

Thank you,
Kenneth A. Gorzycki, CGCS
Director of Agronomy
Horseshoe Bay Resort & Summit Rock Golf Club

HIGHLAND LAKES FIRM
WATER CUSTOMER COOPERATIVE

June 22, 2018

Via email to: LCRAWMP@lcra.org.
Lower Colorado River Authority
LCRA Headquarters
3700 Lake Austin Blvd.
Austin, TX 78703
Re: LCRA WATER MANAGEMENT PLAN
Initial Comments on Technical Papers Released on May 21, 2018

TO WHOM IT MAY CONCERN:

The Highland Lakes Firm Water Customer Cooperative (HLFWCC) is a group of public water suppliers who all have firm water contracts with LCRA for municipal water supplies on which they rely exclusively or primarily for their municipal water supplies. As of the date of this letter, the following governmental entities are members of the HLFWCC:
City of Burnet
City of Cedar Park
City of Leander
City of Pflugerville
Lakeway MUD
Travis County WCID No. 17
West Travis County Public Utility Agency
City of Lago Vista
City of Marble Falls

The water provided to the foregoing entities for public water supplies under their contractual arrangements with LCRA originates in whole or in part from water rights held by LCRA under its Certificates of Adjudication, which require development and approval, through a public process, of the Water Management Plan ("WMP") pursuant to which LCRA manages the state-owned water entrusted to it. Collectively, the member entities of HLFWCC have contracts for approximately 89,4733 acre-feet of firm, non-interruptible water per year. This represents over 20% of the total amount of firm, non-interruptible water that the LCRA has under contract. Therefore, the HLFWCC members are key stakeholders in any WMP update process.

HLFWCC members have used their best efforts to expeditiously review and analyze the first set of technical papers made available by LCRA at its May 21, 2018 meeting. Unfortunately, the brief time allowed for review of these papers does not allow for us to comment in depth on the technical approaches proposed or to evaluate the consequences of

utilizing the proposed approaches, and we reserve the right to do so in the future. However, in response to LCRA's call for comments, HLFWCC offers the following initial general comments for LCRA's further consideration as this process moves forward:

1. **The proposed new demand projection methodology may put firm customers' municipal water supplies at risk.**

   HLFWCC members have questions and concerns about using the new, proposed methodology to calculate projected demand because it may reduce reliability of and increases risk to public water supply. In the May 2018 draft technical paper entitled, "*Development of Projected Firm Demands for Municipal and Other Firm Uses*," LCRA explains that it is adjusting the Region K municipal water demands to account for reduced demand in years that are <u>not</u> "hot and dry high-use demand years" based on a new approach. In the interest of time, the new proposed Austin-only approach is not discussed in these comments; however, for non-Austin users, HLFWCC offers the following initial comments on the proposed new methodology. As we understand it, for non-Austin users, LCRA proposes to base water demand projections in the WMP on lower ("non-high") demand discovered by averaging water use from 2011 through 2016, comparing that period to water use in 2011, and applying the ratio of those calculations to Region K's projected water demands. The technical paper states that this new "weather-varied" demand projection methodology results in a 15% reduction to previously forecasted non-Austin water demand, and a finding that less than half of the historical period would be considered a "high-use" year over the selected historical period (ie., 35% of the years between 1940 and 2016). HLFWCC would like an opportunity to review these calculations and input data and discuss our questions and concerns with LCRA staff.

   It is unclear from the technical paper why this new "weather-varied" yet limited averaging approach to demand forecasting is relevant or necessary, but HLFWCC submits that consideration of demand in years that <u>are</u> "hot and dry high-use demand years" is an important purpose of the WMP and should be one of the underlying conditions assumed for all long-term planning purposes. HLFWCC is concerned that the averaging methodology described in the technical paper may result in a risk to future firm water supplies. HLFWCC believes that it may be more appropriate to continue using a more conservative approach, one that is the most protective of public water supplies and consistent with the Certificates of Adjudication entrusted to LCRA.

2. **LCRA's communication about and opportunities for public review and comment on proposed "technical issues" are too limited.**

HLFWCC believes that LCRA needs to provide more comprehensive explanations for proposed "technical" changes to WMP methodology, and that it should not arbitrarily close the period for commenting on any "technical" issue. HLFWCC finds that the proposed changes to "technical" issues cannot be evaluated in the absence of information about how exactly the WMP might be revised using the new approach. At this juncture, for example, it is impossible to offer fully informed comments because any resulting revisions to the WMP caused by the new approach have not been revealed. HLFWCC finds the "technical papers" to be far from thorough in explaining the pros and cons for adopting the alternative approaches presented in the papers. Finally, HLFWCC believes that a thirty-day period to review "technical papers" about which there is incomplete information is arbitrary and truncates evaluation of both the "technical paper" as well as any possible outcomes produced by possible adoption of any proposed new approach.

3. **LCRA should consider water conservation by firm water customers.**

For quite some time HLFWCC members and others have taken significant steps to reduce water use. HLFWCC members are concerned that their water conservation efforts by public water suppliers might result in the conserving water supplier's demand projections being unrealistically lowered for WMP purposes. Water conservation comes at great monetary cost to the conserving entities; therefore, greater clarity regarding how conservation efforts affect the conserving water supplier and WMP calculations is needed.

HLFWCC appreciates the opportunity to provide these preliminary comments and reserves the right to offer additional comments and request additional information from LCRA as the WMP revision process moves forward.

HIGHLAND LAKES FIRM WATER CUSTOMER COOPERATIVE

By:_____

Earl Foster, President, Steering Committee

cc: HLFWCC Steering Committee