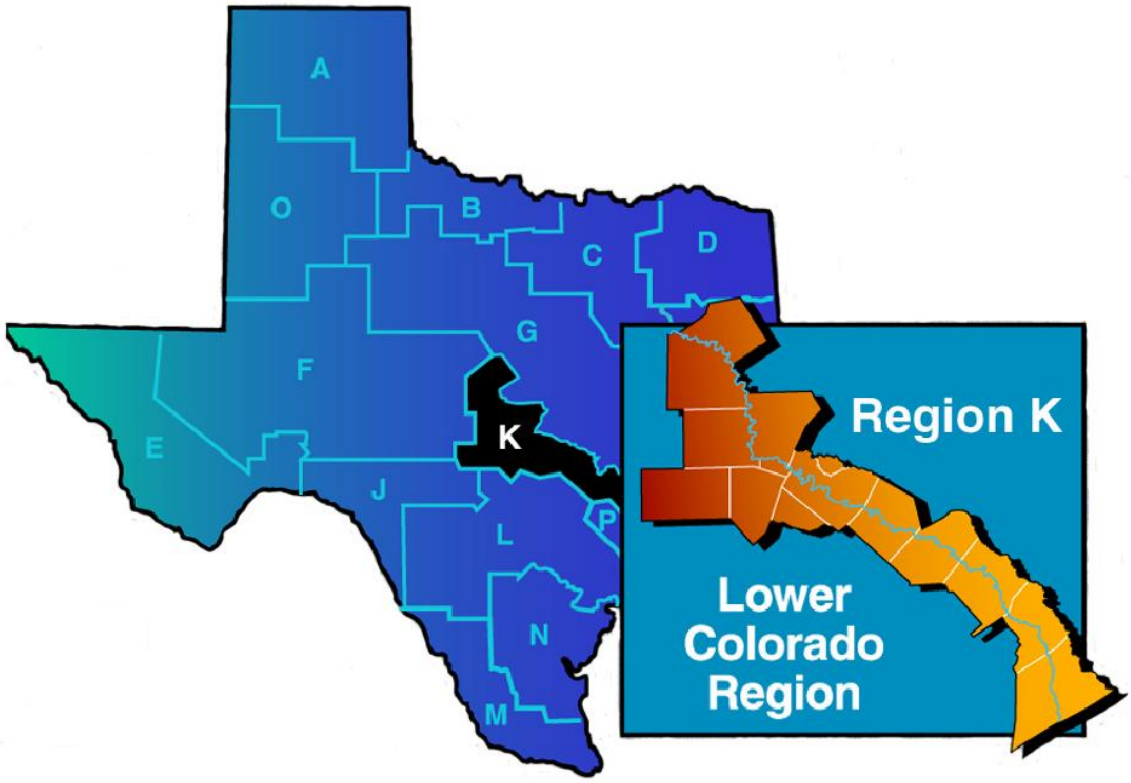
LCRWPG 2011 WATER PLAN

FIRST BIENNIUM STUDIES

SURFACE WATER AVAILABILITY MODELING STUDY

for the

Lower Colorado Regional Water Planning Group



prepared by

Lower Colorado Regional Water Planning Group

with funding assistance from the Texas Water Development Board

prepared for

Texas Water Development Board

with assistance from

AECOM USA Group, Inc.

TBPE Reg. No. F-3082

APRIL 2009

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Lower Colorado Regional Water Planning Group

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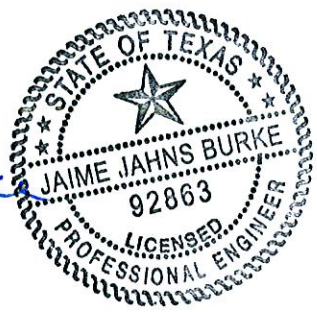

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EXECUTIVE SUMMARY

Purpose of Study

In the January 2006 Lower Colorado Regional Water Planning Group (LCRWPG) Water Plan, the availability of existing surface water supplies in the Colorado River Basin were originally calculated using the Run 3 Version of the Texas Commission on Environmental Quality's (TCEQ) Colorado River Basin Water Availability Model (WAM), dated November 2004. In addition to the standard WAM Run 3, the Regional Planning Group also authorized the development of an alternative WAM run which was referred to as the "No Call" WAM Run 3. The No Call WAM was developed as a result of a request from the Region F Planning Group. The November 2004 WAM indicated a lack of water available on a firm yield basis in a number of Region F's reservoirs as compared to the last planning cycle. The modeling that was to be conducted would be a "WHAT IF" scenario which would generally assume that, during the 50-year planning period, certain large downstream senior water rights holders would not call for water they were legally entitled to by virtue of their priority and would instead allow that water to be impounded in upstream Region F reservoirs.

While the Region K group adopted the adjusted numbers for use in determining Region K surpluses and shortages for the current planning cycle, significant concerns remained. The purpose of this report is to review the concerns as well as additional technical issues as part of a re-evaluation of the TCEQ Colorado River WAM, and to determine whether a more appropriate alternative version of the WAM could be created to more accurately determine the surface water availabilities of the Lower Colorado River. An alternative model, if approved by the TWDB, would be used in current and future rounds of planning to determine availabilities and evaluate water management strategies.

Methodology

The tasks for this report were shared by the consultants for Region K, the City of Austin, and the Lower Colorado River Authority (LCRA). Each consultant was responsible for providing a technical memorandum summarizing their analysis and findings.

Results

The water availability model adopted by the planning group for use in determining surface water availabilities in current and future rounds of planning is known as the *Region K WAM Run 3 Cutoff Model*. The model is a modified version of the TCEQ WAM Run 3, where the basin is essentially divided into two parts, an upper basin and a lower basin. The dividing point is the dams for Ivie Reservoir and Lake Brownwood. All of the water rights are managed according to Prior Appropriation Doctrine, except that all of the water rights in the upper basin are considered senior to the water rights in the lower basin. As the model is a Run 3 version, all of the water rights are represented with their full authorization amounts. This model better reflects the actual and historical operating conditions and existing contractual agreements between LCRA and certain upper basin water right holders than the TCEQ WAM and even the "No Call" WAM developed for the 2006 Region K Plan does. The model's use was approved by TWDB on March 11, 2008.

Availabilities were calculated for reservoir firm yields, including the specific components of the Highland Lakes system, and the major run-of-river rights for the decades 2010 through 2060. Comparisons to the results presented in the 2006 Region K Plan were made. Overall, total availability increased slightly for all decades except 2060, as compared to the 2006 Region K Plan.

Once the availabilities were determined, the supplies were calculated for the water user groups (WUGs) and were compared to the WUG demands from the 2006 Plan. (Population and demand numbers will not be revised until the next phase of planning.) This provided a second method of viewing what effects the revised WAM had on the Region K numbers. The supply numbers for livestock, manufacturing, and mining uses did not change at all. The supply numbers for municipal use, irrigation use, and steam-electric use were smaller than in the 2006 Plan. The supplies decreased even though the overall availability increased as a result of the way the supplies are calculated. The additional availability can be used for future water management strategies.

Looking at the supply shortage changes by county was another method of analysis. Six of the fourteen counties in Region K had supply shortage changes: Colorado County, Fayette County, Llano County, Matagorda County, Mills County, and Wharton County. Eight counties had supply shortages that remained the same as in the 2006 Region K Plan: Bastrop County, Blanco County, Burnet County, Gillespie County, Hays County, San Saba County, Travis County, and Williamson County.

The three counties that showed an increased shortage as compared to the 2006 Region K Plan were Llano County, Matagorda County, and Mills County. Llano County had an increased municipal shortage from a reduced firm yield for the City of Llano reservoir. Mills County also had an increased municipal shortage from a reduced firm yield for the City of Goldthwaite reservoir. Matagorda County had an increased irrigation shortage from the June 29, 1913 priority date for the Gulf Coast run-of-river irrigation water right.

Recommendations

The purpose of this study was to evaluate other alternative surface water availability models for the Colorado River, choose the model that most appropriately reflects the actual and historical operating conditions and existing contractual agreements between LCRA and certain upper basin water right holders, use the model to determine the revised availabilities, and compare those availabilities to the ones determined in the 2006 Region K Plan.

The model chosen is the Region K WAM Run 3 Cutoff Model, which more accurately reflects the conditions of the Colorado River than either the TCEQ WAM or the "No Call" WAM developed for the 2006 Region K Plan. The model's use was approved by TWDB on March 11, 2008. With continued updates, it is currently recommended that this model be used to determine surface water availabilities of the Colorado River now and in future planning cycles.

Overall, the 2006 Region K Plan and the 2008 Region K WAM Cutoff model total availability numbers are very similar. Through its review, input, and recommendations related to this Task 1 process, the planning group has indicated the effort put forth to create the Region K WAM Cutoff model has been valuable in advancing the group's understanding of the surface water availability for the Colorado River Basin. The acceptance of the Cutoff modeling assumption allows the TCEQ WAM to be modified in a manner that alleviates the problems which were created by the modeling assumptions used in the 2006 round of planning. The information provided from the revised model can be a new starting point for surface water availability estimation as part of the 2011 Plan. Despite the overall similarities in total water availability with the 2006 Region K Plan, the preliminary supply estimates presented in this study indicate both increases and decreases in run-of-river water availability at the level of individual water rights as compared to the supply estimates in the 2006 Plan. The largest shortage increase created by the revised model was located in irrigation in Matagorda County, specifically for the Gulf Coast run-of-river water right. Percentage-wise, all of the irrigation run-of-river water rights with the June 29, 1913 priority

date were reduced in the revised model as compared to the 2006 "No-Call" model. The Garwood irrigation water right, with the most senior priority date of November 1, 1900, showed an increase in availability from the results of the 2006 "No-Call" model, with that water most likely coming from the availability decrease in the less senior irrigation water rights. Although there are supply differences on an individual water right basis between the two models, the similarity in water availability on an aggregate regional basis gives confidence in the performance of the Cutoff modeling assumption. The individual differences in water right supplies are likely attributable to the manner in which the two models achieve a redistribution of inflows between the upper and lower Colorado basins, with 2008 Region K WAM Cutoff model offering an improvement in model representation of real-world operations. Efforts to expand current strategies or create new strategies to address these new shortages will occur during the next phase of planning.

1.0 PURPOSE OF STUDY

In the January 2006 Lower Colorado Regional Water Planning Group (LCRWPG) Water Plan, the availability of existing surface water supplies in the Colorado River Basin were originally calculated using the Run 3 Version of the Texas Commission on Environmental Quality's (TCEQ) Colorado River Basin Water Availability Model (WAM), dated November 2004. The results of that analysis were presented in *Tables 3.1* through *3.3* in the 2006 Region K Plan.

In addition to the standard TCEQ WAM Run 3, the LCRWPG also authorized the development of an alternative WAM run which was referred to as the "No Call" WAM Run 3. The No Call WAM was developed as a result of a request from the Region F Planning Group. The November 2004 TCEQ Run 3 WAM indicated a lack of water available on a firm yield basis in a number of Region F's reservoirs as compared to the last planning cycle. The No Call WAM appropriated the water to the two regions more accurately and addressed the current operations of the river system. The results of that analysis were presented in *Tables 3.1a* through *3.3b* in the 2006 Region K Plan.

The water availability modeling using the November 2004 TCEQ Run 3 WAM showed a significant increase in the amount of firm yield and run of river water in the Lower Basin as compared to the amount shown as being available in the 2001 plan. There are a number of possible explanations for these differences. Region F, which includes the upstream portion of the Colorado Basin, also used the November 2004 Colorado Basin WAM for 2006 water plan development. Under the Run 3 scenario, many of the reservoirs in Region F showed little to no firm yield. These reservoirs are the only source of supply to numerous communities in Region F, and the water supply scarcities are such that there are currently few additional economically viable alternatives for supply. One strategy that Region F identified to meet these needs was subordination of downstream senior water rights in Region K, and some Region F members approached Region K water rights holders regarding this issue. The issue of subordination and why it is appropriate is addressed in the 2006 Region K Plan.

The issues noted above were presented to the LCRWPG. Both the Region F and Region K groups recognized the need for coordination between the two regions. Due to the lack of time and funding, it was suggested that the impacts of temporarily implementing a "No Call" assumption could be examined as a potential "quick fix" in order to meet the mandatory deadlines of the 2006 planning cycle. Consequently, Planning Group members voted to proceed with a joint modeling effort on the part of Region F and Region K consultants. The modeling that was to be conducted would be a "WHAT IF" scenario which would generally assume that, during the 50-year planning period, certain large downstream senior water rights holders would not call for water they were legally entitled to by virtue of their priority and would instead allow that water to be impounded in upstream Region F reservoirs.

The joint modeling effort proposal was presented to the Region K group in the following manner:

1. Region K would be able to review the numbers produced from the joint modeling effort and determine whether to use those revised numbers for the shortages and surpluses analysis in place of the numbers calculated by the November 2004 WAM.

2. The effort would be a planning exercise only. No legal positions would be changed or waived as a result of this exercise. No downstream water right holders would be asked or required to formally cede or amend any of their water rights as a result of this planning exercise. In other words, the availability adjustments would have no legal effect and would be temporary in nature.

While the Region K group adopted the adjusted numbers for use in determining Region K surpluses and shortages for the current planning cycle, significant concerns remained:

1. Due to the time frame and technique employed, the numbers that were developed were approximations that may still have some amount of error in them. One clear example of this is that junior water rights in Region K that were not subject to the No Call assumption appeared to experience an increase in reliability, which should not have occurred. Further, the Planning group had remaining questions about the assumptions used by Region F's consultants for allocation of water among various users within Region F itself and the use of safe yield, which could have affected availability of water in Region K to some degree.

2. Overall, the No Call modeling approach resulted in an allocation of stored water among LCRA firm customers and environmental commitments that does not represent the LCRA's likely operations to meet existing legal commitments to provide firm water. Some of the inaccuracies that were experienced in the model were a result of the model using a monthly time step and other simplifying assumptions embedded in the underlying WAM. The WAM's treatment of environmental flow requirements in LCRA's Water Management Plan, for example, appeared to send additional flow during a month even if the commitment was satisfied mid-month. Further, the modeling approach assumed that the biggest impact should be borne by the most junior of these water rights, that being the LCRA's rights for Lakes Buchanan and Travis. This assumption resulted in apparent shortages in Highland Lakes firm commitments largely as a result of the manner in which the WAM allocates firm supply from the Highland Lakes to LCRA's various customers and the environment. LCRA, in reality, does not operate its system of various water rights today in that manner. Because LCRA's irrigation customers are largely served through annual interruptible contracts instead of long-term, firm contracts, a No Call assumption that takes more water from the LCRA's irrigation run-of-river rights while preserving more of the Highland Lakes firm yield would probably have been more appropriate if time had allowed for further refinement of the No Call model approach.

3. There was concern among the group members regarding the impact of the No Call assumption on environmental flows. Two critical issues of concern are as follows. First, the timing of the request and the availability of the numbers was such that there was neither time nor budget for a thorough review of the impact on the environmental flows in the basin. Second, the No Call assumption appeared to suggest that LCRA would not have any interruptible water supply available to meet environmental flow needs. While the group recognized that a full water rights and contract demand without return flows is not projected to occur for some time and consequently, interruptible supply and return flows would, in fact, be available during this planning period to meet some level of environmental flow needs, members felt that a thorough review and analysis of the impact of the No Call assumption on instream flows and bay and estuary inflows was needed as soon as possible.

4. There had been a lengthy debate among the regional planning group members concerning the inclusion of the No Call adjustments in the water availability chapter in the Region K Plan. Region K normally operates on a consensus basis, with all members agreeing to move forward with actions, although some may have reservations. With this issue, there was a clear division among the group. Some members expressed frustration that the short timeframe of the joint-modeling effort made it very difficult to develop a thorough understanding of the results and impacts. Further, members struggled with whether the No Call adjustments should be handled as a management strategy instead of an adjustment to the availability in Region K.

5. During the process, the group identified several technical issues with the WAM (discussed below) that could affect the magnitude or ultimate need for a No Call assumption.

A number of technical issues regarding the WAM had been identified as requiring further consideration and analysis. Due to the lack of time and funding, it was not possible to fully explore these issues in time for them to be addressed in the 2006 plan. The Region K group recommended, however, that these issues be further examined during future rounds of planning. These issues generally include enhancements to the WAM routines, updates to the datasets, and a review of fundamental assumptions. Some specific examples of issues that were identified for further review include:

a. The WAM's approach to modeling environmental flow restrictions on water rights

b. The naturalized flows used in the WAM

c. The WAM's incorporation (or lack thereof) of channel gains and losses

d. The WAM's treatment (or lack thereof) of "futile call" issues

e. The WAM's incorporation of existing subordination or similar agreements and ability to model these types of agreements

f. The WAM's backup of Austin's steam electric water rights with LCRA stored water

g. The WAM's backup of STPNOC's steam electric water rights with LCRA stored water

h. The WAM's representation of a zero firm yield for several major reservoirs in the basin

It is recognized that a few of the above listed issues have been under investigation for betterment of the model. For example, during May 2005, TCEQ revised some of the naturalized flow estimates for the Lower Basin; however, it was not feasible to incorporate the revision in the datasets in the last round of planning.

The purpose of this report is to review the technical issues listed above as part of a re-evaluation of the TCEQ Colorado River WAM, and to determine whether a more appropriate alternative version of the WAM could be created to more accurately determine the surface water availabilities of the Lower Colorado River. An alternative model, if approved by the TWDB, would be used in current and future rounds of planning to determine availabilities and evaluate water management strategies.

2.0 METHODOLOGY

The tasks for this report were shared by the consultants for Region K, the City of Austin, and the Lower Colorado River Authority (LCRA). Each consultant was responsible for providing a technical memorandum summarizing their analysis and findings. These technical memorandums are provided in *Appendix A.*

The City of Austin consultant (Hoffpauir Consulting) conducted a detailed review of the hydrologic and water right information in the TCEQ Colorado River WAM, and addressed the technical issues mentioned both previously in this report and in the 2006 Region K Plan. This technical memorandum is provided in *Appendix A.*

The LCRA consultant (TRC/Brandes) conducted an evaluation of water availability models for the Colorado River Basin. The evaluation provided descriptions, comparisons, advantages, and disadvantages of several alternative water availability models. The memorandum was used for discussion purposes in determining which of the models the planning group thought would be the best alternative for determining surface water availabilities. This technical memorandum is provided in *Appendix A.*

The Region K consultant provided support and review of the above-mentioned analyses, as well as researched relevant water right, agreement, and amendment information that required updating since the 2006 Region K Plan. The Region K consultant recommended which water availability model the planning group should adopt, requested approval of said model from TWDB, and used the model to determine new surface water availabilities and shortages and compared them to the ones reported in the 2006 Region K Plan. The results of the model will be discussed later in *Section 3.0 Results*. The technical memorandum discussing the updated water right, agreement, and amendment information is provided in *Appendix A.* A description of the model as well as the request and approval letters for allowing the use of the model are all provided in *Appendix B.*

Please note that the availability results from this approved model are preliminary and should be considered unofficial for the 2011 Region K Plan. There are still a number of issues the Region K Water Modeling Committee needs to deliberate on before final supply numbers for the 2011 plan can be developed and brought before Region K for consideration for approval. Outstanding issues include:

- status of any recent changes TCEQ has made to the Colorado River WAM
- clarification of adjustments to the naturalized inflow file,
- possibility of using updated Freshwater Inflow Needs Study (FINS) or other LCRA Water Management Plan (WMP) environmental flow criteria that are not in the current TCEQ Water Availability Model
- other issues to be determined

3.0 RESULTS

The water availability model adopted by the planning group for use in determining surface water availabilities is labeled as *5) LCRA No-Call Cutoff Run 3 WAM* in the TRC/Brandes technical memorandum shown in *Appendix A*. Once adopted by the planning group, the name was revised to the *Region K WAM Run 3 Cutoff Model*. The model is a modified version of the TCEQ WAM Run 3, where the basin is essentially divided into two parts, an upper basin and a lower basin. The dividing point is the dams for Ivie Reservoir and Lake Brownwood. All of the water rights are managed according to Prior Appropriation Doctrine, except that all of the water rights in the upper basin are considered senior to the water rights in the lower basin. All of the water rights are represented with their full authorization amounts. This model better reflects the actual and historical operating conditions and existing contractual agreements between LCRA and certain upper basin water right holders than the TCEQ WAM and even the "No Call" WAM developed for the 2006 Region K Plan does. A detailed description of the model is provided in *Appendix B*. The model's use was approved by TWDB on March 11, 2008. The request and approval letters are also provided in *Appendix B*. All results provided in this study should be considered preliminary and unofficial for the 2011 Region K Plan.

3.1 HIGHLAND LAKES SYSTEM

Availabilities were calculated for reservoir firm yields, including the specific components of the Highland Lakes system, and the major run-of-river rights for the decades 2010 through 2060. *Table 3.1* below displays the availability results of the components of the Highland Lakes System from the Region K Cutoff Model. The decrease in the Uncommitted System Yield throughout the decades is due to increased sedimentation in Lakes Buchanan and Travis.

Table 3.1 Components of the Highland Lakes System Firm Yield

Entity or Use	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2010	2020	2030	2040	2050	2060
O.H. Ivie Reservoir Yield Reduction	0	0	0	0	0	0
Backup of City of Austin Water Rights [1]	79,603	87,897	87,860	87,860	87,860	87,884
Highland Lakes Contracts	85,789	85,789	85,789	85,789	85,789	85,789
LCRA Cooling Water [1]	64,551	64,551	64,551	64,551	64,551	64,551
STP Nuclear Operating Company [1, 2]	27,506	32,960	32,480	32,480	32,480	32,840
Instream Flow Requirements [1]	25,081	18,453	18,453	18,453	18,453	18,453
Bay and Estuary Flow Requirements [1]	28,093	6,395	6,395	6,395	6,395	6,395
Additional Highland Lakes Contracts [1]	62,072	62,071	62,071	62,071	62,071	62,071
Total System Commitment	372,695	358,116	357,599	357,599	357,599	357,983
Uncommitted System Yield	29,411	30,511	24,711	19,111	13,111	7,211
Total System Yield	**402,106**	**388,627**	**382,310**	**376,710**	**370,710**	**365,194**

Notes: Colorado WAM provided by TCEQ, August 2007, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, November 2007
Drought-of-Record (DOR) is May 1945 to April 1957 (12 years) for 2010; May 1947 to April 1957 (10 years) for all other decades
[1] These values were averaged over the DOR
[2] Results vary from 0 ac-ft/year to 87,600 ac-ft/year during the DOR

A description of the entities that are components of the Highland Lakes System is taken from the 2006 Region K Plan:

O.H. Ivie Reservoir Yield Reduction

Freese & Nichols, Inc. (FNI) took the O.H. Ivie subordination out when they modeled the No Call assumption.

Backup of City of Austin Water Rights

The three LCRA backup amounts for the City of Austin municipal water rights were summed. These water rights are 61405471005RMBU, 61405471005LMBU, and 61405489003MBU.

Highland Lakes Contracts

The amount listed in the 1999 LCRA Water Management Plan was used.

LCRA Cooling Water

The availability for water rights 61405480001, 61405473001, and 61405474001 was summed.

STP Nuclear Operating Company

This is water right 61405437001BU. The available supply of backup water for STP from the Highland Lakes is limited to 20,000 ac-ft/yr (as a 5-year rolling average) with two generating units in operation (as is the case through 2015) and to 40,000 ac-ft/yr (as a 5-year rolling average) with any additional generating units in operation (beginning in the year 2016).

Instream Flow Requirements

In 1992, LCRA, working with the state natural resource agencies, completed an instream flow needs study. The study was later approved by the Texas Water Commission, predecessor agency to the TCEQ, as incorporated into LCRA's Water Management Plan. The results of that study included two sets of instream flow needs: Critical and Target instream flow needs. The quantity of water committed by the LCRA Highland Lakes System under the Water Management Plan to instream flows consists of (1) the passage of inflows to meet the Target and Critical instream flow criteria that might otherwise be available to store in the Highland lakes; and, (2) the release of stored water to help meet the Critical instream flow criteria. In order to determine the quantity of inflow the LCRA Highland Lakes System bypassed for instream flows in the WAM, the quantity of inflow available to the LCRA's Highland Lakes System before and after an environmental need is engaged, is computed and the inflow reduction to the LCRA Highland Lakes System due to each environmental need is attributed as water bypassed for each environmental need. To determine the quantity of additional stored water released for critical instream flows, the exact quantity of water released from the LCRA Highland Lakes System Storage to help meet each environmental need is extracted from the WAM output and attributed as stored water released for each environmental need. Once all of these components have been extracted and tabulated, the total quantity of water dedicated to instream flows is determined.

The 1999 LCRA Water Management Plan states:

"Total commitments of the Combined Firm Yield from the Highland Lakes for instream flow maintenance will be an average of 12,860 acre-feet per year, with a maximum of 36,720 acre-feet in any one year; 58,700 acre-feet in any two consecutive years; 76,800 acre-feet in any three or four consecutive years; 106,100 acre-feet in any five consecutive years and 128,600 acre-feet in any six to ten consecutive years."

Bay and Estuary Flow Requirements

This amount was the DOR average of BEC-IN (Bay and Estuary Critical – In) minus BEC-OT (Bay and Estuary Critical – Out) from the model output (10,845 ac-ft in the year 2000 scenario).

Critical inflow is the amount of water needed to provide a fishery sanctuary habitat near the mouth of the Colorado River during times of drought. From this sanctuary, fish, shellfish and oysters could be expected to recover and repopulate the bay when more normal weather conditions return.

The 1999 LCRA Water Management Plan states:
"Total commitments of the Combined Firm Yield from the Highland Lakes for bays and estuaries (estuarine inflows) will be an average of 3,090 acre-feet per year, with a maximum of 11,200 acre-feet in any one year; 19,700 in any two consecutive years; 24,200 acre-feet in any three or four consecutive years; 28,200 acre-feet in any five consecutive years and 30,900 acre-feet in any six to ten consecutive years. The total firm stored water commitment for both purposes (instream flow and bays and estuaries) will be an average of 15,950 acre-feet per year. Estimated interruptible stored water supplied during the critical drought for both purposes will be an additional 40,060 acre-feet per year."

Additional Highland Lakes Contracts

This amount includes contracts LCRA is maintaining that were not included in the 1999 Water Management Plan that have separate water rights associated with them. The components are the Cities of Cedar Park, Leander, Lometa, Pflugerville, and the Brazos River Authority.

Uncommitted System Yield

This was determined by subtracting the Highland Lakes Contracts amount (85,789 ac-ft) from the LCRA remaining firm yield (61405482001C) in the WAM. This amount includes any additional firm commitments LCRA has made since the 1999 WMP was approved that do not have separate water rights associated with them.

Highland Lakes

The total system yield decreases over time due to sedimentation of the reservoirs. The Highland Lakes firm yield is equal to the Total System Yield minus the O.H. Ivie Reservoir commitment, and is shown in *Table 3.2*.

Table 3.1A below displays the availability results for the components of the Highland Lakes System from the 2006 Region K Plan using the No Call Model.

Table 3.1A Components of the Highland Lakes System Firm Yield (2006 Region K Plan)

Entity or Use	2006 Region K Plan "No Call" Results (Ac-Ft/Yr)					
	2010	2020	2030	2040	2050	2060
O.H. Ivie Reservoir Yield Reduction	0	0	0	0	0	0
Backup of City of Austin Water Rights [1]	110,046	109,442	108,838	108,234	107,630	107,026
Highland Lakes Contracts	79,452	80,334	81,126	81,918	82,710	83,500
LCRA Cooling Water [1]	64,551	64,551	64,551	64,551	64,551	64,551
STP Nuclear Operating Company [1]	38,111	38,162	38,213	38,264	38,315	38,363
Instream Flow Requirements [1]	18,024	17,387	16,750	16,113	15,476	14,838
Bay and Estuary Flow Requirements [1]	9,863	8,881	7,899	6,917	5,935	4,952
Additional Highland Lakes Contracts [1]	61,408	61,409	61,410	61,411	61,412	61,412
Total System Commitment	381,455	380,166	378,787	377,408	376,029	374,642
Uncommitted System Yield	0	0	0	0	0	0
Total System Yield	**381,455**	**380,166**	**378,787**	**377,408**	**376,029**	**374,642**

Notes: Colorado WAM provided by TCEQ, November 2004, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, July 2004
Drought-of-Record (DOR) is May 1945 to April 1957 (12 years)
The values for 2010 through 2050 were determined by interpolation
[1] These values were averaged over the DOR

Table 3.1B below shows a comparison of the calculated availabilities using the Region K Cutoff Model and the 2006 Region K Plan No Call Model. The Region K Cutoff Model showed a total system yield that varied between an increase of 20,651 ac-ft/yr and a decrease of 9,448 ac-ft/yr, depending on the decade. The Region K Cutoff Model also showed a significant decrease in the Backup to the City of Austin and South Texas Nuclear Project availabilities. The decrease in the Backup of City of Austin availability is offset by the increase in the City of Austin run-of-river availability, which can be seen in *Tables 3.3A* and *3.3B*. The instream flows and bay and estuary flows increased substantially from the 2006 Region K Plan in 2010, but that is due greatly to the inclusion of Target flows as well as the Critical flows in the calculation versus the 2006 Region K Plan, which only included the Critical flows. The 2006 Region K Plan No Call Model assumed zero interruptible supplies (Uncommitted System Yield), while the Region K Cutoff Model had Uncommitted System Yield available for all decades. Other than these changes, the results from both models were fairly similar, with respect to the components of the Highland Lakes System.

Table 3.1B Components of the Highland Lakes System Firm Yield (Comparison)

Entity or Use	Region K Cutoff Results - 2006 "No Call" Results (Ac-Ft/Yr)					
	2010	2020	2030	2040	2050	2060
O.H. Ivie Reservoir Yield Reduction	0	0	0	0	0	0
Backup of City of Austin Water Rights	-30,443	-21,545	-20,978	-20,374	-19,770	-19,142
Highland Lakes Contracts	6,337	5,455	4,663	3,871	3,079	2,289
LCRA Cooling Water	0	0	0	0	0	0
STP Nuclear Operating Company	-10,605	-5,202	-5,733	-5,784	-5,835	-5,523
Instream Flow Requirements	7,057	1,066	1,703	2,340	2,977	3,615
Bay and Estuary Flow Requirements	18,230	-2,486	-1,504	-522	460	1,443
Additional Highland Lakes Contracts	664	662	661	660	659	659
Total System Commitment	-8,760	-22,050	-21,188	-19,809	-18,430	-16,659
Uncommitted System Yield	29,411	30,511	24,711	19,111	13,111	7,211
Total System Yield	**20,651**	**8,461**	**3,523**	**-698**	**-5,319**	**-9,448**

3.2 RESERVOIR FIRM YIELDS

The estimated firm yields for all reservoirs within the Colorado River Basin, calculated using the Region K Cutoff Model, are presented below in *Table 3.2*, for the decades 2010 through 2060.

Table 3.2 Reservoir Firm Yield

Entity or Use	Region K Cutoff Model Results (Ac-Ft/Yr)					
	2010	2020	2030	2040	2050	2060
Highland Lakes	**402,106**	**388,627**	**382,310**	**376,710**	**370,710**	**365,194**
City of Goldthwaite	0	0	0	0	0	0
City of Llano	0	0	0	0	0	0
Walter E. Long (Decker Lake)	0	0	0	0	0	0
Lake Bastrop	0	0	0	0	0	0
Lake Fayette	0	0	0	0	0	0
City of Lometa	0	0	0	0	0	0
STP Reservoir	0	0	0	0	0	0
Minor Reservoir Subtotal	**0**	**0**	**0**	**0**	**0**	**0**
TOTAL	**402,106**	**388,627**	**382,310**	**376,710**	**370,710**	**365,194**

Notes: Colorado WAM provided by TCEQ, August 2007, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, November 200
Drought-of-Record (DOR) is May 1945 to April 1957 (12 years) for 2010; May 1947 to April 1957 (10 years) for all other decades

A description of the minor reservoirs is taken from the 2006 Region K Plan:

- The **City of Goldthwaite** owns and operates a two-reservoir system as part of its water supply facilities. The reservoirs include a small reservoir with a capacity of 40 ac-ft adjacent to the river and a larger reservoir with a capacity of 200 ac-ft, which is located off-channel. The city pumps water from the Colorado River into the smaller reservoir and then pumps it into the larger reservoir, from which water is drawn for treatment. The size of the reservoirs are relatively small in comparison to the city's water demand, which is projected to decline from approximately 580 ac-ft in the year 2000 scenario to 565 ac-ft in the year 2060. Based on the limited storage available, the firm yields of the reservoirs are dependent upon continued river flows throughout the year. It is estimated that the available storage would be depleted within four months once the river ceases flowing. Based on the Region K Cutoff Model, it was determined that the Goldthwaite reservoir system has a firm yield of 0 ac-ft/yr (water rights 61402553401, 61402553402, and 61402553001).

- The **City of Llano** owns and operates two reservoirs on the Llano River: City Lake and City Park Lake, both of which are small channel dams. The two reservoirs were estimated to have a combined capacity of 503 ac-ft in 1988. This is significantly less than the original design capacity of 700 ac-ft. The decreased capacity is due to sedimentation rates in the two reservoirs. The firm yield estimated by the Region K Cutoff Model was 0 ac-ft/yr (water rights 61401650001 and 61401650002).

- **Lake Walter E. Long (Decker Lake)** is owned and operated by the City of Austin. The lake is formed by a dam on Decker Creek, which is a tributary to the Colorado River in Travis County. The City of Austin uses Decker to supply cooling water for an electrical generating plant. The City of Austin supplements the water supply to Decker by pumping water from the Colorado River based on run-of-river rights and a water supply contract with LCRA for stored water from the Highland Lakes. Therefore, because the water from Decker Lake has already been accounted for in run-of-river and LCRA backup amounts, the firm yield of the lake itself in the Region K Cutoff Model is considered 0 ac-ft/yr.

- **Lake Bastrop** is owned and operated by the LCRA. The lake is formed by a dam on Spicer Creek, which is a tributary to Piney Creek and the Colorado River in Bastrop County. The LCRA uses water from Lake Bastrop for cooling purposes at its Sam Gideon Power Generating Station. The LCRA supplements the water supply at this lake by pumping water into the lake from the Colorado River. The water pumped into the lake is stored water from the Highland Lakes. Therefore, because the water from Lake Bastrop has already been accounted for in run-of-river and LCRA backup amounts, the firm yield of the lake itself in the Region K Cutoff Model is considered 0 ac-ft/yr.

- **Lake Fayette** is owned and operated by the LCRA. The lake is formed by a dam on Cedar Creek, which is a tributary to the Colorado River in Fayette County. The LCRA uses water from Lake Fayette for cooling purposes at the Fayette Power Project. The LCRA supplements the water supply at this lake by pumping water into the reservoir from the Colorado River. A portion of the water pumped is run-of-river water rights held by the City of Austin, which is co-owner in the Fayette Power Project. The remainder of the water pumped into the reservoir is stored water from the Highland Lakes. Therefore, because the water from Lake Fayette has already been accounted for in run-of-river and LCRA backup amounts, the firm yield of the lake itself in the Region K Cutoff Model is considered 0 ac-ft/yr.

- **Lometa Reservoir** is owned and operated by the LCRA. The reservoir is formed by a dam on Salt Creek, which is a tributary to the Colorado River in Lampasas County. The LCRA uses water from Lometa Reservoir for municipal purposes within the service area of the City of Lometa. The reservoir has a normal maximum operating capacity of 554.6 ac-ft. A maximum of 882 ac-ft of water is available for diversion from the Colorado River, including 476 ac-ft for municipal demands and 406 ac-ft to off set evaporative losses. Because this amount is allocated against the Highland Lakes firm yield, the reported firm yield of the Lometa Reservoir is 0 ac-ft/yr.

- **South Texas Project Reservoir**: The Main Cooling Reservoir associated with the South Texas Project Electric Generating Station is a 7,000-acre (surface area) off-channel reservoir located in Matagorda County. At the maximum design operating level, the reservoir has a capacity of 202,600 ac-ft, or 9.6 percent of the total capacity of Lakes Travis and Buchanan as stated in the LCRA Water Management Plan. The firm yield from the Region K Cutoff Model is considered to be 0 ac-ft/yr since the reservoir firm yield is supplied by the STP run-of-river right (STP Nuclear Operating Co. et al.) and LCRA stored water from Lakes Buchanan and Travis, and the amount of water from the run-of-river right and LCRA's Highland Lakes has already been included in the water availability analysis for Region K (refer to *Tables 3.1* and *3.3*). If both the run-of-river right and the reservoir firm yield were included, then the water would be double counted since the water available to the reservoir is based on the diversions from the river.

The estimated firm yields for all reservoirs within the Colorado River Basin, from the 2006 Region K Plan, using the No Call Model, are presented below in *Table 3.2A*.

Table 3.2A Reservoir Firm Yield (2006 Region K Plan)

Entity or Use	2006 Region K Plan "No Call" Results (Ac-Ft/Yr)					
	2010	2020	2030	2040	2050	2060
Highland Lakes	**381,455**	**380,166**	**378,787**	**377,408**	**376,029**	**374,642**
City of Goldthwaite [1]	144	144	145	145	145	145
City of Llano [1]	178	169	160	151	142	135
Walter E. Long (Decker Lake)	0	0	0	0	0	0
Lake Bastrop	0	0	0	0	0	0
Lake Fayette	0	0	0	0	0	0
City of Lometa	0	0	0	0	0	0
STP Reservoir	0	0	0	0	0	0
Minor Reservoir Subtotal	**322**	**313**	**305**	**296**	**287**	**280**
TOTAL	**381,777**	**380,479**	**379,092**	**377,704**	**376,316**	**374,922**

Notes: Colorado WAM provided by TCEQ, November 2004, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, July 2004
Drought-of-Record (DOR) is May 1945 to April 1957 (12 years)
The values for 2010 through 2050 were determined by interpolation
[1] These values were averaged over the DOR

Table 3.2B below shows a comparison of the reservoir firm yields determined using the Region K Cutoff Model and the 2006 Region K Plan No Call Model. Overall, the Region K Cutoff Model varied between an increased firm yield and a decreased firm yield, depending on the decade. The reservoir firm yields for the City of Goldthwaite and the City of Llano did show a decrease by using the Region K Cutoff Model versus using the 2006 Region K Plan No Call Model. In the 2006 Plan, the firm yields that were reported for those two reservoirs were based on an average over the Drought-of-Record period, instead of the minimum amount of water available in any given year, which is a more appropriate definition. The Region K Cutoff Model assumed the true definition of reservoir firm yield to determine the amount of water available.

Table 3.2B Reservoir Firm Yield (Comparison)

Entity or Use	Region K Cutoff Results - 2006 "No Call" Results (Ac-Ft/Yr)					
	2010	2020	2030	2040	2050	2060
Highland Lakes	**20,651**	**8,461**	**3,523**	**-698**	**-5,319**	**-9,448**
City of Goldthwaite	-144	-144	-145	-145	-145	-145
City of Llano	-178	-169	-160	-151	-142	-135
Walter E. Long (Decker Lake)	0	0	0	0	0	0
Lake Bastrop	0	0	0	0	0	0
Lake Fayette	0	0	0	0	0	0
City of Lometa	0	0	0	0	0	0
STP Reservoir	0	0	0	0	0	0
Minor Reservoir Subtotal	**-322**	**-313**	**-305**	**-296**	**-287**	**-280**
TOTAL	**20,329**	**8,148**	**3,218**	**-994**	**-5,606**	**-9,728**

3.3 MAJOR RUN-OF-RIVER RIGHTS

A comparison of the 2010 availabilities for major run-of-river rights holders calculated using the Region K Cutoff Model and the 2006 Region K Plan No Call Model are presented in *Table 3.3A.* The water availability presented in the table for most of the major run-of-river rights is based on the amount of run-of-river water that would be available during the driest year of the DOR. The water availability for the City of Austin and STNP water rights is based on the average water availability during the DOR period, due to contracted backup supply from LCRA.

Table 3.3A Major Run-of-River Rights in the Colorado Basin 2010 Availability Comparison

Water Right ID Number	Water Right Holder	Maximum Permitted Diversion	Priority Date	Region K Cutoff (ac-ft/yr)	2006 Plan "No Call" (ac-ft/yr)	Difference (ac-ft/yr)
				2010	2010	2010
61405434201RR	LCRA - Garwood	133,000	Nov 1, 1900	130,141	111,740	18,401
61405475001LRRS	LCRA - Lakeside #1	52,500	Jan 4, 1901	10,405	10,570	-165
61405475001LRRL			Jun 29, 1913	1,573	6,274	-4,701
61405475001LRRR			Mar 8, 1938	0	0	0
61405475001LRRJ		78,750	Nov 1, 1987	553	2,925	-2,372
61405476003RRS	LCRA - Gulf Coast	228,570	Dec 1, 1900	14,476	14,554	-78
61405476003RRL			Jun 29, 1913	28,987	58,058	-29,071
61405476003RRR			Mar 8, 1938	0	0	0
61405476003RRJ		33,930	Nov 1, 1987	1,365	1,512	-147
61405476003JBU			Nov 1, 1987	0	0	0
61405477001RR	LCRA - Pierce Ranch	55,000	Sep 1, 1907	12,468	4,231	8,237
61405477001RRL			Jun 29, 1913	1,648	6,538	-4,890
61405477001RRR			Mar 8, 1938	0	0	0
61405475001WRR	LCRA - Lakeside #2	55,000	Sep 2, 1907	8,791	4,231	4,560
61405475001WRRL			Jun 29, 1913	1,648	6,538	-4,890
61405475001RRRR			Mar 8, 1938	0	0	0
61405471005SMRR	City of Austin - (mun.) [1]	250,000	Jun 30, 1913	148,431	119,734	28,697
61405471005SBU	City of Austin - (mun.) [1]		Jun 30, 1913	49,845	47,010	2,835
61405471005LMRR	City of Austin - (mun.) [1]	21,403	Jun 27, 1914	9,944	9,556	388
61405471001P	City of Austin - (stm.)	24,000	Jun 27, 1914	14,894	5,296	9,598
61405471002P	City of Austin - (stm.)		Jun 27, 1914	1,267	1,312	-45
61405489003M	City of Austin - (mun.) [1]	20,300	Aug 20, 1945	3,881	5,357	-1,476
61405489003P	City of Austin - (stm.)	16,156	Aug 20, 1945	0	315	-315
61405489003PBU	City of Austin - (stm.)		Aug 20, 1945	99	2,554	-2,455
61405437001RIV	STP Nuclear Operating Co. [1, 2]	102,000	Jun 10, 1974	51,811	49,039	2,772
61405434102	City of Corpus Christi	35,000	Nov 2, 1900	22,884	25,021	-2,137
Totals		**1,105,609**		**515,111**	**492,365**	**22,746**

Notes:

Region K Cutoff: WAM provided by TCEQ, August 2007, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, November 2

2006 "No Call": WAM provided by TCEQ, November 2004, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, July 2004

Drought-of-Record (DOR) is May 1945 to April 1957 (12 years) for both models

[1] These values were averaged over the DOR

[2] Annual results vary from 2,554 ac-ft/yr to 102,000 ac-ft/yr during the DOR

A description of the major run-of-river rights is taken from the 2006 Region K Plan, with the exception of STP Nuclear Operating Company, whose description has been updated based on their recent settlement agreement with LCRA:

Irrigators

Garwood, Lakeside #1, Gulf Coast, Pierce Ranch, and Lakeside #2 each have several water rights, both run-of-river and backup. The run-of-river rights are listed in *Table 3.3A*. The run-of-river water rights were summed for each irrigator to determine which year in the model had the minimum total diversion. The water right amounts for that year are listed in the table.

City of Austin

The City of Austin has four municipal water rights shown in the table. These are 61405471005SMRR, 61405471005SBU, 61405471005LMRR, and 61405489003M. Because these water rights are backed up by LCRA each year, an average during the DOR was used.

The City of Austin has three steam-electric water rights shown in the table. These are 61405471001P, 61405471002P, and 61405489003P (61405489003PBU). The water availability for these rights was determined by using the minimum amount of water available in any year during the DOR.

STP Nuclear Operating Company et al.

The run-of-river water right, 61405437001RIV, was determined by taking the average over the DOR period. This was done because there is a contract for backup from LCRA, and there is a reservoir that allows for storage of water over the DOR period, rather than having to use the entire amount of water received in a particular year. The STNP diversion point is within the tidal reaches of the Gulf of Mexico. Required diversions at low flow rates during the DOR period will have a negative effect on the water quality diverted at this point.

Corpus Christi

The water availability for this run-of-river water right was determined by using the minimum amount of water available in any year during the DOR.

Table 3.3B below shows the same comparison as *Table 3.3A*, but for 2060 values instead of 2010.

Table 3.3B Major Run-of-River Rights in the Colorado Basin 2060 Availability Comparison

Water Right ID Number	Water Right Holder	Maximum Permitted Diversion	Priority Date	Region K Cutoff (ac-ft/yr)	2006 Plan "No Call" (ac-ft/yr)	Difference (ac-ft/yr)
				2060	2060	2060
61405434201RR	LCRA - Garwood	133,000	Nov 1, 1900	130,141	111,740	18,401
61405475001LRRS	LCRA - Lakeside #1	52,500	Jan 4, 1901	10,405	10,570	-165
61405475001LRRL			Jun 29, 1913	1,573	6,274	-4,701
61405475001LRRR			Mar 8, 1938	0	0	0
61405475001LRRJ		78,750	Nov 1, 1987	520	2,925	-2,405
61405476003RRS	LCRA - Gulf Coast	228,570	Dec 1, 1900	14,476	14,554	-78
61405476003RRL			Jun 29, 1913	28,909	58,058	-29,149
61405476003RRR			Mar 8, 1938	0	0	0
61405476003RRJ		33,930	Nov 1, 1987	155	1,444	-1,289
61405476003JBU			Nov 1, 1987	0	0	0
61405477001RR	LCRA - Pierce Ranch	55,000	Sep 1, 1907	12,525	4,231	8,294
61405477001RRL			Jun 29, 1913	1,648	6,538	-4,890
61405477001RRR			Mar 8, 1938	0	0	0
61405475001WRR	LCRA - Lakeside #2	55,000	Sep 2, 1907	8,791	4,231	4,560
61405475001WRRL			Jun 29, 1913	1,648	6,538	-4,890
61405475001RRRR			Mar 8, 1938	0	0	0
61405471005SMRR	City of Austin - (mun.) [1]	250,000	Jun 30, 1913	143,859	121,062	22,797
61405471005SBU	City of Austin - (mun.) [1]		Jun 30, 1913	48,034	47,592	442
61405471005LMRR	City of Austin - (mun.) [1]	21,403	Jun 27, 1914	8,407	10,030	-1,623
61405471001P	City of Austin - (stm.)	24,000	Jun 27, 1914	14,894	5,361	9,533
61405471002P	City of Austin - (stm.)		Jun 27, 1914	1,267	741	526
61405489003M	City of Austin - (mun.) [1]	20,300	Aug 20, 1945	3,519	5,993	-2,474
61405489003P	City of Austin - (stm.)	16,156	Aug 20, 1945	0	304	-304
61405489003PBU	City of Austin - (stm.)		Aug 20, 1945	744	2,389	-1,645
61405437001RIV	STP Nuclear Operating Co. [1, 2]	102,000	Jun 10, 1974	46,349	48,791	-2,442
61405434102	City of Corpus Christi	35,000	Nov 2, 1900	22,884	25,021	-2,137
Totals		**1,105,609**		**500,748**	**494,387**	**6,361**

Notes:

Region K Cutoff: WAM provided by TCEQ, August 2007, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, November 2

2006 "No Call": WAM provided by TCEQ, November 2004, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, July 2004

Drought-of-Record is May 1945 to April 1957 (12 years) for 2060 2006 Plan and May 1947 to April 1957 (10 years) for 2060 Region K Cutoff

[1] These values were averaged over the DOR

[2] Annual results vary from 0 ac-ft/yr to 102,000 ac-ft/yr during the DOR

A table showing a comparison of availabilities for each decade from 2010 through 2060 for the major run-of-river rights can be found in *Appendix C*. Overall, the run-of-river water availability increased by approximately 23,000 ac-ft/yr for 2010, and 6,000 ac-ft/yr for 2060 from the 2006 Region K Plan. The water rights with the largest changes were the LCRA-Garwood and Gulf Coast irrigators, and the City of Austin municipal and steam electric rights.

3.4 WHOLESALE WATER PROVIDER AVAILABILITY

The LCRA and the City of Austin are the two wholesale water providers whose supply is affected by the revised Colorado River WAM. The revised availabilities are discussed below.

The water available to LCRA is primarily associated with the Highland Lakes System and several senior run-of-river irrigation water rights in the lower basin. *Table 3.4* shows the water available to LCRA.

Table 3.4 Total Water Available to the Lower Colorado River Authority

Water Rights Holder	Water Availability During Drought of Record (Ac-Ft/Yr)					
	2010	2020	2030	2040	2050	2060
LCRA - Garwood	130,141	130,141	130,141	130,141	130,141	130,141
LCRA - Lakeside #1	12,531	12,498	12,498	12,498	12,498	12,498
LCRA - Gulf Coast	44,827	43,540	43,540	43,540	43,540	43,540
LCRA - Pierce Ranch	14,116	14,173	14,173	14,173	14,173	14,173
LCRA - Lakeside #2	10,440	10,440	10,440	10,440	10,440	10,440
LCRA - Highland Lakes	402,106	388,627	382,310	376,710	370,710	365,194
Total	614,161	599,419	593,102	587,502	581,502	575,986

The City of Austin has run-of-river water rights to divert and use water from the Colorado River. Hydrologic conditions are such that Austin's full authorized diversion amount of water is not available to Austin under these water rights. As a result, the City of Austin has entered into a contract with LCRA to firm up these water rights with water stored in the Highland Lakes. *Table 3.5* contains a summary of the water available to the City of Austin.

Table 3.5 Total Water Available to the City of Austin

Water Source (Water Right ID Numbers)	Water Rights Holder	Water Supply Source	Water Availability During Drought of Record (Ac-Ft/Yr)					
			2010	2020	2030	2040	2050	2060
61405471005SMRR	COA [1]	ROR - Municipal	148,431	143,846	143,846	143,846	143,846	143,459
61405471005SBU	COA 1	ROR - Municipal	49,845	48,034	48,034	48,034	48,034	48,034
61405471005LMRR	COA 1	ROR - Municipal	9,944	8,407	8,407	8,407	8,407	8,407
61405489003M	COA 1	ROR - Municipal	3,881	3,519	3,556	3,556	3,556	3,519
Municipal ROR Subtotal			212,101	203,806	203,843	203,843	203,843	203,419
61405471005RMBU	COA backup (LCRA) [1]	Highland Lakes	51,724	58,120	58,120	58,120	58,120	58,107
61405471005LMBU	COA backup (LCRA) [2]	Highland Lakes	11,459	12,996	12,996	12,996	12,996	12,996
61405489003MBU	COA backup (LCRA) [3]	Highland Lakes	16,419	16,781	16,744	16,744	16,744	16,781
Remaining Contract	LCRA Contract	Highland Lakes	33,296	33,297	33,297	33,297	33,297	33,697
LCRA Subtotal			112,899	121,194	121,157	121,157	121,157	121,581
Municipal & Manufacturing Total			**325,000**	**325,000**	**325,000**	**325,000**	**325,000**	**325,000**
61405471001P (Town Lake)	COA	ROR - Steam Electric	14,894	14,894	14,894	14,894	14,894	14,894
61405471002P (FPP)	COA	ROR - Steam Electric	1,267	1,267	1,267	1,267	1,267	1,267
61405489003P (Decker)	COA	ROR - Steam Electric	0	0	0	0	0	0
61405489003PBU (Decker)	COA	ROR - Steam Electric	99	744	744	744	744	744
Town Lake Contract	LCRA Contract	Highland Lakes	7,839	7,839	7,839	7,839	7,839	7,839
Decker Contract	LCRA Contract	Highland Lakes	16,057	15,412	15,412	15,412	15,412	15,412
FPP & Sandhill Contract	LCRA Contract	Highland Lakes	3,500	3,500	3,500	3,500	3,500	3,500
Steam Electric Total			**43,656**	**43,656**	**43,656**	**43,656**	**43,656**	**43,656**
TOTAL			**368,656**	**368,656**	**368,656**	**368,656**	**368,656**	**368,656**

[1] Two City of Austin ROR Rights and an LCRA back-up add up to 250,000 ac-ft/yr.

[2] The City of Austin ROR Right and the LCRA back-up add up to 21,403 ac-ft/yr.

[3] The City of Austin ROR Right and the LCRA back-up add up to 20,300 ac-ft/yr.

3.5 REVISED SHORTAGE ANALYSIS

Once the availabilities were determined, the supplies were calculated for the water user groups (WUGs) and were compared to the WUG demands from the 2006 Plan. (Population and demand numbers will not be revised until the next phase of planning.) This provided a second method of viewing what effects the revised WAM had on the Region K numbers. Tables showing the revised shortages for each county can be found in *Appendix D*.

Figure 3.1 below shows a comparison of the availabilities in ac-ft/yr from just the WAM modeling for 2001, 2006, and the current study. Overall, the 2006 Region K Plan and the 2008 Region K WAM Cutoff model total availability numbers are very similar. *Appendix E* contains a table showing a comparison of the availabilities for the various surface water entities for the 2001 Plan, 2006 Plan, and current study.

Figure 3.1 Region K Water Availability from WAM Modeling

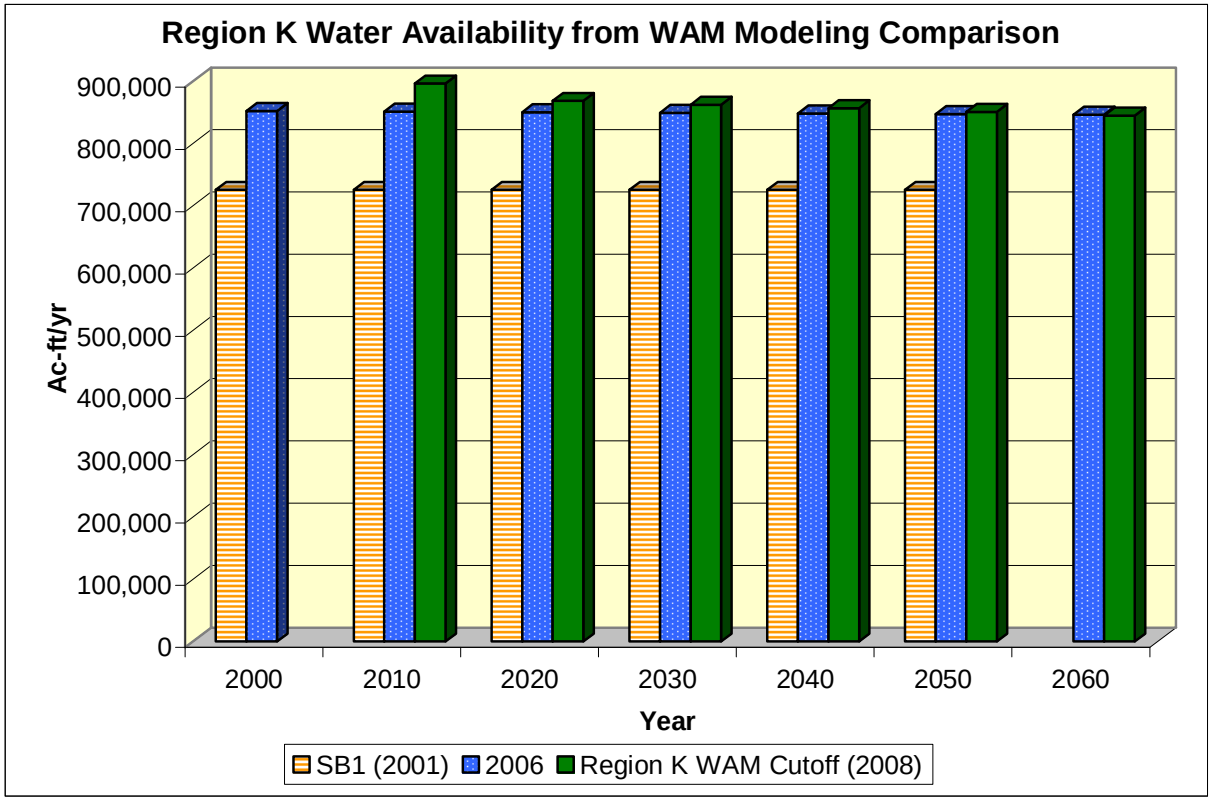

Table 3.6 below shows how the supply (either surplus or shortage) by water use from the Region K WAM Cutoff model differs from the supply by water use calculated for the 2006 Region K Plan. As the table shows, the supply for livestock, manufacturing, and mining uses did not change at all. The supply for municipal use, irrigation use, and steam-electric use were all less. The supplies decreased even though the overall availability increased as a result of the way the supplies are calculated. The additional availability can be used for future water management strategies.

Table 3.6 Change in Supply (by Water Use) When Comparing the Region K WAM Cutoff Model Results with the 2006 Region K Plan Results

Water Use	Water Supply Change (ac-ft/yr)					
	2010	2020	2030	2040	2050	2060
Municipal	-322	-313	-305	-296	-287	-280
Irrigation	-15,116	-16,423	-16,410	-16,397	-16,384	-16,368
Livestock	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Mining	0	0	0	0	0	0
Steam-Electric	-8,148	-8,155	-5,134	-5,133	-5,132	-4,769

Looking at the supply shortage changes by county was another method of analysis. Six of the fourteen counties in Region K had supply shortage changes: Colorado County, Fayette County, Llano County, Matagorda County, Mills County, and Wharton County. Eight counties had supply shortages that remained the same as in the 2006 Region K Plan: Bastrop County, Blanco County, Burnet County, Gillespie County, Hays County, San Saba County, Travis County, and Williamson County. *Table 3.7* below shows how the supply by county from the Region K WAM Cutoff model differs from the supply by county calculated for the 2006 Region K Plan. A positive number denotes a decrease in the amount of shortage, while a negative number denotes an increase in the amount of shortage.

Table 3.7 Change in Supply Shortage (by County) When Comparing the Region K WAM Cutoff Model Results with the 2006 Region K Plan Results

County	Water Use	Change in Water Supply Shortage (ac-ft/yr)					
		2010	2020	2030	2040	2050	2060
Colorado	Irrigation	4,602	4,574	4,574	4,574	4,574	4,574
Fayette	Steam-Electric	0	69	183	297	411	526
Llano	Municipal	-178	-169	-160	-151	-142	-135
Matagorda	Irrigation	-29,297	-30,571	-30,558	-30,545	-30,532	-30,516
	Steam-Electric	-240	-248	-8,323	-8,324	-8,325	-7,965
Mills	Municipal	-144	-144	-145	-145	-145	-145
Wharton	Irrigation	8,383	6,532	6,358	6,358	6,358	6,358

The following figures show the supply results for both models.

Figure 3.2 Comparison of Supplies for Colorado County

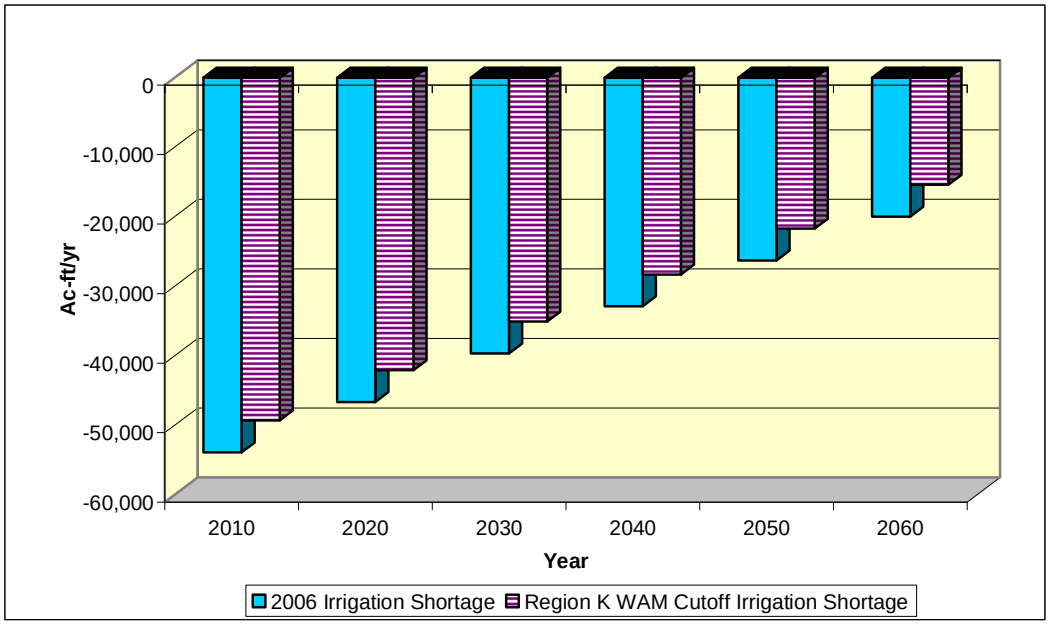

Figure 3.2 shows that although there is still an irrigation shortage in Colorado County, the shortage is a smaller amount as a result of the Region K WAM Cutoff model than it was in the 2006 Region K Plan.

Figure 3.3 Comparison of Supplies for Fayette County

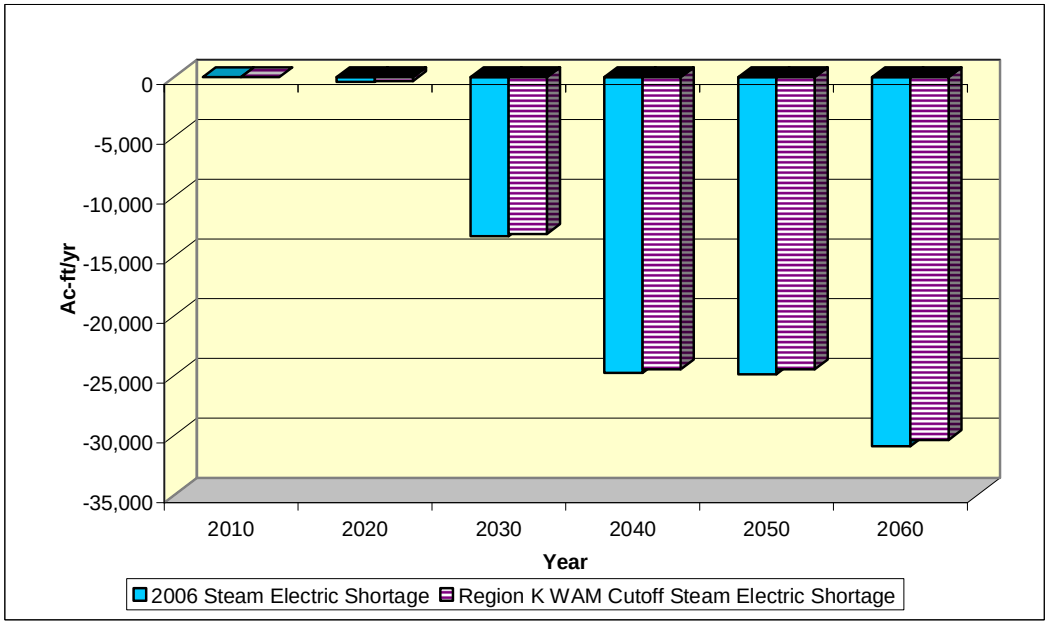

Figure 3.3 shows that the steam-electric shortage in Fayette County is smaller for most decades as a result of the Region K WAM Cutoff model than it was in the 2006 Region K Plan.

Figure 3.4 Comparison of Supplies for Llano County

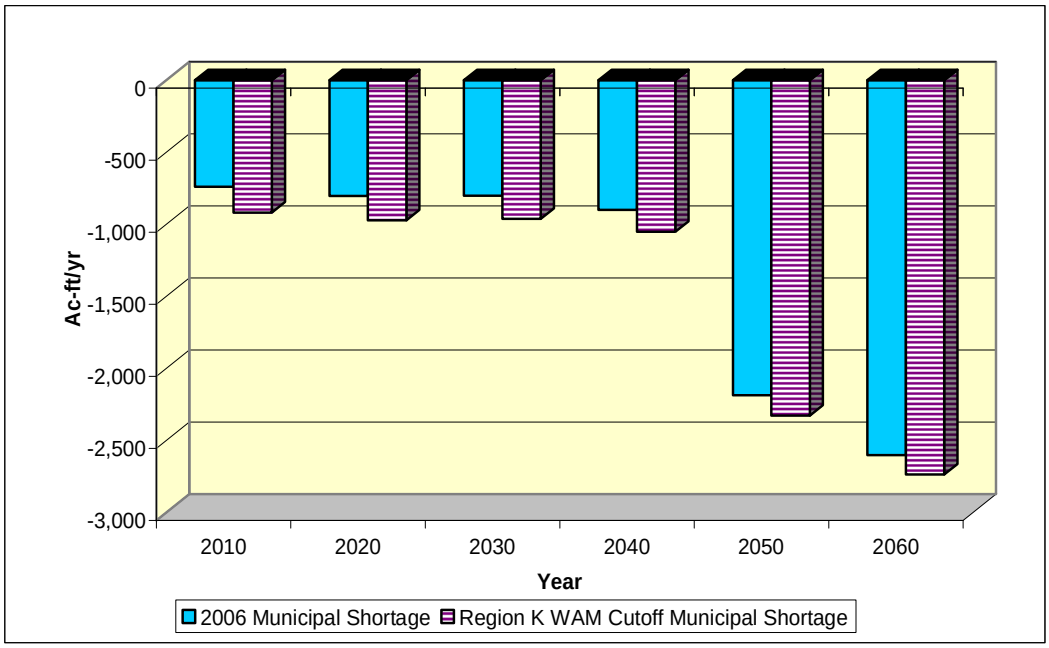

Figure 3.4 shows that the municipal shortage for Llano County is slightly larger as a result of the Region K WAM Cutoff model than it was in the 2006 Region K Plan. This is due specifically to the City of Llano reservoir having a firm yield of 0 ac-ft for most of the years within the drought-of-record period.

Figure 3.5 Comparison of Supplies for Matagorda County

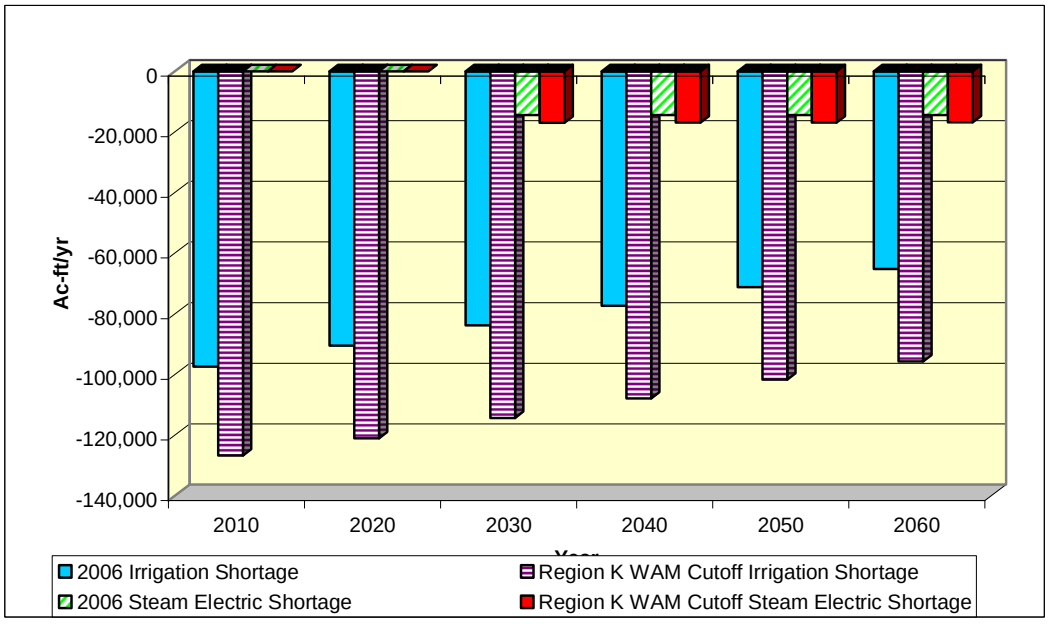

Figure 3.5 shows that both the irrigation shortage and the steam-electric shortage for Matagorda County are larger as a result of the Region K WAM Cutoff model than they were in the 2006 Region K Plan.

Figure 3.6 Comparison of Supplies for Mills County

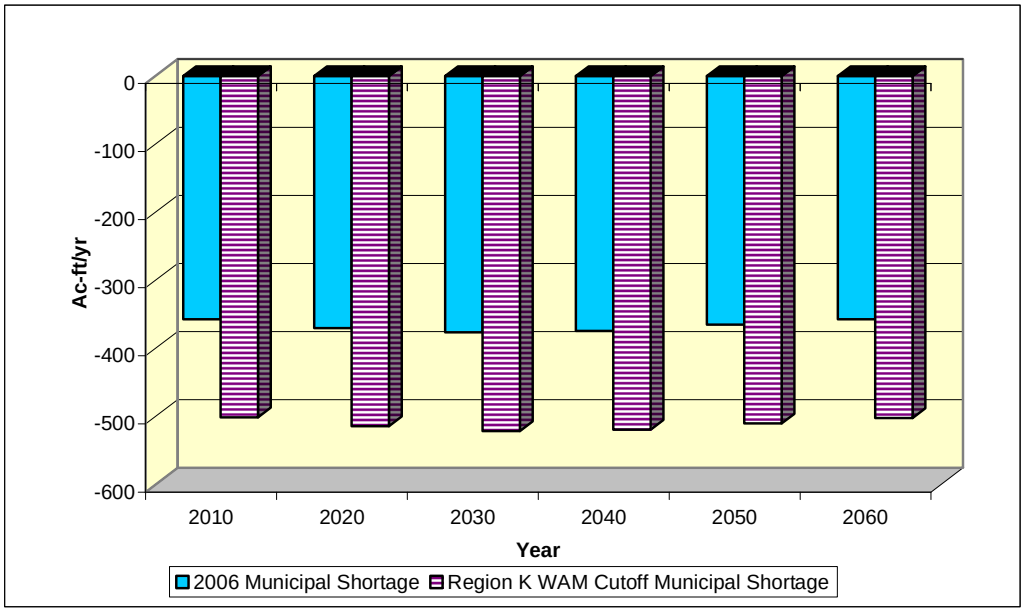

Figure 3.6 shows that the municipal shortage for Mills County is slightly larger as a result of the Region K WAM Cutoff model than it was in the 2006 Region K Plan. This is due specifically to the City of Goldthwaite reservoir having a firm yield of 0 ac-ft for most of the years within the drought-of-record period.

Figure 3.7 Comparison of Supplies for Wharton County

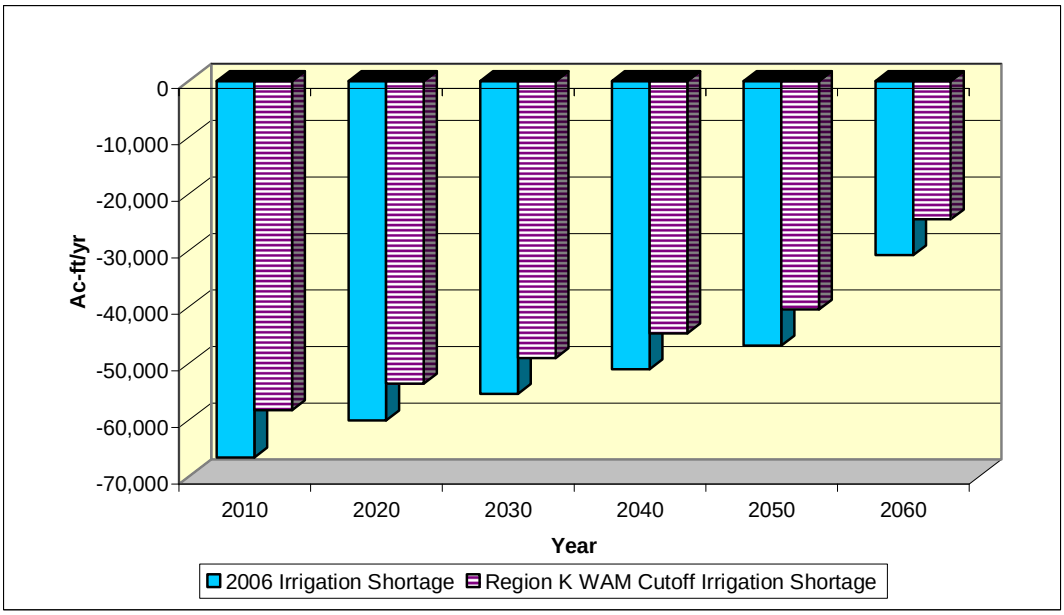

Figure 3.7 shows that although there is still an irrigation shortage in Wharton County, the shortage is a smaller amount as a result of the Region K WAM Cutoff model than it was in the 2006 Region K Plan.

The three counties that showed an increased shortage as compared to the 2006 Region K Plan were Llano County, Matagorda County, and Mills County. Llano County had an increased municipal shortage from a reduced firm yield for the City of Llano reservoir. Mills County also had an increased municipal shortage from a reduced firm yield for the City of Goldthwaite reservoir. In the 2006 Plan, the firm yields that were reported for those two reservoirs were based on an average over the Drought-of-Record period, instead of the minimum amount of water available in any given year, which is a more appropriate definition. The Region K Cutoff Model assumed the true definition of reservoir firm yield to determine the amount of water available. Matagorda County had an increased irrigation shortage from the June 29, 1913 priority date for the Gulf Coast run-of-river irrigation water right.

4.0 RECOMMENDATIONS

The purpose of this study was to evaluate other alternative surface water availability models for the Colorado River, choose the model that most appropriately reflects the actual and historical operating conditions and existing contractual agreements between LCRA and certain upper basin water right holders, use the model to determine the revised availabilities, and compare those availabilities to the ones determined in the 2006 Region K Plan.

The model chosen is the Region K WAM Cutoff Model, and does more accurately reflect the conditions of the Colorado River than either the TCEQ WAM or the "No Call" WAM developed for the 2006 Region K Plan. The model's use was approved by TWDB on March 11, 2008. With continued updates, it is currently recommended that this model be used to determine surface water availabilities of the Colorado River now and in future planning cycles.

Overall, the 2006 Region K Plan and the 2008 Region K WAM Cutoff model total availability numbers are very similar. The planning group feels the effort put forth to create the Region K WAM Cutoff model has been extremely valuable in providing advanced understanding of the surface water availability for the Colorado River Basin. The acceptance of the Cutoff modeling assumption allows the TCEQ WAM to be modified in a manner that alleviates the problems which were created by the modeling assumptions used in the 2006 round of planning. The information provided from the revised model can be a new starting point for surface water availability estimation as part of the 2011 Plan.

Overall, the 2006 Region K Plan and the 2008 Region K WAM Cutoff model total availability numbers are very similar. Through its review, input, and recommendations related to this Task 1 process, the planning group has indicated the effort put forth to create the Region K WAM Cutoff model has been valuable in advancing the group's understanding of the surface water availability for the Colorado River Basin. The acceptance of the Cutoff modeling assumption allows the TCEQ WAM to be modified in a manner that alleviates the problems which were created by the modeling assumptions used in the 2006 round of planning. The information provided from the revised model can be a new starting point for surface water availability estimation as part of the 2011 Plan. Despite the overall similarities in total water availability with the 2006 Region K Plan, the preliminary supply estimates presented in this study indicate both increases and decreases in run-of-river water availability at the level of individual water rights as compared to the supply estimates in the 2006 Plan. The largest shortage increase created by the revised model was located in irrigation in Matagorda County, specifically for the Gulf Coast run-of-river water right. Percentage-wise, all of the irrigation run-of-river water rights with the June 29, 1913 priority date were reduced in the revised model as compared to the 2006 "No-Call" model. The Garwood irrigation water right, with the most senior priority date of November 1, 1900, showed an increase in availability from the results of the 2006 "No-Call" model, with that water most likely coming from the availability decrease in the less senior irrigation water rights. Although there are supply differences on an individual water right basis between the two models, the similarity in water availability on an aggregate regional basis gives confidence in the performance of the Cutoff modeling assumption. The individual differences in water right supplies are likely attributable to the manner in which the two models achieve a redistribution of inflows between the upper and lower Colorado basins, with 2008 Region K WAM Cutoff model offering an improvement in model representation of real-world operations. Efforts to expand current strategies or create new strategies to address these new shortages will occur during the next phase of planning.

APPENDIX A

TCB
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Memorandum

Date	July 2008
To	Region K Planning Group
From	Jaime Burke
Subject	Technical Memorandum for Region K Surface Water Availability Modeling

The purpose of this technical memorandum is to complete the summary of findings for Scope of Work Items 1b-l, shown below:

a. Develop detailed scopes of work for sub-tasks to be shared by the Region K consultant, the Lower Colorado River Authority (LCRA) and City of Austin, and their consultants. This scope development will involve meeting with the Scoping Committee, the consultants for LCRA and the City of Austin, and meeting with the Lower Colorado Regional Water Planning Group (LCRWPG) for presentation of the scope of services in the grant application package, and response to Texas Water Development Board (TWDB) comments on the scope items. All detailed scopes of work for sub-tasks developed for this study will be submitted to TWDB for approval, and a notice to proceed from the Executive Administrator of the TWDB is required.

b. Conduct a detailed review of the hydrologic and water right information in the TCEQ WAM for the Colorado River. There were nine technical issues identified in the 2006 Region K Plan that this task would attempt to clarify, as follows:

   The WAM's representation of a zero firm yield for several reservoirs in the basin;
   The WAM's approach to modeling environmental flow restrictions on water rights;
   The naturalized flows used in the WAM;
   The WAM's incorporation of channel gains and losses;
   The WAM's treatment (or lack thereof) of "futile call" issues;
   The WAM's incorporation of existing subordination agreements;
   The WAM's backup of Austin's steam electric water rights with LCRA stored water;
   Inconsistencies with how interregional strategies are addressed in the planning cycle relative to application of WAM Run 3; and,
   Other technical issues.

   In-Kind Services: LCRA and Austin are responsible to provide the services for this task through in-kind services, and the Professional will provide support, review, and coordination of meetings.

c. Contact TCEQ staff to discuss the current status of the Colorado River WAM and determine whether or not modifications to include the "priority circumvention" subroutine or any other significant changes are anticipated by TCEQ. Also discuss any written agreements that are

provided by LCRA or any of the upstream rights holders with TCEQ staff and determine status of any efforts to include them in the WAM.

In-Kind Services: LCRA and Austin are responsible to provide the services for this task through in-kind services, and the Professional will provide support, review, and coordination of meetings.

d. Research and present alternative WAM versions (LCRA-San Antonio Water System [SAWS], LCRA No Call-Brandes, TCEQ Priority Circumvention if available, and others as identified) and the advantages and disadvantages of each to the Water Modeling Committee (one meeting).

In-Kind Services: LCRA and Austin are responsible to provide the services for this task through in-kind services, and the Professional will provide support, review, and coordination of meetings.

e. Coordinate with Region F and determine if there are any additional agreements or other specific items that Region F desires to incorporate (up to three meetings anticipated, with all by conference call or by Region F representatives coming to Region K area).

In-Kind Services: LCRA and Austin are responsible to provide the services for this task through in-kind services, and the Professional will provide support, review, and coordination of meetings.

f. Coordinate with LCRA regarding incorporation of LCRA-SAWS Water Project (LSWP) water availability in the model. Verify that the LSWP can be modeled with the alternative WAM versions being considered.

In-Kind Services: LCRA and Austin are responsible to provide the services for this task through in-kind services, and the Professional will provide support, review, and coordination of meetings.

g. Meet with the LCRWPG Water Modeling Committee to discuss the findings of the WAM review in terms of any clarification or resolution they may bring to the “No Call” assumption used in the second round of planning (one meeting).

In-Kind Services: LCRA and Austin are responsible to provide the services for this task through in-kind services, and the Professional will provide support, review, and coordination of meetings.

h. Report to the Water Modeling Committee on Region F input and determine whether to incorporate any changes requested (same meeting as g above).

In-Kind Services: LCRA and Austin are responsible to provide the services for this task through in-kind services, and the Professional will provide support, review, and coordination of meetings.

i. Assist the Water Modeling Committee and the LCRWPG in choosing a course of action and deciding which surface water availability model to use for planning purposes (one meeting, plus one meeting of the LCRWPG).

j. Research information from any other relevant major project undertaken by any entity or water right holder that may have impacts on water availability estimates.

k. Incorporate information on the revised schedule for cooling water needs for additional generating capacity for the South Texas Nuclear Project, as appropriate.

l. Research information on any new water right, any amendment or any agreements between parties since the January 2006 Regional Plans for inclusion in the model.

Scope item 1b discussion is provided in the attached technical memorandum from Hoffpauir Consulting. Discussion of scope items 1c-h is provided in a second attached technical memorandum from TRC/Brandes. This technical memorandum will address scope items 1j-l to complete the summary.

To address scope item 1j, there are currently no major projects being undertaken by an entity or water right holder that should have impacts on surface water availability estimates. The LCRA-SAWS Water Project (LSWP) had been undergoing changes since the last plan, but that project addresses the water management strategy portion of water planning, and not the availability portion.

To address scope items 1k and 1l for the STP Nuclear Operating Company, a written discussion has been provided by STP and is as follows:

The ongoing litigation between the STP Nuclear Operating Company (STPNOC) and the Lower Colorado River Authority (LCRA) referenced in the 2006 Regional Water Plan was settled in January 2006. The settlement had advantages for both parties:

- *The amended and restated contract by and between STPNOC and the LCRA, effective January 1, 2006, provides STPNOC a known and secure water supply source to support reliable operation for as long as electric generating facilities are operating at the South Texas Project site.*

- *It gives LCRA the flexibility to provide STPNOC its water supply from various sources; and provided clarity on the long-term water supply needs of STPNOC.*

- *This will assist LCRA in planning its future water supply strategies/projects to help meet its long-term water demands identified in the regional water planning process.*

One of the major points of the settlement agreement was the development of a Water Delivery Plan that is part of the contract which provides:

20,000 acre-feet per year average over 5 years of stored water (for 2 units)

40,000 acre-feet per year average over 5 years (for any additional generation capacity)

This is different from what is contained in the current LCRA Water Management Plan and provides the basis for updating the Water Availability Model.

The run of the river right for 102,000 acre-feet remains unchanged except that STPNOC will begin utilizing the full right in 2020 vs. 2030.

Relative to scope item 1l, the City of Austin and LCRA have an updated settlement agreement since the 2006 Region K Plan, although the provisions of this agreement have not been incorporated into the surface water availability model. The provisions may be incorporated as part of the evaluation of future water supply strategies.

Hoffpauir
Consulting

300 Borderbrook Drive, Bryan, TX 77801
Phone: 979-575-0804 Fax: 979-260-7674

TECHNICAL MEMORANDUM

TO: The Lower Colorado Regional Water Planning Group (Region K);
Water Modeling Committee

FROM: Richard Hoffpauir

DATE: February 11, 2008

RE: 2011 Region K Water Plan- First Biennium Studies, Study 1, Item b.

Review of Hydrologic and Water Rights Information in the TCEQ WAM for the Colorado River Basin

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1. Introduction

Water supply modeling for the 2006 Region K Plan was conducted with a new model, the Texas Commission on Environmental Quality ("TCEQ") Water Availability Model ("WAM"). This model differed from the model used in the 2001 Region K Plan, the LCRA RESPONSE model, in several key assumptions. The most notable difference is the assumption regarding the availability of inflows. In order to improve the surface water supply estimates for the 2006 planning period, the Region K group adopted a "No Call" modeling assumption on upper basin inflows which was added to the WAM by the Region F consultant. In order to gain knowledge of the possible reasons for the simulated differences in water availability between the unmodified WAM and the results used in the previous plan, nine technical issues were proposed in the 2006 Region K Plan for further research. The nine technical issues are as follows:

1) The WAM's representation of a zero firm yield for several reservoirs in the basin (Section 2.0);
2) The WAM's approach to modeling environmental flow restrictions on water rights (Section 5.1);
3) The naturalized flows used in the WAM (Section 4.1);
4) The WAM's incorporation of channel gains and losses (Section 4.2);
5) The WAM's treatment, or lack thereof, of "futile call" issues (Section 4.3);
6) The WAM's incorporation of existing subordination agreements (Section 5.3);
7) The WAM's backup of Austin's steam electric water rights with LCRA stored water (Section 5.4);
8) Inconsistencies with how interregional strategies are addressed in the planning cycle relative to application of WAM Run 3 (Section 6.8); and,
9) Other technical issues (Section 5.2).

This memorandum will explore each of these issues with an emphasis on gaining insights as to their effect on the water availability results obtained with the Colorado Basin WAM. The relevant memorandum section for each of these issues is noted in the listing above.

2.0 Simulated Reservoir Firm Yield

The Texas Water Development Board ("TWDB") required the Colorado Basin WAM to be used for the 2006 Region K and Region F Plans. In particular, the full authorization version of the WAM, known as Run 3, was required. In the 2001 Region K Plan, the LCRA RESPONSE model was used to determine surface water availability. The differences in simulation assumptions as well as the differences in simulated firm yield between the two models are presented in the memorandum required by Item d of this Biennium Study. The models produce significantly different results with respect to the distribution of run-of-river water availability and reservoir firm yield. Unlike the results presented in the 2001 Region F Plan, many of Region F's reservoirs are simulated as having a zero firm yield with the Colorado Basin WAM.

The differences in simulated reservoir firm yield for Region K and Region F in their respective 2001 plans and with the Colorado Basin WAM are directly related to the assumptions used in the models. The 2001 Region K Plan used a surface water model which assumes water rights in the lower basin do not make calls for the passage of inflows originating in the drainage areas upstream of Lake O.H. Ivie and Lake Brownwood, hereafter referred to as the "upper basin". This drainage area boundary for lower basin water right calls on inflows is a simplifying assumption to reflect, in addition to historical basin operations, a subordination agreement between Lake Buchanan and Lake O.H. Ivie as well as the priority date for impoundment at Lake Brownwood which is senior to LCRA's Lakes Travis and Buchanan. The Colorado Basin WAM, on the other hand, contains no assumptions for segregation of water rights into upper and lower basin groupings. Water rights in the Colorado Basin WAM can make calls on inflows originating throughout their respective upstream drainage area. The drainage area boundary placed on calls for inflow passage in the RESPONSE model is likely to account for most of the simulated water availability differences between the two models. Possible justifications for the use of this assumption in the RESPONSE model and a similar assumption adopted for the 2006 Region K Plan are discussed in the following sections of this memorandum.

3.0 Historical Operations and the Prior Appropriation Doctrine

Water rights in Texas are assigned a priority date to establish a relative order of call for determining access to available water within each basin. Water rights with the oldest priority date would be allowed to divert or impound available water before water rights with more recent priority dates. The Prior Appropriation Doctrine, however, is not the method by which water right holders in the Colorado River Basin have historically utilized water. Instead, water rights have generally operated on a capture basis. As water flows past the water right's physical diversion location on the stream course, water is diverted or impounded according to the volumetric and environmental flow conditions of the permit or certificate of adjudication. Enforcement of the Prior Appropriation Doctrine would require

a State sponsored Water Master to administer potentially hundreds of active water rights on nearly 900 miles of stream course from Lake J.B. Thomas to Matagorda Bay. It is reasonable to assume that hydrological and practical limits would be considered when determining the volume and distance upstream for calls on inflow passage by senior water right holders.

As part of LCRA's calculation of the Combined Firm Yield for Lakes Travis and Buchanan in its Water Management Plan, no inflows are assumed to pass from the drainage areas upstream of Lake O.H. Ivie or Lake Brownwood unless these lakes are full and spilling. One would expect the probability to be very low for upstream lake spills to occur during an extreme drought when LCRA's firm yield is being tested. The ability for flows to pass efficiently over long distances of drought stressed stream courses is also of concern and will be discussed in Section 4 of this memorandum. The lower basin's second largest holding of senior water rights, after LCRA, belongs to the City of Austin. In times of run-of-river shortage for its water rights and to provide additional supplies of firm water, Austin has contractual agreements with LCRA to receive stored water or other LCRA supplies. The contractual agreements with LCRA have historically precluded the need for Austin to require inflow passages from the upper basin. Because LCRA and the City of Austin together account for the vast majority of the water rights in the lower basin on an authorized volumetric and active usage basis, there is a low probability that inflow passage from the upper basin would need to be exercised during drought conditions.

Figure 1 was derived from Run 3 of the Colorado Basin WAM. The input code governing the Lake Buchanan to Lake O.H. Ivie subordination agreement was removed from the model to highlight the potential impact of downstream calls on inflows. The figure depicts the reduction of average water availability at the location of Lake O.H. Ivie as the model simulates all water rights in the basin in priority order. Near the end of the priority order, the figure shows that little to no unappropriated water remains in the stream at this location. Significant flow is simulated as physically remaining in the stream, however, as it passes downstream to meet priority calls on inflows. Over 1,600 water rights and environmental flow requirements are simulated as causing the reduction of available water as shown in Figure 1, including notable reductions associated with the following:

- the senior most municipal diversion by the City of Austin with the Gulf Coast irrigation district priority date of December 1, 1900 via an LCRA subordination agreement,
- the remainder of the senior municipal diversion by the City of Austin with its authorized priority date of June 30, 1913,
- the senior most refilling of Lakes Travis and Buchanan with a priority date of March 29, 1926, and
- refilling of Lake O.H. Ivie with a priority date of February 21, 1978.

Table 1 presents an aggregation of the data shown in Figure 1. The majority of the available water at the location of Lake O.H. Ivie remains instream as it passes to meet downstream calls on inflows. A repetition of the 1950's drought conditions increases the percentage of water which is simulated as passing downstream.

Figure 1. Simulated Average Water Availability at the Location of Lake O.H. Ivie

Assuming TCEQ WAM Run3 Conditions, and
O.H. Ivie Subordination Code Removed from Simulation

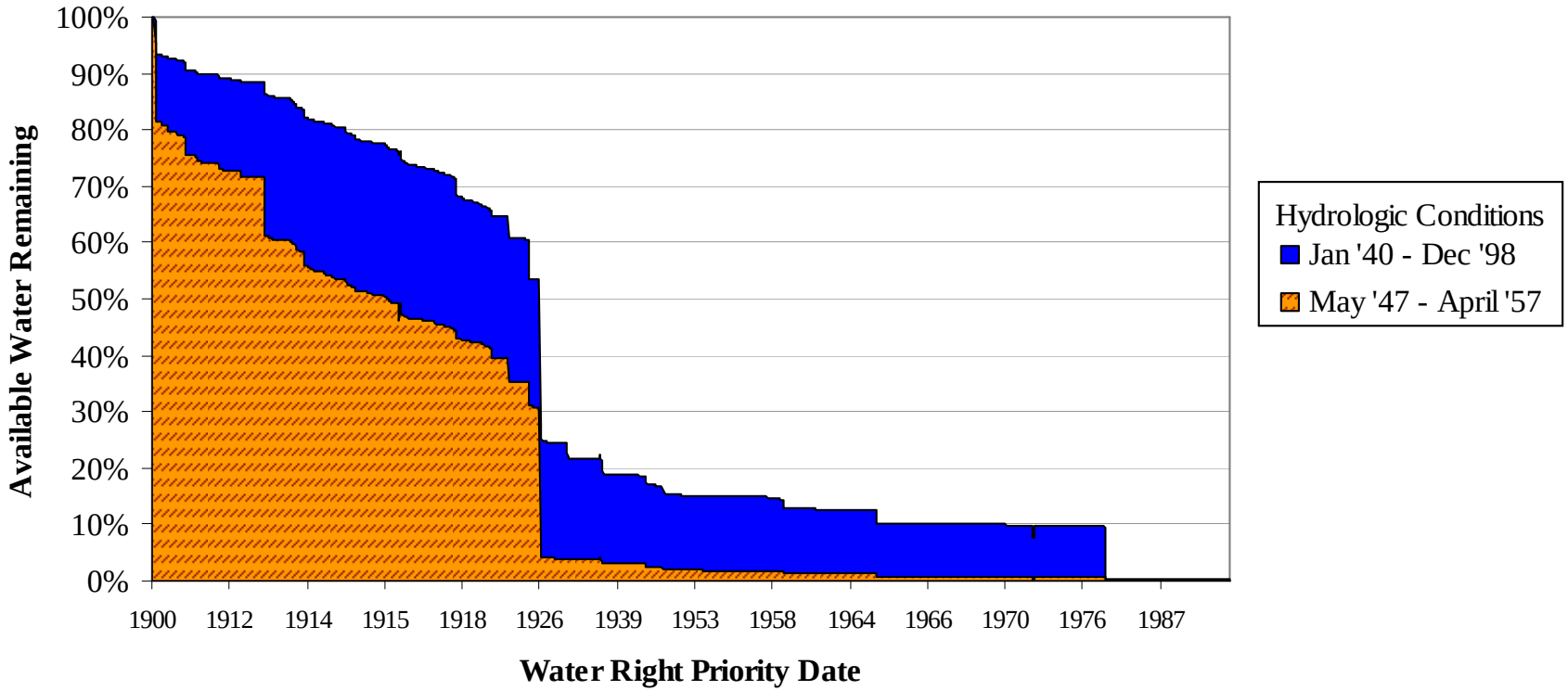


Table 1. Simulated Average Allocation of Available Water at the Location of Lake O.H. Ivie
Assuming TCEQ WAM Run3 Conditions, and
O.H. Ivie Subordination Code Removed from Simulation

Relative Location of Water Rights and Environmental Flow Requirements	Hydrologic Conditions		Number of Rights and Requirements Simulated
	Jan '40 - Dec '98	May '47 - April '57	
Downstream of O.H. Ivie	55%	71%	268
Austin Municipal, June 30, 1913 *	*8%*	*25%*	
Travis and Buchanan, March 29, 1929	*29%*	*27%*	
All other downstream rights and req.	*18%*	*19%*	
Upstream of O.H. Ivie	32%	25%	454
Lake O.H. Ivie	10%	1%	3
Confluent Watersheds, e.g., Pecan Bayou, San Saba River, Llano River, and Brazos-Colorado Coastal Basin	3%	3%	960
Total	100%	100%	1,685

* *Includes water obtained at more senior priority dates via the subordination agreement with LCRA's Gulf Coast, Lakeside, and Pierce Ranch irrigation districts.*

4.0 Hydrologic Data in the TCEQ WAM

4.1 Naturalized Flow

The WAM simulates water right operations over a time series of monthly "naturalized" flows. These input monthly flows are assumed to represent conditions that would have occurred in the absence of diverters, dischargers, and reservoir operations. Naturalized flows in the WAM are constructed using historical flows recorded at stream gaging stations with adjustments for the corresponding time series of known historical water uses. Historical water use adjustments are applied to gaged flows at or near the gaging station as well as those uses which occurred upstream. Other adjustments might be made to stream gaging records to account for changes to land use, climate, or spring flow. The general equation used to adjust gaged flows takes the form:

Naturalized Flow = Gauged Flow + Local Withdrawals
- Local Releases and Returns
+ Change in Local Reservoir Storage
+ Local Reservoir Net Evap-Precip
+ *DF* x (Upstream Withdrawals
- Upstream Releases and Returns
+ Upstream Change in Reservoir Storage
+ Upstream Reservoir Net Evap-Precip) Equation 1.

where *DF* is a delivery factor, expressed as a percentage, between the upstream and downstream end of the reach in question. Each upstream change in flow is multiplied by the delivery factor for the respective reaches traversed between the upstream point of

change and the downstream gaging station. The delivery factor is a function of the total conveyance or channel losses, *CL*, incurred over the stream reach.

$$DF = (1 - CL) \qquad \text{Equation 2.}$$

The Colorado Basin WAM currently uses a hydrological period of record between 1940 and 1998. This period of record is used as a representation of the range of flows which may occur in the future, assuming factors such as land use and climate remain relatively unchanged with respect to the assumptions used to construct the naturalized flow time series. Within the WAM's naturalized flow period of record is an approximately decade long drought for the lower basin beginning in the later 1940's and persisting through April, 1957. This period is currently used as the drought of record for computing lower basin reservoir firm yield. Though the upper basin also experienced severe drought conditions during this same time period, a more severe drought is defined for the upper basin corresponding to the late 1990's and into the first decade of the 21st century.

4.2 Channel Losses

Gaged flows in the naturalization process are representative of channel losses present in the upstream river reaches at the time of recording. It is therefore necessary in the naturalization process to apply the same channel loss time series to the known changes in flow which occurred upstream. Obtaining realistic values of the channel loss time series is, however, exceptionally difficult and is discussed further in section 4.3. Channel losses can be expressed as the total effect of many variable phenomena acting on the river reach.

$$\begin{aligned} CL_{\text{total}} = \; & CL_{\text{seepage to groundwater}} + CL_{\text{geologic fissures}} + CL_{\text{riparian vegetation}} \\ & + CL_{\text{evaporation from the water surface}} + CL_{\text{stream bank or depression storage}} \\ & + CL_{\text{unidentified diverters}} \quad \ldots \quad + CL_{\text{other natural or manmade sources}} \end{aligned} \qquad \text{Equation 3.}$$

Stream reaches which are designated as "gaining" are still subject to channel losses. In many reaches, for example, the groundwater table will meet the level of the stream bed and contribute inflow. This will eliminate the $CL_{\text{seepage to groundwater}}$ term in Equation 3 as a source for channel loss in that reach. Net gains from the contribution of many sources, including groundwater or surface water tributaries, are expected in most river reaches as flow typically increases in an upstream to downstream direction. Measuring net gains between gaging stations does not preclude other sources of channel losses from acting on the reach, and possibly in significant quantities.

4.2.1 Seepage to Groundwater

It is possible for surface water to migrate towards the groundwater table through the stream bed. This can occur when a groundwater table with a direct hydrologic connection to the stream falls below the bed level. Directional changes in the migration of water between the stream and the groundwater table can be caused by seasonal rainfall and groundwater pumping conditions which influence the depth to the groundwater table. In the case of significant and long term groundwater pumping, depressed groundwater tables may not

manifest for many years after pumping initiates. This raises the probability for pumping in non-drought years to result in channel losses on stream courses in drought years though pumping may be curtailed during the drought.

4.2.2 Other Sources of Channel Loss

Many other sources of channel loss may exist and operate simultaneously on the stream reach. Geologic formations such as faults, caverns, or other highly porous features can dramatically reduce or eliminate stream flow. These concentrated sources of channel loss are often easily identified. Other sources may be more diffuse and therefore more difficult to quantify. Riparian vegetation can consume stream flow through stream bank absorption or by accessing shallow alluvial groundwater. Bare floodplain alluvium can absorb stream flow as soil moisture evaporates. Flood flows can cause an increase in stream bank soil moisture storage during the rising portion of the event, although much of this storage is often released during the receding period of the flood as the stream returns to lower stages. Unidentified diverters might also account for losses of water along a reach.

4.3 Quantifying Channel Loss

Channel loss is exceptionally difficult to quantify for a variety of reasons. Losses are often small in magnitude relative to measurements of stream flow over the studied stream reach. This can allow unidentified or underestimated incremental gains to conceal their presence. The magnitude of loss between stream gaging stations is also often within the magnitude of error for the instrumentation. Estimation of the contribution of ungaged surface water tributaries presents another source for error. Simulation of site specific groundwater interaction with the stream bed is prone to uncertainty attributable to, for example, non-unique parameter calibration in groundwater models. Due to the variability of the channel loss time series, studies which attempt to establish average annual losses over many years of data may miss seasonal trends, correlations with stream flow events, or trends due to drought or groundwater pumping.

4.4 Channel Loss in the WAM

Most of the TCEQ WAMs account for major channel losses, such as known groundwater recharge zones and reaches with significant riparian vegetation. Channel losses, however, are ubiquitous and variable even if they cannot be easily measured or estimated. The current version of the Colorado Basin WAM only applies channel loss coefficients to reaches upstream of Lake Buchanan to account for stream flow uptake by salt cedars (*Tamarix* sp.). Figure 2 shows the location of reaches in the Colorado Basin WAM assigned a value for channel loss. The average delivery factor is 98.8% per mile through these upstream reaches. For example, the stream bed length from Lake J.B. Thomas to Matagorda Bay is approximately 890 miles. The WAM's cumulative delivery factor over this length is 90.9%. Similarly, the cumulative delivery factor from Lake O.H. Ivie is 99.6% over a stream bed length of 655 miles to the bay. If one were to release 100 gallons of water at the location of Lake Thomas or Lake Ivie during any month and under any flow

condition, the simulation would allow 90.9 or 99.6 gallons, respectively, to arrive at the bay.

The WAM allows a single and fixed channel loss value to be specified for each stream reach. This value remains constant throughout the entire simulation. In contrast, the gaged flow used to construct the naturalized flow is embedded with a channel loss time series that changed throughout the historical record. The WAM uses the single and fixed value of channel loss as part of the algorithm for downstream conveyance of changes to the naturalized flow. A downside to using a static channel loss in the WAM's input data set is the inability to replicate natural variability in the simulation and possibly in the process of constructing a naturalized flow dataset. For reasons previously discussed, it is often difficult to quantify channel losses outside of obvious trends in the gaged flow record.

The need to evaluate new permit applications by TCEQ over a long period of record necessitates a channel loss which is applicable for a wide range of flows. The majority of a basin's total annual naturalized flow is often concentrated in high flow pulses or flooding events. These events are likely to be less sensitive to relatively small channel losses, especially if these flow events are not coincident with a larger period of drought. Therefore in the context of the WAM's intended purpose and considering the uncertainty involved in channel loss quantification, the single and minimal channel loss value may be adequate.

The hydrologic context of TWDB's regional water planning process differs from that of TCEQ's process for evaluating permit applications. Regional planning focuses specifically on yield during the worst drought in the period of record. There is greater probability for the total channel loss to be elevated during this period. Sources of loss, some of which are listed in Equation 3, may become amplified by drought or may only be present during a drought, but uncertainty still exists for quantifying channel losses for this period in the hydrologic dataset.

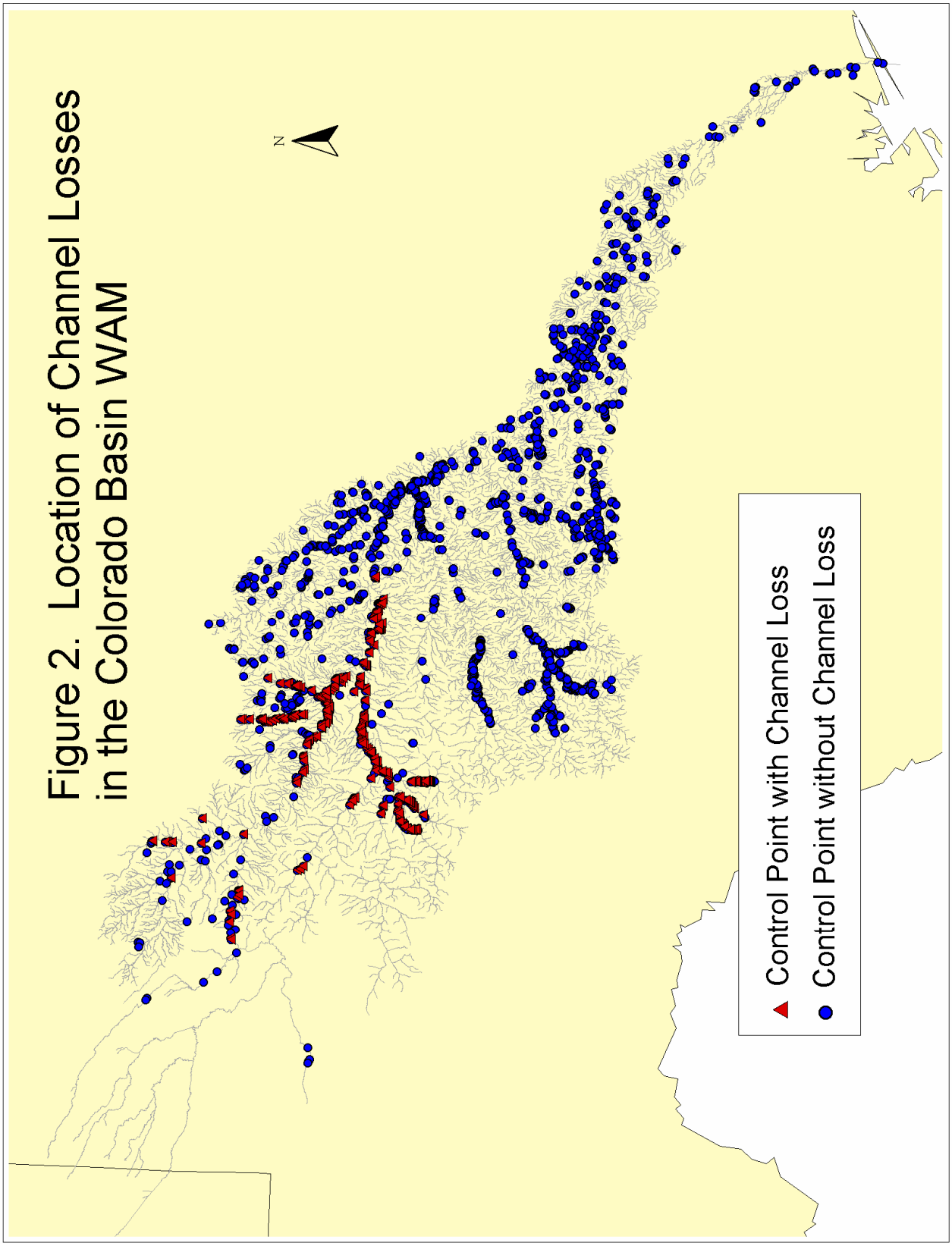


Figure 2. Location of Channel Losses
in the Colorado Basin WAM
N
Control Point with Channel Loss
Control Point without Channel Loss

4.5 Channel Loss and the Futile Call

A limit on calls for the passage of inflows by a downstream water right holder occurs when it is determined that the cumulative delivery factor is nearly zero at some point upstream. Calls on inflows upstream of this point are "futile" because the water cannot reach the downstream point. Since calls for inflow passage are most likely to occur during times of low water availability, and especially during droughts, these periods may correlate with increases in the probability for elevated channel losses. Since the delivery factor decreases as the channel loss increases, there will be a contraction of the stream distance defining the futile call. Therefore, the distance for defining a futile call is not static, but can vary according to the intensity of the factors which drive the channel losses. When priority order based calls on inflows are most likely to be exercised, the contributing watershed within the futile call boundary may be at a minimum.

In the Colorado Basin WAM, there are no networks of reaches with channel losses high enough to produce a cumulative delivery factor of less than 90%. While any channel loss will limit the amount of inflow passage, the WAM's current channel losses do not result in the simulation of futile calls even under the most severe drought conditions on record. In reality, if a Water Master were assigned to the Colorado River Basin during an extreme drought, limitations on the distance for calls on inflows might be considered even if the delivery factor was greater than zero. Efficient usage of inflows to meet local needs may take priority over requiring an extreme loss to be incurred as water travels and diminishes downstream, possibly over hundreds of miles.

4.6 Regional Planning Assumptions and the Futile Call

The drought of record is used in regional planning to evaluate water supplies and shortages. In Region K, the drought of record occurred in the late 1940's through April, 1957. Water supplies are evaluated for demands 50 years into the future. This creates up to 100 years of difference between the drought conditions under which gaged stream flows were recorded and those future hydrologic conditions which might exist for the water demand projection. For example, groundwater pumping has increased in most of the aquifers in Texas over the period of record used in the WAM. According to Section 1.3 of the 2006 Region F Plan, groundwater pumping increased in their region by 10% just in the decade of the 1990's. In addition, Region F's Plan is almost exclusively dependent on developing new groundwater sources to meet future shortages as surface water sources are shown to be entirely appropriated. Recent and future increases in regional groundwater pumping may create favorable conditions for an increased probability of channel loss presence due to seepage into the groundwater table during a drought. Similarly, the density of salt cedars or climatic patterns may change in the 100 year span between the time of the drought of record hydrology and the furthest water demand projection.

5.0 Conventions in the TCEQ WAM

5.1 Environmental Flow Requirements

The WAM requires the environmental flow restrictions of senior water rights to be honored by junior water rights as well. This prevents junior water rights from causing stream flow depletions that reduce environmental flows below the amount required by the senior water right. Specific to the Colorado Basin WAM, the environmental flow requirements applied to the impoundment rights of LCRA's Lakes Travis and Buchanan must be honored by water rights junior to March 27, 1926. This causes upper basin water rights to be curtailed in the simulation even though LCRA, in reality, will not call on inflow passage for impoundment or diversion needs.

5.2 Storage Priority

Diversion and impoundment water rights are simulated at their priority dates in the full amount authorized on their permits or certificates of adjudication. Reservoirs are allowed to call on inflow passage in order to fill the conservation pool completely. While this respects the legality of the impoundment right for the purposes of evaluating new permit applications, it may not always reflect planning and real world operations. For example, a reservoir operator with a conservation pool over 90% full and holding a senior priority water right may be unlikely to call for upstream inflows to be passed under most conditions. The inflows might be used upstream by junior water rights. Refilling of Lakes Travis and Buchanan in the WAM requires all inflows to be passed from the upper basin, except for the amount impounded by Lake O.H. Ivie according the simulated subordination agreement with Lake Buchanan. Because of the WAM's treatment of impoundment priority, no water will remain unappropriated in the simulation for upper basin water rights with priority dates junior to March 27, 1926 during periods when Lakes Travis and Buchanan are unable to completely fill their conservation pools. The impoundment priority assumption has major implications for simulated upper basin water availability during non-drought periods as well as during the drought of record.

5.3 Incorporation of Existing Subordination Agreements

The only subordination agreement in the WAM which could affect upper basin water availability is that between Lake Buchanan and Lake O.H. Ivie. Lake Ivie is simulated as impounding available inflows otherwise available to Lake Buchanan in an amount sufficient to produce a firm supply from Lake Ivie of up to 113,000 acre feet per year. Otherwise, all other water rights in the lower basin, including LCRA impoundment rights, are simulated with the ability to call on inflows from the upper basin.

5.4 LCRA Releases of Stored Water for Steam Electric Supply

Austin's steam electric water demands are modeled in the WAM according to their paper water right amounts. Currently, LCRA stored water is not modeled as being released downstream to fulfill contractual agreements for meeting demands in excess of the water

available to the run-of-river water rights. As a consequence, this modeling assumption may affect simulated instream flows between Lake Travis and the stream electric point of diversion. This could be analyzed in future plans for possible refinement of instream flow levels, but otherwise has no impact on water availability to other water rights in the simulation.

6.0 Conclusion

The low storage volumes in many of the Upper Colorado River Basin's reservoirs over the past decade have not been the result of priority calls on inflows by lower basin water rights. Growing regional demand and natural hydrologic supply are attributable to the perceived deficits in the upper basin's stored water volume. The recent drought period, which ended for the lower basin in early 2007, did not cause LCRA or other lower basin water rights to seek priority order based calls on inflow passage from upper basin entities. Surface water modeling for regional planning to date has been reflective of this operational practice.

The nine technical issues identified in the 2006 Region K Plan point to the need to apply modeling assumptions that are more representative of the basin's real world operation. The assumptions for a planning model could be different from the assumptions used for a permitting model, yet both models can be considered fair representations of the basin for their respective tasks. The assumptions used in planning models do not imply a deficiency in the assumptions used in the permitting models. The reverse is true as well.

There is a need to regularly produce updates to any model as new data or new model features become available. Changes in planning needs or new permits granted within the basin also require updates of the model used for planning purposes. While it is important to choose a set of assumptions in order to proceed with the analysis, it is also important to recognize that additional updates, new data or different assumptions can change the model's output. This potential for uncertainty in model input or structure can be balanced with a margin of safety in planning for future water management strategies.

The nine technical issues explored in this memorandum can be summarized as follows.

6.1 Simulated Reservoir Firm Yield

A simulated firm yield value of zero in many of Region F's reservoirs when using the Colorado Basin WAM is primarily attributable to allowances for all diversion rights, impoundment rights, and environmental flow requirements to make priority order calls for inflow passage regardless of the upstream location from which the inflows originate. Secondarily, the WAM's minimal application of channel losses allows priority order calls to have impacts further upstream than may be realistic.

6.2 Environmental Flow Restrictions

The WAM requires the environmental flow restrictions of senior water rights to be honored by all junior water rights. Allowance for priority order calls on all inflows contributes to the impact of lower basin environmental flow restrictions on upper basin water rights in the Colorado Basin WAM.

6.3, 6.4, 6.5 WAM Hydrology

Losses of stream flow to various natural phenomena are difficult to measure and estimate due to a high degree of variability in the loss rate and the likelihood for a small magnitude relative to the total stream flow between nearby gaging stations. Because of uncertainty in for quantifying the actual channel loss time series, user judgment should be paired with an understanding of the needs of the analysis when assigning static channel losses in the WAM. For TCEQ, the need to evaluate new permit applications requires a strict interpretation of the legal framework of the State's Prior Appropriation Doctrine. Water rights are simulated through a long period of record to determine their performance in both drought and non-drought periods. Consideration of futile calls on the passage of inflow may not be as important when evaluating new permit applications, especially for high flow events which represent the majority of the remaining unappropriated water in the basin. On the other hand, the modeling required for TWDB Regional Planning is designed to assess reservoir firm yield and run-of-river diversion availability during a repeat of the worst drought on record. Operational arrangements to forgo calls on inflows originating in the upper basin by lower basin water right holders and natural hydrological limitations on inflow conveyance during drought are important planning considerations for accurately simulating system behaviors for this specific period in the hydrologic dataset.

6.6 Existing Subordination Agreements

TCEQ may choose to update the WAM's input code for new features as they are made available in the Water Rights Analysis Package ("WRAP"). The WAM's current treatment of existing subordination agreements does not significantly affect water availability in the upper basin, relative to the issues discussed in Section 6.1.

6.7 LCRA Releases of Stored Water for Steam Electric Supply

The WAM does not explicitly model the contractual delivery of firm stored water from LCRA to Austin for steam electric needs in excess of the run-of-river water rights. Austin's contracts for firm water backup are accounted for in an aggregate "remaining yield" diversion in the WAM. Simulated instream flows between Lake Travis and the Austin steam electric point of diversion may be affected by the use of this simplification, but simulated water availability in the upper basin is likely not.

6.8 Inconsistency with Interregional Strategies

The choice of surface water modeling assumptions for the 2011 Region K Plan which can accommodate the inclusion of all water management strategies should resolve this issue.

6.9 Storage Priority

The WAM respects the strict legal interpretation of a water right's ability to impound all available water needed to refill the reservoir's conservation pool, even though reservoir operation has historically not functioned in this manner. In the case of the Colorado Basin WAM, upper basin water availability is zero in months when either Lake Travis or Lake Buchanan is unable to completely refill. All inflows must be passed downstream regardless of the degree to which storage is below full capacity.

EVALUATION OF WATER AVAILABILTIY MODELS FOR THE COLORADO RIVER BASIN

LIST OF WATER AVAILABILITY MODELS

1) Existing TCEQ Run 3 WAM
2) TCEQ Run 3 WAM With Priority Circumvention
3) LCRA System RESPONSE Model
4) Freese & Nichols Region F No-Call Run 3 WAM
5) LCRA No-Call Cutoff Run 3 WAM
6) LSWP No-Call Cutoff Operational WAMS
   - Without LSWP
   - With LSWP

See Table 1 for a summary of key features of the different water availability models. Following are brief descriptions of the models and their basic advantages and disadvantages with regard to their use for Region K Water Supply Planning.

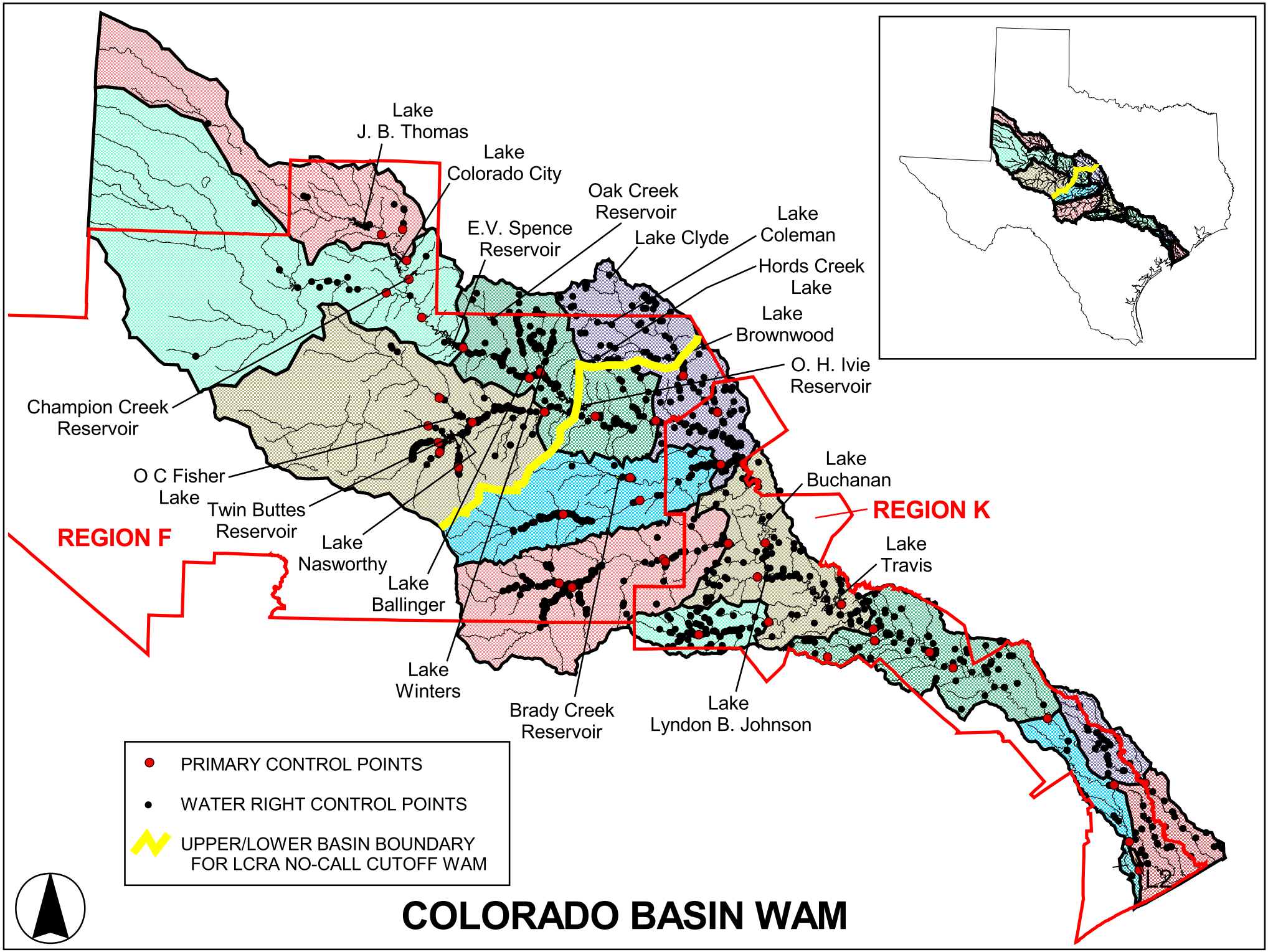
1. EXISTING TCEQ RUN 3 WAM

General Description

This is the version of the WAM that is based on full application of the Prior Appropriation Doctrine and that TCEQ normally uses for evaluating new appropriations for water, including amendments to existing water rights, in the Colorado River Basin. It includes the entire basin and has every water right in the basin represented individually with full authorized amounts specified for diverting and storing water and with any special conditions that may be included in water rights accounted for (to the extent possible with the WRAP code). These special conditions typically include flow bypass requirements for environmental and other downstream uses, seasonal use limitations, and permit-specific contractual requirements or special agreements with other water rights specifically identified in a water right. No return flows are included in this model. The hydrologic record used by this model includes monthly naturalized flows for the 1940-1998 period at gages located throughout the Colorado River Basin.

Advantages

- Basically this model describes the amount of water legally available to all water rights in the basin through strict application of the Prior Appropriation Doctrine.
- It is the model that the TWDB in general requires to be used for regional water supply planning under normal water rights and water use circumstances.



COLORADO BASIN WAM

TABLE 1 – SUMMARY OF KEY FEATURES OF WATER AVAILABILITY MODELS FOR THE COLORADO RIVER BASIN

Item No.	Model Feature	(1) Existing TCEQ Run 3 WAM *	(2) LCRA System Response Model	(3) F&N No-Call Run 3 WAM	(4) LCRA No-Call CO Run 3 WAM	(5) LSWP No-Call Cutoff Operational WAMs Without LSWP	(6) LSWP No-Call Cutoff Operational WAMs With LSWP
	GENERAL MODEL OPERATIONS						
1	Operated for determining the firm annual yield of the Buchanan/Travis reservoir system	Yes	Yes	Yes	Yes	No	No
2	Includes LSWP components and interbasin transfer of water to SAWS	No	No	No	No	No	Yes
3	Model structured as system of components with output from one used as input to others	No	Yes	Yes	No	No	No
4	Model requires spreadsheet analysis of interim results to achieve final water availability results	No	No	Yes	No	No	No
5	Operated to evaluate alternative means for meeting future projected water demands	No	No	No	No	Yes	Yes
6	Simulations attempt to leave some reserve stored water in Highland Lakes	No	Yes	No	No	Yes	Yes
7	Model structured to maximize Highland Lakes storage and levels while still satisfying demands	No	No	No	No	No	Yes
	HYDROLOGY						
8	Based on TCEQ 1940-1998 naturalized flows throughout entire basin	Yes	No	Yes	Yes	No	No
9	Based on TCEQ 1940-1998 naturalized flows throughout entire basin with 1952 flow adjustment	No	No	No	No	Yes	Yes
10	Based on 1941-1965 TDWR 1979 WAM inflows to Highland Lakes and LP 60 lower basin flows	No	Yes	No	No	No	No
	WATER RIGHTS PRIORITY STRUCTURE						
11	Represents each water right individually in the entire basin	Yes	No	Yes	Yes	Yes	Yes
12	Applies Prior Appropriation Doctrine to all water rights in entire basin honoring priority dates	Yes	No	No	No	No	No
13	Divides basin into upper and lower parts separated at dams for Ivie and Brownwood Reservoirs	No	No	No	Yes	Yes	Yes
14	Applies Prior Appropriation Doctrine to upper and lower basins separately	No	Yes	No	Yes	Yes	Yes
15	Assumes all water rights in upper basin are senior in priority to all lower basin water rights	No	Yes **	No	Yes	Yes	Yes
16	Assumes natural order priority for certain junior reservoir rights in upper basin.	No	No	Yes	No	No	No
17	Assumes major lower basin senior rights are subordinated to certain junior upper basin rights	No	No	Yes	No	No	No
	RESERVOIR STORAGE						
18	Assumes authorized reservoir conservation storage for all water rights in the entire basin	Yes	No	No	Yes	No	No
19	Assumes projected reservoir conservation storage capacities for future decades	No	Yes	Yes	No	Yes	Yes
	DIVERSIONS AND DEMANDS						
20	Assumes demands equal to authorized diversion amounts for all water rights in the entire basin	Yes	No	Yes	Yes	No	No
21	Assumes authorized diversion amounts for all water rights not associated with Highland Lakes	Yes	Yes	Yes	Yes	Yes	Yes
22	Assumes Region K projected demands for all water uses associated with Highland Lakes	No	Yes	No	No	Yes	Yes
23	Assumes all M&I demands of LCRA customers will be met from Highland Lakes through 2060	Yes	Yes	Yes	Yes	Yes	No
24	Assumes some of LCRA's M&I demands will be met with LCRA run-of-rights through 2060	No	No	No	No	No	Yes

TABLE 1 – SUMMARY OF KEY FEATURES OF WATER AVAILABILITY MODELS FOR THE COLORADO RIVER BASIN (cont'd.)

Item No.	Model Feature	(1) Existing TCEQ Run 3 WAM *	(2) LCRA System Response Model	(3) F&N Region F No-Call WAM	(4) LCRA No-Call CO Run 3 WAM	(5) LSWP No-Call Cutoff Operational WAMs: Without LSWP	(6) LSWP No-Call Cutoff Operational WAMs: With LSWP
	RETURN FLOWS						
25	Includes no return flows from diversions by any of the water rights in the entire basin.	Yes	No	Yes	Yes	No	No
26	Includes City of Austin return flows into Colorado River available for use by others	No	Yes	No	No	Yes	Yes
27	Includes City of Austin return flows into Colorado River with dedicated indirect reuse by Austin	No	No	No	No	Yes	Yes
28	Includes dedicated use of Austin return flows for satisfying environmental flow requirements	No	No	No	No	Yes	Yes
29	Includes lower basin irrigation return flows into Colorado River	No	Yes	No	No	Yes	Yes
	IRRIGATION SUPPLIES						
30	Incorporates 1999 WMP interruptible water supply provisions for LCRA irrigation users	Yes	Yes	Yes	Yes	No	No
31	Incorporates alternative interruptible water supply provisions for LCRA irrigation users	No	No	No	No	Yes	Yes
32	Provides firm supply for LCRA irrigation users through 2060	No	No	No	No	No	Yes
	ENVIRONMENTAL FLOW REQUIREMENTS						
33	Incorporates 1999 WMP provisions for instream environmental flow requirements	Yes	Yes	Yes	Yes	No	No
34	Incorporates alternative provisions for instream environmental flow requirements	No	No	No	No	Yes	Yes
35	Incorporates 1999 WMP provisions for B&E freshwater inflow requirements	Yes	Yes	Yes	Yes	No	No
36	Incorporates alternative provisions for B&E freshwater inflow requirements	No	No	No	No	Yes	Yes
37	Includes caps on Highland Lakes water used to satisfy environmental flow requirements	Yes	No	Yes	Yes	No	No

* Also pertains to the TCEQ Run 3 WAM With Priority Circumvention.

** In the Response model, inflows to the Highland Lakes were extracted from the TDWR's 1979 Water Availability Model that reflected to some extent water rights priorities based on type of water use and assumed the only inflows from the upper basin to the lower basin were spills from Ivie Reservoir.

- Currently, it is the only model recognized by the TCEQ for evaluating water availability for water rights permitting purposes in the Colorado River Basin.
- It is the model that TCEQ normally would use to evaluate an application for a new water rights permit or permit amendment.
- The model is maintained by TCEQ to be generally current with regard to new water rights permits and permit amendments approved and issued in the Colorado River Basin by the TCEQ.
- The model is in the public domain and readily available on TCEQ's web site.

Disadvantages

- The model does not reflect the historical operation of water rights in the Colorado River Basin and assumes that senior water rights in the extreme lower basin can exercise a priority call on junior water rights located in the extreme upper basin and that the flows bypassed by the upstream junior water rights, after adjustment for losses, would actually be available for diversion or storage by the downstream senior water rights.
- The model amplifies the potential for futile calls for water by downstream senior water rights from upstream junior water rights.
- The model fails to reflect reality in terms of the available supply of water actually provided for certain water rights in the basin because of the model's strict legal application of the Prior Appropriation Doctrine and its failure to represent the limitations imposed through individual contractual agreements among water rights holders that are not incorporated into water rights permit language.
- In reality, some of the largest water rights in the basin, such as those for the Highland Lakes and for several major irrigation operations in the lower basin that are owned by LCRA, either are contractually limited from exercising their senior priorities or normally would not exercise their senior priorities for "calling" for streamflows to be passed by upstream junior water rights, but these contractual limitations on available supplies are not fully reflected in the model.
- With the model structured to include all water rights in the basin in the Prior Appropriation water allocation process, particularly those located upstream of Ivie Reservoir, the available supplies simulated with the model for certain Region K users, namely those with water rights priorities senior to, and including, the Highland Lakes, generally are overstated with respect to actual real-world conditions and are inconsistent with water availability results from previous Senate Bill 1 regional planning efforts.
- With the model structured to include all water rights in the basin in the Prior Appropriation water allocation process, particularly those located upstream of Ivie Reservoir, the available supplies simulated with the model for certain Region F users, namely those with major reservoirs that have water rights priorities junior to the Highland Lakes, generally are understated with respect to actual real-world conditions and are inconsistent with water availability results from previous Senate Bill 1 regional planning efforts.
- The model does not include any return flows associated with water rights diversions.

- The model does not account for operational losses associated with the passage of inflows or the release of stored water from the Highland Lakes for downstream users.
- The model does not include the basic water supply provisions and limitations contained in LCRA's most recent settlement agreements with STPNOC and the City of Austin.
- The model does not include the proposed LCRA-SAWS Water Project.

2. TCEQ RUN 3 WAM WITH PRIORITY CIRCUMVENTION

General Description

This version of the WAM has not yet been developed by the TCEQ. TCEQ has indicated that it does intend to adapt the new priority circumvention features recently made available in the current WRAP code to several of the subordination activities that are currently represented in the Existing TCEQ Run 3 WAM using the more rudimentary procedures originally included in the version of the WRAP code that existed at the time the original Colorado Basin WAM was developed. Again, this model would include the entire basin and would have all water rights in the basin represented in the model. It would be structured exactly the same as the Existing TCEQ Run 3 WAM with full application of the Prior Appropriation Doctrine and with the new priority circumvention features incorporated.

Advantages

- Same as those for the Existing TCEQ Run 3 WAM, except that the more advanced priority circumvention procedures would be used to represent several of the subordination activities among LCRA and other water right holders, such as the subordination of some of LCRA's senior-priority run-of-river irrigation rights on the Lower Colorado River to the City of Austin's most senior-priority water right at Lake Austin and the agreement between LCRA and CRMWD whereby Ivie Reservoir is allowed to store water that Lake Buchanan would otherwise be authorized to store to the extent that such water is needed to be stored in Ivie Reservoir to provide a firm supply of 113,000 acre-feet per year.

Disadvantages

- Same as those for the Existing TCEQ Run 3 WAM.

3. LCRA SYSTEM RESPONSE MODEL

General Description

The RESPONSE model was developed by LCRA as a tool for computation of the annual water supply demands supportable under varied operating policies while observing water rights requirements. The model simulates the operation and behavior of the Highland Lakes reservoir system while supplying water to downstream diversion points with full regard for water rights seniority in the lower basin. The model has been used to evaluate water availability throughout the lower portion of the Colorado River Basin and to develop the reservoir management policies

specified in the Drought Management Plan component of the Lower Colorado Basin Water Management Plan (WMP), both 1999 WMP and the pending 2003 WMP at the TCEQ. Pursuant to the development of the 2001 Region K Water Plan, the RESPONSE model also was used by LCRA to determine available water supplies for various water users and uses in the lower basin for future decades and for the preliminary evaluation of the LCRA-SAWS Water Project (LSWP) as a proposed water supply strategy for Regions K and L.

The RESPONSE model can be operated to evaluate the available supply of water for the lower basin users (at different demand levels) from run-of-the-river diversions from the Colorado River, supplemented with water from the Highland Lakes. The model provides water supplies from Lakes Buchanan and Travis for both firm and interruptible demands. In the model, the irrigation demands in the lower basin change from year to year depending on: (1) the acres cultivated in each irrigation operation for first and second rice crops; and (2) weather conditions (rainfall and evaporation) in each year. The water demand for the first crop of rice occurs only in the months of March through July, while second crop demands are in August, September and October. The irrigation demand that is unmet from the downstream run-of-the-river water rights is satisfied with the interruptible supply from Lakes Buchanan and Travis, with this supply dependent upon the combined content in the reservoirs at the beginning of each year.

The RESPONSE model is actually made up of two integrated modules that are executed in an annual loop and one post-processing module. The first integrated module, Daily Allocation, allocates daily Colorado River flows throughout a calendar year to individual lower basin diverters based on legal water right priorities and determines shortages that require water from the Highland Lakes to be satisfied. The second integrated module, Lake Operations, uses the results of the first module to operate the Highland lakes reservoir system for that same calendar year. This is done on a monthly basis to either pass Highland Lakes inflows or release stored water, to manage the storage of unused inflows, to allow for losses due to evaporation, and to calculate potential spills. The final post-processing module, South Texas module, determines if the flow past the Bay City gage is sufficient to meet the STPNOC diversion requirements and develops the appropriate release from the Highland Lakes if it is not. The suite of modules is then manually re-run iteratively until the flow past Bay City is always sufficient the meet the STPNOC requirements.

The inflows to the Highland Lakes used in the RESPONSE model are about 10 to 12 percent less than those used in the TCEQ WAM. These inflows apparently originated from the legacy water availability model of the Colorado River Basin that was developed by the Texas Department of Water Resources (TDWR) in the late 1970s. Different versions of this TDWR legacy model were based on varying assumptions. The inflows to the Highland Lakes used in the RESPONSE model were generated considering only the spills from Ivie Reservoir, thus excluding the majority of the flows above that reservoir. A review of available documents describing this model indicates the following, each of which may have significantly affected the magnitude of the inflows to the Highland Lakes as used in the RESPONSE model:

- The 1970's version of TDWR Colorado water availability model, in general, did not exercise the full authorized storage rights for reservoirs. As such, the inflows to the Highland Lakes from the model reflected conditions whereby upstream junior rights were allowed to divert any available flow to the extent that such flow was not needed to satisfy the demands from downstream senior reservoirs that could not be satisfied with water

stored in the downstream senior reservoirs. Then, and only then, was the junior right forced to pass inflows to the downstream reservoirs. The junior right, by being allowed to take such water, could thus impair a downstream reservoir's ability to supply its authorized diversion under critical drought conditions.

- Municipal rights apparently were assigned priorities in accordance with the provisions of the Wagstaff Act, i.e. 1931 priority date if granted after the Wagstaff Act was enacted, but the highest priority (oldest priority date) if granted before the Wagstaff Act was enacted, which is significantly different from the Prior Appropriation Doctrine as modeled in the WAMs based solely on priority date. The approach used in the TDWR model generally makes municipal water rights senior to industrial and irrigation rights.
- An exception to the above priority convention is that in the Run IV version of the TWDR legacy model, all rights located downstream of the confluence of the Colorado River with the Concho River, or approximately at the dam site of Ivie Reservoir on the Colorado River, were considered junior in priority to all of the upstream rights; hence, no flows were passed downstream by these upstream rights to meet the demands of the downstream rights, even though they may have been senior in priority.
- The demands assigned to specific water rights in the TDWR legacy model did not reflect current authorized diversion amounts because the model was developed before the adjudication process was completed. For example, the City of Austin was assigned a municipal right of only 50,000 ac-ft/yr (with a high priority) with a return flow factor of 51%, but the City also was assigned an industrial right of 284,844 ac-ft/yr with a return flow factor of 97.5% (with a relatively low priority). Also, the LCRA also was assigned a non-irrigation season hydropower right of 100,000 ac-ft/yr (with the lowest priority date) from Lake Travis.
- The later versions of the TDWR's legacy water availability model (referred to as Runs III & IV) appear to have included Ivie Reservoir with a total demand of 113,000 ac-ft/yr, with the municipal portion of this demand (88,000 ac-ft/yr) assigned a 1931 priority date (senior to the Highland Lakes) and satisfied with stored water. The industrial portion of this demand (25,000 ac-ft/yr) was assigned a low priority and satisfied only with run-of-river water. Hence, the effect of Ivie Reservoir on inflows to the Highland Lakes appears to be at least partially reflected in the inflows used for the RESPONSE Model, but probably not in a manner consistent with current contractual agreements between LCRA and the CRMWD.

Inflows to the Colorado River below Lake Travis in the RESPONSE model are based on the naturalized flows derived by the TDWR in the late 1970s (LP-60, 1978). These flows generally agree with the naturalized flows used in the Existing TCEQ Run 3 WAM for some sections of the river; however, between Austin and Smithville, the RESPONSE monthly flows are about 15% lower than those used in the WAMs. Also, between Austin and Columbus, the RESPONSE flows do exhibit negative incremental inflows about 10 to 20 percent of the time during the 1941-1965 period. Such negative incremental inflows were eliminated from the WAM naturalized flows by distributing the negative inflow values to adjacent months with positive inflows, but they continue to be included in the RESPONSE computations. Finally, the inflows to the Colorado River from Columbus to Bay City are significantly lower in the RESPONSE model, with zero inflows in the irrigation months, whereas the inflows are higher in the WAMs.

Advantages

- The model provides a closer approximation of reality with regard to water rights operations in the upper basin above Ivie Reservoir and the limited passage of streamflows from the upper basin for downstream senior water rights than either the Existing TCEQ Run 3 WAM or the F&N No-Call Run 3 WAM.
- The model tends to reflect the historical and current operation of the basin with regard to water rights and the Prior Appropriation Doctrine relative to upper basin water rights.
- The model has been used by LCRA for all of the water availability evaluations that support the Highland Lakes operational provisions included in the currently-effective 1999 Water Management Plan and the pending 2003 Water Management Plan.
- The RESPONSE model was used in the 2001 Region K Planning Study as the basis for establishing water availability for lower basin users, as well as for the preliminary evaluation of the LSWP strategy. The output from the 2050 With LSWP scenario provided preliminary estimates of the quantities of groundwater needed for supplying shortages in irrigation demands that could not be met with surface water. The 2050 With and Without Project RESPONSE simulations were also used to develop lake level criteria included in SB 1629 as a requirement of the LSWP.
- The model can be operated by LCRA to determine available water supplies for users in the lower basin under specific varying input conditions.
- The model does account for return flows from the City of Austin.
- The model accounts for user-specified operational losses associated with the passage of inflows or the release of stored water from the Highland Lakes for downstream users.

Disadvantages

- The RESPONSE model historically has only been operated and used by LCRA.
- Uncertainties regarding the assumptions and conditions on the inflows to the Highland Lakes translate to uncertainties in model results.
- The inclusion in the model of negative incremental inflows with regard to Colorado River flows below Austin and the apparent exclusion of inflows to the Colorado River below Columbus translate to uncertainties in model results.
- The inflow data set used in the RESPONSE model is limited to 1941-1965 hydrology.
- The model does not include LCRA's most recent settlement agreements with STPNOC and the City of Austin.
- Although the RESPONSE model was used during 2001 Region K Planning Study for the preliminary evaluation of the LSWP, the simplistic nature of the model limited its ability to simulate various environmental and other criteria without major modifications of the model code. Due to time constraints, such modifications of the code were not considered to be feasible, and as such, the updated yield for the LSWP in the 2001 Region K Plan was derived using both the RESPONSE model and a spreadsheet program, making it somewhat difficult to trace back to the assumptions behind this strategy in the 2001 Plan.

4. FREESE & NICHOLS REGION F NO-CALL RUN 3 WAM

General Description

For the 2006 Region F Water Planning Group, their consultant, Freese & Nichols, Inc. (FNI), developed this modeling process, which consists of several water availability models that must all be operated to arrive at an answer with regard to water availability for all water rights in the entire Colorado River Basin. In this process, the output from one model serves as the input to another model. FNI developed this modeling approach as an alternative to the Existing TCEQ Run 3 WAM, since the Run 3 WAM resulted in almost no firm supply or significantly reduced firm supply for Region F's reservoirs, with the full application of the Prior Appropriation Doctrine. Since many of the water supply reservoirs located upstream of Ivie and Brownwood Reservoirs are junior in priority to the Highland Lakes and other senior water rights owned by LCRA, the City of Austin, the City of Corpus Christi, and Brown County WID, the Existing TCEQ Run 3 WAM requires that these upstream junior water rights pass streamflows downstream whenever the downstream senior reservoirs are not full or the senior run-of-the-river rights experience shortages. This results in little or no water available for storage in the upstream reservoirs and little or no firm yield, even though these reservoirs are actually authorized under their respective water rights to divert significant quantities of water. Apparently, many of these upstream reservoirs were originally analyzed by the owners and permitted by the State based on the assumption that they would not have to pass inflows necessary to satisfy downstream senior water rights. Since those firm supply estimates were used as the basis for the 2001 Region F Plan, the significant reduction in firm supply with the TCEQ Run 3 WAM compared to those of the 2001 Region F Plan would have necessitated new water management strategies, without potential for such water being physically available.

While requiring the passage of inflows by upstream junior water rights to satisfy downstream senior rights is consistent with the strict legal application of the Prior Appropriation Doctrine, it is recognized that this is not how the basin has historically been operated and that in reality such priority calls for upstream flows to satisfy downstream senior water rights are likely to not actually happen in the event of a severe drought in the basin. For these reasons, and also because some of the upstream junior water rights are covered by subordination agreements with LCRA that allow the upstream reservoirs to store inflows that Lakes Buchanan and Travis would otherwise be entitled to store, the Region F Planning Group elected to develop a special Run 3 WAM modeling process based on the assumption that certain downstream senior water rights are subordinate to certain junior water rights in the upper basin such that these junior water rights would not have to pass streamflows downstream in response to priority calls by the downstream senior rights. This particular WAM modeling process is referred to herein as the F&N No-Call Run 3 WAM.

The specific downstream senior water rights that are subordinated to certain upstream water rights in the F&N No-Call Run 3 WAM include the following:

- LCRA Garwood
- LCRA Gulf Coast
- LCRA Lakeside
- LCRA Pierce Ranch

- LCRA Lake Travis
- LCRA Lake Buchanan
- LCRA Lake LBJ
- LCRA Lake Inks
- City of Austin Lake Austin
- City of Austin Town Lake
- Brown County WID Lake Brownwood

The specific upstream junior water rights that benefit from the subordination of the above downstream senior water rights in the F&N No-Call Run 3 WAM include the following:

- Lake Thomas
- Champion Creek Reservoir
- Lake Colorado City
- E. V. Spence Reservoir
- Oak Creek Reservoir
- Lake Ballinger
- Lake Winters
- O. C. Fisher Reservoir
- Twin Buttes Reservoir
- Lake Nasworthy
- O. H. Ivie Reservoir
- Hords Creek Lake
- Lake Coleman
- Lake Clyde
- Lake Brownwood
- Brady Creek Reservoir
- City of Junction

The F&N No-Call Run 3 WAM modeling process involves successive runs using three different WAM-type models to arrive at answers regarding water availability for the various junior and senior water rights involved in the subordination process, as well as for all other water rights in the basin. These model runs include the following:

- Base Run – Made using a modified version of the Existing TCEQ Run 3 WAM to tract the quantities of flow passed downstream by each of the specific upstream junior water rights in response to priority calls by the selected downstream senior water rights that subsequently are to be subordinated to the upstream junior rights.
- MiniWAM Run – Made using a simplified WAM-type model that includes only the specific upstream junior water rights identified above, simulated in **natural** priority order (upstream rights are allowed to use water before downstream rights) with the available flows for these junior water rights calculated as the sum of the following quantities:
    - Priority depletions as simulated with the Base Run,
    - Simulated flows from the Base Run that are passed downstream by the specific upstream junior water rights to the senior water rights that are to be subordinated, and

  - Any remaining unappropriated water at the locations of the upstream junior water rights as simulated with the Base Run.

- Impact Run – Made using the Existing TCEQ Run 3 WAM, but with the upstream junior water rights included in the MiniWAM replaced with the simulated depletions for these water rights from the MiniWAM, and with adjustments made in the available water supplies of the downstream senior water rights to correspondingly limit their depletions due to their subordination to the upstream junior water rights. These adjustments are calculated external to the WAM using spreadsheets and monthly values of naturalized flows and simulated depletions from the Base Run and the MiniWAM.

Advantages

- Results from this water availability modeling process reflect assumptions adopted by Region F for water supply planning purposes regarding the passage of flows by upstream junior water rights above Ivie and Brownwood Reservoirs for downstream senior water rights in the lower basin.
- The modeling process partially reflects historical and current operations in the Colorado River Basin by allowing certain upstream junior water rights (primarily all major reservoirs) to store and divert inflows without being subject to calls for water by specific downstream senior water rights.
- The available supplies simulated with the modeling process for certain Region K users, namely those with water rights priorities senior to, and including, the Highland Lakes, generally reflect actual real-world conditions and are somewhat consistent with water availability results from previous Senate Bill 1 regional planning efforts.
- The available supplies simulated with the modeling process for certain Region F users, namely those with major reservoirs that have water rights priorities junior to the Highland Lakes, reflect actual real-world conditions and are consistent with water availability results from previous Senate Bill 1 regional planning efforts.

Disadvantages

- The modeling process only partially reflects historical and current operations in the Colorado River Basin since it only applies to certain senior water rights in the lower basin and certain junior water rights in the upper basin.
- The computational routines and procedures required for subordinating the lower basin senior water rights to the upper basin junior water rights are complex, difficult to understand, and require multiple model runs and spreadsheet analyses to arrive at final answers regarding water availability for all water rights in the Colorado River Basin.
- The entire computational process has to be repeated each time a change is made in any input variable to the model, which is time consuming and requires considerable effort.
- The subordination scheme involving selected water rights as represented in the model would be difficult, if not impossible, to implement in the real world.
- Results from the modeling process in terms of the yield of the Highland Lakes system are not consistent with those from previous Senate Bill 1 regional planning efforts.

- Results from the modeling process as derived during the 2006 Region F Water Planning Study do not reflect changes in the basic TCEQ Run 3 WAM that have been made since that time.
- The modeling process does not include any return flows associated with water rights diversions.
- The modeling process does not account for operational losses associated with the passage of inflows or the release of stored water from the Highland Lakes for downstream users.
- The modeling process does not include LCRA's most recent settlement agreements with STPNOC and the City of Austin.
- The modeling process does not include the proposed LCRA-SAWS Water Project.

5. LCRA NO-CALL CUTOFF RUN 3 WAM

General Description

This model provides a hybrid representation of water allocation in the Colorado River Basin that recognizes actual and historical operating conditions with regard to the storage of inflows entering Ivie and Brownwood Reservoirs and the limited passage of these inflows downstream, but still incorporates the Prior Appropriation Doctrine for determining water availability for the water rights located upstream of Ivie and Brownwood Dams and for the water rights located downstream of these dams. This model conforms exactly to the Existing TCEQ Run 3 WAM, except that it is structured in two parts, with the portion of the basin above the dams for Ivie Reservoir and Lake Brownwood included in the upper part and the remainder of the basin below these dams included in the lower part. All water rights included in each part of the model are simulated in accordance with the Prior Appropriation Doctrine recognizing their respective priority dates, but all water rights in the upper part of the basin are stipulated as being senior in priority to all water rights in the lower part of the basin. As such, this model includes the entire basin and every water right in the basin.

Each water right in the basin is represented individually, with full authorized amounts for diverting and storing water specified and with any special conditions that may be included in water rights accounted for (to the extent possible with the WRAP code). These special conditions typically include flow bypass flow requirements for environmental and other downstream uses, seasonal use limitations, and water right-specific contractual requirements or special contractual agreements with other water rights. No return flows are included in this model. This model is structured to better reflect actual and historical operating conditions with regard to the storage of inflows entering Ivie and Brownwood Reservoirs (and the limited passage of inflows through these reservoirs) and existing contractual agreements between LCRA and certain upper basin water right holders that allow the upper basin junior-priority rights to use streamflows that otherwise would have to be passed downstream to LCRA's more senior Highland Lakes and other rights.

Advantages

- The model provides a closer approximation of reality with regard to water rights operations in the upper basin above Ivie and Brownwood Reservoirs and the limited passage of streamflows from the upper basin for downstream senior water rights than either the Existing TCEQ Run 3 WAM or the F&N No-Call Run 3 WAM.
- Results from this water availability model generally reflect assumptions adopted by Region F for water supply planning purposes regarding the passage of flows by upstream junior water rights for downstream senior water rights, except that the major reservoirs upstream of Ivie and Brownwood Dams are not simulated in **natural** priority order.
- The model accounts for some additional subordination agreements between LCRA and certain water rights holders in the upper basin upstream of Ivie and Brownwood Reservoirs that are not reflected in either the Existing TCEQ Run 3 WAM or the F&N No-Call Run 3 WAM.
    - Subordination of LCRA's senior water rights to San Angelo Water Supply Corporation's Twin Buttes Reservoir with certain conditions.
    - Subordination of LCRA's pending Excess Flows Permit to all water rights upstream of Ivie and Brownwood Reservoirs.
- With the model structured with all water rights upstream of Ivie and Brownwood Reservoirs made senior in priority to all water rights downstream of these reservoirs, the available supplies simulated with the model for certain Region K users, namely those with water rights priorities senior to, and including, the Highland Lakes, generally are more consistent with actual real-world conditions and with water availability results from previous Senate Bill 1 regional planning efforts.
- With the model structured with all water rights upstream of Ivie and Brownwood Reservoirs made senior in priority to all water rights downstream of these reservoirs, the available supplies simulated with the model for certain Region F users, namely those with major reservoirs that have water rights priorities junior to the Highland Lakes, generally are more consistent with actual real-world conditions and with water availability results from previous Senate Bill 1 regional planning efforts.
- The model can be created from the Existing TCEQ Run 3 WAM with minimal effort and thus can include all existing water rights that are included in the Existing TCEQ Run 3 WAM at any time.
- The model is available upon request from LCRA.

Disadvantages

- The model does not provide for a strict application of the Prior Appropriation Doctrine.
- The model result may show that some junior water rights downstream of Ivie and Brownwood that are not part of any subordination agreement could be negatively impacted regarding their water availability.

- This model is not currently recognized by the TCEQ for evaluating water availability for water rights in the Colorado River Basin, and it is not being used by the TCEQ to evaluate an application for a new water rights permit or permit amendment.
- The model is not regularly maintained by LCRA or TCEQ with regard to new water rights permits and permit amendments approved and issued in the Colorado River Basin by the TCEQ.
- The model is not available on TCEQ's or LCRA's web site.
- The model does not include any return flows associated with water rights diversions.
- The model does not include the basic water supply provisions and limitations contained in LCRA's most recent settlement agreements with STPNOC and the City of Austin.
- The model does not account for operational losses associated with the passage of inflows or the release of stored water from the Highland Lakes for downstream users.
- The modeling process does not include the proposed LCRA-SAWS Water Project.

6. LSWP NO-CALL CUTOFF OPERATIONAL WAMS

General Description

These models are structured basically the same as the LCRA No-Call Cutoff Run 3 WAM, except they reflect specific future conditions without and with the proposed LCRA-SAWS Water Project (LSWP) in operation over the expected life of the LSWP. As such, these models include the entire basin and have every water right in the basin represented individually. A fundamental difference with respect to the previous models is that these LSWP models include the Region K projected demands for specific decades for all water users associated with LCRA, which basically includes all of LCRA's customers that rely on LCRA's water supplies for either their primary water supply or backup of their primary supply. All water rights not associated with LCRA and the Highland Lakes are represented in these models individually with full their authorized amounts for diverting and storing water specified and with any special conditions that may be included in their water rights accounted for (to the extent possible with the WRAP code). Separate models are available for future decadal conditions (projected Region K demands and reservoir storage capacities), including the year 2010 without the LSWP in operation and the years 2030, 2060 and 2080 both without and with the LSWP in operation. Models representing other intervening decades are being developed. The reuse of return flows to the Colorado River from the City of Austin as considered in the 2006 Region K Planning Study and as recently agreed upon by the LCRA and the City of Austin in the 2007 Settlement Agreement are included in these models, as well as return flows to the Colorado River from LCRA's lower basin irrigation operations.

Advantages

- Same as those for the LCRA No-Call Cutoff Run 3 WAM.
- These models are specifically designed to reflect operational conditions without and with the proposed LSWP implemented over the life of the LSWP.

- Modified versions of this model have been and are being used routinely by LCRA and the City of Austin to evaluate water availability for water rights owned by the LCRA and the City of Austin, as well as other entities in the lower basin.
- These models include demands and return flows associated with the City of Austin's municipal use consistent with the 2006 Region K Planning Study.
- These models include the basic water supply provisions and limitations contained in LCRA's most recent settlement agreements with STPNOC and the City of Austin.
- The "with-project" model does include the most current version of the proposed LCRA-SAWS Water Project.
- These models account for user-specified operational losses associated with the passage of inflows or the release of stored water from the Highland Lakes for downstream users.

Disadvantages

- Same as those for the LCRA No-Call Cutoff Run 3 WAM.

SUMMARY OF WATER USE AND AVAILABILITY FEATURES INCLUDED IN LCRA AGREEMENTS AND THEIR REPRESENTATION IN WATER AVAILABILITY MODELS FOR THE COLORADO RIVER BASIN

NO.	AGREEMENT NAME AND PARTIES	YEAR SIGNED		INCLUDED IN PERMIT LANGUAGE	RELEVANT FEATURES OF AGREEMENT	ACCOUNTED FOR IN MODELS				
		Original	Last Amended			Existing * TCEQ Run 3 Run 3 WAM	LCRA System Response Model	F&N Region F No-Call Run 2 WAM	LCRA No-Call Cutoff Run 3 WAM	LSWP No-Call Cutoff Oper. WAMs
1	*Twin Buttes Reservoir Agreement* San Angelo Water Supply Corporation and LCRA	1957	- -	No	1) Subordinates all LCRA water rights to Twin Buttes Reservoir. 2) Allows SAWSC to divert water for irrigation of up to 10,000 acres and for municipal use within the City of San Angelo's service area.	1) No 2) Yes	1) Yes 2) Yes	1) No 2) Yes	1) Yes 2) Yes	1) Yes 2) Yes
2	*Lake Spence Agreement* Colorado River Municipal Water District and LCRA	1965	1998	Yes	1) Allows CRMWD to operate Spence Reservoir. 2) Requires passage of inflows for LCRA's senior rights. 3) Does not require releases of stored water for LCRA.	1) Yes 2) Yes 3) Yes	1) Yes 2) No 3) Yes	1) Yes 2) No 3) Yes	1) Yes 2) No 3) Yes	1) Yes 2) No 3) Yes
3	*Stacy Dam Agreement* Colorado River Municipal Water District and LCRA	1985	1998	Yes	1) Allows CRMWD to operate Ivie Reservoir. 2) Allows Ivie to store inflows that otherwise are authorized for Lake Buchanan to the extent inflows are needed to provide 113,000 ac-ft/yr of supply from Ivie. 3) Does not require releases of stored water for LCRA.	1) Yes 2) Yes 3) Yes	1) Yes 2) Yes 3) Yes	1) Yes 2) Yes 3) Yes	1) Yes 2) Yes 3) Yes	1) Yes 2) Yes 3) Yes
4	*1972 STP Agreement* South Texas Project and LCRA		See Item 7	Yes	1) Requires LCRA to provide up to 102,000 ac-ft/yr to STP from either LCRA River Right or Highland Lakes. 2) Limits amount of HIghland Lakes water LCRA provides to STP to _____.	1) Yes 2) Yes	1) Yes 2) Yes	1) Yes 2) Yes	1) Yes 2) Yes	1) No 2) No
5	*1987 Austin Settlement Agreement* City of Austin and LCRA	1987	See Item 8	Yes	1) Subordinates LCRA's Lakeside water right (COA 14-5475) to the City of Austin's Lake Austin water right (COA 14-5471). 2) Subordinates LCRA's Gulf Coast water right (COA 14-5476) to the City of Austin's Lake Austin water right (COA 14-5471). 3) Subordinates LCRA's Pierce Ranch water right (COA 14-5477) to the City of Austin's Lake Austin water right (COA 14-5471).	1) Yes 2) Yes 3) Yes	1) Yes 2) Yes 3) Yes	1) Yes 2) Yes 3) Yes	1) Yes 2) Yes 3) Yes	1) Yes 2) Yes 3) Yes

SUMMARY OF WATER USE AND AVAILABILITY FEATURES INCLUDED IN LCRA AGREEMENTS AND THEIR REPRESENTATION IN WATER AVAILABILITY MODELS FOR THE COLORADO RIVER BASIN (cont'd.)

NO.	AGREEMENT NAME AND PARTIES	YEAR SIGNED		INCLUDED IN PERMIT LANGUAGE	RELEVANT FEATURES OF AGREEMENT	ACCOUNTED FOR IN MODELS				
		Original	Last Amended			Existing * TCEQ Run 3 Run 3 WAM	LCRA System Response Model	F&N Region F No-Call Run 2 WAM	LCRA No-Call Cutoff Run 3 WAM	LSWP No-Call Cutoff Oper. WAMs
6	*Excess Flows Permit Subordination Agreement* Colorado River Municipal Water District, Brown County Water Improvement District No. 1, and LCRA	2001	- -	Yes (Draft)	1) Subordinates LCRA's pending Excess Flows Permit to all existing water rights upstream of Ivie and Brownwood Reservoirs. 2) Subordinates LCRA's pending Excess Flows Permit to any new water right permit or amendment of existing permit held by the CRMWD or BCWID upstream of Ivie and Brownwood Reservoirs.	1) No 2) No	1) Yes 2) Yes	1) No 2) No	1) No 2) No	1) Yes 2) Yes
7	*2006 STP Agreement* South Texas Project and LCRA	2006	- -	No (Proposed)	1) Allows STP to divert up to 102,000 ac-ft/yr under the LCRA River Right. 2) Requires LCRA to provide backup water to STP from the Highland Lakes or other sources. 3) Limits amount of backup water LCRA provides to STP to 40,000 ac-ft/yr as a 5-year rolling average.	1) No 2) No 3) No	1) No 2) No 3) No	1) No 2) No 3) No	1) No 2) No 3) No	1) Yes 2) Yes 3) Yes
8	*2007 Austin Settlement Agreement* City of Austin and LCRA	2007	- -	No (Proposed)	1) Provides for the use of Austin's return flows first for helping meet instream and bay & estuary flow criteria along the Lower Colorado River. 2) Provides for the indirect reuse of any remaining amount of Austin's return flows by the City of Austin. 3) Finally, provides that any unused amount of Austin's return flows is available for use by others according to the Prior Appropriation Doctrine.	1) No 2) No 3) No	1) No 2) No 3) No	1) No 2) No 3) No	1) No 2) No 3) No	1) Yes 2) Yes 3) Yes

* Also applies to the TCEQ Run 3 WAM With Priority Circumvention

D R A F T

NOTES FROM TCEQ DISCUSSIONS
REGARDING WATER AVAILABILITY MODELING
FOR THE COLORADO RIVER BASIN

November 2007

- TCEQ has maintained the Run 3 WAM for the Colorado River Basin current with new water rights permits and amendments.

- The most current version of the Run 3 WAM is available directly from TCEQ staff, not necessarily from the TCEQ web site.

- The only representations of subordination agreements or other arrangements between individual water right holders in the Colorado River Basin that are incorporated into the WAM are those that are recognized and included in water rights permits and certificates of adjudication and their amendments.

- TCEQ currently has no plans to add any new subordination agreements or other arrangements between individual water right holders in the Colorado River Basin to the existing Run 3 WAM.

- TCEQ would consider incorporating into the WAM any existing subordination agreements or other arrangements between individual water right holders in the Colorado River Basin that are not recognized and included in existing water rights permits or certificates of adjudication or their amendments if such agreements or arrangements are included in a future revision or amendment of the Lower Colorado Basin Water Management Plan (WMP).

- TCEQ may in the future adapt the Priority Circumvention procedure to the Lometa water right and to the subordination of Lake Buchanan to Ivie Reservoir.

- TCEQ does not plan to modify the representation of the STP run-of-river water right or the procedures and limitations for backing up STP's water supply with Highland Lakes water in the Colorado River Basin WAM until the STP run-of-river right is amended to reflect the new settlement agreement between STP and the LCRA.

- To the extent possible, all provisions of the currently-effective WMP (1999) must be represented in the Run 3 WAM since the WMP is an integral part of the existing water rights authorizing Lakes Buchanan and Travis.

    - Caps on Highland Lakes water for satisfying environmental flow requirements as stipulated in the 1999 WMP must be accounted for in the WAM.

    - Specific operating rules for using stored water from Lakes Buchanan and Travis as stipulated in the 1999 WMP must be prescribed in the WAM.

- TCEQ already has incorporated into the Colorado River Basin Run 3 WAM the revised procedures suggested by TRC/Brandes for refilling Lakes Inks, LBJ and Marble Falls in response to evaporation losses.

- With proper documentation, TCEQ will modify the naturalized flows for the Colorado River from Mansfield Dam downstream to the Gulf to reflect an apparent overstatement of inflow to Lake Travis during the September 1952 flood event (this modification has already been made to the naturalized flows used in the LCRA and LSWP No-Call Cutoff WAMs).

D R A F T

NOTES FROM DISCUSSIONS WITH FREESE & NICHOLS REGARDING REGION F WATER AVAILABILITY MODELING FOR THE COLORADO RIVER BASIN

Conference Call and Discussions With Jon Albright
November 2007

- Region F has no new water supply analyses using water availability models planned for water rights in the upper Colorado River Basin, with the exception of some site-specific studies for Pecan Bayou water rights.

- Region F is waiting to see what approach Region K adopts and implements for assessing the availability of water supplies for water rights in the lower Colorado River Basin.

- Use of the LCRA No-Call Cutoff Run 3 WAM for establishing available water supplies for Region K would be consistent with Region F's water supply planning assumptions regarding the passage of streamflows by upstream water rights above Ivie and Brownwood Reservoirs to downstream water users in Region K.

- For purposes of Region K water supply planning, it would not be necessary to modify the LCRA No-Call Cutoff Run 3 WAM to provide natural order priorities for all of the major reservoir water rights upstream of Ivie and Brownwood Reservoirs as is done for Region F; although, this could be done relatively easily.

APPENDIX B

DESCRIPTION OF REGION K WAM RUN 3 CUTOFF MODEL

The TCEQ's Colorado WAM Run 3 (circa September 17, 2007) was used as the base model for constructing the current version of what is referred to as the Region K WAM Run 3 Cutoff Model. This model is believed to be exactly the same as the TCEQ's current Run 3 version of the Colorado Basin WAM, except that it has been modified to reflect historical and existing operations of water rights with respect to reservoirs in the upper basin above Ivie and Brownwood Dams and to be generally consistent with procedures for determining the firm yield of the Highland Lakes as incorporated in the currently effective LCRA 1999 Water Management Plan (WMP). Specifically, the following modifications have been made to the TCEQ model for purposes of Region K planning:

1) The Colorado River Basin has been divided into two subbasins; one above Ivie and Brownwood Dams and one below these dams, with all water rights in the upper basin made senior in priority to all water rights in the lower subbasin while still maintaining priority order among the water rights in each subbasin.

2) The interruptible supply of water from the Highland Lakes that is authorized under the LCRA 1999 WMP for supplementing the water supply of downstream run-of-the-river water rights has been eliminated to reflect future firm yield operation of the Highland Lakes in accordance with policies incorporated in the WMP.

3) In accordance with provisions of the 2006 Settlement Agreement between the LCRA and the South Texas Project (STP), the available supply of run-of-river water for STP under Certificate of Adjudication No. 14-5437 is authorized at 102,000 ac-ft/yr (excluding Highland Lakes backup water), and the available supply of backup water for STP from the Highland Lakes is limited to 20,000 ac-ft/yr (as a 5-year rolling average) with two generating units in operation (as will be the case through the year 2015 according to STP) and to 40,000 ac-ft/yr (as a 5-year rolling average) with any additional generating units in operation (beginning in the year 2016 according to STP). In the WAM, water requirements for STP in excess of these limits are assumed to be obtained from external sources other than the Colorado River.

4) While the combined effects of these modifications to the model have resulted in changes in the overall available supply of water for various users in the basin, the authorized diversion amount (demand) for the LCRA "uncommitted card" (WAM Water Right ID No. 61405482001C) is still set at 132,000 ac-ft/yr in order to maintain the Highland Lakes system in a firm yield condition in accordance with WMP procedures.

Following is a summary of specific features and information regarding the Region K WAM Run 3 Cutoff Model as it currently exists:

1) All water rights in the entire Colorado River Basin and the Colorado-Brazos Coastal Basin (San Bernard River) are individually represented and simulated in accordance with their full authorized diversion and reservoir storage amounts.

2) All streamflow restrictions and environmental flow requirements stipulated in individual water rights, including the LCRA 1999 WMP, that limit diversions and/or reservoir storage are accounted for in the model.

3) Simulations with the WAM are made using a monthly time step over the entire period from 1940 through 1998.

4) Monthly naturalized streamflows are input to the model at primary control points (gaging stations) for the entire 1940-1998 simulation period and used to describe the available naturalized flows at all water right locations based on drainage area ratios.

5) The original naturalized flows for September 1952 for all primary control points on the mainstem of the Colorado River from Mansfield Dam to the Gulf of Mexico have been reduced by 300,000 acre-feet to reflect an adjustment in the original procedures used to estimate inflows to Lake Travis from its upstream ungaged watershed.

6) The area-capacity relationships for all reservoirs represented in the model correspond to authorized conservation storage quantities stipulated in existing water rights; however, for purposes of evaluating future water supply strategies, these area-capacity relationships will be adjusted to reflect future sedimentation conditions in the reservoirs corresponding to the future demand (decade) conditions being analyzed.

7) Bay and estuary (B&E) freshwater inflow requirements for Critical and Target conditions as stipulated in the LCRA 1999 WMP are fully engaged in the model based on the 1997 FINS criteria, including the Buchanan-Travis combined storage triggers for determining when Highland Lakes water is made available for satisfying the various B&E inflow needs. For purposes of evaluating future water supply strategies, alternative B&E inflow requirements may be used such as the 2006 FINS criteria or the LCRA/SAWS Water Project bay health criteria.

8) Instream environmental flow requirements at various locations along the Lower Colorado River are represented in the model in accordance with the LCRA 1999 WMP, including the Buchanan-Travis combined storage triggers for determining when Highland Lakes water is made available for satisfying the various instream environmental flow needs.

9) Annual and multi-year environmental flow caps from the LCRA 1999 WMP are included in the model for limiting the use of Highland Lakes water for satisfying instream and B&E environmental flow requirements. For purposes of evaluating future water supply strategies, it is anticipated that these caps will be eliminated from the model because the need for environmental flows will change as other demands for water from the Highland Lakes change in the future.

10) In accordance with the restructuring of the model for Region K planning, no interruptible water from the Highland Lakes is provided for supplying the demands of any water rights in the lower basin. For purposes of evaluating future water supply strategies, it is anticipated that interruptible water from the Highland Lakes will be provided for supplying demands in the lower basin in order to be more consistent with actual system operations and that appropriate irrigation demand curtailment procedures will be used in accordance with current WMP practices.

11) Water demands for LCRA's four lower basin irrigation operations are set at the annual diversion amounts authorized in the existing water rights for these operations, which totals

636,750 ac-ft/yr; however, for purposes of evaluating future water supply strategies, these irrigation water demands will be reduced to levels consistent with anticipated future usage and may be varied annually and monthly as a function of weather conditions.

12) Unless specified otherwise in a particular water right, no Municipal or Industrial return flows, including those from the City of Austin, are accounted for in the model. Municipal or Industrial return flows may be addressed as part of future water supply strategies.

13) No Irrigation return flows are discharged into the Colorado River or any of its tributaries in the model. Irrigation return flows may be addressed as part of future water supply strategies.

14) In accordance with provisions in water rights owned by Austin and LCRA, Austin's most senior water authorizing the diversion of 250,000 ac-ft/yr from the Colorado River is designated as being senior in priority to all of LCRA's water rights, with the exception of the Garwood right, even though some of LCRA's water rights have priority dates older than the Austin senior water right.

15) The provisions of the recent Settlement Agreement between the LCRA and the City of Austin are not represented in the model, but may be incorporated as part of the evaluation of future water supply strategies.

16) The provisions of the recent Settlement Agreement between LCRA and the South Texas Project are represented in the model.

17) Operating rules for Lakes Buchanan and Travis maintain consistent levels of drawdown in each of the reservoirs under specified demands, with Lake Buchanan serving as the last source of water for meeting demands during extreme drought conditions. Reservoir operating rules may change as part of the evaluation of future water supply strategies.

18) No existing term permits for water rights are included in the model.

LOWER COLORADO REGIONAL WATER PLANNING GROUP

John E. Burke, P.E.
Chairman

P.O. Drawer P
Bastrop, TX 78602

Phone: 512/303-3943
Fax: 512/303-4881

February 22, 2008

Mr. Kevin Ward
Executive Administrator
Texas Water Development Board
Stephen F. Austin Bldg.
P.O. Box 13231
Austin, Texas 78711-3231

Subject: Request by the Lower Colorado Regional Water Planning Group (Region K) to use a model other than the TCEQ WAM Run 3 for determining availability of surface water resources

Dear Mr. Ward:

During the last round of regional water planning, it was determined very late in the planning effort that the required TCEQ WAM Run 3 did not adequately reflect the historical operation of water rights and existing contractual commitments in the Colorado River Basin. To remedy the situation, Region F developed a modeling process called the Region F No-Call Run 3 WAM that was used by Region K to determine its surface water availability numbers. Results from the Region F model were presented in the 2006 Region K Plan and used to evaluate some of Region K's water management strategy needs. However, there were several issues and concerns that Region K had with the Region F model and its assumptions but there was not sufficient time or budget to resolve such.

Because of these issues and concerns, Region K applied for and received first round funding to fully evaluate which model it should use in its future planning efforts in determining surface water availability. Region K's Water Modeling Committee fully evaluated all of the modeling platforms which are capable of providing such analyses. After an extensive review, the Modeling Committee and subsequently the full Region K planning group adopted LCRA's No-Call Run 3 WAM (Region K WAM Run 3 Cutoff Model) as the model that most reflects the existing contractual commitments and historic operation of the water rights in the basin. The LCRWPG officially approved, at its most recent meeting on January 9, 2008, the use of the model as the base platform for determining surface water availabilities. Region K has been in contact with the consultant for Region F regarding Region K's use of the Region K WAM Run 3 Cutoff model. We do not anticipate that there will be significant conflicts between the two regions with respect to this model's use.

The Region K WAM Run 3 Cutoff Model uses the base TCEQ WAM 3 model with several modifications as described in the attached document by TRC/Brandes, entitled *Description of Region K WAM Run 3 Cutoff Model.* The model will be adjusted for sedimentation when determining the availabilities for the years 2010 through 2060.

Our Water Modeling Committee has reviewed all of the assumptions that are currently embedded in the Region K WAM Run 3 Cutoff Model and agrees with them. This is the model that Region K proposes to use to determine surface water availability under its first round funded tasks items for this planning cycle. We are happy to provide you with a copy of the model for your review.

If the Board has any issues or concerns with Region K's use of this particular model, we would appreciate hearing back as quickly as possible. Developing the scope of work for the next biennium will need to begin shortly, and the Board's decision on the use of this model for planning purposes could significantly affect the scope.

Very Truly Yours,

John E. Burke, Chairman
Lower Colorado Regional Water Planning Group

JEB/cb

Enclosure: *Description of Region K WAM Run 3 Cutoff Model*
CD containing the Region K WAM Run 3 Cutoff model

c: Mr. David Meesey, TWDB

March 11, 2008

Mr. John E. Burke, P.E.
Chairman, Lower Colorado Regional Water Planning Group
P.O. Drawer P
Bastrop, Texas 78602

Dear Mr. Burke:

Thank you for your letter dated February 22, 2008 in which you requested permission to use a modified surface water availability model, termed the "Region K WAM Run 3 cutoff model", in the current phase of regional water planning. Approval by the Texas Water Development Board's (TWDB) Executive Administrator for use of a locally-modified water availability model is required by the regional planning grant contract between the TWDB and the political subdivision for your planning group. Because of problems experienced in the last round of regional water planning with the base model, region-specific modifications were made which resulted in the "cutoff model."

After a review of the proposed model by our Surface Water Resources Division, the TWDB agrees that the "Region K WAM Run 3 cutoff model" is an appropriate tool for your region to use in determining surface water availability during the current planning cycle. Use of this model is approved for development of the 2011 Region K plan.

We appreciate your ongoing commitment to regional water planning. If you have any questions, please contact Mr. David Meesey, Team Leader for State and Regional Water Planning, at (512) 936-0852.

Sincerely,

J. Kevin Ward
Executive Administrator

APPENDIX C

Table 3.3 Major Run-of-River Water Rights in the Colorado Basin Comparison (Ac-Ft/Yr)

Water Right ID Numbers	Water Rights Holder	Maximum Permitted Diversion	Priority Date	2006 Plan	Reg K Cutoff	2006 Plan	Reg K Cutoff	2006 Plan	Reg K Cutoff	2006 Plan	Reg K Cutoff	2006 Plan	Reg K Cutoff	2006 Plan	Reg K Cutoff
				2010	2010	2020	2020	2030	2030	2040	2040	2050	2050	2060	2060
61405434201RR	LCRA - Garwood	133,000	Nov 1, 1900	111,740	130,141	111,740	130,141	111,740	130,141	111,740	130,141	111,740	130,141	111,740	130,141
		Sub-Total		**111,740**	**130,141**	**111,740**	**130,141**	**111,740**	**130,141**	**111,740**	**130,141**	**111,740**	**130,141**	**111,740**	**130,141**
61405475001LRRS	LCRA - Lakeside #1	52,500	Jan 4, 1901	10,570	10,405	10,570	10,405	10,570	10,405	10,570	10,405	10,570	10,405	10,570	10,405
61405475001LRRL			Jun 29, 1913	6,274	1,573	6,274	1,573	6,274	1,573	6,274	1,573	6,274	1,573	6,274	1,573
61405475001LRRR			Mar 8, 1938	0	0	0	0	0	0	0	0	0	0	0	0
61405475001LRRJ		78,750	Nov 1, 1987	2,925	553	2,925	520	2,925	520	2,925	520	2,925	520	2,925	520
		Sub-Total		**19,769**	**12,531**	**19,769**	**12,498**	**19,769**	**12,498**	**19,769**	**12,498**	**19,769**	**12,498**	**19,769**	**12,498**
61405476003RRS	LCRA - Gulf Coast	228,570	Dec 1, 1900	14,554	14,476	14,554	14,476	14,554	14,476	14,554	14,476	14,554	14,476	14,554	14,476
61405476003RRL			Jun 29, 1913	58,058	28,987	58,058	28,909	58,058	28,909	58,058	28,909	58,058	28,909	58,058	28,909
61405476003RRR			Mar 8, 1938	0	0	0	0	0	0	0	0	0	0	0	0
61405476003RRJ		33,930	Nov 1, 1987	1,512	1,365	1,499	155	1,486	155	1,473	155	1,460	155	1,444	155
		Sub-Total		**74,124**	**44,827**	**74,111**	**43,540**	**74,098**	**43,540**	**74,085**	**43,540**	**74,072**	**43,540**	**74,056**	**43,540**
61405477001RR	LCRA - Pierce Ranch	55,000	Sep 1, 1907	4,231	12,468	4,231	12,525	4,231	12,525	4,231	12,525	4,231	12,525	4,231	12,525
61405477001RRL			Jun 29, 1913	6,538	1,648	6,538	1,648	6,538	1,648	6,538	1,648	6,538	1,648	6,538	1,648
61405477001RRR			Mar 8, 1938	0	0	0	0	0	0	0	0	0	0	0	0
		Sub-Total		**10,769**	**14,116**	**10,769**	**14,173**	**10,769**	**14,173**	**10,769**	**14,173**	**10,769**	**14,173**	**10,769**	**14,173**
61405475001WRR	LCRA - Lakeside #2	55,000	Sep 2, 1907	4,231	8,791	4,231	8,791	4,231	8,791	4,231	8,791	4,231	8,791	4,231	8,791
61405475001WRRL			Jun 29, 1913	6,538	1,648	6,538	1,648	6,538	1,648	6,538	1,648	6,538	1,648	6,538	1,648
61405475001RRRR			Mar 8, 1938	0	0	0	0	0	0	0	0	0	0	0	0
		Sub-Total		**10,769**	**10,440**	**10,769**	**10,440**	**10,769**	**10,440**	**10,769**	**10,440**	**10,769**	**10,440**	**10,769**	**10,440**
61405471005SMRR	City of Austin - (mun.) [1]	250,000	Jun 30, 1913	119,734	148,431	120,000	143,846	120,266	143,846	120,532	143,846	120,798	143,846	121,062	143,859
61405471005SBU	City of Austin - (mun.) [1]		Jun 30, 1913	47,010	49,845	47,126	48,034	47,242	48,034	47,358	48,034	47,474	48,034	47,592	48,034
61405471005LMRR	City of Austin - (mun.) [1]	21,403	Jun 27, 1914	9,556	9,944	9,651	8,407	9,746	8,407	9,841	8,407	9,936	8,407	10,030	8,407
61405471001P	City of Austin - (stm.)	24,000	Jun 27, 1914	5,296	14,894	5,309	14,894	5,322	14,894	5,335	14,894	5,348	14,894	5,361	14,894
61405471002P	City of Austin - (stm.)		Jun 27, 1914	1,312	1,267	1,198	1,267	1,084	1,267	970	1,267	856	1,267	741	1,267
61405489003M	City of Austin - (mun.) [1]	20,300	Aug 20, 1945	5,357	3,881	5,484	3,519	5,611	3,556	5,738	3,556	5,865	3,556	5,993	3,519
61405489003P	City of Austin - (stm.)	16,156	Aug 20, 1945	315	0	313	0	311	0	309	0	307	0	304	0
61405489003PBU	City of Austin - (stm.)		Aug 20, 1945	2,554	99	2,521	744	2,488	744	2,455	744	2,422	744	2,389	744
61405437001RIV	STP Nuclear Operating Co. [1]	102,000	Jun 10, 1974	49,039	51,811	48,989	46,349	48,939	46,349	48,889	46,349	48,839	46,349	48,791	46,349
61405434102	City of Corpus Christi	35,000	Nov 2, 1900	25,021	22,884	25,021	22,884	25,021	22,884	25,021	22,884	25,021	22,884	25,021	22,884
Totals		**1,105,609**		**492,365**	**515,111**	**492,770**	**500,735**	**493,175**	**500,772**	**493,580**	**500,772**	**493,985**	**500,772**	**494,387**	**500,748**

Notes: Colorado WAM provided by TCEQ, August 2007, Run 3. WRAP program by Dr. Ralph Wurbs, Texas A&M University, November 2007

Drought-of-Record (DOR) for 2006 Plan is May 1945 to April 1957 (12 years)

Drought-of-Record (DOR) for Region K Cutoff Model is May 1945 to April 1957 (12 years) for 2010; May 1947 to April 1957 (10 years) for all other decades

The values for the 2006 Plan numbers were taken from Table 3.3a in the 2006 Plan

[1] These values were averaged over the DOR

Region K Current Water Availability Sources

Source Name	Source Type	Source RWPG	Source County	Source Basin	Source Identifier	Water Availability (ac-ft/yr)							Comments
						Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050	Year 2060	
City of Austin - ROR (Municipal)	0	K		Colorado	3461405471A	175,823	208,220	200,287	200,287	200,287	200,287	199,900	REGION K WAM CUTOFF MODEL
City of Austin - ROR (Municipal)	0	K		Colorado	3461405489A	5,230	3,881	3,519	3,556	3,556	3,556	3,519	REGION K WAM CUTOFF MODEL
City of Austin - ROR (Steam Elec.)	0	K		Colorado	3461405471A-SE	6,709	16,161	16,161	16,161	16,161	16,161	16,161	REGION K WAM CUTOFF MODEL
City of Austin - ROR (Steam Elec.)	0	K		Colorado	3461405489A-SE	2,904	99	744	744	744	744	744	REGION K WAM CUTOFF MODEL
LCRA - Garwood ROR	0	K		Colorado	3461405434A	111,740	130,141	130,141	130,141	130,141	130,141	130,141	REGION K WAM CUTOFF MODEL
LCRA - Gulf Coast ROR	0	K		Colorado	3461405476A	74,137	44,827	43,540	43,540	43,540	43,540	43,540	REGION K WAM CUTOFF MODEL
LCRA - Lakeside ROR	0	K		Colorado	3461405475	30,538	22,971	22,938	22,938	22,938	22,938	22,938	REGION K WAM CUTOFF MODEL
LCRA - Pierce Ranch ROR	0	K		Colorado	3461405477	10,769	14,116	14,173	14,173	14,173	14,173	14,173	REGION K WAM CUTOFF MODEL
STP Nuclear Operating Co. - ROR	0	K		Colorado	3461405437	49,089	51,811	46,349	46,349	46,349	46,349	46,349	REGION K WAM CUTOFF MODEL
San Bernard ROR	0	K		Brazos-Colorado	3461303421	1,600	1,600	1,600	1,600	1,600	1,600	1,600	Based on TCEQ water rights database; Reliability of WR has not been verified.
Goldthwaite Reservoir	0	K		Colorado	14350	144	0	0	0	0	0	0	REGION K WAM CUTOFF MODEL
Highland Lakes	0	K		Colorado	140B0	382,924	402,106	388,627	382,310	376,710	370,710	365,194	REGION K WAM CUTOFF MODEL
Llano Reservoir	0	K		Colorado	14520	187	0	0	0	0	0	0	REGION K WAM CUTOFF MODEL
Blanco Reservoir	0	K		Guadalupe	18120	596	596	596	596	596	596	596	TCEQ WAM
Irrigation Local Supply	0	K	Bastrop	Brazos	011996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Bastrop	Colorado	011996	786	786	786	786	786	786	786	TWDB IRLS table
Irrigation Local Supply	0	K	Bastrop	Guadalupe	011996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Blanco	Colorado	016996	67	67	67	67	67	67	67	TWDB IRLS table
Irrigation Local Supply	0	K	Blanco	Guadalupe	016996	9	9	9	9	9	9	9	TWDB IRLS table
Irrigation Local Supply	0	K	Burnet	Brazos	027996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Burnet	Colorado	027996	276	276	276	276	276	276	276	TWDB IRLS table
Irrigation Local Supply	0	K	Colorado	Brazos-Colorado	045996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Colorado	Colorado	045996	3,000	3,000	3,000	3,000	3,000	3,000	3,000	TWDB IRLS table
Irrigation Local Supply	0	K	Colorado	Lavaca	045996	4,002	4,002	4,002	4,002	4,002	4,002	4,002	TWDB IRLS table
Irrigation Local Supply	0	K	Fayette	Brazos	075996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Fayette	Colorado	075996	534	534	534	534	534	534	534	TWDB IRLS table
Irrigation Local Supply	0	K	Fayette	Guadalupe	075996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Fayette	Lavaca	075996	20	20	20	20	20	20	20	TWDB IRLS table
Irrigation Local Supply	0	K	Gillespie	Colorado	086996	880	880	880	880	880	880	880	TWDB IRLS table
Irrigation Local Supply	0	K	Gillespie	Guadalupe	086996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Hays	Colorado	105996	41	41	41	41	41	41	41	TWDB IRLS table
Irrigation Local Supply	0	K	Llano	Colorado	150996	440	440	440	440	440	440	440	TWDB IRLS table
Irrigation Local Supply	0	K	Matagorda	Brazos-Colorado	161996	4,000	4,000	4,000	4,000	4,000	4,000	4,000	TWDB IRLS table
Irrigation Local Supply	0	K	Matagorda	Colorado	161996	900	900	900	900	900	900	900	TWDB IRLS table
Irrigation Local Supply	0	K	Matagorda	Colorado-Lavaca	161996	4,000	4,000	4,000	4,000	4,000	4,000	4,000	TWDB IRLS table
Irrigation Local Supply	0	K	Mills	Brazos	167996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Mills	Colorado	167996	2,378	2,378	2,378	2,378	2,378	2,378	2,378	TWDB IRLS table
Irrigation Local Supply	0	K	San Saba	Colorado	206996	8,800	8,800	8,800	8,800	8,800	8,800	8,800	TWDB IRLS table
Irrigation Local Supply	0	K	Travis	Brazos	227996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Travis	Colorado	227996	880	880	880	880	880	880	880	TWDB IRLS table
Irrigation Local Supply	0	K	Travis	Guadalupe	227996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Wharton	Brazos-Colorado	241996	2,000	2,000	2,000	2,000	2,000	2,000	2,000	TWDB IRLS table
Irrigation Local Supply	0	K	Wharton	Colorado	241996	7,650	7,650	7,650	7,650	7,650	7,650	7,650	TWDB IRLS table
Irrigation Local Supply	0	K	Wharton	Colorado-Lavaca	241996	0	0	0	0	0	0	0	TWDB IRLS table
Irrigation Local Supply	0	K	Williamson	Colorado	246996	0	0	0	0	0	0	0	TWDB IRLS table
Livestock Local Supply	0	K		Brazos	12997	566	566	566	566	566	566	566	2001 Plan: Sum of Demands
Livestock Local Supply	0	K		Brazos-Colorado	13997	394	394	394	394	394	394	394	2001 Plan: Sum of Demands
Livestock Local Supply	0	K		Colorado	14997	6,262	6,262	6,262	6,262	6,262	6,262	6,262	2001 Plan: Sum of Demands
Livestock Local Supply	0	K		Colorado-Lavaca	15997	289	289	289	289	289	289	289	2001 Plan: Sum of Demands
Livestock Local Supply	0	K		Guadalupe	18997	298	298	298	298	298	298	298	2001 Plan: Sum of Demands
Livestock Local Supply	0	K		Lavaca	16997	649	649	649	649	649	649	649	2001 Plan: Sum of Demands
Other Local Supply	0	K		Brazos-Colorado	13999	1,655	1,696	1,746	1,793	1,844	1,900	1,900	TWDB
Other Local Supply	0	K		Colorado	14999	27,642	19,282	20,890	22,717	24,883	27,470	27,470	TWDB
Carrizo-Wilcox	1	K	Bastrop	Brazos	01110	1,744	1,744	1,744	1,744	1,744	1,744	1,744	Lost Pines GCD

Region K Current Water Availability Sources

Source Name	Source Type	Source RWPG	Source County	Source Basin	Source Identifier	Water Availability (ac-ft/yr)							Comments
						Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050	Year 2060	
Carrizo-Wilcox	1	K	Bastrop	Colorado	01110	24,916	24,916	24,916	24,916	24,916	24,916	24,916	Lost Pines GCD
Carrizo-Wilcox	1	K	Bastrop	Guadalupe	01110	1,340	1,340	1,340	1,340	1,340	1,340	1,340	Lost Pines GCD
Carrizo-Wilcox	1	K	Fayette	Colorado	07510	290	290	290	290	290	290	290	based on % of area
Carrizo-Wilcox	1	K	Fayette	Guadalupe	07510	66	66	66	66	66	66	66	based on % of area
Carrizo-Wilcox	1	K	Fayette	Lavaca	07510	44	44	44	44	44	44	44	based on % of area
Edwards-BFZ	1	K	Hays	Colorado	10511	5,140	5,140	5,140	5,140	5,140	5,140	5,140	BSEACD
Edwards-BFZ	1	K	Travis	Brazos	22711	22	22	22	22	22	22	22	BSEACD, GAM
Edwards-BFZ	1	K	Travis	Colorado	22711	2,913	2,913	2,913	2,913	2,913	2,913	2,913	BSEACD, GAM
Edwards-BFZ	1	K	Travis	Guadalupe	22711	25	25	25	25	25	25	25	BSEACD, GAM
Edwards-BFZ	1	K	Williamson	Brazos	24611	265	265	265	265	265	265	265	GAM
Edwards-BFZ	1	K	Williamson	Colorado	24611	10	10	10	10	10	10	10	GAM
Edwards-Trinity (Plateau)	1	K	Blanco	Colorado	01613	107	107	107	107	107	108	108	based on % of area
Edwards-Trinity (Plateau)	1	K	Blanco	Guadalupe	01613	50	50	50	50	50	51	51	based on % of area
Edwards-Trinity (Plateau)	1	K	Gillespie	Colorado	08613	1,410	1,410	1,410	1,410	1,410	1,410	1,410	based on % of area
Edwards-Trinity (Plateau)	1	K	Gillespie	Guadalupe	08613	90	90	90	90	90	90	90	based on % of area
Ellenburger-San Saba	1	K	Blanco	Colorado	01614	2,849	2,849	2,849	2,849	2,849	2,849	2,849	based on % of area
Ellenburger-San Saba	1	K	Blanco	Guadalupe	01614	1,025	1,025	1,025	1,025	1,025	1,025	1,025	based on % of area
Ellenburger-San Saba	1	K	Burnet	Brazos	02714	987	987	987	987	987	987	987	based on % of area
Ellenburger-San Saba	1	K	Burnet	Colorado	02714	2,161	2,161	2,161	2,161	2,161	2,161	2,161	based on % of area
Ellenburger-San Saba	1	K	Gillespie	Colorado	08614	5,535	5,535	5,535	5,535	5,535	5,535	5,535	based on % of area
Ellenburger-San Saba	1	K	Gillespie	Guadalupe	08614	65	65	65	65	65	65	65	based on % of area
Ellenburger-San Saba	1	K	Llano	Colorado	15014	758	758	758	758	758	758	758	TWDB GW-U table
Ellenburger-San Saba	1	K	San Saba	Colorado	20614	10,194	10,194	10,194	10,194	10,194	10,194	10,194	TWDB GW-U table
Gulf Coast	1	K	Colorado	Brazos-Colorado	04515	11,506	11,506	11,506	11,506	11,506	11,506	11,506	based on % of area
Gulf Coast	1	K	Colorado	Colorado	04515	17,436	17,436	17,436	17,436	17,436	17,436	17,436	based on % of area
Gulf Coast	1	K	Colorado	Lavaca	04515	18,915	18,915	18,915	18,915	18,915	18,915	18,915	based on % of area
Gulf Coast	1	K	Fayette	Brazos	07515	65	65	65	65	65	65	65	based on % of area
Gulf Coast	1	K	Fayette	Colorado	07515	3,300	3,300	3,300	3,300	3,300	3,300	3,300	based on % of area
Gulf Coast	1	K	Fayette	Guadalupe	07515	144	144	144	144	144	144	144	based on % of area
Gulf Coast	1	K	Fayette	Lavaca	07515	5,188	5,188	5,188	5,188	5,188	5,188	5,188	based on % of area
Gulf Coast	1	K	Matagorda	Brazos-Colorado	16115	22,423	22,423	22,423	22,423	22,423	22,423	22,423	based on % of area
Gulf Coast	1	K	Matagorda	Colorado	16115	3,218	3,218	3,218	3,218	3,218	3,218	3,218	based on % of area
Gulf Coast	1	K	Matagorda	Colorado-Lavaca	16115	23,580	23,580	23,580	23,580	23,580	23,580	23,580	based on % of area
Gulf Coast	1	K	Wharton	Brazos-Colorado	24115	42,295	42,295	42,295	42,295	42,295	42,295	42,295	based on % of area
Gulf Coast	1	K	Wharton	Colorado	24115	41,812	41,812	41,812	41,812	41,812	41,812	41,812	based on % of area
Gulf Coast	1	K	Wharton	Colorado-Lavaca	24115	8,543	8,543	8,543	8,543	8,543	8,543	8,543	based on % of area
Hickory	1	K	Blanco	Colorado	01616	747	747	747	747	747	747	747	based on % of area
Hickory	1	K	Blanco	Guadalupe	01616	165	165	165	165	165	165	165	based on % of area
Hickory	1	K	Burnet	Brazos	02716	2,257	2,257	2,257	2,257	2,257	2,257	2,257	based on % of area
Hickory	1	K	Burnet	Colorado	02716	3,154	3,154	3,154	3,154	3,154	3,154	3,154	based on % of area
Hickory	1	K	Gillespie	Colorado	08616	1,934	1,934	1,934	1,934	1,934	1,934	1,934	based on % of area
Hickory	1	K	Gillespie	Guadalupe	08616	66	66	66	66	66	66	66	based on % of area
Hickory	1	K	Llano	Colorado	15016	12,517	12,517	12,517	12,517	12,517	12,517	12,517	TWDB GW-U table
Hickory	1	K	San Saba	Colorado	20616	6,540	6,540	6,540	6,540	6,540	6,540	6,540	TWDB GW-U table
Marble Falls	1	K	Blanco	Colorado	01619	300	300	300	300	300	300	300	GWbyBasin file 9/24/99
Marble Falls	1	K	Burnet	Brazos	02719	291	291	291	291	291	291	291	based on % of area
Marble Falls	1	K	Burnet	Colorado	02719	5,334	5,334	5,334	5,334	5,334	5,334	5,334	based on % of area
Marble Falls	1	K	San Saba	Colorado	20619	12,380	12,380	12,380	12,380	12,380	12,380	12,380	TWDB GW-U table
Queen City	1	K	Bastrop	Brazos	01124	227	227	227	227	227	227	227	based on % of area
Queen City	1	K	Bastrop	Colorado	01124	2,126	2,126	2,126	2,126	2,126	2,126	2,126	based on % of area
Queen City	1	K	Bastrop	Guadalupe	01124	403	403	403	403	403	403	403	based on % of area
Queen City	1	K	Fayette	Colorado	07524	1,034	1,034	1,034	1,034	1,034	1,034	1,034	based on % of area
Queen City	1	K	Fayette	Guadalupe	07524	175	175	175	175	175	175	175	based on % of area
Queen City	1	K	Fayette	Lavaca	07524	26	26	26	26	26	26	26	based on % of area
Sparta	1	K	Bastrop	Brazos	01127	49	49	49	49	49	49	49	based on % of area

Region K Current Water Availability Sources

Source Name	Source Type	Source RWPG	Source County	Source Basin	Source Identifier	Water Availability (ac-ft/yr)							Comments
						Year 2000	Year 2010	Year 2020	Year 2030	Year 2040	Year 2050	Year 2060	
Sparta	1	K	Bastrop	Colorado	01127	5,000	5,000	5,000	5,000	5,000	5,000	5,000	based on % of area
Sparta	1	K	Bastrop	Guadalupe	01127	340	340	340	340	340	340	340	based on % of area
Sparta	1	K	Fayette	Colorado	07527	3,667	3,667	3,667	3,667	3,667	3,667	3,667	based on % of area
Sparta	1	K	Fayette	Guadalupe	07527	598	598	598	598	598	598	598	based on % of area
Sparta	1	K	Fayette	Lavaca	07527	235	235	235	235	235	235	235	based on % of area
Trinity	1	K	Bastrop	Colorado	01128	12	12	12	10	10	8	8	GWbyBasin file 9/24/99
Trinity	1	K	Blanco	Colorado	01628	1,149	1,149	1,149	1,149	1,149	942	942	based on % of area
Trinity	1	K	Blanco	Guadalupe	01628	451	451	451	451	451	373	373	based on % of area
Trinity	1	K	Burnet	Brazos	02728	1,221	1,221	1,221	1,221	1,221	1,221	1,221	GAM
Trinity	1	K	Burnet	Colorado	02728	1,329	1,329	1,329	1,329	1,329	1,329	1,329	GAM
Trinity	1	K	Gillespie	Colorado	08628	3,354	3,354	3,354	3,354	3,354	3,354	3,354	Based on HCUWCD Data
Trinity	1	K	Gillespie	Guadalupe	08628	46	46	46	46	46	46	46	Based on HCUWCD Data
Trinity	1	K	Hays	Colorado	10528	2,500	2,500	2,500	2,500	2,500	2,500	2,500	GAM
Trinity	1	K	Mills	Brazos	16728	1,430	1,430	1,430	1,254	1,254	1,028	1,028	based on % of area
Trinity	1	K	Mills	Colorado	16728	1,330	1,330	1,330	1,166	1,166	956	956	based on % of area
Trinity	1	K	Travis	Brazos	22728	28	28	28	28	28	28	28	GAM
Trinity	1	K	Travis	Colorado	22728	3,839	3,839	3,839	3,839	3,839	3,839	3,839	GAM
Trinity	1	K	Travis	Guadalupe	22728	33	33	33	33	33	33	33	GAM
Trinity	1	K	Williamson	Brazos	24628	58	58	58	58	58	58	58	GAM
Trinity	1	K	Williamson	Colorado	24628	2	2	2	2	2	2	2	GAM
Other Aquifer	1	K	Bastrop	Brazos	01122	0	0	0	0	0	0	0	
Other Aquifer	1	K	Bastrop	Colorado	01122	3,350	3,350	3,350	3,350	3,350	3,350	3,350	Alluvial supplies
Other Aquifer	1	K	Bastrop	Guadalupe	01122	0	0	0	0	0	0	0	
Other Aquifer	1	K	Blanco	Colorado	01622	0	0	0	0	0	0	0	
Other Aquifer	1	K	Burnet	Colorado	02722	305	305	305	305	305	305	305	Alluvial supplies
Other Aquifer	1	K	Colorado	Colorado	04522	4,269	4,269	4,269	4,269	4,269	4,269	4,269	Alluvial supplies
Other Aquifer	1	K	Fayette	Brazos	07522	0	0	0	0	0	0	0	
Other Aquifer	1	K	Fayette	Colorado	07522	3,696	3,696	3,696	3,696	3,696	3,696	3,696	Alluvial supplies
Other Aquifer	1	K	Fayette	Guadalupe	07522	0	0	0	0	0	0	0	
Other Aquifer	1	K	Fayette	Lavaca	07522	0	0	0	0	0	0	0	
Other Aquifer	1	K	Gillespie	Colorado	08622	0	0	0	0	0	0	0	
Other Aquifer	1	K	Hays	Colorado	10522	0	0	0	0	0	0	0	
Other Aquifer	1	K	Llano	Colorado	15022	109	109	109	109	109	109	109	Alluvial supplies
Other Aquifer	1	K	Mills	Brazos	16722	0	0	0	0	0	0	0	
Other Aquifer	1	K	Mills	Colorado	16722	0	0	0	0	0	0	0	
Other Aquifer	1	K	San Saba	Colorado	20622	0	0	0	0	0	0	0	
Other Aquifer	1	K	Travis	Brazos	22722	0	0	0	0	0	0	0	
Other Aquifer	1	K	Travis	Colorado	22722	1,808	1,818	1,835	1,848	1,853	1,856	1,860	Alluvial supplies
Other Aquifer	1	K	Travis	Guadalupe	22722	21	25	30	34	37	40	43	Alluvial supplies
Other Aquifer	1	K	Williamson	Brazos	24622	0	0	0	0	0	0	0	
Other Aquifer	1	K	Williamson	Colorado	24622	0	0	0	0	0	0	0	
					Region K Subtotal	1,281,144	1,316,978	1,290,804	1,286,073	1,282,698	1,278,626	1,272,693	
Lake Brownwood	0	F		Colorado	14140	1,688	1,688	1,688	0	0	0	0	Based on Brookesmith SUD
Brazos River Authority System	0	G		Brazos	120B0	301	316	342	370	401	440	488	Estimate based on TCEQ maximum production capacity at treatment plant (Stillhouse Reservoir) multiplied by the percent of Kempner demand in Region K.
Edwards-BFZ	1	G	Williamson	Brazos	24611G	12	10	9	9	8	8	8	Based on Chisholm Trail SUD
Canyon Lake	0	L		Guadalupe	18020	126	188	263	334	397	466	545	Estimate based on CLWSC Water Availability Report and demand.
					Subtotal	2,127	2,202	2,302	713	806	914	1,041	
					TOTAL	**1,283,271**	**1,319,180**	**1,293,106**	**1,286,786**	**1,283,504**	**1,279,540**	**1,273,734**	

Note: Downstream water availability does not include return flows.

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
AQUA WSC	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	5,952	5,952	5,952	5,952	5,952	5,952	5,952	New WUG: Supply Estimate based on Aqua WSC 3/29/04
AQUA WSC	BASTROP	COLORADO	K		Colorado	140B0	Highland Lakes	3,954	3,822	3,634	3,475	3,366	0	0	New WUG: Supply Estimate based on LCRA 02/02/05
BASTROP	BASTROP	COLORADO	K	Bastrop	Colorado	01122	Other Aquifer	1,927	1,927	1,927	1,927	1,927	1,927	1,927	Supply estimate based on TCEQ total production. 2/8/05
BASTROP COUNTY WCID #2	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	1,721	1,171	1,171	1,171	1,171	1,171	1,171	New WUG: Supply based on Bastrop County WCID #2 9/20/04
COUNTY-OTHER	BASTROP	BRAZOS	K	Bastrop	Brazos	01110	Carrizo-Wilcox	304	363	422	486	524	536	536	2001 Plan: Demand
COUNTY-OTHER	BASTROP	COLORADO	K		Colorado	140B0	Highland Lakes	2,092	2,050	700	700	700	700	700	Supply based on LCRA revised data 2/7/05
COUNTY-OTHER	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	446	446	446	446	446	446	446	Aqua WSC email 3/29/04
COUNTY-OTHER	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	735	805	561	222	0	0	0	2001 Plan: Demand - other supplies
COUNTY-OTHER	BASTROP	GUADALUPE	K	Bastrop	Guadalupe	01124	Queen City	196	196	196	196	196	196	196	2001 Plan: A-ALL, % & Tbl 4
CREEDMOOR-MAHA WSC	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	6	6	6	6	6	6	6	New WUG: Supply Estimate based on Aqua WSC email 3/29/04
CREEDMOOR-MAHA WSC	BASTROP	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	13	14	14	15	17	18	18	New WUG: Supply Estimate based on BSEACD
ELGIN	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	1,683	1,679	1,674	1,671	1,670	1,670	1,671	Based on TCEQ maximum production capacity and proportioned by total demand. 1/14/05
LEE COUNTY WSC	BASTROP	BRAZOS	K	Bastrop	Brazos	01110	Carrizo-Wilcox	725	725	725	725	725	725	725	New WUG: Supply based on Lee County WSC 9/20/04
LEE COUNTY WSC	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	1,123	1,123	1,123	1,123	1,123	1,123	1,123	New WUG: Supply based on Lee County WSC 9/20/04
MANVILLE WSC	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	124	127	131	133	136	140	146	New WUG: Supply estimated from TCEQ well production capacities and proportioned by total population. 1/11/05
MANVILLE WSC	BASTROP	COLORADO	K	Bastrop	Colorado	01122	Other Aquifer	38	41	42	46	52	60	68	New WUG: Supply estimated from TCEQ well production capacities and proportioned by total population. 1/11/05
POLONIA WSC	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	29	25	24	25	25	27	30	New WUG: Supply estimated from TCEQ well production capacities and proportioned by total population. 1/20/05
SMITHVILLE	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	794	830	922	1,025	1,072	1,283	1,283	2001 Plan: Demand
IRRIGATION	BASTROP	BRAZOS	K	Bastrop	Brazos	01124	Queen City	23	23	23	23	23	23	23	2001 Plan: AllocFile10 9/24/99
IRRIGATION	BASTROP	BRAZOS	K	Bastrop	Brazos	01127	Sparta	5	5	5	5	5	5	5	2001 Plan: AllocFile10 9/24/99
IRRIGATION	BASTROP	COLORADO	K	Bastrop	Colorado	011996	Irrigation Local Supply	750	750	750	750	750	750	750	2001 Plan: TWDB
IRRIGATION	BASTROP	COLORADO	K	Bastrop	Colorado	01127	Sparta	500	500	500	500	500	500	500	2001 Plan: AllocFile10 9/24/99
IRRIGATION	BASTROP	COLORADO	K	Bastrop	Colorado	01124	Queen City	213	213	213	213	213	213	213	2001 Plan: AllocFile10 9/24/99
IRRIGATION	BASTROP	GUADALUPE	K	Bastrop	Guadalupe	01124	Queen City	40	40	40	40	40	40	40	2001 Plan: AllocFile10 9/24/99
IRRIGATION	BASTROP	GUADALUPE	K	Bastrop	Guadalupe	01127	Sparta	34	34	34	34	34	34	34	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	BASTROP	BRAZOS	K	Bastrop	Brazos	01127	Sparta	39	39	39	39	39	39	39	2001 Plan: AllocFile10 90% reduced
LIVESTOCK	BASTROP	BRAZOS	K		Brazos	12997	Livestock Local Supply	154	154	154	154	154	154	154	2001 Plan: LCRA Provided data
LIVESTOCK	BASTROP	BRAZOS	K	Bastrop	Brazos	01124	Queen City	141	141	141	141	141	141	141	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	BASTROP	COLORADO	K	Bastrop	Colorado	01124	Queen City	1,322	1,322	1,322	1,322	1,322	1,322	1,322	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	BASTROP	COLORADO	K	Bastrop	Colorado	01127	Sparta	4,000	4,000	4,000	4,000	4,000	4,000	4,000	2001 Plan: AllocFile10 90% reduced
LIVESTOCK	BASTROP	COLORADO	K		Colorado	14997	Livestock Local Supply	696	696	696	696	696	696	696	2001 Plan: LCRA Provided data
LIVESTOCK	BASTROP	GUADALUPE	K	Bastrop	Guadalupe	01124	Queen City	125	125	125	125	125	125	125	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	BASTROP	GUADALUPE	K		Guadalupe	18997	Livestock Local Supply	5	5	5	5	5	5	5	2001 Plan: LCRA Provided data
LIVESTOCK	BASTROP	GUADALUPE	K	Bastrop	Guadalupe	01127	Sparta	272	272	272	272	272	272	272	2001 Plan: AllocFile10 90% reduced
MANUFACTURING	BASTROP	BRAZOS	K	Bastrop	Brazos	01110	Carrizo-Wilcox	0	0	0	0	0	0	0	2001 Plan: Demand - other supplies
MANUFACTURING	BASTROP	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	31	38	46	54	64	75	75	2001 Plan: Demand - other supplies
MANUFACTURING	BASTROP	COLORADO	K		Colorado	14999	Other Local Supply	48	48	48	48	48	48	48	2001 Plan: LCRA Provided data
MANUFACTURING	BASTROP	GUADALUPE	K	Bastrop	Guadalupe	01110	Carrizo-Wilcox	0	0	0	0	0	0	0	2001 Plan: Demand
MINING	BASTROP	BRAZOS	K	Bastrop	Brazos	01124	Queen City	23	23	23	23	23	23	23	2001 Plan: AllocFile10 9/24/99
MINING	BASTROP	BRAZOS	K	Bastrop	Brazos	01127	Sparta	5	5	5	5	5	5	5	2001 Plan: AllocFile10 9/24/99
MINING	BASTROP	COLORADO	K	Bastrop	Colorado	01124	Queen City	213	213	213	213	213	213	213	2001 Plan: AllocFile10 9/24/99
MINING	BASTROP	COLORADO	K	Bastrop	Colorado	01127	Sparta	500	500	500	500	500	500	500	2001 Plan: AllocFile10 9/24/99
MINING	BASTROP	COLORADO	K		Colorado	14999	Other Local Supply	12	10	8	7	7	9	9	2001 Plan: LCRA Provided data
MINING	BASTROP	GUADALUPE	K	Bastrop	Guadalupe	01124	Queen City	40	40	40	40	40	40	40	2001 Plan: AllocFile10 9/24/99
MINING	BASTROP	GUADALUPE	K	Bastrop	Guadalupe	01127	Sparta	34	34	34	34	34	34	34	2001 Plan: AllocFile10 9/24/99
STEAM ELECTRIC POWER	BASTROP	BRAZOS						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	BASTROP	COLORADO	K		Colorado	140B0	Highland Lakes	5,970	5,970	5,970	5,970	3,220	0	0	Supply based on LCRA revised data 2/7/05
STEAM ELECTRIC POWER	BASTROP	COLORADO	K		Colorado	140B0	Highland Lakes	10,750	10,750	10,750	10,750	10,750	10,750	10,750	Region K WAM Run 3 Cutoff; TCEQ WAM 5/6/05; LCRA Cooling Water
STEAM ELECTRIC POWER	BASTROP	GUADALUPE						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
BLANCO	BLANCO	GUADALUPE		Blanco	Guadalupe	18120	Blanco Reservoir	596	596	596	596	596	596	596	TCEQ WAM 2/21/05
BLANCO	BLANCO	GUADALUPE	K	Blanco	Guadalupe	01628	Trinity	25	25	25	25	25	25	25	2001 Plan: A-ALL, LIMIT

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
CANYON LAKE WSC	BLANCO	GUADALUPE	L		Guadalupe	18020	Canyon Lake	126	188	263	334	397	466	545	New WUG: Supply Estimate based on CLWSC Water Availability Report and demand 2/4/05
COUNTY-OTHER	BLANCO	COLORADO	K	Blanco	Colorado	01614	Ellenburger-San Saba	150	150	150	150	150	150	150	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	BLANCO	COLORADO	K	Blanco	Colorado	01616	Hickory	60	60	60	60	60	60	60	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	BLANCO	COLORADO	K		Colorado	14999	Other Local Supply	37	43	49	55	57	56	56	2001 Plan: LCRA Provided data
COUNTY-OTHER	BLANCO	COLORADO	K	Blanco	Colorado	01628	Trinity	1,149	1,149	1,149	1,149	1,149	942	942	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	BLANCO	GUADALUPE	K	Blanco	Guadalupe	01613	Edwards-Trinity (Plateau)	50	50	50	50	50	50	50	2001 Plan: A-ALL, LIMIT 157 reduced
COUNTY-OTHER	BLANCO	GUADALUPE	K	Blanco	Guadalupe	01628	Trinity	85	23	0	0	0	0	0	2001 Plan: A-ALL, % & Tbl 4
JOHNSON CITY	BLANCO	COLORADO	K	Blanco	Colorado	01614	Ellenburger-San Saba	887	887	887	887	887	887	887	2001 Plan: A-ALL, LIMIT
IRRIGATION	BLANCO	COLORADO	K	Blanco	Colorado	01614	Ellenburger-San Saba	667	667	667	667	667	667	667	2001 Plan: A-ALL, % & Tbl 4
IRRIGATION	BLANCO	GUADALUPE	K	Blanco	Guadalupe	016996	Irrigation Local Supply	9	9	9	9	9	9	9	2001 Plan: LCRA Provided data
IRRIGATION	BLANCO	GUADALUPE	K	Blanco	Guadalupe	01628	Trinity	89	89	89	89	89	76	76	2001 Plan: A-ALL, 100% reduced
LIVESTOCK	BLANCO	COLORADO	K		Colorado	14997	Livestock Local Supply	101	101	101	101	101	101	101	2001 Plan: Demand, LCRA provided data
LIVESTOCK	BLANCO	COLORADO	K	Blanco	Colorado	01614	Ellenburger-San Saba	749	749	749	749	749	749	749	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	BLANCO	GUADALUPE	K	Blanco	Guadalupe	01628	Trinity	69	69	69	69	69	56	56	2001 Plan: A-ALL, 42.6% reduced
LIVESTOCK	BLANCO	GUADALUPE	K		Guadalupe	18997	Livestock Local Supply	101	101	101	101	101	101	101	2001 Plan: Demand, LCRA provided data
MANUFACTURING	BLANCO	COLORADO						0	0	0	0	0	0	0	New WUG: Minimal Demand, therefore 0 Supply
MANUFACTURING	BLANCO	GUADALUPE	K	Blanco	Guadalupe	01628	Trinity	9	9	9	9	9	7	7	2001 Plan: AllocFile10 100% reduced
MINING	BLANCO	COLORADO	K	Blanco	Colorado	01614	Ellenburger-San Saba	285	285	285	285	285	285	285	2001 Plan: A-ALL, % & Tbl 4
MINING	BLANCO	GUADALUPE	K	Blanco	Guadalupe	01628	Trinity	43	43	43	43	43	35	35	2001 Plan: AllocFile10 9/24/99
STEAM ELECTRIC POWER	BLANCO	COLORADO						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	BLANCO	GUADALUPE						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
BERTRAM	BURNET	BRAZOS	K	Burnet	Brazos	02714	Ellenburger-San Saba	207	200	190	184	185	191	191	2001 Plan: Demand
BURNET	BURNET	COLORADO	K	Burnet	Colorado	02714	Ellenburger-San Saba	1,862	1,862	1,862	1,862	1,862	1,862	1,862	2001 Plan: A-ALL, LIMIT
BURNET	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	4,100	4,100	4,100	4,100	0	0	0	Supply Estimate based on LCRA 4/9/04
CHISHOLM TRAIL SUD	BURNET	BRAZOS	G	Williamson	Brazos	24611G	Edwards-BFZ	12	10	9	9	8	8	8	New WUG: less than 1% of population in Region K. All currently served by groundwater but contracts in place for Colorado River and Brazos River water. 1/11/05
COTTONWOOD SHORES	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	138	138	0	0	0	0	0	Supply Estimate based on LCRA 4/9/04
COUNTY-OTHER	BURNET	BRAZOS	K	Burnet	Brazos	02714	Ellenburger-San Saba	400	400	400	400	400	400	400	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	BURNET	BRAZOS	K	Burnet	Brazos	02728	Trinity	985	972	960	947	934	921	921	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	BURNET	COLORADO	K	Burnet	Colorado	02714	Ellenburger-San Saba	16	10	2	0	0	0	0	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	BURNET	COLORADO	K	Burnet	Colorado	02716	Hickory	54	54	54	54	54	54	54	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	901	556	330	280	250	250	250	Supply based on LCRA revised data 2/7/05
COUNTY-OTHER	BURNET	COLORADO	K	Burnet	Colorado	02719	Marble Falls	21	21	21	21	21	21	21	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	BURNET	COLORADO	K	Burnet	Colorado	02728	Trinity	227	227	227	192	192	157	157	2001 Plan: A-ALL, % & Tbl 4
GRANITE SHOALS	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	830	830	830	0	0	0	0	Supply Estimate based on LCRA 4/9/04
KEMPNER WSC	BURNET	BRAZOS	G		Brazos	120B0	Brazos River Authority System	301	316	342	370	401	440	488	New WUG: Supply Estimate based on TCEQ maximum production capacity at treatment plant (Stillhouse Reservoir) times percent of total Kempner demand in Region K. Need Region G coordination. 1/13/05
KINGSLAND WSC	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	40	45	52	58	64	71	0	Supply Estimate based on revised LCRA data and proportioned by county. 2/8/05
LAKE LBJ MUD	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	233	259	294	327	358	0	0	New WUG: Supply Estimate based on revised LCRA data. 2/2/05
MARBLE FALLS	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	2,000	2,000	2,000	0	0	0	0	Supply Estimate based on LCRA 4/9/04
MARBLE FALLS	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	1,000	1,000	1,000	1,000	1,000	0	0	Supply Estimate based on LCRA 4/9/04
MEADOWLAKES	BURNET	COLORADO	K		Colorado	14999	Other Local Supply	486	486	486	486	486	486	486	2001 Plan: TCB & LCRA provided data
IRRIGATION	BURNET	BRAZOS	K	Burnet	Brazos	02728	Trinity	0	0	0	0	0	0	0	2001 Plan: AllocFile10 18.4% reduced
IRRIGATION	BURNET	COLORADO	K	Burnet	Colorado	02716	Hickory	2,397	2,397	2,397	2,397	2,397	2,397	2,397	2001 Plan: AllocFile10 9/24/99
IRRIGATION	BURNET	COLORADO	K	Burnet	Colorado	02719	Marble Falls	533	533	533	533	533	533	533	2001 Plan: AllocFile10 9/24/99
IRRIGATION	BURNET	COLORADO	K	Burnet	Colorado	02728	Trinity	104	104	104	88	88	72	72	2001 Plan: AllocFile10 9/24/99
IRRIGATION	BURNET	COLORADO	K	Burnet	Colorado	027996	Irrigation Local Supply	276	276	276	276	276	276	276	2001 Plan: TWDB
IRRIGATION	BURNET	COLORADO	K	Burnet	Colorado	02714	Ellenburger-San Saba	25	25	25	25	25	25	25	2001 Plan: ALLOC-F10 9/24/99
LIVESTOCK	BURNET	BRAZOS	K	Burnet	Brazos	02728	Trinity	45	45	45	45	45	45	45	2001 Plan: A-ALL, 12.6% reduced
LIVESTOCK	BURNET	BRAZOS	K		Brazos	12997	Livestock Local Supply	341	341	341	341	341	341	341	2001 Plan: Demand
LIVESTOCK	BURNET	COLORADO	K	Burnet	Colorado	02716	Hickory	189	189	189	189	189	189	189	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	BURNET	COLORADO	K		Colorado	14997	Livestock Local Supply	210	210	210	210	210	210	210	2001 Plan: Demand
LIVESTOCK	BURNET	COLORADO	K	Burnet	Colorado	02728	Trinity	71	71	71	60	60	50	50	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	BURNET	COLORADO	K	Burnet	Colorado	02719	Marble Falls	3,115	3,115	3,115	3,115	3,115	3,115	3,115	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	BURNET	COLORADO	K	Burnet	Colorado	02714	Ellenburger-San Saba	25	25	25	25	25	25	25	2001 Plan: A-ALL, LIMIT
MANUFACTURING	BURNET	BRAZOS						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
MANUFACTURING	BURNET	COLORADO	K	Burnet	Colorado	02714	Ellenburger-San Saba	25	25	25	25	25	25	25	2001 Plan: ALLOC-F10 9/24/99
MANUFACTURING	BURNET	COLORADO	K		Colorado	14999	Other Local Supply	1,237	1,367	1,503	1,643	1,761	1,933	1,933	2001 Plan: LCRA Provided data
MANUFACTURING	BURNET	COLORADO	K		Colorado	140B0	Highland Lakes	500	500	500	500	500	500	500	Supply Estimate based on LCRA 4/9/04

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
MINING	BURNET	BRAZOS	K	Burnet	Brazos	02728	Trinity	54	54	54	54	45	45	45	2001 Plan: A-ALL, 5% reduced
MINING	BURNET	COLORADO	K		Colorado	14999	Other Local Supply	767	747	762	778	801	826	826	2001 Plan: LCRA Provided data
MINING	BURNET	COLORADO	K	Burnet	Colorado	02719	Marble Falls	123	123	123	123	123	123	123	2001 Plan: A-ALL, % & Tbl 4
MINING	BURNET	COLORADO	K	Burnet	Colorado	02716	Hickory	315	315	315	315	315	315	315	2001 Plan: A-ALL, % & Tbl 4
MINING	BURNET	COLORADO	K	Burnet	Colorado	02728	Trinity	4	4	4	3	3	3	3	2001 Plan: AllocFile10 9/24/99
MINING	BURNET	COLORADO	K	Burnet	Colorado	02714	Ellenburger-San Saba	25	25	25	25	25	25	25	2001 Plan: A-ALL, LIMIT
STEAM ELECTRIC POWER	BURNET	BRAZOS						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	BURNET	COLORADO	K	Burnet	Colorado	02714	Ellenburger-San Saba	25	25	25	25	25	25	25	2001 Plan: AllFile10 9/24 Limit
COLUMBUS	COLORADO	COLORADO	K	Colorado	Colorado	04515	Gulf Coast	1,350	1,350	1,350	1,350	1,350	1,350	1,350	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	COLORADO	BRAZOS-COLORADO	K	Colorado	Brazos-Colorado	04515	Gulf Coast	122	122	122	122	122	122	122	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	COLORADO	COLORADO	K	Colorado	Colorado	04515	Gulf Coast	800	800	800	800	800	800	800	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	COLORADO	LAVACA	K	Colorado	Lavaca	04515	Gulf Coast	254	250	250	250	250	250	250	2001 Plan: A-ALL, % & Tbl 4
EAGLE LAKE	COLORADO	BRAZOS-COLORADO	K	Colorado	Brazos-Colorado	04515	Gulf Coast	440	440	440	440	440	440	440	2001 Plan: A-ALL, LIMIT
EAGLE LAKE	COLORADO	COLORADO	K	Colorado	Colorado	04515	Gulf Coast	430	430	430	430	430	430	430	2001 Plan: A-ALL, LIMIT
WEIMAR	COLORADO	COLORADO	K	Fayette	Colorado	07515	Gulf Coast	1,804	1,804	1,804	1,804	1,804	1,804	1,804	2001 Plan: A-ALL, LIMIT
WEIMAR	COLORADO	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	2,119	2,119	2,119	2,119	2,119	2,119	2,119	2001 Plan: A-ALL, LIMIT 2218 reduced
IRRIGATION	COLORADO	BRAZOS-COLORADO	K		Colorado	3461405475	LCRA - Lakeside ROR	8,429	6,340	6,331	6,331	6,331	6,331	6,331	Region K WAM Run 3 Cutoff; Lakeside ROR split between 3 basins.
IRRIGATION	COLORADO	BRAZOS-COLORADO	K		Colorado	3461405434A	LCRA - Garwood ROR	21,588	25,143	25,143	25,143	25,143	25,143	25,143	Region K WAM Run 3 Cutoff; 70% of Garwood ROR water in a minimum year (LCRA) split between 3 basins.
IRRIGATION	COLORADO	BRAZOS-COLORADO	K	Colorado	Brazos-Colorado	04515	Gulf Coast	7,775	7,775	7,775	7,775	7,775	7,775	7,775	2001 Plan: Demand
IRRIGATION	COLORADO	COLORADO	K		Colorado	3461405475	LCRA - Lakeside ROR	4,092	3,078	3,073	3,073	3,073	3,073	3,073	Region K WAM Run 3 Cutoff; Lakeside ROR split between 3 basins.
IRRIGATION	COLORADO	COLORADO	K	Colorado	Colorado	04515	Gulf Coast	11,191	11,191	11,191	11,191	11,191	11,191	11,191	2001 Plan: Demand
IRRIGATION	COLORADO	COLORADO	K	Colorado	Colorado	045996	Irrigation Local Supply	3,000	3,000	3,000	3,000	3,000	3,000	3,000	2001 Plan: LCRA Provided data
IRRIGATION	COLORADO	COLORADO	K		Colorado	3461405434A	LCRA - Garwood ROR	10,481	12,207	12,207	12,207	12,207	12,207	12,207	Region K WAM Run 3 Cutoff; 70% of Garwood ROR water in a minimum year (LCRA) split between 3 basins.
IRRIGATION	COLORADO	LAVACA	K		Colorado	3461405475	LCRA - Lakeside ROR	18,017	13,553	13,534	13,534	13,534	13,534	13,534	Region K WAM Run 3 Cutoff; Lakeside ROR split between 3 basins.
IRRIGATION	COLORADO	LAVACA	K	Colorado	Lavaca	04515	Gulf Coast	14,050	14,050	14,050	14,050	14,050	14,050	14,050	2001 Plan: Demand
IRRIGATION	COLORADO	LAVACA	K	Colorado	Lavaca	045996	Irrigation Local Supply	4,002	4,002	4,002	4,002	4,002	4,002	4,002	2001 Plan: LCRA Provided data
IRRIGATION	COLORADO	LAVACA	K		Colorado	3461405434A	LCRA - Garwood ROR	46,149	53,749	53,749	53,749	53,749	53,749	53,749	Region K WAM Run 3 Cutoff; 70% of Garwood ROR water in a minimum year (LCRA) split between 3 basins.
LIVESTOCK	COLORADO	BRAZOS-COLORADO	K	Colorado	Brazos-Colorado	04515	Gulf Coast	65	65	65	65	65	65	65	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	COLORADO	BRAZOS-COLORADO	K		Brazos-Colorado	13997	Livestock Local Supply	39	39	39	39	39	39	39	2001 Plan: LCRA Provided data
LIVESTOCK	COLORADO	COLORADO	K		Colorado	14997	Livestock Local Supply	860	860	860	860	860	860	860	2001 Plan: LCRA Provided data
LIVESTOCK	COLORADO	COLORADO	K	Colorado	Colorado	04515	Gulf Coast	25	25	25	25	25	25	25	2001 Plan: A-ALL, LIMIT
LIVESTOCK	COLORADO	LAVACA	K		Lavaca	16997	Livestock Local Supply	177	177	177	177	177	177	177	2001 Plan: LCRA Provided data
LIVESTOCK	COLORADO	LAVACA	K	Colorado	Lavaca	04515	Gulf Coast	283	283	283	283	283	283	283	2001 Plan: A-ALL, % & Tbl 4
MANUFACTURING	COLORADO	BRAZOS-COLORADO	K	Colorado	Brazos-Colorado	04515	Gulf Coast	27	27	27	27	27	27	27	2001 Plan: A-ALL, % & Tbl 4
MANUFACTURING	COLORADO	COLORADO	K		Colorado	14999	Other Local Supply	1,143	1,215	1,285	1,353	1,418	1,481	1,481	2001 Plan: A-ALL, TCB
MANUFACTURING	COLORADO	LAVACA						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
MINING	COLORADO	BRAZOS-COLORADO	K	Colorado	Brazos-Colorado	04515	Gulf Coast	120	100	100	100	100	100	100	2001 Plan: A-ALL, % & Tbl 4
MINING	COLORADO	COLORADO	K		Colorado	14999	Other Local Supply	18,920	10,508	11,391	12,443	13,785	15,402	15,402	2001 Plan: A-ALL and LCRA provided data
MINING	COLORADO	LAVACA	K	Colorado	Lavaca	04515	Gulf Coast	1,727	1,627	1,627	1,627	1,627	1,627	1,627	2001 Plan: A-ALL, 100% reduced
STEAM ELECTRIC POWER	COLORADO	BRAZOS-COLORADO						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	COLORADO	COLORADO	K	Colorado	Colorado	04515	Gulf Coast	0	0	0	0	0	0	0	2001 Plan: AllFile10 9/24 Limit
STEAM ELECTRIC POWER	COLORADO	LAVACA						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
AQUA WSC	FAYETTE	COLORADO	K		Colorado	140B0	Highland Lakes	65	90	115	135	150	0	0	New WUG: Supply Estimate based on LCRA 02/02/05
COUNTY-OTHER	FAYETTE	BRAZOS	K	Fayette	Brazos	07515	Gulf Coast	0	0	0	0	0	0	0	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	FAYETTE	COLORADO	K	Fayette	Colorado	07515	Gulf Coast	428	154	0	0	0	0	0	2001 Plan: A-ALL, LIMIT; adjusted year 2000 value based on reduced total available Gulf Coast supplies 2/7/05
COUNTY-OTHER	FAYETTE	COLORADO	K	Fayette	Colorado	07524	Queen City	90	90	90	90	90	90	90	2001 Plan: AllFile10 limit
COUNTY-OTHER	FAYETTE	COLORADO	K	Fayette	Colorado	07527	Sparta	53	0	0	0	0	0	0	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	FAYETTE	COLORADO	K		Colorado	140B0	Highland Lakes	97	12	0	0	0	0	0	Supply Estimate based on LCRA 4/9/04
COUNTY-OTHER	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07515	Gulf Coast	76	76	76	76	76	76	76	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07527	Sparta	90	90	90	90	90	90	90	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	FAYETTE	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	279	226	204	96	9	0	0	2001 Plan: A-ALL, % & Tbl 4

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
FAYETTE WSC	FAYETTE	COLORADO	K	Fayette	Colorado	07524	Queen City	282	282	282	282	282	282	282	New WUG: Supply Estimate based on TCEQ maximum production capacity for listed wells and proportioned based on demand per basin. 1/13/05
FAYETTE WSC	FAYETTE	COLORADO	K	Fayette	Colorado	07515	Gulf Coast	675	675	675	675	675	675	675	New WUG: Supply Estimate based on TCEQ maximum production capacity for listed wells and proportioned based on demand per basin. 1/13/05
FAYETTE WSC	FAYETTE	LAVACA	K	Fayette	Lavaca	07524	Queen City	25	25	25	25	25	25	25	New WUG: Supply Estimate based on TCEQ maximum production capacity for listed wells and proportioned based on demand per basin. 1/13/05
FAYETTE WSC	FAYETTE	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	59	59	59	59	59	59	59	New WUG: Supply Estimate based on TCEQ maximum production capacity for listed wells and proportioned based on demand per basin. 1/13/05
FLATONIA	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07515	Gulf Coast	53	53	52	53	53	53	53	Supply Estimate based on TCEQ maximum production capacity for listed wells and proportioned based on demand per basin. 1/20/05
FLATONIA	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07510	Carrizo-Wilcox	66	66	66	66	66	66	66	Supply Estimate based on TCEQ maximum production capacity for listed wells (168). 1/20/05 Total supply was reduced due to limited Carrizo supplies in Fayette County.
FLATONIA	FAYETTE	LAVACA	K	Fayette	Lavaca	07510	Carrizo-Wilcox	44	44	44	44	44	44	44	Supply Estimate based on TCEQ maximum production capacity for listed wells (168). 1/20/05; Reduced to supply available to Carrizo-Wilcox aquifer in Fayette County, Lavaca basin
FLATONIA	FAYETTE	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	183	182	183	183	183	183	182	Supply Estimate based on TCEQ maximum production capacity for listed wells and proportioned based on demand per basin. 1/20/05
LA GRANGE	FAYETTE	COLORADO	K	Fayette	Colorado	07524	Queen City	662	662	662	662	662	662	662	Supply available to Queen City aquifer in Fayette County, Colorado basin minus supply to Fayette WSC and County Other.
LA GRANGE	FAYETTE	COLORADO	K	Fayette	Colorado	07527	Sparta	1,850	1,850	1,850	1,850	1,850	1,850	1,850	2001 Plan: A-ALL, 100% reduced
LEE COUNTY WSC	FAYETTE	COLORADO		Fayette	Colorado	07510	Carrizo-Wilcox	290	290	290	290	290	290	290	Supply available to Carrizo-Wilcox aquifer in Fayette County, Colorado basin
SCHULENBURG	FAYETTE	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	2,119	2,119	2,119	2,119	2,119	2,119	2,119	2001 Plan: A-ALL, LIMIT 2580 reduced
IRRIGATION	FAYETTE	BRAZOS	K	Fayette	Brazos	07515	Gulf Coast	1	1	1	1	1	1	1	2001 Plan: AllocFile10 9/24/99
IRRIGATION	FAYETTE	COLORADO	K	Fayette	Colorado	07515	Gulf Coast	150	150	150	150	150	150	150	2001 Plan: AllocFile10 9/24/99
IRRIGATION	FAYETTE	COLORADO	K	Fayette	Colorado	075996	Irrigation Local Supply	534	534	534	534	534	534	534	2001 Plan: LCRA provided data and Demand
IRRIGATION	FAYETTE	COLORADO	K	Fayette	Colorado	07510	Carrizo-Wilcox	0	0	0	0	0	0	0	Reduced supply due to over allocation of Carrizo-Wilcox in Fayette County Colorado basin 2/7/05
IRRIGATION	FAYETTE	COLORADO	K	Fayette	Colorado	07527	Sparta	484	484	484	484	484	484	484	2001 Plan: AllocFile10 9/24/99
IRRIGATION	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07515	Gulf Coast	2	2	2	2	2	2	2	2001 Plan: AllocFile10 10% reduced
IRRIGATION	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07527	Sparta	60	60	60	60	60	60	60	2001 Plan: AllocFile10 9/24/99
IRRIGATION	FAYETTE	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	14	14	14	14	14	14	14	2001 Plan: AllocFile10 9/24/99
IRRIGATION	FAYETTE	LAVACA	K	Fayette	Lavaca	07527	Sparta	3	3	3	3	3	3	3	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	FAYETTE	BRAZOS	K		Brazos	12997	Livestock Local Supply	2	2	2	2	2	2	2	2001 Plan: Demand
LIVESTOCK	FAYETTE	COLORADO	K	Fayette	Colorado	07515	Gulf Coast	140	140	140	140	140	140	140	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	FAYETTE	COLORADO	K	Fayette	Colorado	07527	Sparta	733	733	733	733	733	733	733	2001 Plan: A-ALL, 30% reduced
LIVESTOCK	FAYETTE	COLORADO	K		Colorado	14997	Livestock Local Supply	1,746	1,746	1,746	1,746	1,746	1,746	1,746	2001 Plan: LCRA Provided data
LIVESTOCK	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07527	Sparta	179	179	179	179	179	179	179	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	FAYETTE	GUADALUPE	K		Guadalupe	18997	Livestock Local Supply	142	142	142	142	142	142	142	2001 Plan: LCRA Provided data
LIVESTOCK	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07515	Gulf Coast	2	2	2	2	2	2	2	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	FAYETTE	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	176	176	176	176	176	176	176	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	FAYETTE	LAVACA	K	Fayette	Lavaca	07527	Sparta	71	71	71	71	71	71	71	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	FAYETTE	LAVACA	K		Lavaca	16997	Livestock Local Supply	472	472	472	472	472	472	472	2001 Plan: LCRA Provided data
MANUFACTURING	FAYETTE	BRAZOS						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
MANUFACTURING	FAYETTE	COLORADO	K	Fayette	Colorado	07515	Gulf Coast	0	0	0	0	0	0	0	2001 Plan: AllocFile10 9/24/99
MANUFACTURING	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07527	Sparta	22	22	22	22	22	22	22	2001 Plan: AllocFile10 9/24/99
MANUFACTURING	FAYETTE	LAVACA	K	Fayette	Lavaca	07527	Sparta	8	8	8	8	8	8	8	2001 Plan: AllocFile10 9/24/99
MANUFACTURING	FAYETTE	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	152	152	152	152	152	152	152	2001 Plan: A-ALL, % & Tbl 4
MINING	FAYETTE	BRAZOS	K	Fayette	Brazos	07515	Gulf Coast	63	42	25	7	1	0	0	2001 Plan: A-ALL, 100% reduced
MINING	FAYETTE	COLORADO	K	Fayette	Colorado	07527	Sparta	367	367	367	367	367	367	367	2001 Plan: AllocFile10 9/24/99
MINING	FAYETTE	COLORADO	K	Fayette	Colorado	07515	Gulf Coast	103	103	103	103	103	103	103	2001 Plan: A-ALL, % & Tbl 4
MINING	FAYETTE	GUADALUPE	K	Fayette	Guadalupe	07527	Sparta	60	60	60	60	60	60	60	2001 Plan: AllocFile10 9/24/99
MINING	FAYETTE	LAVACA	K	Fayette	Lavaca	07515	Gulf Coast	10	10	10	10	10	10	10	2001 Plan: A-ALL, % & Tbl 4
MINING	FAYETTE	LAVACA	K	Fayette	Lavaca	07527	Sparta	24	24	24	24	24	24	24	2001 Plan: AllocFile10 9/24/99

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
STEAM ELECTRIC POWER	FAYETTE	BRAZOS						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	FAYETTE	COLORADO	K		Colorado	3461405471A-SE	City of Austin - ROR (Steam Elec.)	1,426	1,267	1,267	1,267	1,267	1,267	1,267	Region K WAM Run 3 Cutoff; FPP
STEAM ELECTRIC POWER	FAYETTE	COLORADO	K		Colorado	140B0	Highland Lakes	38,101	38,101	38,101	38,101	38,101	38,101	38,101	Region K WAM Run 3 Cutoff; TCEQ WAM 5/6/05; LCRA Cooling Water
STEAM ELECTRIC POWER	FAYETTE	COLORADO	K		Colorado	140B0	Highland Lakes	3,500	3,500	3,500	3,500	3,500	3,500	3,500	Supply Estimate based on LCRA 4/9/04
STEAM ELECTRIC POWER	FAYETTE	GUADALUPE						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	FAYETTE	LAVACA						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
COUNTY-OTHER	GILLESPIE	COLORADO	K	Gillespie	Colorado	08613	Edwards-Trinity (Plateau)	968	968	968	968	968	968	968	Hill Country UWCD 5/14/04
COUNTY-OTHER	GILLESPIE	COLORADO	K	Gillespie	Colorado	08614	Ellenburger-San Saba	436	436	436	436	436	436	436	Hill Country UWCD 5/14/04
COUNTY-OTHER	GILLESPIE	COLORADO	K	Gillespie	Colorado	08616	Hickory	596	596	596	596	596	596	596	Hill Country UWCD 5/14/04
COUNTY-OTHER	GILLESPIE	GUADALUPE	K	Gillespie	Colorado	08628	Trinity	1,123	1,123	1,123	1,123	1,123	1,123	1,123	Hill Country UWCD 5/14/04
COUNTY-OTHER	GILLESPIE	GUADALUPE	K	Gillespie	Guadalupe	08613	Edwards-Trinity (Plateau)	90	90	90	90	90	90	90	Hill Country UWCD 5/14/04
COUNTY-OTHER	GILLESPIE	GUADALUPE	K	Gillespie	Guadalupe	08614	Ellenburger-San Saba	65	65	65	65	65	65	65	Hill Country UWCD 5/14/04
COUNTY-OTHER	GILLESPIE	COLORADO	K	Gillespie	Guadalupe	08616	Hickory	66	66	66	66	66	66	66	Hill Country UWCD 5/14/04
COUNTY-OTHER	GILLESPIE	GUADALUPE	K	Gillespie	Guadalupe	08628	Trinity	26	26	26	26	26	26	26	Hill Country UWCD 5/14/04
FREDERICKSBURG	GILLESPIE	COLORADO	K	Gillespie	Colorado	08614	Ellenburger-San Saba	3,174	3,174	3,174	3,174	3,174	3,174	3,174	Hill Country UWCD 5/14/04
FREDERICKSBURG	GILLESPIE	COLORADO	K	Gillespie	Colorado	08616	Hickory	662	662	662	662	662	662	662	Hill Country UWCD 5/14/04
IRRIGATION	GILLESPIE	COLORADO	K	Gillespie	Colorado	08613	Edwards-Trinity (Plateau)	71	71	71	71	71	71	71	2001 Plan: A-ALL, LIMIT reduced
IRRIGATION	GILLESPIE	COLORADO	K	Gillespie	Colorado	086996	Irrigation Local Supply	880	880	880	880	880	880	880	2001 Plan: LCRA provided data?
IRRIGATION	GILLESPIE	COLORADO	K	Gillespie	Colorado	08628	Trinity	1,149	1,149	1,149	1,149	1,149	1,149	1,149	Hill Country UWCD 5/14/04
IRRIGATION	GILLESPIE	COLORADO	K	Gillespie	Colorado	08616	Hickory	210	210	210	210	210	210	210	Hill Country UWCD 5/14/04
IRRIGATION	GILLESPIE	COLORADO	K	Gillespie	Colorado	08614	Ellenburger-San Saba	1,239	1,239	1,239	1,239	1,239	1,239	1,239	Hill Country UWCD 5/14/04
IRRIGATION	GILLESPIE	GUADALUPE	K	Gillespie	Guadalupe	08628	Trinity	0	0	0	0	0	0	0	2001 Plan: AllocFile10 10% reduced
LIVESTOCK	GILLESPIE	COLORADO	K		Colorado	14997	Livestock Local Supply	515	515	515	515	515	515	515	2001 Plan: Demand
LIVESTOCK	GILLESPIE	COLORADO	K	Gillespie	Colorado	08613	Edwards-Trinity (Plateau)	266	266	266	266	266	266	266	Hill Country UWCD 5/14/04
LIVESTOCK	GILLESPIE	COLORADO	K	Gillespie	Colorado	08614	Ellenburger-San Saba	266	266	266	266	266	266	266	Hill Country UWCD 5/14/04
LIVESTOCK	GILLESPIE	COLORADO	K	Gillespie	Colorado	08616	Hickory	266	266	266	266	266	266	266	Hill Country UWCD 5/14/04
LIVESTOCK	GILLESPIE	COLORADO	K	Gillespie	Colorado	08628	Trinity	932	932	932	932	932	932	932	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	GILLESPIE	GUADALUPE	K	Gillespie	Guadalupe	08628	Trinity	20	20	20	20	20	20	20	2001 Plan: A-ALL, 17.6% reduced
LIVESTOCK	GILLESPIE	GUADALUPE	K		Guadalupe	18997	Livestock Local Supply	13	13	13	13	13	13	13	2001 Plan: Demand
MANUFACTURING	GILLESPIE	COLORADO	K	Gillespie	Colorado	08613	Edwards-Trinity (Plateau)	34	34	34	34	34	34	34	Hill Country UWCD 5/14/04
MANUFACTURING	GILLESPIE	COLORADO	K	Gillespie	Colorado	08614	Ellenburger-San Saba	398	398	398	398	398	398	398	Hill Country UWCD 5/14/04
MANUFACTURING	GILLESPIE	COLORADO	K	Gillespie	Colorado	08616	Hickory	150	150	150	150	150	150	150	Hill Country UWCD 5/14/04
MANUFACTURING	GILLESPIE	COLORADO	K		Colorado	14999	Other Local Supply	158	158	158	158	158	158	158	2001 Plan: Demand
MANUFACTURING	GILLESPIE	GUADALUPE						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
MINING	GILLESPIE	COLORADO	K	Gillespie	Colorado	08616	Hickory	50	50	50	50	50	50	50	Hill Country UWCD 5/14/04
MINING	GILLESPIE	COLORADO	K	Gillespie	Colorado	08628	Trinity	150	150	150	150	150	150	150	Hill Country UWCD 5/14/04
MINING	GILLESPIE	COLORADO	K	Gillespie	Colorado	08613	Edwards-Trinity (Plateau)	71	71	71	71	71	71	71	2001 Plan: AllFile10 9/24 Limit reduced
MINING	GILLESPIE	COLORADO	K	Gillespie	Colorado	08614	Ellenburger-San Saba	22	22	22	22	22	22	22	2001 Plan: AllocFile10 9/24/99
MINING	GILLESPIE	GUADALUPE	K	Gillespie	Guadalupe	08628	Trinity	0	0	0	0	0	0	0	2001 Plan: AllocFile10 10% reduced
STEAM ELECTRIC POWER	GILLESPIE	COLORADO	K	Gillespie	Colorado	08613	Edwards-Trinity (Plateau)	0	0	0	0	0	0	0	Hill Country UWCD 5/14/04
STEAM ELECTRIC POWER	GILLESPIE	GUADALUPE						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
BUDA	HAYS	COLORADO	K	Hays	Colorado	10511	Edwards-BFZ	614	614	614	614	614	614	614	BSEACD 3/9/04
CIMARRON PARK WATER COMPANY	HAYS	COLORADO		Hays	Colorado	10511	Edwards-BFZ	327	362	362	362	362	362	362	New WUG: BSEACD 3/9/04
COUNTY-OTHER	HAYS	COLORADO	K		Colorado	140B0	Highland Lakes	1,915	1,915	1,915	1,915	1,915	0	0	Supply based on LCRA revised data 2/7/05
COUNTY-OTHER	HAYS	COLORADO	K	Hays	Colorado	10511	Edwards-BFZ	877	877	877	877	877	877	877	BSEACD 3/9/04
DRIPPING SPRINGS	HAYS	COLORADO	K		Colorado	140B0	Highland Lakes	560	560	560	560	560	0	0	New WUG: Supply Estimate based on LCRA 4/9/04 (from Dripping Springs WSC)
DRIPPING SPRINGS WSC	HAYS	COLORADO	K	Hays	Colorado	10528	Trinity	240	240	240	240	240	240	240	New WUG: Supply based on Dripping Springs WSC 9/20/04
HILL COUNTRY WSC	HAYS	COLORADO	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	992	0	0	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04
HILL COUNTRY WSC	HAYS	COLORADO	K		Colorado	140B0	Highland Lakes	0	440	702	980	1,249	1,582	1,844	New WUG: Retail customer of West Travis RWS. Subtracted demand from West Travis Contract. 2/10/05
MOUNTAIN CITY	HAYS	COLORADO		Hays	Colorado	10511	Edwards-BFZ	89	132	132	132	132	132	132	New WUG: BSEACD 3/9/04
IRRIGATION	HAYS	COLORADO	K	Hays	Colorado	10511	Edwards-BFZ	931	931	931	931	931	931	931	2001 Plan: AllocFile10 9/24/99
IRRIGATION	HAYS	COLORADO	K	Hays	Colorado	10528	Trinity	2	2	2	2	2	1	1	2001 Plan: AllocFile10 9/24/99
IRRIGATION	HAYS	COLORADO	K	Hays	Colorado	105996	Irrigation Local Supply	41	41	41	41	41	41	41	2001 Plan: LCRA Provided data
LIVESTOCK	HAYS	COLORADO	K		Colorado	14997	Livestock Local Supply	192	192	192	192	192	192	192	2001 Plan: LCRA Provided data
LIVESTOCK	HAYS	COLORADO	K	Hays	Colorado	10528	Trinity	30	30	30	30	30	25	25	2001 Plan: A-ALL, 17.6% reduced
LIVESTOCK	HAYS	COLORADO	K	Hays	Colorado	10511	Edwards-BFZ	624	624	624	624	624	624	624	2001 Plan: ALLOC-F10 9/24/99
MANUFACTURING	HAYS	COLORADO	K	Hays	Colorado	10511	Edwards-BFZ	922	922	922	922	922	922	922	BSEACD 3/9/04 855 ac-ft/yr; rest Plan2001
MINING	HAYS	COLORADO	K	Hays	Colorado	10511	Edwards-BFZ	9	9	9	9	9	9	9	2001 Plan: A-ALL, % & Tbl 4
MINING	HAYS	COLORADO	K	Hays	Colorado	10528	Trinity	12	12	12	12	12	10	10	2001 Plan: A-ALL, 3.5% reduced

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
STEAM ELECTRIC POWER	HAYS	COLORADO						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
COUNTY-OTHER	LLANO	COLORADO	K	Llano	Colorado	15014	Ellenburger-San Saba	120	120	120	120	120	120	120	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	LLANO	COLORADO	K	Llano	Colorado	15016	Hickory	45	45	45	45	45	45	45	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	LLANO	COLORADO	K		Colorado	140B0	Highland Lakes	2,074	2,074	747	747	728	728	728	Supply based on LCRA revised data 2/7/05
KINGSLAND WSC	LLANO	COLORADO	K		Colorado	140B0	Highland Lakes	460	455	448	442	436	429	0	New WUG: Supply Estimate based on revised LCRA data and proportioned by county. 2/8/05
KINGSLAND WSC	LLANO	COLORADO	K	Llano	Colorado	15022	Other Aquifer	109	109	109	109	109	109	109	New WUG: Supply Estimate based on TCEQ capacity for listed wells. Assumes all GW is supplied within Llano County. 1/14/05
LAKE LBJ MUD	LLANO	COLORADO	K		Colorado	140B0	Highland Lakes	1,556	1,530	1,495	1,462	1,431	0	0	New WUG: Supply Estimate based on revised LCRA data. 2/2/05
LLANO	LLANO	COLORADO	K		Colorado	140B0	Highland Lakes	87	87	87	87	0	0	0	Supply Estimate based on LCRA 4/9/04
LLANO	LLANO	COLORADO	K		Colorado	14520	Llano Reservoir	187	0	0	0	0	0	0	Region K WAM Run 3 Cutoff
SUNRISE BEACH VILLAGE	LLANO	COLORADO	K		Colorado	140B0	Highland Lakes	278	278	278	278	278	278	278	New WUG: Supply Estimate based on TCEQ maximum production capacity for system. 1/14/05
SUNRISE BEACH VILLAGE	LLANO	COLORADO	K	Llano	Colorado	15016	Hickory	65	65	65	65	65	65	65	New WUG: Supply Estimate based on TCEQ maximum production capacity for listed wells. 1/14/05
IRRIGATION	LLANO	COLORADO	K	Llano	Colorado	150996	Irrigation Local Supply	440	440	440	440	440	440	440	2001 Plan: LCRA Provided data
IRRIGATION	LLANO	COLORADO	K	Llano	Colorado	15016	Hickory	10,051	10,051	10,051	10,051	10,051	10,051	10,051	2001 Plan: A-ALL, % & Tbl 4
IRRIGATION	LLANO	COLORADO	K	Llano	Colorado	15014	Ellenburger-San Saba	76	76	76	76	76	76	76	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	LLANO	COLORADO	K		Colorado	14997	Livestock Local Supply	393	393	393	393	393	393	393	2001 Plan: LCRA Provided data
LIVESTOCK	LLANO	COLORADO	K	Llano	Colorado	15016	Hickory	288	288	288	288	288	288	288	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	LLANO	COLORADO	K	Llano	Colorado	15014	Ellenburger-San Saba	8	8	8	8	8	8	8	2001 Plan: A-ALL, % & Tbl 4
MANUFACTURING	LLANO	COLORADO						0	0	0	0	0	0	0	New WUG: Minimal Demand, therefore 0 Supply
MINING	LLANO	COLORADO	K	Llano	Colorado	15016	Hickory	1,252	1,252	1,252	1,252	1,252	1,252	1,252	2001 Plan: A-ALL, % & Tbl 4
MINING	LLANO	COLORADO	K	Llano	Colorado	15014	Ellenburger-San Saba	76	76	76	76	76	76	76	2001 Plan: A-ALL, % & Tbl 4
STEAM ELECTRIC POWER	LLANO	COLORADO	K		Colorado	140B0	Highland Lakes	15,700	15,700	15,700	15,700	15,700	15,700	15,700	Region K WAM Run 3 Cutoff; TCEQ WAM 5/6/05; LCRA Cooling Water
BAY CITY	MATAGORDA	BRAZOS-COLORADO	K	Matagorda	Brazos-Colorado	16115	Gulf Coast	6,255	6,255	6,255	6,255	6,255	6,255	6,255	2001 Plan: A-ALL, LIMIT 9725 reduced
COUNTY-OTHER	MATAGORDA	COLORADO			Colorado	140B0	Highland Lakes	15	15	0	0	0	0	0	Supply based on LCRA revised data 2/7/05
COUNTY-OTHER	MATAGORDA	BRAZOS-COLORADO	K	Matagorda	Brazos-Colorado	16115	Gulf Coast	1,938	1,936	1,933	1,932	1,932	1,933	1,933	2001 Plan: ALLOC-F10 9/24/99
COUNTY-OTHER	MATAGORDA	COLORADO	K	Matagorda	Colorado	16115	Gulf Coast	250	250	250	250	250	250	250	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	MATAGORDA	COLORADO		Matagorda	Brazos-Colorado	16115	Gulf Coast	789	789	789	789	789	789	789	
COUNTY-OTHER	MATAGORDA	COLORADO-LAVACA	K	Matagorda	Colorado-Lavaca	16115	Gulf Coast	3,902	3,902	3,902	3,902	3,902	3,902	3,902	2001 Plan: A-ALL, % & Tbl 4
ORBIT SYSTEMS INC	MATAGORDA	COLORADO-LAVACA		Matagorda	Colorado-Lavaca	16115	Gulf Coast	0	0	0	0	0	0	0	New WUG: TCEQ database shows only supply to Matagorda County as dissolved; No well data. 1/14/05
PALACIOS	MATAGORDA	COLORADO-LAVACA	K	Matagorda	Colorado-Lavaca	16115	Gulf Coast	2,152	2,152	2,152	2,152	2,152	2,152	2,152	2001 Plan: A-ALL, LIMIT
SOUTHWEST UTILITIES	MATAGORDA	BRAZOS-COLORADO		Matagorda	Colorado-Lavaca	16115	Gulf Coast	140	140	140	140	140	140	140	New WUG: Supply Estimate based on TCEQ maximum production capacity for listed wells. 1/13/05
IRRIGATION	MATAGORDA	BRAZOS-COLORADO	K		Colorado	3461405476A	LCRA - Gulf Coast ROR	34,844	21,069	20,464	20,464	20,464	20,464	20,464	Region K WAM Run 3 Cutoff; Gulf Coast ROR split by basin.
IRRIGATION	MATAGORDA	BRAZOS-COLORADO	K	Matagorda	Brazos-Colorado	161996	Irrigation Local Supply	4,000	4,000	4,000	4,000	4,000	4,000	4,000	2001 Plan: TWDB
IRRIGATION	MATAGORDA	BRAZOS-COLORADO	K	Matagorda	Brazos-Colorado	16115	Gulf Coast	4,082	4,082	4,082	4,082	4,082	4,082	4,082	2001 Plan: Demand
IRRIGATION	MATAGORDA	COLORADO	K		Colorado	3461405476A	LCRA - Gulf Coast ROR	4,449	2,689	2,612	2,612	2,612	2,612	2,612	Region K WAM Run 3 Cutoff; Gulf Coast ROR split by basin.
IRRIGATION	MATAGORDA	COLORADO	K	Matagorda	Colorado	16115	Gulf Coast	1,389	1,389	1,389	1,389	1,389	1,389	1,389	2001 Plan: Demand
IRRIGATION	MATAGORDA	COLORADO	K	Matagorda	Colorado	161996	Irrigation Local Supply	900	900	900	900	900	900	900	2001 Plan: TWDB
IRRIGATION	MATAGORDA	COLORADO-LAVACA	K		Colorado	3461405476A	LCRA - Gulf Coast ROR	34,844	21,069	20,464	20,464	20,464	20,464	20,464	Region K WAM Run 3 Cutoff; Gulf Coast ROR split by basin.
IRRIGATION	MATAGORDA	COLORADO-LAVACA	K	Matagorda	Colorado-Lavaca	16115	Gulf Coast	7,108	7,108	7,108	7,108	7,108	7,108	7,108	2001 Plan: Demand
IRRIGATION	MATAGORDA	COLORADO-LAVACA	K	Matagorda	Colorado-Lavaca	161996	Irrigation Local Supply	4,000	4,000	4,000	4,000	4,000	4,000	4,000	2001 Plan: TWDB
LIVESTOCK	MATAGORDA	BRAZOS-COLORADO	K		Brazos-Colorado	13997	Livestock Local Supply	206	206	206	206	206	206	206	2001 Plan: Demand
LIVESTOCK	MATAGORDA	BRAZOS-COLORADO	K	Matagorda	Brazos-Colorado	16115	Gulf Coast	875	875	875	875	875	875	875	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	MATAGORDA	COLORADO	K		Colorado	14997	Livestock Local Supply	25	25	25	25	25	25	25	2001 Plan: LCRA Provided data
LIVESTOCK	MATAGORDA	COLORADO	K	Matagorda	Colorado	16115	Gulf Coast	171	171	171	171	171	171	171	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	MATAGORDA	COLORADO-LAVACA	K		Colorado-Lavaca	15997	Livestock Local Supply	215	215	215	215	215	215	215	2001 Plan: LCRA Provided data
LIVESTOCK	MATAGORDA	COLORADO-LAVACA	K	Matagorda	Colorado-Lavaca	16115	Gulf Coast	215	215	215	215	215	215	215	2001 Plan: A-ALL, LIMIT
MANUFACTURING	MATAGORDA	BRAZOS-COLORADO	K	Matagorda	Brazos-Colorado	16115	Gulf Coast	1,823	1,823	1,823	1,823	1,823	1,823	1,823	2001 Plan: ALLOC-F10 8% reduced
MANUFACTURING	MATAGORDA	BRAZOS-COLORADO	K		Colorado	140B0	Highland Lakes	7,438	7,438	3,150	1,464	1,464	0	0	Supply Estimate based on revised LCRA data (split by basin). 2/2/05
MANUFACTURING	MATAGORDA	COLORADO	K	Matagorda	Colorado	16115	Gulf Coast	929	929	929	929	929	929	929	2001 Plan: A-ALL, % & Tbl 4
MANUFACTURING	MATAGORDA	COLORADO	K		Colorado	140B0	Highland Lakes	6,784	6,784	2,872	1,336	1,336	0	0	Supply Estimate based on revised LCRA data (split by basin). 2/2/05
MANUFACTURING	MATAGORDA	COLORADO-LAVACA	K	Matagorda	Colorado-Lavaca	16115	Gulf Coast	2,537	2,537	2,537	2,537	2,537	2,537	2,537	2001 Plan: A-ALL, % & Tbl 4
MINING	MATAGORDA	BRAZOS-COLORADO	K	Matagorda	Brazos-Colorado	16115	Gulf Coast	182	182	182	182	182	182	182	2001 Plan: A-ALL, % & Tbl 4
MINING	MATAGORDA	COLORADO	K	Matagorda	Colorado	16115	Gulf Coast	0	0	0	0	0	0	0	2001 Plan: AllocFile10 9/24/99
MINING	MATAGORDA	COLORADO-LAVACA	K	Matagorda	Colorado-Lavaca	16115	Gulf Coast	664	664	664	664	664	664	664	2001 Plan: A-ALL, % & Tbl 4

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
STEAM ELECTRIC POWER	MATAGORDA	BRAZOS-COLORADO						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	MATAGORDA	COLORADO	K	Matagorda	Colorado	16115	Gulf Coast	443	443	443	443	443	443	443	2001 Plan: A-ALL, % & Tbl 4
STEAM ELECTRIC POWER	MATAGORDA	COLORADO	K		Colorado	3461405437	STP Nuclear Operating Co. - ROR	49,089	51,811	46,349	46,349	46,349	46,349	46,349	Region K WAM Run 3 Cutoff
STEAM ELECTRIC POWER	MATAGORDA	COLORADO	K		Colorado	140B0	Highland Lakes	38,060	27,506	32,960	32,480	32,480	32,480	32,840	Region K WAM Run 3 Cutoff; LCRA contract: Back-up of STP WR (was 5680 now 38,060)
STEAM ELECTRIC POWER	MATAGORDA	COLORADO-LAVACA						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
BROOKSMITH SUD	MILLS	COLORADO	F		Colorado	14140	Lake Brownwood	10	10	10	0	0	0	0	New WUG: Supply based on Brookesmith SUD 9/20/04
COUNTY-OTHER	MILLS	BRAZOS	K	Mills	Brazos	16728	Trinity	259	259	259	227	227	186	186	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	MILLS	COLORADO	K	Mills	Colorado	16728	Trinity	336	336	336	295	295	242	242	2001 Plan: A-ALL, % & Tbl 4
GOLDTHWAITE	MILLS	BRAZOS	K	Mills	Brazos	16728	Trinity	1	1	1	1	1	1	1	New WUG: Supply Estimate based on TCEQ maximum production capacity for listed wells and proportioned based on demand per basin. 1/20/05
GOLDTHWAITE	MILLS	BRAZOS	K		Colorado	14350	Goldthwaite Reservoir	2	0	0	0	0	0	0	Region K WAM Run 3 Cutoff; New WUG: TCEQ WAM 5/6/05
GOLDTHWAITE	MILLS	COLORADO	K		Colorado	14350	Goldthwaite Reservoir	142	0	0	0	0	0	0	Region K WAM Run 3 Cutoff; New WUG: TCEQ WAM 5/6/05
GOLDTHWAITE	MILLS	COLORADO	K	Mills	Colorado	16728	Trinity	67	67	67	67	67	68	68	Supply Estimate based on TCEQ maximum production capacity for listed wells and proportioned based on demand per basin. 1/20/05
IRRIGATION	MILLS	BRAZOS	K	Mills	Brazos	16728	Trinity	143	143	143	125	125	103	103	2001 Plan: AllocFile10 9/24/99
IRRIGATION	MILLS	COLORADO	K	Mills	Colorado	16728	Trinity	76	76	76	66	66	54	54	2001 Plan: AllocFile10 9/24/99
IRRIGATION	MILLS	COLORADO	K	Mills	Colorado	167996	Irrigation Local Supply	2,378	2,378	2,378	2,378	2,378	2,378	2,378	2001 Plan: TWDB
LIVESTOCK	MILLS	BRAZOS	K	Mills	Brazos	16728	Trinity	438	438	438	438	438	438	438	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	MILLS	COLORADO	K	Mills	Colorado	16728	Trinity	407	407	407	357	357	293	293	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	MILLS	COLORADO	K		Colorado	14997	Livestock Local Supply	314	314	314	314	314	314	314	2001 Plan: LCRA Provided data
MANUFACTURING	MILLS	BRAZOS						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
MANUFACTURING	MILLS	COLORADO						0	0	0	0	0	0	0	New WUG: Minimal Demand, therefore 0 Supply
MINING	MILLS	BRAZOS	K	Mills	Brazos	16728	Trinity	143	143	143	125	125	103	103	2001 Plan: AllocFile10 9/24/99
MINING	MILLS	COLORADO	K	Mills	Colorado	16728	Trinity	133	133	133	117	117	96	96	2001 Plan: AllocFile10 9/24/99
STEAM ELECTRIC POWER	MILLS	BRAZOS						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	MILLS	COLORADO						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
COUNTY-OTHER	SAN SABA	COLORADO	K	San Saba	Colorado	20614	Ellenburger-San Saba	7,744	7,744	7,744	7,744	7,744	7,744	7,744	Supply available to Ellenburger-San Saba aquifer in San Saba County, Colorado basin minus supply to Richland and San Saba WUG.
COUNTY-OTHER	SAN SABA	COLORADO	K	San Saba	Colorado	20616	Hickory	50	50	50	50	50	50	50	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	SAN SABA	COLORADO	K	San Saba	Colorado	20619	Marble Falls	250	250	250	250	250	250	250	2001 Plan: A-ALL, LIMIT
COUNTY-OTHER	SAN SABA	COLORADO	K		Colorado	140B0	Highland Lakes	20	0	0	0	0	0	0	Supply based on LCRA revised data 2/7/05
RICHLAND SUD	SAN SABA	COLORADO	K	San Saba	Colorado	20614	Ellenburger-San Saba	210	210	210	210	210	210	210	New WUG: Supply Estimate based on TCEQ maximum production capacity for listed wells. 1/14/05
SAN SABA	SAN SABA	COLORADO	K	San Saba	Colorado	20614	Ellenburger-San Saba	2,240	2,240	2,240	2,240	2,240	2,240	2,240	2001 Plan: Plant verbal confirmation
IRRIGATION	SAN SABA	COLORADO	K	San Saba	Colorado	20616	Hickory	4,715	4,715	4,715	4,715	4,715	4,715	4,715	2001 Plan: AllocFile10 9/24/99
IRRIGATION	SAN SABA	COLORADO	K	San Saba	Colorado	20619	Marble Falls	4,643	4,643	4,643	4,643	4,643	4,643	4,643	2001 Plan: AllocFile10 9/24/99
IRRIGATION	SAN SABA	COLORADO	K	San Saba	Colorado	206996	Irrigation Local Supply	8,800	8,800	8,800	8,800	8,800	8,800	8,800	2001 Plan: TWDB
LIVESTOCK	SAN SABA	COLORADO	K	San Saba	Colorado	20619	Marble Falls	2,612	2,612	2,612	2,612	2,612	2,612	2,612	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	SAN SABA	COLORADO	K		Colorado	14997	Livestock Local Supply	224	224	224	224	224	224	224	2001 Plan: Demand
LIVESTOCK	SAN SABA	COLORADO	K	San Saba	Colorado	20616	Hickory	994	994	994	994	994	994	994	2001 Plan: A-ALL, % & Tbl 4
MANUFACTURING	SAN SABA	COLORADO	K	San Saba	Colorado	20616	Hickory	144	144	144	144	144	144	144	2001 Plan: AllocFile10 9/24/99
MANUFACTURING	SAN SABA	COLORADO	K	San Saba	Colorado	20619	Marble Falls	2,612	2,612	2,612	2,612	2,612	2,612	2,612	2001 Plan: AllocFile10 9/24/99
MINING	SAN SABA	COLORADO	K	San Saba	Colorado	20619	Marble Falls	1,238	1,238	1,238	1,238	1,238	1,238	1,238	2001 Plan: AllocFile10 9/24/99
MINING	SAN SABA	COLORADO	K	San Saba	Colorado	20616	Hickory	301	301	301	301	301	301	301	2001 Plan: A-ALL, % & Tbl 4
STEAM ELECTRIC POWER	SAN SABA	COLORADO						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
ANDERSON MILL MUD	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	0	0	0	0	0	0	0	New WUG Name: Supply Estimate based on OLD name & COA meeting 3/16/04
AQUA WSC	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	981	1,088	1,251	1,390	1,484	0	0	New WUG: Supply Estimate based on LCRA 02/02/05
AUSTIN	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	126,161	166,834	153,289	153,127	140,185	131,532	121,412	Region K WAM Run 3 Cutoff; remaining supply after wholesale commitment allocation
AUSTIN	TRAVIS	COLORADO	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	716	1,066	1,561	2,436	3,556	3,556	3,519	Region K WAM Run 3 Cutoff; remaining supply after wholesale commitment allocation
AUSTIN	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	143,947	112,899	121,194	121,157	121,157	121,157	121,581	Region K WAM Run 3 Cutoff; COA contract with LCRA (this supply makes the COA municipal and manufacturing supply total 325,000 ac-ft/yr)

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
BARTON CREEK WEST WSC	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	348	348	348	348	348	348	348	New WUG: Supply Estimate based on LCRA 4/9/04
BEE CAVE VILLAGE	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	241	241	241	241	241	241	241	New WUG: Supply Estimate based on LCRA 4/9/04
BRIARCLIFF VILLAGE	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	300	300	300	300	0	0	0	New WUG: Supply Estimate based on LCRA 4/9/04
CEDAR PARK	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	112	188	290	384	443	0	0	New WUG: Supply Estimate based on LCRA 4/9/04 (split by region); Contract to Williamson-Travis MUD #1 has been taken from 2000 and 2010 planning periods.
COUNTY-OTHER	TRAVIS	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	64	64	64	64	64	64	64	Aqua WSC email 3/29/04
COUNTY-OTHER	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	7,403	5,343	4,186	3,252	2,100	1,119	1,209	Based on COA meeting 1/28/05 (portion of demand)
COUNTY-OTHER	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	1,443	1,443	1,443	1,443	1,443	1,443	1,443	BSEACD 3/9/04
COUNTY-OTHER	TRAVIS	GUADALUPE	K	Travis	Colorado	22711	Edwards-BFZ	1	1	1	1	1	1	1	BSEACD 3/9/04
COUNTY-OTHER	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	14,424	13,820	11,472	6,171	5,051	1,470	1,470	Supply based on LCRA revised data 2/7/05 (Travis County WCID #19 supply taken out)
COUNTY-OTHER	TRAVIS	COLORADO	K	Travis	Colorado	22728	Trinity	592	592	592	592	592	485	485	2001 Plan: A-ALL, 100% reduced
CREEDMOOR-MAHA WSC	TRAVIS	COLORADO	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	818	818	0	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04 (Proportioned by basin demand)
CREEDMOOR-MAHA WSC	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	477	450	437	430	417	407	407	New WUG: Supply Estimate based on BSEACD 3/9/04 (Proportioned by basin demand)
CREEDMOOR-MAHA WSC	TRAVIS	GUADALUPE	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	21	21	0	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04 (Proportioned by basin demand)
CREEDMOOR-MAHA WSC	TRAVIS	GUADALUPE	K	Travis	Guadalupe	22711	Edwards-BFZ	13	12	12	11	11	11	11	New WUG: Supply Estimate based on BSEACD 3/9/04 (Proportioned by basin demand)
ELGIN	TRAVIS	COLORADO	K	Bastrop	Colorado	01110	Carrizo-Wilcox	10	14	20	22	23	23	22	New WUG: Supply Estimate based on TCEQ maximum production capacity for groundwater treatment facility and proportioned by total demand. 1/14/05
GOFORTH WSC	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	32	27	25	24	22	20	20	New WUG: Supply Estimate based on BSEACD 3/9/04 (Proportioned by region demand)
HILL COUNTRY WSC	TRAVIS	COLORADO	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	688	0	0	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04
HILL COUNTRY WSC	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	0	238	364	484	555	633	714	New WUG: Retail customer of West Travis RWS. Subtracted demand from West Travis Contract. 2/10/05
JONESTOWN	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	251	251	250	250	0	0	0	Jonestown WSC split between Jonestown and Jonestown WSC WUGs.
JONESTOWN WSC	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	109	109	110	110	0	0	0	New WUG: Supply Estimate based on LCRA 4/9/04; supply split between Jonestown and Jonestown WSC
LAGO VISTA	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	6,770	6,770	6,500	0	0	0	0	Supply Estimate based on revised LCRA data 2/2/05. Multiple contracts with different expiration dates.
LAKEWAY	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	2,455	2,455	2,455	0	0	0	0	Lakeway MUD supply from LCRA was allocated to Lakeway.
LAKEWAY MUD	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	0	0	0	0	0	0	0	New WUG: Supply Estimate based on revised LCRA data. 2/2/05
LOOP 360 WSC	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	871	871	871	0	0	0	0	New WUG: Supply Estimate based on LCRA 4/9/04
LOST CREEK MUD	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	951	0	0	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04
MANOR	TRAVIS	COLORADO	K	Travis	Colorado	22722	Other Aquifer	661	661	661	661	661	661	661	Supply estimate based on TCEQ total production. 2/8/05
MANOR	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	1,680	1,680	1,680	0	0	0	0	COA email 2/18/04
MANVILLE WSC	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	2,240	2,240	2,240	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04
MANVILLE WSC	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	0	0	0	0	0	0	0	New WUG: Supply reduced from estimated from TCEQ well production capacities due to other supplies and reduction of Edwards-BFZ in Travis County Colorado Basin 2/7/05
MANVILLE WSC	TRAVIS	COLORADO	K	Travis	Colorado	22722	Other Aquifer	1,067	1,064	1,063	1,059	1,053	1,045	1,037	New WUG: Supply estimated from TCEQ well production capacities and proportioned for percent total population. 1/14/05
MUSTANG RIDGE	TRAVIS	COLORADO	K	Travis	Colorado	22722	Other Aquifer	80	93	111	128	139	150	162	New WUG: No Data; Assumed alluvial supplies (no major or minor aquifers in the area)
MUSTANG RIDGE	TRAVIS	GUADALUPE	K	Travis	Guadalupe	22722	Other Aquifer	21	25	30	34	37	40	43	New WUG: No Data; Assumed alluvial supplies (no major or minor aquifers in the area)

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
NORTH AUSTIN MUD #1	TRAVIS	COLORADO	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	112	109	107	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04
NORTH TRAVIS COUNTY MUD #5	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	0	514	792	1,045	1,196	0	0	TCEQ database shows MUD as annexed by Pflugerville 2/8/05 (Met Demand from Pflugerville supplies)
NORTH TRAVIS COUNTY MUD #5	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	314	0	0	0	0	0	0	TCEQ database shows MUD as annexed by Pflugerville 2/8/05 (Met Demand from Pflugerville supplies)
PFLUGERVILLE	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	0	11,486	11,208	10,955	10,804	0	0	Supply Estimate based on LCRA 4/9/04 (12000 reduced by North Travis County MUD 5)
PFLUGERVILLE	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	10,887	0	0	0	0	0	0	COA email 2/18/04; COA contract expires 12/31/07 and is replaced with LCRA contract (11201 reduced by North Travis County MUD 5)
PFLUGERVILLE	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	0	0	0	0	0	0	0	Supply reduced from estimated from City of Pflugerville Update due to other supplies and reduction of Edwards-BFZ in Travis County Colorado Basin 2/7/05
RIVER PLACE ON LAKE AUSTIN	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	900	900	0	0	0	0	0	New WUG: Supply Estimate based on LCRA 4/9/04
ROLLINGWOOD	TRAVIS	COLORADO	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	1,120	1,120	1,120	1,120	0	0	0	Supply Estimate based on COA email 2/18/04
ROUND ROCK	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	108	0	0	0	0	0	0	New WUG: COA email 2/18/04. Proportioned by Region
ROUND ROCK	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	213	241	266	264	240	223	210	New WUG: Supply estimated from TCEQ well production capacities and proportioned for percent total demand. 1/14/05
SHADY HOLLOW MUD	TRAVIS	COLORADO	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	763	747	731	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04
THE HILLS	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	1,600	1,600	1,600	0	0	0	0	New WUG: Supply Estimate based on LCRA 4/9/04
TRAVIS COUNTY WCID #17	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	9,354	9,354	8,800	8,800	8,800	8,800	0	New WUG: Supply Estimate based on LCRA revised data. 2/2/05
TRAVIS COUNTY WCID #18	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	1,400	1,400	0	0	0	0	0	New WUG: Supply Estimate based on LCRA 4/9/04
TRAVIS COUNTY WCID #19	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	293	376	374	0	0	0	0	New WUG: Supply based on demand and Travis County WCID No. 19 9/20/04 (supplied by Travis County MUD #4 which is contained in Travis County Other)
TRAVIS COUNTY WCID #20	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	1,135	1,135	1,135	0	0	0	0	New WUG: Supply Estimate based on LCRA revised data. 2/2/05
WELLS BRANCH MUD	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	1,527	1,508	1,490	0	0	0	0	New WUG Name: Supply Estimate based on COA email 2/18/04
WEST LAKE HILLS	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	2,420	2,420	2,420	0	0	0	0	2001 Plan; Supplied by Travis County Water District #10, which is included in County-Other
WEST TRAVIS COUNTY REGIONAL WS	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	3,411	2,733	2,345	1,947	1,607	1,196	853	New WUG: Supply Estimate based on LCRA. Retail supplies to various WUGs have been subtracted out. 2/10/05
WILLIAMSON-TRAVIS COUNTY MUD #1	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	482	482	0	0	0	0	0	New WUG: Supply based on Williamson-Travis Counties MUD No. 1 (supplied by Cedar Park)
WINDERMERE UTILITY COMPANY	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	2,240	2,240	2,240	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04
WINDERMERE UTILITY COMPANY	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	0	0	0	0	0	0	0	New WUG: Supply reduced from estimated from Windermere Utility Co. numbers due to other supplies and reduction of Edwards-BFZ in Travis County Colorado Basin 2/7/05
IRRIGATION	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	187	187	187	187	187	187	187	Reduced 2001 Plan value to account for reduction in available Edwards-BFZ supply to Travis County Colorado Basin 2/7/05
IRRIGATION	TRAVIS	COLORADO	K	Travis	Colorado	227996	Irrigation Local Supply	880	880	880	880	880	880	880	2001 Plan: TWDB
IRRIGATION	TRAVIS	COLORADO	K	Travis	Brazos	22711	Edwards-BFZ	5	5	5	5	5	5	5	New WUG Basin: AllocFile10 9/24/99
IRRIGATION	TRAVIS	COLORADO	K	Travis	Colorado	22728	Trinity	85	85	85	85	85	70	70	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	TRAVIS	COLORADO	K	Travis	Brazos	22711	Edwards-BFZ	1	1	1	1	1	1	1	New WUG Basin: AllocFile10 9/24/99
LIVESTOCK	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	186	186	186	186	186	186	186	Reduced 2001 Plan value to account for reduction in available Edwards-BFZ supply to Travis County Colorado Basin 2/7/05
LIVESTOCK	TRAVIS	COLORADO	K		Colorado	14997	Livestock Local Supply	870	870	870	870	870	870	870	2001 Plan: LCRA provided data and Demand
LIVESTOCK	TRAVIS	COLORADO	K	Travis	Colorado	22728	Trinity	2	2	2	2	2	1	1	2001 Plan: AllocFile10 9/24/99
LIVESTOCK	TRAVIS	GUADALUPE	K		Guadalupe	18997	Livestock Local Supply	36	36	36	36	36	36	36	2001 Plan: A-ALL, Demand
MANUFACTURING	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	167	167	167	167	167	167	167	2001 Plan: AllocFile10 9/24/99
MANUFACTURING	TRAVIS	COLORADO	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	12,943	18,578	23,081	32,504	43,680	50,168	56,472	Based on COA meeting 1/28/05 (portion of demand)
MANUFACTURING	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	910	0	0	0	0	0	0	Supply Estimate based on revised LCRA data. 2/2/05

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
MINING	TRAVIS	COLORADO	K		Colorado	14999	Other Local Supply	4,834	4,700	5,200	5,745	6,361	7,070	7,070	Revised 2001 number by 46 ac-ft/yr since supply was over allocated 2/7/05
MINING	TRAVIS	COLORADO	K	Travis	Colorado	22711	Edwards-BFZ	187	187	187	187	187	187	187	Reduced 2001 Plan value to account for reduction in available Edwards-BFZ supply to Travis County Colorado Basin 2/7/05
MINING	TRAVIS	COLORADO	K	Travis	Colorado	22728	Trinity	171	171	171	171	171	140	140	2001 Plan: AllocFile10 9/24/99
STEAM ELECTRIC POWER	TRAVIS	COLORADO	K		Colorado	140B0	Highland Lakes	30,860	23,896	23,251	23,251	23,251	23,251	23,251	Region K WAM Run 3 Cutoff (firms up Town Lake and Decker supply)
STEAM ELECTRIC POWER	TRAVIS	COLORADO	K		Colorado	3461405471A-SE	City of Austin - ROR (Steam Elec.)	5,283	14,894	14,894	14,894	14,894	14,894	14,894	Region K WAM Run 3 Cutoff; Town Lake
STEAM ELECTRIC POWER	TRAVIS	COLORADO	K		Colorado	3461405489A-SE	City of Austin - ROR (Steam Elec.)	2,904	99	744	744	744	744	744	Region K WAM Run 3 Cutoff; Decker
STEAM ELECTRIC POWER	TRAVIS	COLORADO	K	Travis	Colorado	22728	Trinity	3	3	3	3	3	3	3	2001 Plan: AllocFile10 9/24/99
STEAM ELECTRIC POWER	TRAVIS	GUADALUPE						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
COUNTY-OTHER	WHARTON	BRAZOS-COLORADO	K	Wharton	Brazos-Colorado	24115	Gulf Coast	5,869	5,869	5,869	5,869	5,869	5,869	5,869	2001 Plan: A-ALL, 100% reduced
COUNTY-OTHER	WHARTON	COLORADO	K	Wharton	Colorado	24115	Gulf Coast	1,106	1,106	1,106	1,106	1,106	1,106	1,106	2001 Plan: A-ALL, % & Tbl 4
COUNTY-OTHER	WHARTON	COLORADO-LAVACA	K	Wharton	Colorado-Lavaca	24115	Gulf Coast	299	299	299	299	299	299	299	2001 Plan: A-ALL, % & Tbl 4
WHARTON	WHARTON	BRAZOS-COLORADO	K	Wharton	Brazos-Colorado	24115	Gulf Coast	5,636	5,636	5,636	5,636	5,636	5,636	5,636	2001 Plan: 2/3 OF DEMAND
WHARTON	WHARTON	COLORADO	K	Wharton	Colorado	24115	Gulf Coast	540	540	540	540	540	540	540	2001 Plan: 1/3 OF DEMAND
IRRIGATION	WHARTON	BRAZOS-COLORADO	K		Colorado	3461405434A	LCRA - Garwood ROR	18,267	21,275	21,275	21,275	21,275	21,275	21,275	Region K WAM Run 3 Cutoff; 30% of Garwood ROR water in a minimum year (LCRA) split between 3 basins.
IRRIGATION	WHARTON	BRAZOS-COLORADO	K	Wharton	Brazos-Colorado	24115	Gulf Coast	25,816	25,816	25,816	25,816	25,816	25,816	25,816	2001 Plan: Demand
IRRIGATION	WHARTON	BRAZOS-COLORADO	K	Wharton	Brazos-Colorado	241996	Irrigation Local Supply	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2001 Plan: TWDB
IRRIGATION	WHARTON	BRAZOS-COLORADO	K		Colorado	3461405477	LCRA - Pierce Ranch ROR	5,868	7,692	7,692	7,692	7,692	7,692	7,692	Region K WAM Run 3 Cutoff; Pierce Ranch ROR split by basin.
IRRIGATION	WHARTON	COLORADO	K		Colorado	3461405434A	LCRA - Garwood ROR	9,483	11,045	11,045	11,045	11,045	11,045	11,045	Region K WAM Run 3 Cutoff; 30% of Garwood ROR water in a minimum year (LCRA) split between 3 basins.
IRRIGATION	WHARTON	COLORADO	K	Wharton	Colorado	24115	Gulf Coast	29,567	29,567	29,567	29,567	29,567	29,567	29,567	2001 Plan: Demand
IRRIGATION	WHARTON	COLORADO	K	Wharton	Colorado	241996	Irrigation Local Supply	7,650	7,650	7,650	7,650	7,650	7,650	7,650	2001 Plan: TWDB
IRRIGATION	WHARTON	COLORADO	K		Colorado	3461405477	LCRA - Pierce Ranch ROR	3,047	3,994	3,994	3,994	3,994	3,994	3,994	Region K WAM Run 3 Cutoff; Pierce Ranch ROR split by basin.
IRRIGATION	WHARTON	COLORADO-LAVACA	K		Colorado	3461405434A	LCRA - Garwood ROR	5,772	6,722	6,722	6,722	6,722	6,722	6,722	Region K WAM Run 3 Cutoff; 30% of Garwood ROR water in a minimum year (LCRA) split between 3 basins.
IRRIGATION	WHARTON	COLORADO-LAVACA	K	Wharton	Colorado-Lavaca	24115	Gulf Coast	7,060	7,060	7,060	7,060	7,060	7,060	7,060	2001 Plan: Demand
IRRIGATION	WHARTON	COLORADO-LAVACA	K		Colorado	3461405477	LCRA - Pierce Ranch ROR	1,854	2,430	2,430	2,430	2,430	2,430	2,430	Region K WAM Run 3 Cutoff; Pierce Ranch ROR split by basin.
LIVESTOCK	WHARTON	BRAZOS-COLORADO	K	Wharton	Brazos-Colorado	24115	Gulf Coast	222	222	222	222	222	222	222	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	WHARTON	BRAZOS-COLORADO	K		Brazos-Colorado	13997	Livestock Local Supply	149	149	149	149	149	149	149	2001 Plan: LCRA Provided data
LIVESTOCK	WHARTON	COLORADO	K		Colorado	14997	Livestock Local Supply	115	115	115	115	115	115	115	2001 Plan: LCRA Provided data
LIVESTOCK	WHARTON	COLORADO	K	Wharton	Colorado	24115	Gulf Coast	171	171	171	171	171	171	171	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	WHARTON	COLORADO-LAVACA	K	Wharton	Colorado-Lavaca	24115	Gulf Coast	113	113	113	113	113	113	113	2001 Plan: A-ALL, % & Tbl 4
LIVESTOCK	WHARTON	COLORADO-LAVACA	K		Colorado-Lavaca	15997	Livestock Local Supply	74	74	74	74	74	74	74	2001 Plan: LCRA Provided data
MANUFACTURING	WHARTON	BRAZOS-COLORADO	K	Wharton	Brazos-Colorado	24115	Gulf Coast	90	90	90	90	90	90	90	2001 Plan: A-ALL, % & Tbl 4
MANUFACTURING	WHARTON	COLORADO	K	Wharton	Colorado	24115	Gulf Coast	335	335	335	335	335	335	335	2001 Plan: A-ALL, % & Tbl 4
MANUFACTURING	WHARTON	COLORADO-LAVACA	K	Wharton	Colorado-Lavaca	24115	Gulf Coast	165	165	165	165	165	165	165	2001 Plan: A-ALL, % & Tbl 4
MINING	WHARTON	BRAZOS-COLORADO	K		Brazos-Colorado	13999	Other Local Supply	1,655	1,696	1,746	1,793	1,844	1,900	1,900	2001 Plan: LCRA Provided data
MINING	WHARTON	BRAZOS-COLORADO	K	Wharton	Brazos-Colorado	24115	Gulf Coast	850	850	850	850	850	850	850	2001 Plan: A-ALL, % & Tbl 4
MINING	WHARTON	COLORADO	K	Wharton	Colorado	24115	Gulf Coast	1,005	1,005	1,005	1,005	1,005	1,005	1,005	2001 Plan: A-ALL, % & Tbl 4
MINING	WHARTON	COLORADO-LAVACA	K	Wharton	Colorado-Lavaca	24115	Gulf Coast	23	23	23	23	23	23	23	2001 Plan: A-ALL, % & Tbl 4
STEAM ELECTRIC POWER	WHARTON	BRAZOS-COLORADO						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply
STEAM ELECTRIC POWER	WHARTON	COLORADO	K		Brazos-Colorado	3461303421	San Bernard ROR	1,600	1,600	1,600	1,600	1,600	1,600	1,600	New WUG: Based on TCEQ water rights database; Reliability of WR has not been verified 2/8/05
STEAM ELECTRIC POWER	WHARTON	COLORADO-LAVACA						0	0	0	0	0	0	0	New WUG: 0 Demand, therefore 0 Supply

Region K Water Supply Table (by WUG and water source)

WUG Name	WUG County	WUG Basin	RWPG Water Source	Water Source County Name	Water Source Basin Name	Specific Source Identifier	Specific Source Name	Year 2000 SUPPLY (ac-ft/yr)	Year 2010 SUPPLY (ac-ft/yr)	Year 2020 SUPPLY (ac-ft/yr)	Year 2030 SUPPLY (ac-ft/yr)	Year 2040 SUPPLY (ac-ft/yr)	Year 2050 SUPPLY (ac-ft/yr)	Year 2060 SUPPLY (ac-ft/yr)	Source of Data*
ANDERSON MILL MUD	WILLIAMSON	BRAZOS	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	1,504	0	0	0	0	0	0	New WUG Name: Supply Estimate based on COA 1/28/05 (Demand)
AUSTIN	WILLIAMSON	BRAZOS	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	2,315	3,993	5,964	8,286	10,786	13,479	16,338	New WUG Basin: Supply Estimate based on OLD basin 2/21/04 (Met Demand)
AUSTIN	WILLIAMSON	BRAZOS	K		Colorado	3461405489A	City of Austin - ROR (Municipal)	0	0	0	0	0	0	0	New WUG Basin: Supply Estimate based on OLD basin 2/21/04
AUSTIN	WILLIAMSON	BRAZOS	K		Colorado	140B0	Highland Lakes	0	0	0	0	0	0	0	New WUG Basin: Supply Estimate based on OLD basin 2/21/04
COUNTY-OTHER	WILLIAMSON	BRAZOS	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	2,123	2,401	2,729	3,118	3,536	3,989	4,469	New WUG Basin: Supply Estimate based on COA meeting 1/28/05 (Met Demand)
COUNTY-OTHER	WILLIAMSON	BRAZOS	K	Williamson	Brazos	24628	Trinity	45	49	53	57	58	58	58	New WUG Basin: Supply available to Trinity aquifer in Williamson County, Brazos basin minus Mining Demand. 2/7/05
COUNTY-OTHER	WILLIAMSON	BRAZOS	K	Williamson	Brazos	24611	Edwards-BFZ	265	265	265	265	265	265	265	New WUG Basin: Supply available to Edwards-BFZ aquifer in Williamson County, Brazos basin. 2/7/05
NORTH AUSTIN MUD #1	WILLIAMSON	BRAZOS	K		Colorado	3461405471A	City of Austin - ROR (Municipal)	1,007	983	968	0	0	0	0	New WUG: Supply Estimate based on COA email 2/18/04
IRRIGATION	WILLIAMSON	BRAZOS						0	0	0	0	0	0	0	New WUG Basin: 0 Demand, therefore 0 Supply
LIVESTOCK	WILLIAMSON	BRAZOS						0	0	0	0	0	0	0	New WUG Basin: 0 Demand, therefore 0 Supply
MANUFACTURING	WILLIAMSON	BRAZOS						0	0	0	0	0	0	0	New WUG Basin: 0 Demand, therefore 0 Supply
MINING	WILLIAMSON	BRAZOS	K	Williamson	Brazos	24628	Trinity	13	9	5	1	0	0	0	New WUG Basin: Met Demand.
MINING	WILLIAMSON	BRAZOS	K	Williamson	Brazos	24611	Edwards-BFZ	0	0	0	0	0	0	0	New WUG Basin
STEAM ELECTRIC POWER	WILLIAMSON	BRAZOS						0	0	0	0	0	0	0	New WUG Basin: 0 Demand, therefore 0 Supply
								1,189,506	1,166,902	1,149,913	1,126,605	1,119,947	1,089,900	1,081,097	

BSEACD = Barton Springs Edwards Aquifer Conservation District
TWDB = Texas Water Development Board
A-ALL = TWDB allocation tables
LIMIT = Volume limitation based on TWDB allocation
% & Tbl 4 = Percent of available supply identified in 2001 Region K Table 4 based on TWDB allocation
LCRA = Lower Colorado River Authority (modeling results or contract amounts)
2001 Plan: Demand = Based on historic use
COA = City of Austin
Hill Country UWCD = Hill Country Underground Conservation District
TCEQ = Texas Commission on Environmental Quality
WUG = Water User Group

APPENDIX D

REVISED SHORTAGE ANALYSIS TABLES

Bastrop Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	0	0	(1,725)	(3,579)	(5,852)	(13,741)	(20,205)
(No. of) WUGs	*0*	*0*	*2*	*4*	*6*	*9*	*10*
Irrigation	(355)	(119)	(50)	(40)	(31)	(24)	(17)
WUGs	*2*	*2*	*1*	*1*	*1*	*1*	*1*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	(6)	(8)	(17)	(28)	(38)	(46)	(60)
WUGs	*1*	*1*	*2*	*2*	*2*	*2*	*2*
Mining	0	(4,293)	(4,297)	(4,298)	0	0	0
WUGs	*0*	*1*	*1*	*1*	*0*	*0*	*0*
Steam Electric	0	0	0	0	(4,030)	(8,750)	(8,750)
WUGs	*0*	*0*	*0*	*0*	*1*	*1*	*1*
TOTAL	**(361)**	**(4,420)**	**(6,089)**	**(7,945)**	**(9,951)**	**(22,561)**	**(29,032)**
WUGs	***3***	***4***	***6***	***8***	***10***	***13***	***14***

Blanco Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(44)	(122)	(169)	(192)	(210)	(233)	(263)
(No. of) WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Irrigation	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	(1)	(1)	(1)	(1)	(1)	(1)	(1)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**(45)**	**(123)**	**(170)**	**(193)**	**(211)**	**(234)**	**(264)**
WUGs	***2***	***2***	***2***	***2***	***2***	***2***	***2***

Burnet Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(55)	(907)	(1,945)	(4,473)	(5,434)	(7,837)	(9,199)
(No. of) WUGs	*5*	*6*	*7*	*9*	*9*	*10*	*10*
Irrigation	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	(23)	(23)	(23)	(23)	(23)	(23)	(23)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Manufacturing	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Mining	(437)	(688)	(766)	(800)	(833)	(853)	(898)
WUGs	*1*	*2*	*2*	*2*	*2*	*2*	*2*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**(515)**	**(1,618)**	**(2,734)**	**(5,296)**	**(6,290)**	**(8,713)**	**(10,120)**
WUGs	***7***	***9***	***10***	***12***	***12***	***13***	***13***

Colorado Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(100)	(105)	(109)	(106)	(97)	(93)	(90)
(No. of) WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Irrigation	(62,060)	(49,300)	(42,090)	(35,089)	(28,312)	(21,723)	(15,416)
WUGs	*2*	*2*	*2*	*2*	*2*	*2*	*2*
Livestock	(25)	(25)	(25)	(25)	(25)	(25)	(25)
WUGs	*2*	*2*	*2*	*2*	*2*	*2*	*2*
Manufacturing	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Mining	0	(8,569)	(8,079)	(7,246)	(6,111)	(4,692)	(4,867)
WUGs	*0*	*3*	*3*	*3*	*3*	*3*	*3*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**(62,185)**	**(57,999)**	**(50,303)**	**(42,466)**	**(34,545)**	**(26,533)**	**(20,398)**
WUGs	***5***	***8***	***8***	***8***	***8***	***8***	***8***

Fayette Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(75)	(245)	(581)	(864)	(1,124)	(1,600)	(2,099)
(No. of) WUGs	*3*	*2*	*5*	*5*	*6*	*7*	*6*
Irrigation	(23)	(20)	(18)	(16)	(14)	(12)	(10)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Livestock	(22)	(22)	(22)	(22)	(22)	(22)	(22)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Manufacturing	(2)	(45)	(70)	(94)	(117)	(137)	(162)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Mining	0	0	(4)	(22)	(28)	(29)	(29)
WUGs	*0*	*0*	*1*	*1*	*1*	*1*	*1*
Steam Electric	0	0	(332)	(9,632)	(20,972)	(20,972)	(26,882)
WUGs	*0*	*0*	*1*	*1*	*1*	*1*	*1*
TOTAL	**(122)**	**(332)**	**(1,027)**	**(10,650)**	**(22,277)**	**(22,772)**	**(29,204)**
WUGs	***6***	***5***	***10***	***10***	***11***	***12***	***11***

Gillespie Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	0	0	0	0	0	0	0
(No. of) WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Irrigation	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**
WUGs	***0***	***0***	***0***	***0***	***0***	***0***	***0***

Hays Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	0	(2,066)	(5,270)	(7,782)	(10,334)	(15,952)	(18,446)
(No. of) WUGs	*0*	*5*	*5*	*5*	*5*	*5*	*5*
Irrigation	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	0	0	0	(6)	(126)	(234)	(333)
WUGs	*0*	*0*	*0*	*1*	*1*	*1*	*1*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**0**	**(2,066)**	**(5,270)**	**(7,788)**	**(10,460)**	**(16,186)**	**(18,779)**
WUGs	***0***	***5***	***5***	***6***	***6***	***6***	***6***

Llano Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(724)	(918)	(973)	(962)	(1,051)	(2,328)	(2,736)
(No. of) WUGs	*1*	*1*	*2*	*2*	*2*	*3*	*4*
Irrigation	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	(62)	(62)	(62)	(62)	(62)	(62)	(62)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Manufacturing	(2)	(3)	(3)	(3)	(3)	(3)	(3)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**(788)**	**(983)**	**(1,038)**	**(1,027)**	**(1,116)**	**(2,393)**	**(2,801)**
WUGs	***3***	***3***	***4***	***4***	***4***	***5***	***6***

Matagorda Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(2)	(2)	(2)	(2)	(2)	(2)	(2)
(No. of) WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Irrigation	(110,374)	(126,742)	(121,053)	(114,334)	(107,897)	(101,703)	(95,731)
WUGs	*3*	*3*	*3*	*3*	*3*	*3*	*3*
Livestock	(56)	(56)	(56)	(56)	(56)	(56)	(56)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Manufacturing	0	0	(4,479)	(8,439)	(9,134)	(12,507)	(13,515)
WUGs	*0*	*0*	*2*	*2*	*2*	*2*	*2*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	(240)	(248)	(22,728)	(22,728)	(22,728)	(22,368)
WUGs	*0*	*1*	*1*	*1*	*1*	*1*	*1*
TOTAL	**(110,432)**	**(127,040)**	**(125,838)**	**(145,559)**	**(139,817)**	**(136,996)**	**(131,672)**
WUGs	***5***	***6***	***8***	***8***	***8***	***8***	***8***

Mills Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(366)	(501)	(514)	(521)	(519)	(510)	(502)
(No. of) WUGs	*2*	*2*	*2*	*3*	*3*	*3*	*3*
Irrigation	(404)	(339)	(275)	(241)	(180)	(193)	(186)
WUGs	*2*	*2*	*2*	*2*	*2*	*1*	*1*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	(1)	(1)	(1)	(1)	(1)	(1)	(1)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**(771)**	**(841)**	**(790)**	**(763)**	**(700)**	**(704)**	**(689)**
WUGs	***5***	***5***	***5***	***6***	***6***	***5***	***5***

San Saba Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	0	0	0	0	(3)	(3)	(5)
(No. of) WUGs	*0*	*0*	*0*	*0*	*1*	*1*	*1*
Irrigation	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**0**	**0**	**0**	**0**	**(3)**	**(3)**	**(5)**
WUGs	***0***	***0***	***0***	***0***	***1***	***1***	***1***

Travis Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(374)	(3,444)	(7,915)	(26,505)	(29,579)	(58,309)	(104,181)
(No. of) WUGs	*4*	*10*	*15*	*25*	*26*	*33*	*34*
Irrigation	(135)	(124)	(114)	(105)	(97)	(89)	(82)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	(2,159)	(4,257)	(5,046)	(5,837)	(6,636)	(7,368)	(8,013)
WUGs	*1*	*1*	*1*	*1*	*1*	*1*	*1*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**(2,668)**	**(7,825)**	**(13,075)**	**(32,447)**	**(36,312)**	**(65,766)**	**(112,276)**
WUGs	***6***	***12***	***17***	***27***	***28***	***35***	***36***

Wharton Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	0	0	0	(4)	(4)	0	0
(No. of) WUGs	*0*	*0*	*0*	*1*	*1*	*0*	*0*
Irrigation	(74,857)	(58,218)	(53,525)	(48,997)	(44,636)	(40,429)	(24,462)
WUGs	*3*	*2*	*2*	*2*	*2*	*2*	*2*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	0	0	0	0	0	0	(8)
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*1*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**(74,857)**	**(58,218)**	**(53,525)**	**(49,001)**	**(44,640)**	**(40,429)**	**(24,470)**
WUGs	***3***	***2***	***2***	***3***	***3***	***2***	***3***

Williamson Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	0	(1,464)	(1,434)	(2,357)	(2,303)	(2,275)	(2,275)
(No. of) WUGs	*0*	*1*	*1*	*2*	*2*	*2*	*2*
Irrigation	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Livestock	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Manufacturing	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Mining	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Steam Electric	0	0	0	0	0	0	0
WUGs	*0*	*0*	*0*	*0*	*0*	*0*	*0*
TOTAL	**0**	**(1,464)**	**(1,434)**	**(2,357)**	**(2,303)**	**(2,275)**	**(2,275)**
WUGs	***0***	***1***	***1***	***2***	***2***	***2***	***2***

Region K Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	(1,740)	(9,774)	(20,637)	(47,347)	(56,512)	(102,883)	(160,003)
(No. of) WUGs	*18*	*30*	*42*	*59*	*64*	*76*	*78*
Irrigation	(248,208)	(234,862)	(217,125)	(198,822)	(181,167)	(164,173)	(135,904)
WUGs	*14*	*13*	*12*	*12*	*12*	*11*	*11*
Livestock	(188)	(188)	(188)	(188)	(188)	(188)	(188)
WUGs	*6*	*6*	*6*	*6*	*6*	*6*	*6*
Manufacturing	(2,171)	(4,315)	(9,617)	(14,409)	(16,056)	(20,297)	(22,096)
WUGs	*6*	*6*	*9*	*10*	*10*	*10*	*11*
Mining	(437)	(13,550)	(13,146)	(12,366)	(6,972)	(5,574)	(5,794)
WUGs	*1*	*6*	*7*	*7*	*6*	*6*	*6*
Steam Electric	0	(240)	(580)	(32,360)	(47,730)	(52,450)	(58,000)
WUGs	*0*	*1*	*2*	*2*	*3*	*3*	*3*
TOTAL	**(252,744)**	**(262,929)**	**(261,293)**	**(305,492)**	**(308,625)**	**(345,565)**	**(381,985)**
WUGs	***45***	***62***	***78***	***96***	***101***	***112***	***115***

Region K Surplus/Shortage

	2000	2010	2020	2030	2040	2050	2060
Municipal (ac-ft)	259,851	224,929	159,228	80,484	21,827	(56,032)	(116,620)
Irrigation	(216,241)	(200,145)	(179,032)	(157,438)	(136,613)	(116,578)	(80,646)
Livestock	15,935	15,935	15,935	15,874	15,874	15,781	15,781
Manufacturing	12,854	8,513	(1,724)	(6,624)	(8,286)	(12,464)	(14,484)
Mining	12,933	(2,414)	(1,621)	(380)	6,285	8,269	7,975
Steam Electric	99,839	42,043	38,663	681	(16,655)	(25,676)	(32,591)
TOTAL	**185,171**	**88,861**	**31,449**	**(67,403)**	**(117,568)**	**(186,700)**	**(220,585)**

Region K Surplus/Shortage

	2000	2010	2020	2030	2040	2050	2060
Bastrop (ac-ft)	27,180	15,316	8,789	3,066	(955)	(13,985)	(20,654)
Blanco	3,558	3,405	3,255	3,133	3,034	2,661	2,496
Burnet	15,061	13,337	11,636	7,426	2,049	(666)	(2,547)
Colorado	(55,154)	(50,078)	(41,267)	(32,294)	(23,233)	(14,133)	(7,010)
Fayette	28,014	5,619	4,454	(5,393)	(17,157)	(17,806)	(24,451)
Gillespie	6,569	6,019	5,476	5,330	5,397	5,433	5,414
Hays	3,663	(223)	(3,537)	(6,164)	(8,833)	(14,567)	(17,160)
Llano	26,052	26,054	24,952	24,830	24,576	22,965	22,293
Matagorda	(68,350)	(108,577)	(112,422)	(132,217)	(126,450)	(123,558)	(118,179)
Mills	(63)	(121)	(85)	(210)	(140)	(298)	(225)
San Saba	30,774	30,856	30,941	31,029	31,115	31,218	31,303
Travis	227,704	191,873	137,530	67,030	19,899	(42,947)	(92,996)
Wharton	(60,147)	(43,469)	(37,157)	(30,934)	(24,890)	(19,065)	3,083
Williamson	310	(1,150)	(1,116)	(2,035)	(1,980)	(1,952)	(1,952)
TOTAL	**185,171**	**88,861**	**31,449**	**(67,403)**	**(117,568)**	**(186,700)**	**(220,585)**

Region K Shortage

	2000	2010	2020	2030	2040	2050	2060
Bastrop (ac-ft)	(361)	(4,420)	(6,089)	(7,945)	(9,951)	(22,561)	(29,032)
Blanco	(45)	(123)	(170)	(193)	(211)	(234)	(264)
Burnet	(515)	(1,618)	(2,734)	(5,296)	(6,290)	(8,713)	(10,120)
Colorado	(62,185)	(57,999)	(50,303)	(42,466)	(34,545)	(26,533)	(20,398)
Fayette	(122)	(332)	(1,027)	(10,650)	(22,277)	(22,772)	(29,204)
Gillespie	0	0	0	0	0	0	0
Hays	0	(2,066)	(5,270)	(7,788)	(10,460)	(16,186)	(18,779)
Llano	(788)	(983)	(1,038)	(1,027)	(1,116)	(2,393)	(2,801)
Matagorda	(110,432)	(127,040)	(125,838)	(145,559)	(139,817)	(136,996)	(131,672)
Mills	(771)	(841)	(790)	(763)	(700)	(704)	(689)
San Saba	0	0	0	0	(3)	(3)	(5)
Travis	(2,668)	(7,825)	(13,075)	(32,447)	(36,312)	(65,766)	(112,276)
Wharton	(74,857)	(58,218)	(53,525)	(49,001)	(44,640)	(40,429)	(24,470)
Williamson	0	(1,464)	(1,434)	(2,357)	(2,303)	(2,275)	(2,275)
TOTAL	**(252,744)**	**(262,929)**	**(261,293)**	**(305,492)**	**(308,625)**	**(345,565)**	**(381,985)**

APPENDIX E

WATER AVAILABILITY COMPARISON

Water Availability Results Comparison

(From Surface Water Availability Modeling Only)

2001 Availability Value: LCRA Response Model (December 2000 Chapter 3 Table 3.19)

2006 Availability Value: WAM with "No Call" Assumption (No Return Flows & No Interruptible)

2008 Availability Value: Region K WAM Run 3 Cutoff Model

	2000 (ac-ft/yr)			**2010 (ac-ft/yr)**				**2020**				**2030**				**2040**				**2050**				**2060**			
2006 Water Source	2001 Plan	2006 WAM "No Call"	***Difference (2006 "No Call"-2001)***	2001 Plan	2006 WAM "No Call"	2008 Cutoff WAM	***Difference (2008 Cutoff-2006 "No-Call")***	2001 Plan	2006 WAM "No Call"	2008 Cutoff WAM	***Difference (2008 Cutoff-2006 "No-Call")***	2001 Plan	2006 WAM "No Call"	2008 Cutoff WAM	***Difference (2008 Cutoff-2006 "No-Call")***	2001 Plan	2006 WAM "No Call"	2008 Cutoff WAM	***Difference (2008 Cutoff-2006 "No-Call")***	2001 Plan	2006 WAM "No Call"	2008 Cutoff WAM	***Difference (2008 Cutoff-2006 "No-Call")***	2006 WAM "No Call"	2008 Cutoff WAM	***Difference (2008 Cutoff-2006 "No-Call")***	**Comment on Difference**
City of Austin - ROR Municipal	172,673	181,053	*8,380*	172,673	181,657	212,100	30,443	172,673	182,261	203,806	21,545	172,673	182,865	203,843	20,978	172,673	183,469	203,843	20,374	172,673	184,073	203,843	19,770	184,677	203,818	19,141	2008 CUTOFF VS. 2006 "NO CALL"
City of Austin - ROR Steam Electric	7,159	9,613	*2,454*	7,159	9,477	16,261	6,784	7,159	9,341	16,905	7,564	7,159	9,205	16,905	7,700	7,159	9,069	16,905	7,836	7,159	8,933	16,905	7,972	8,795	16,905	8,110	2008 CUTOFF VS. 2006 "NO CALL"
LCRA - Garwood ROR	50,000	111,740	*61,740*	50,000	111,740	130,141	18,401	50,000	111,740	130,141	18,401	50,000	130,141	130,141	-	50,000	130,141	130,141	-	50,000	130,141	130,141	-	130,141	130,141	-	2008 CUTOFF VS. 2006 "NO CALL"
LCRA - Gulf Coast ROR	-	74,137	*74,137*	-	74,124	44,827	(29,297)	-	74,111	43,540	(30,571)	-	74,098	43,540	(30,558)	-	74,085	43,540	(30,545)	-	74,072	43,540	(30,532)	74,056	43,540	(30,516)	2008 CUTOFF VS. 2006 "NO CALL"
LCRA - Lakeside #1 ROR	-	19,769	*19,769*	-	19,769	12,531	(7,238)	-	19,769	12,498	(7,271)	-	19,769	12,498	(7,271)	-	19,769	12,498	(7,271)	-	19,769	12,498	(7,271)	19,769	12,498	(7,271)	2008 CUTOFF VS. 2006 "NO CALL"
LCRA - Lakeside #2 ROR	4,232	10,769	*6,537*	4,232	10,769	10,440	(329)	4,232	10,769	10,440	(329)	4,232	10,769	10,440	(329)	4,232	10,769	10,440	(329)	4,232	10,769	10,440	(329)	10,769	10,440	(329)	2008 CUTOFF VS. 2006 "NO CALL"
LCRA - Pierce Ranch ROR	-	10,769	*10,769*	-	10,769	14,116	3,347	-	10,769	14,173	3,404	-	10,769	14,173	3,404	-	10,769	14,173	3,404	-	10,769	14,173	3,404	10,769	14,173	3,404	2008 CUTOFF VS. 2006 "NO CALL"
San Bernard ROR	-	1,600	*1,600*	-	1,600	1,600	-	-	1,600	1,600	-	-	1,600	1,600	-	-	1,600	1,600	-	-	1,600	1,600	-	1,600	1,600	-	Based on TCEQ water rights database; Reliability of WR has not been verified.
STP Nuclear Operating Co. ROR	41,320	49,089	*7,769*	41,320	49,039	51,811	2,772	41,320	48,989	46,349	(2,640)	41,320	48,939	46,349	(2,590)	41,320	48,889	46,349	(2,540)	41,320	48,839	46,349	(2,490)	48,791	46,349	(2,442)	2008 CUTOFF VS. 2006 "NO CALL"
Highland Lakes	445,766	382,924	*(62,842)*	445,766	381,545	402,106	20,561	445,766	380,166	388,627	8,461	445,766	378,787	382,310	3,523	445,766	377,408	376,710	(698)	445,766	376,029	370,710	(5,319)	374,642	365,194	(9,448)	2008 CUTOFF VS. 2006 "NO CALL"
Goldthwaite Reservoir	400	144	*(256)*	400	144	-	(144)	400	144	-	(144)	400	145	-	(145)	400	145	-	(145)	400	145	-	(145)	145	-	(145)	2008 CUTOFF VS. 2006 "NO CALL"
Lake Bastrop	1,000	-	*(1,000)*	1,000	-	-	-	1,000	-	-	-	1,000	-	-	-	1,000	-	-	-	1,000	-	-	-	-	-	-	Included as part of Highland Lakes
Lake Fayette	1,400	-	*(1,400)*	1,400	-	-	-	1,400	-	-	-	1,400	-	-	-	1,400	-	-	-	1,400	-	-	-	-	-	-	Included as part of Highland Lakes
Llano Reservoir	400	187	*(213)*	400	178	-	(178)	400	169	-	(169)	400	160	-	(160)	400	151	-	(151)	400	142	-	(142)	135	-	(135)	2008 CUTOFF VS. 2006 "NO CALL"
Walter E. Long (Decker Lake)	1,000	-	*(1,000)*	1,000	-	-	-	1,000	-	-	-	1,000	-	-	-	1,000	-	-	-	1,000	-	-	-	-	-	-	Included as part of Highland Lakes
Blanco Reservoir	300	596	*296*	300	596	596	-	300	596	596	-	300	596	596	-	300	596	596	-	300	596	596	-	596	596	-	RESPONSE VS. WAM

APPENDIX F

TWDB COMMENTS AND RESPONSES

ATTACHMENT 1

TWDB Contract No. 0704830696

Region K, Region-Specific Contract Study

1) **Surface Water Availability Modeling Study**
2) **Environmental Impacts of Water Management Strategies**
3) **Evaluation of High Growth Areas**

TWDB Comments on Draft Final Region-Specific Study Reports

Surface Water Availability Modeling Study

1. Page ES-1, the last paragraph states "overall, total availability increased slightly as compared to the 2006 Region K plan." However, the first paragraph on the next page indicates that availability in three sectors was unchanged, while the availability for municipal, irrigation, and steam-electric demands was "smaller" than in the 2006 plan. Please reconcile these two statements in the final report.

2. Page 3-2, the second paragraph refers to FNI, but does not define the term. Please define it in the final report.

3. It is difficult to find information in appendices A and B, then to relate the information to the main body of the report. Please consider adding an index to both appendices in the final report.

Environmental Impacts of Water Management Strategies

1. Interpretation of the study results is somewhat difficult because two different base models were used for "with" and "without" strategy comparisons (i.e. WAM Run 3 Cutoff Model and LSWP Model). Also, one or more strategies may have been incorporated in the "without" strategy (base) model used to evaluate other strategies. The report documents the necessity of conducting the analysis in this fashion but could be improved by making it explicitly clear which model was used and which strategies were incorporated in the base model for the analysis of each strategy. Please consider adding a clarifying sentence to the description of each strategy analysis in Chapter 3.0 Results (pp 3-1 to 3-50). For example, on page 3-2, the first paragraph could read (additions in *italics*): "This strategy involves the expansion of LCRA contracts to meet shortages. The increase in contract amounts should decrease interruptible supplies, and therefore, regulated streamflows downstream of the strategy." *For the analysis, the* (WAM Run 3 Cutoff Model or LSWP Model) *with the inclusion of strategies* (xxx) *was used for the base condition.*

2. Figure 3.1 on page 3-2 is titled "location of control points" but it seems to list only the major control points used in the study, as there are several other control

points referred to in the text that are not included in this or a similar figure. Please consider re-titling Figure 3.1 "location of major control points" and referencing the map in Exhibit B of all control points.

3. Strategies number 4 (pp. 3-13 through 3-15), 10 (pp. 3-38 through 3-40), and 11 (pp. 3-43 through 3-45) use four control points, but the contract scope of work states that five designated control points on the Colorado River and major tributaries will be used for a quantitative impact analysis. Likewise, strategy number 13 (pp. 3-48 through 3-49) only uses three control points. Please justify the deviation from the contract scope of work in the final report.

4. In the Executive Summary, an example of the detailed results of a single strategy is given. Please include a summary of the significant results of all the strategies in the final report.

5. Figures 3.2 – 3.19 beginning on page 3-6 show 58-year median flows with 10^{th} and 90^{th} percentile flows. The legend is shown on the x axis, which actually shows flow volumes in increments of 50,000 acre-feet per year. Please consider moving this legend to the y axis which shows median flows for each month of the year.

Evaluation of High Growth Areas

1. Please note that TWDB's acceptance of a final report for this study does not constitute approval of any revised population or water demand projections contained therein. The formal procedure for requesting revised projections is stated in TAC 357.5 (d) (2):
   "Before requesting a revision to the population and water demand projections, the regional water planning group shall discuss the issue at a public meeting for which notice has been posted pursuant to the Open Meetings Act in addition to being published on the internet and mailed at least 14 days before the meeting to every person or entity that has requested notice of regional water planning group activities. The public will be able to submit oral or written comment at the meeting and written comments for 14 days following the meeting. The regional water planning group will summarize the public comments received in its request for projection revisions. Within 45 days of receipt of a request from a regional water planning group for revision of population or water demand projections, the executive administrator shall consult with the requesting regional water planning group and respond to their request."

   All requested revisions which receive the consensus recommendation of the Texas Water Development Board, Texas Department of Agriculture, Texas Commission on Environmental Quality, and Texas Parks and Wildlife Department, will then be presented for consideration of Board approval at the next scheduled meeting.

2. Page 3-6, the first paragraph states that a population density of 150 persons per square mile was assumed but no explanation is provided. Please provide the rationale for this assumption in the final report.

3. Page 3-6, Table 3-6 includes the numerical difference between the State Data Center's estimated 1/1/07 population in the study area and the interpolated TWDB estimates for the same time period. In addition to the numerical difference between the projections, please consider including the percentage difference as well.

4. Page 3-7, Table 3.7 lists the "CAMPO" growth estimates for 2035 compared with the 2006 Region K plan estimates. For areas where they don't agree (Manor and Mustang Ridge), suggested increases were made to the projections by subtracting from county-other, but no explanation or methodology for the selected projections is provided. Please provide the rationale for these assumptions in the final report.

Response to TWDB Comments on Draft Final Region-Specific Study Reports (4/07/09)

Surface Water Availability Modeling Study

1. Page ES-1, the last paragraph states "overall, total availability increased slightly as compared to the 2006 Region K plan." However, the first paragraph on the next page indicates that availability in three sectors was unchanged, while the availability for municipal, irrigation, and steam-electric demands was "smaller" than in the 2006 plan. Please reconcile these two statements in the final report.

   Response: Agreed. In some places, the word "supply" should have been used instead of "availability". The referenced paragraph and the appropriate places in Section 3.0 will be revised to provide necessary clarification.

2. Page 3-2, the second paragraph refers to FNI, but does not define the term. Please define it in the final report.

   Response: Agreed. The term will be defined.

3. It is difficult to find information in appendices A and B, then to relate the information to the main body of the report. Please consider adding an index to both appendices in the final report.

   Response: Agreed. An index for Appendices A, B, and C will be added along with page numbers.